MOOERS LANDFILL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

FINAL

WORK PLAN

NOVEMBER 1990

PREPARED FOR

CLINTON COUNTY HIGHWAY DEPARTMENT

LANDFILL DIVISION

Clinton County, New York

PREPARED BY

BARTON & LOGUIDICE, P.C.
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PROJECT NO. 244.19

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November 1, 1990

Mr. Brian H. Davidson
New York State Department of
Environmental Conservation
Division of Hazardous Waste
Remediation
50 Wolf Road
Albany, New York 12233-7010

Re: Mooers Landfill
RI/FS Work Plan and
Citizens Participation
Plan

File: 244.19

Dear Mr. Davidson:

Pursuant with your letter dated October 1, 1990, Barton & Loguidice, P.C., on behalf of Clinton County, has enclosed herewith the final Mooers Landfill Remedial Investigation/Feasibility Study Work Plan and ancillary documents including the Citizens Participation Program.

In addition, we have prepared a response reference checklist which addresses the NYSDEC comments pertaining to the final draft Work Plan documents submitted September 4, 1990. Both draft and final draft NYSDEC comments and the respective responses have been appended to this final Work Plan as Appendix C.

The Citizens Participation Program has been approved by Ms. Elizabeth Lowe, NYSDEC, Region 5, Citizen Participation Specialist.

If you have any further questions please feel free to contact me.

Very truly yours,

BARTON & LOGUIDICE, P.C.

Michael S. Quinn

Michael S. Quinn, P.E.
Project Engineer

MSQ/blh
cc: Mr. William Bingel

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WORK PLAN

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1.0 INTRODUCTION

Since the amount of hazardous contaminants disposed of at the Clinton County, Mooers Landfill, and the hydrogeologic condition which control the movement of these contaminants are largely unknown, a comprehensive Remedial Investigation/ Feasibility Study (RI/FS) is proposed. However, the proposed work plan is structured in a task-by-task progressive manner whereby individual tasks may be scaled back based on the results of the preceding tasks. Structured in this manner, the RI/FS will "tailor" the scope of work during project task implementation to include only those items which will add significantly to the database from which remedial alternatives are to be formulated.

The RI/FS will be conducted in general accordance with the U.S. EPA "Guidance on Remedial Investigations and Feasibility Studies Under CERCLA" (EPA/540/G-89/004 October, 1988) and relevant NYSDEC, Division of Hazardous Waste Remediation guidance. The RI will concentrate on characterizing site conditions, determining if surface or subsurface contamination has taken place and estimating potential exposure targets. A specific set of tasks will be performed to accomplish these goals, as discussed in Section 5.0. Based on the finding of the RI, a Supplemental RI may be implemented to address any issues found during the RI which are beyond the proposed scope of the Work Plan. The Supplemental RI will be scoped to provide detailed investigations to further define the potential human and environmental impacts and provide additional data for the feasibility study.

The Feasibility Study (FS) will evaluate methods to prevent, minimize or eliminate the release of hazardous substances from the site. Within this general framework,

emphasis will be placed on technically feasible, low cost solutions that are environmentally sound. The structure of the FS is two staged whereby an initial screening of the remedial alternatives will be conducted followed by a detailed analysis of selected remedial alternatives. The screening stage will enable those alternatives which are shown infeasible, or ineffective to be eliminated. The detailed analysis will enable the selected alternatives to be evaluated in more detail and culminate in a recommendation of the most appropriate site remediation methodology.

This document also comprises two ancillary documents which are appended. A Sampling and Analysis Plan (SAP) and Health and Safety Plan are provided in Appendix A and B respectively.

The SAP comprises a quality management plan and a data management plan. The quality management plan specifies the procedures for performing the investigation, sampling and laboratory analyses presented in the Work Plan and establishes quality control and quality assurance procedures to be used in the RI/FS. The data management plan establishes document control for the RI/FS including data documentation materials and procedures, project file requirements and report formats.

The Health and Safety Plan establishes procedures to provide for the health and safety of personnel performing the work and identifies the potential hazard to which personnel may be exposed.

2.0 BACKGROUND AND PHYSICAL SETTING

Background:

The Mooers Landfill Site is located on North Star Road in the Town of Mooers, Clinton County, New York. The landfill is part of a 145 acre parcel of land currently owned by the County. The actual landfilled footprint area is approximately 11.0 acres and has been owned and operated by Clinton County since the landfill opened in 1977. Landfill operations and fill progression have generally followed the fill progression methods and construction detailed in the Mooers Sanitary Landfill Operating Plan Drawings. Current operations are limited to filling above existing refuse (i.e., no expansion of footprint area). All refuse disposed of at the landfill is currently covered with daily and/or intermediate cover soil mined from an adjacent borrow pit.

Waste entering the landfill has been chiefly composed of mixed municipal waste from residents of northern Clinton County. Hazardous wastes have allegedly been disposed of in the landfill between 1979 and 1985. Disposal records from the County Highway Department were kept starting 1980. These records indicate that the waste volumes range from approximately 7,000 tons per year in 1980 to approximately 10,000 tons per year in 1989.

The County does not have specific daily records of hazardous waste types or volumes which entered and were disposed of in the landfill from potential principal responsible parties. Tonnage figures and names of haulers were recorded, specific descriptions of the contents of each load were not.

The NYSDEC has classified the Mooers Landfill as an inactive hazardous waste disposal site and has listed the site in the Registry of Inactive Hazardous Waste Disposal Sites in New York (No. 510005). The NYSDEC has determined that the site constitutes a significant threat to the environment. Accordingly, action is required to develop and implement a Remedial Investigation and Feasibility Study program (RI/FS) in order to abate and/or eliminate threats to the environment.

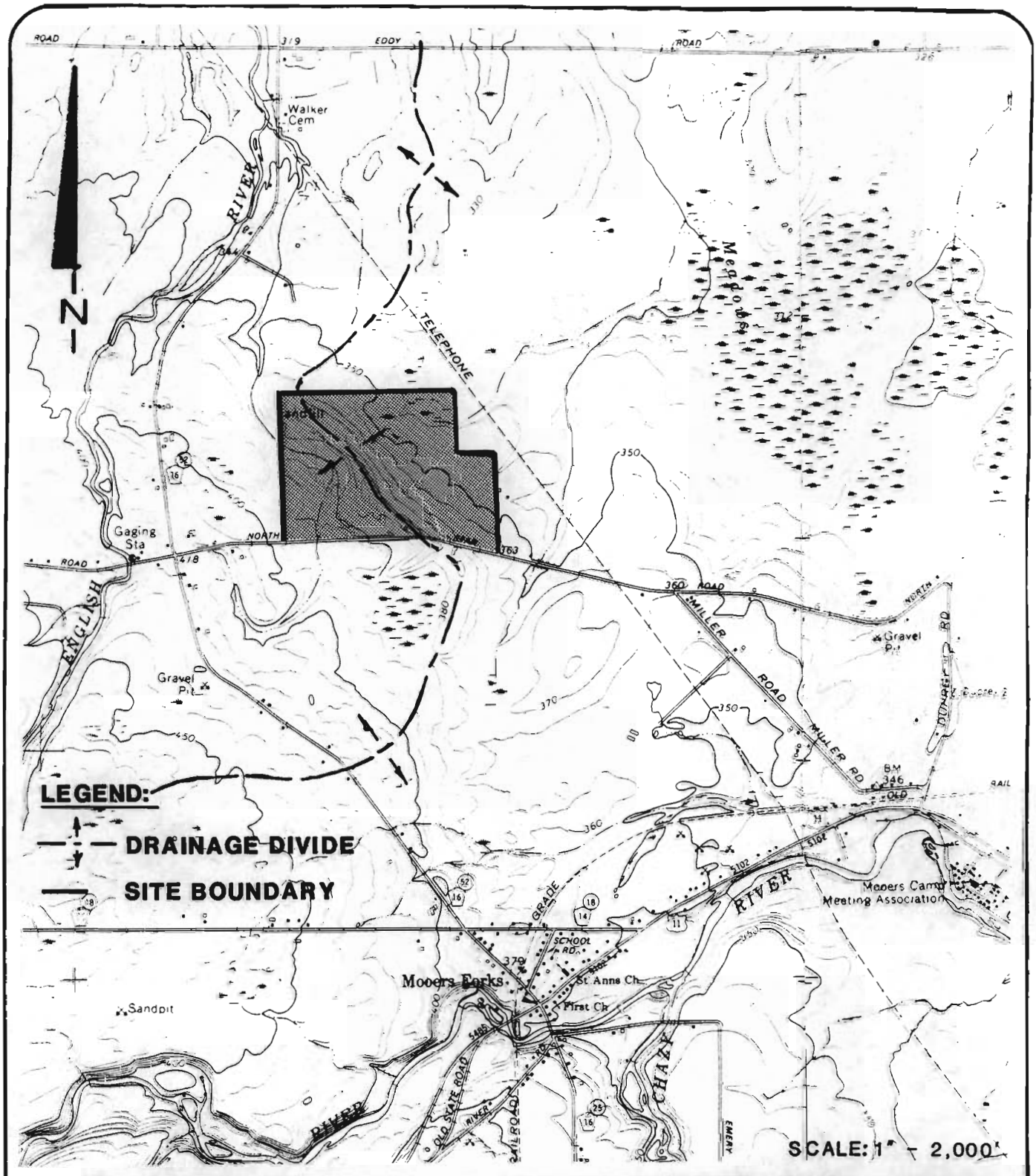
Physical Setting:

The Mooers Landfill is located on an elongated glacial diamic which trends northwest from approximately the entrance to the landfill facility. This geomorphological feature is approximately 3,500 feet long as it extends from the facility entrance to its northwest limits. This feature is bounded by a swamp directly south of the access road, an unnamed stream to the west and a densely forested flat lying area to the north and east. Maximum topographic relief of the diamic prior to landfill development was approximately 40 feet. Existing elevations resulting from landfill development will be established pending the completion of an aerial survey of the project site and vicinity.

The longitudinal axis of the diamic structure forms a drainage divide between the unnamed stream to the west and the forested area to the east. Drainage on the westward side and northern end of the landfill site flows to either the unnamed stream or a seasonal watercourse, both of which are tributary flows of the English River. Drainage on the east side of the landfill site enters several

watercourses which flow through the forested area east of the site and converge at a wetlands area (Beaver Meadows) which discharges to an unnamed stream that flows north to Eddy Road.

Figure 2-1 illustrates the topography and drainage patterns of the project site and vicinity. This figure is based on topography shown on NYSDOT, Altona and Mooers quadrangle maps revised in 1979.



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MOOERS SANITARY LANDFILL

SITE LOCATION

AND

DRAINAGE MAP

TOWN OF MOOERS CLINTON Co.

Figure **2-1**

Project No. **244.19**

3.0 INITIAL EVALUATION

3.1 General Site Conditions

An initial evaluation of general site conditions at the Mooers Landfill may be made based on site walkovers, drainage analysis and water quality testing results produced from several NYSDEC sampling events.

Walkovers undertaken by Barton & Loguidice engineers and geologist during August, 1989 and April, 1990 produced the following observations:

- The landfill cover soil is a sandy material with variable amounts of gravel and fines.

- Only one leachate seep was found and is located on the eastward side of the landfill.

- The observed leachate seep forms a small pond which apparently discharges to watercourses which flow through the forested area east of the landfill. The leachate pond has a pungent odor and is orange in color.

- No evidence of leachate entering the unnamed stream on the westward side of the landfill was found.

- A pile of metals exists at the north end of the landfill limits.

- A tire pile exists between the landfill refuse limits and borrow pit on the south end.

- The geologic exposure resulting from the borrow pit would indicate the likelihood of difficult overburden drilling conditions. Numerous boulders and cobbles are dispersed throughout a medium to coarse sand matrix on the exposure face.

Through an evaluation of the drainage conditions at the project site and vicinity, it is apparent that two general surface water pathways exist. The impact to these pathways will be investigated during the RI/FS. Specifically, water and sediment quality of the unnamed stream on the westward side of the landfill will be further evaluated, as well as the impact of the leachate pond discharge to the eastward watercourses.

Water quality sampling events of both groundwater and surface water were undertaken in 1988 and 1990 by NYSDEC personnel out of the Raybrook, New York regional office. The results of this testing indicate that a contravention of groundwater standards is present on the east side of the landfill in the immediate vicinity of the leachate pond and landfill limits. Existing wells sampled in this area showed maximum volatile organic and semi-volatile organic concentrations of 1.1 parts per million (PPM). Contaminant compound types found in these wells were also found in the leachate sample. Maximum contaminant compound levels detected in the leachate were found to be 7.9 PPM with unknown compounds concentrations reaching an estimated 100 PPM.

Surface water sampling was undertaken at three locations, they include: a) a stream crossing at Eddy Road; b) downstream from Eddy Road (north) at

approximately the USA and Canada border; and c) the unnamed stream on the westward side of the landfill. The samples results reported for the unnamed stream showed no indication of contaminants. Samples taken at the Eddy Road crossing and USA/Canada border show both very low levels (0.015 to .003 PPM) of acetone and/or 2-butanone. Due to the distance of the sampling location from the site, the volatile nature of the compounds found, the presence of unknown contaminant in a trip blank sample, the absence of field blanks, the very low concentrations, the relatively frequent occurrence of acetone and 2-butanone as laboratory contaminants and the absence of contamination during subsequent sampling and analysis events, the validity of the results reported is questionable. As a means of verification, the sampling program proposed for the Mooers Landfill RI/FS will include re-sampling at the Eddy Road stream crossing.

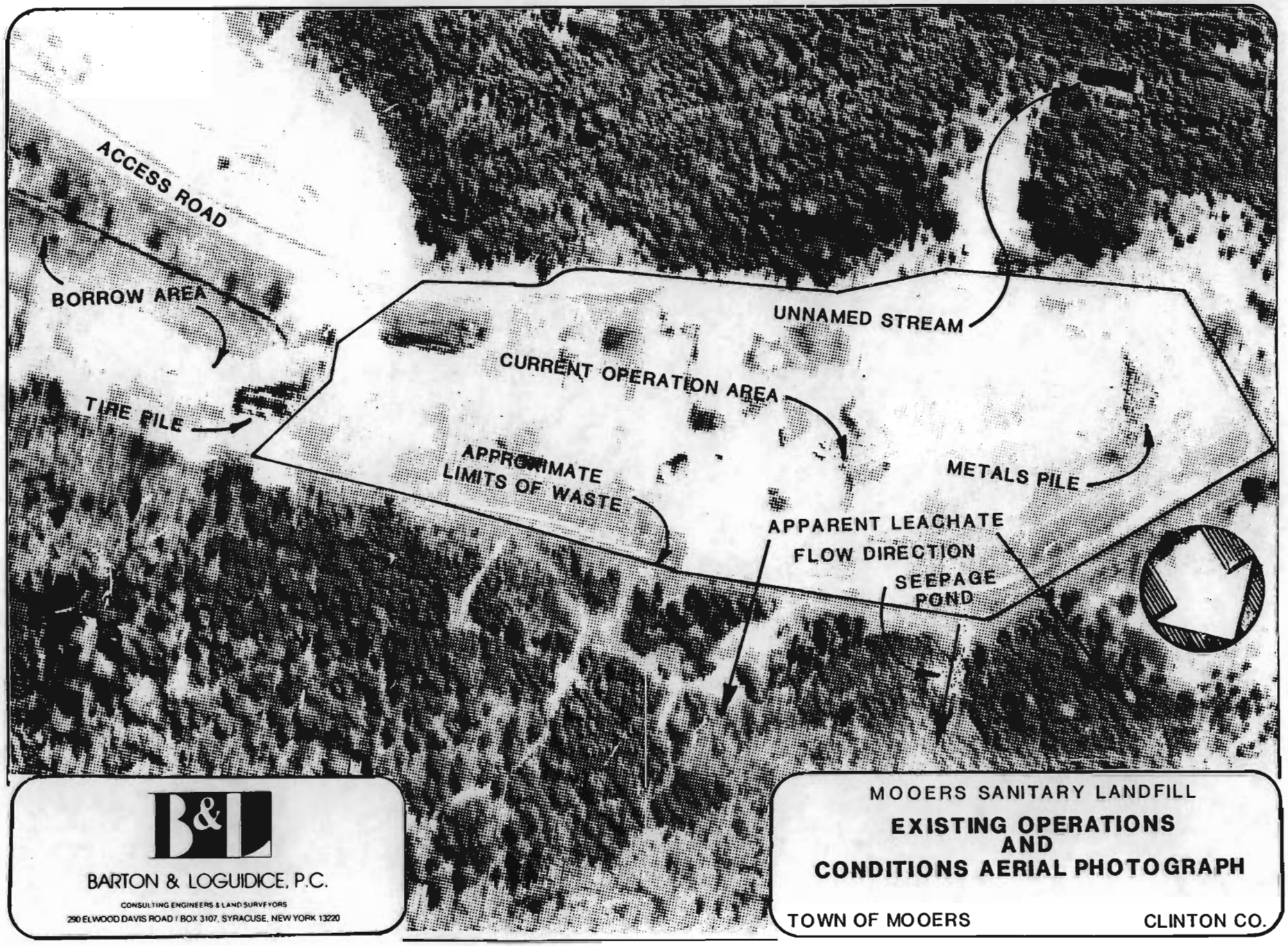
Figure 3-1 is an aerial photograph which illustrates existing site features and the apparent direction of landfill contaminant impacts.

3.2 Preliminary Risk Assessment

3.2.1 Background

The area surrounding the Mooers Landfill is rural and sparsely populated. Land use is primarily residential and agricultural. There are no industrial or commercial facilities within the immediate vicinity of the landfill. The nearest town is Mooers Forks, just over two miles from the site. The property is bordered on the north and northeast by wetlands and undeveloped tracts of land, on the

FIGURE 3-1



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MOOERS SANITARY LANDFILL

EXISTING OPERATIONS AND CONDITIONS AERIAL PHOTOGRAPH

TOWN OF MOOERS CLINTON CO.

south by Star Road and to the east and west by several farms and private dwellings. The site is readily accessible on foot from North Star Road and the dwellings to the east and west. There are no municipal water supplies within the vicinity of the Mooers site. Potable groundwater wells (presumably in bedrock) serve residences along North Star Road to the south and unidentified road to the east of the site, along Blackman Corners Road to the west, and on an unidentified road to the north. Contaminants associated with the landfill have been detected in overburden monitoring wells on the site. The potential would exist for private wells to be impacted by contaminants migrating from the site if landfill contaminants enter the bedrock formation.

Surface water at the site flows through two unnamed tributaries of the English River. One creek flows from the southwestern corner of the landfill northwest and exits the site on the western perimeter of the landfill. The other creek drains wetlands to the east of the landfill, crosses Eddy Road and the USA/Canada border and ultimately enters the English River. Leachate seeps have been documented on the eastern portion of the landfill and may be impacting water quality in the unnamed creek draining that area. Neither of these creeks are used as potable water supplies.

3.2.2 Chemicals and Potential Concern

Table 3-1 summarizes the results of the preliminary groundwater, surface water and leachate sampling performed in November, 1989 by the NYSDEC.

TABLE 3-1

MOOERS LANDFILL

Compounds Detected in the Groundwater,
Surface Water and Leachate
During Preliminary Sampling Program at
Mooers Landfill (1989)

Compound	Maximum		
	Groundwater Concentration (ug/l)	Leachate Concentration (ug/l)	Surface Water Concentration (ug/l)
1,1,1-Trichloroethane	320	ND	ND
Chloroethane	61	ND	ND
Acetone	490	7,900	15
1,1-Dichloroethane	16	ND	ND
Methyl ethyl ketone	880	6,100	16
Methyl isobutyl ketone	82	ND	ND
Toluene	480	630	ND
Phenol	85	360	ND
4-Methyl phenol	520	1,900	ND
Benzoic Acid	1,100	3,500	ND

Source: NYSDEC, 1990

From this list, chemicals of potential concern can be identified. Factors important in the evaluation of these chemicals are their relative toxicities, concentrations relative to background levels and the likelihood of migration from the site. Based on these criteria, the following contaminants have been tentatively identified as chemicals of potential concern:

- 1,1,1-Trichloroethane
- 1,1-Dichloroethane
- Chloroethane
- Acetone
- Methyl ethyl ketone
- Methyl isobutyl ketone
- Toluene
- Phenol
- 4-Methyl phenol (p-cresol)
- Benzoic acid

3.2.3 Human Exposure and Toxicity

Exposure assessments identify the actual or potential human exposure pathways and characterize the number and complexity of these pathways. They also identify the site conditions which may promote chemical migration and the likely magnitude of the exposures. Potential routes of exposure at the Mooers site would include:

- Ingestion of contaminated groundwater.
- Inhalation and absorption of volatile chemicals in indoor air and water resulting from domestic use of contaminated groundwater.
- Direct contact with comtaminated leachate from the site.
- Methane gas and volatile compounds migrating with methane.

The final identification and assessment of exposure pathways will be quantitatively evaluated as part of the remedial investigation after all pertinent environmental data have been reviewed. For each exposure scenario, the concentrations of the chemicals in relevant environmental media (groundwater, surface water, etc.) at the potential exposure points will be identified. In instances where exposure point concentrations are unknown, estimates from best available data may be used.

None of the above identified chemicals of concern from the Mooers site have been classified as probable or known human carcinogens by the USEPA (USEPA, 1986). Therefore, these compounds will be evaluated according to their reference doses (acceptable daily intakes).

3.2.4 Environmental Exposure and Toxicity

To evaluate potential terrestrial and aquatic impacts, published toxicity information concerning effects of the chemical contaminants on biota will be considered in conjunction with observations and

inventories of biota made during the ecological evaluation. For those exposure pathways which have been identified, potential, acute and chronic effects and the potential for the contaminants to bioaccumulate in terrestrial and aquatic organisms, will be evaluated.

Since leachate seeps have been identified on the eastern boundary of the site, the potential exists for contaminant discharge to the stream and wetlands to the east of the site. To date, those contaminants which have been identified at the site have a low potential for bioaccumulation (BCF less than 50). However, the potential for toxicity to aquatic and terrestrial biota exists if biota are exposed to those areas of the site impacted by leachate.

4.0 PROJECT OBJECTIVES AND TECHNICAL APPROACH

The project objectives and technical approach are discussed in the following subsections of this report.

4.1 Project Objectives

The specific objectives of this project will include the following:

- To thoroughly define the nature and extent of groundwater contamination at the landfill and vicinity, specifically identifying: a) the type and concentrations of contaminants; b) the rate of migration of contaminants; c) the areal extent of contaminants leaving the landfill.

- To thoroughly define the nature and extent of surface water and watercourse sediment contamination as a result of contaminants emanating from the landfill, specifically identifying; a) the types and concentrations of contaminants discharging from the leachate seepage area identified on the eastward side of the landfill; b) the impact of leachate seepage to downstream surface water quality and watercourse sediments; c) the impact, if any, to the surface water quality and sediments of the unnamed stream bounding the westward side of the landfill and discharging to the English River.

surficial soils suggest that an EMC survey is worthy of further consideration.

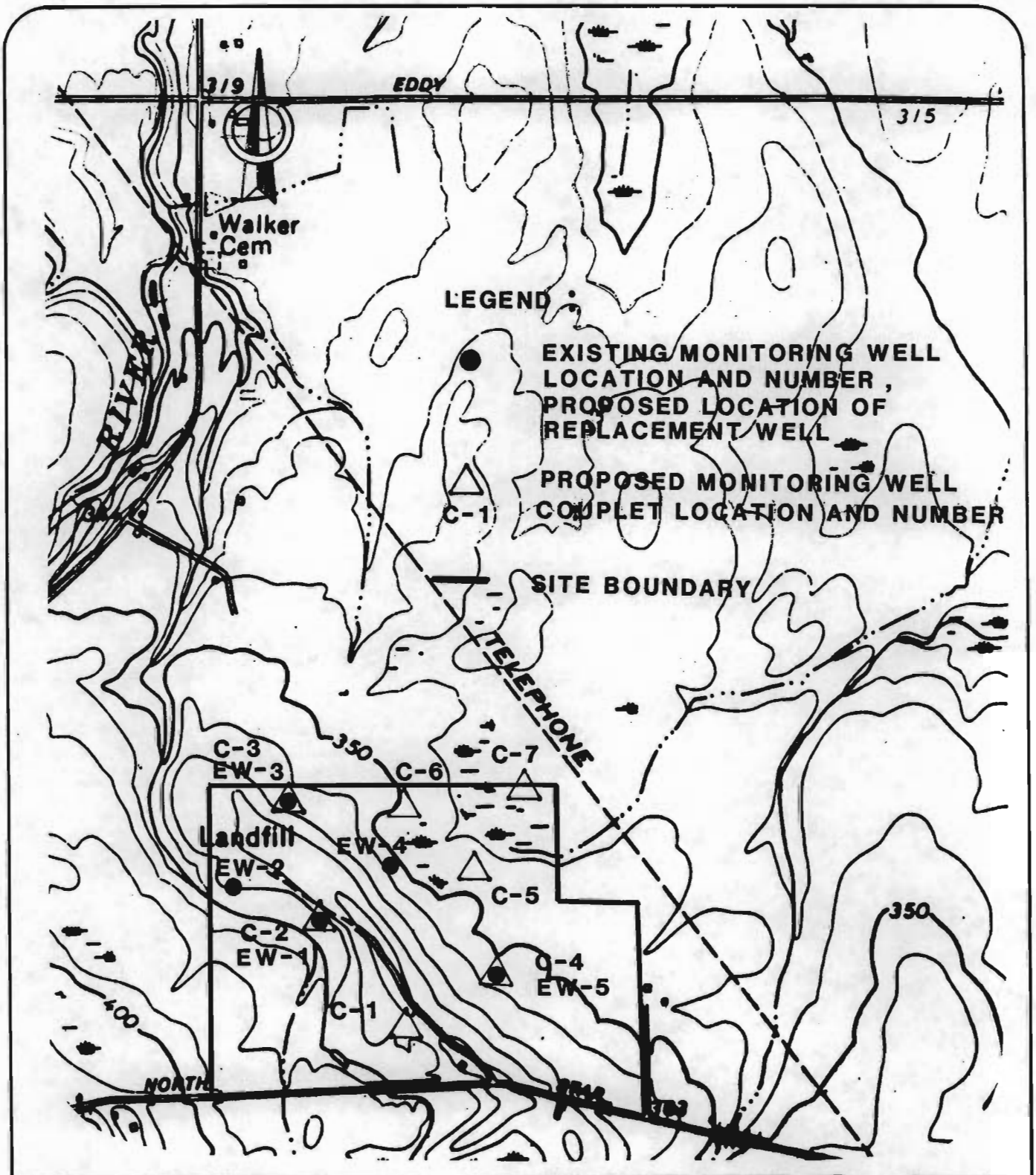
A successful implementation of an EMC survey would expedite efforts to define the contaminant limits at the project site and immediate vicinity. The EMC survey would also aid the optimization of monitoring well placement since the survey would establish inferred contamination limits.

4.2.3 Soil Gas Survey

A soil gas survey will be conducted to confirm and more closely define the limits of possible contaminant plumes identified as a result of the geophysical investigation. The combined results of the geophysical and soil gas survey investigations will be used to adjust the proposed monitoring well locations.

4.2.4 Replacement of Existing Monitoring Wells

The present condition of on-site monitoring wells warrants their removal and replacement. Replacement wells will be constructed in accordance with current Division of Hazardous Waste Remediation guidance on monitoring installation and construction and as shown on Figure 5-3. All replacement wells will be set at a depth corresponding to the top of the uppermost water table surface. The location of the existing wells are shown on Figure 4-1. The replacement wells will eliminate the uncertainties regarding the validity of the samples currently extracted from the existing monitoring well network.



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MOOERS SANITARY LANDFILL

EXISTING & PROPOSED MONITORING WELL LOCATIONS

TOWN OF MOOERS CLINTON CO.

Figure 4-1

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4.2.5 Definition of Vertical and Horizontal Groundwater Gradients

Critical to understanding the direction and the rate of soluble contaminant movement is the measurement of the vertical and horizontal gradients at the project site and vicinity. To establish the gradients, an array of monitoring well couplets or clusters will be installed. The depths and exact number of these monitoring wells will be based on specific hydrogeologic conditions. However, for the purpose of formulating a work plan, the following geologic model shall be used: a) the project site and vicinity overlies sandstone bedrock; b) approximately 50 feet of overburden soils overlie the bedrock; c) the overburden soils are predominantly sand with varying amounts of silt and gravel, and frequent cobbles and boulders; d) the overburden soils have a high unconfined water table surface.

Using the working geologic model, monitoring well couplets would be installed. These couplets would consist of a shallow well which would screen and monitor groundwater conditions at the water table surface, and a deep well which would monitor groundwater conditions at the top of rock depth. Based on vertical gradient and groundwater quality data obtained from each couplet, a decision will be made to install a monitoring well into the bedrock. An upward (discharging) gradient and groundwater contaminant levels within tolerable levels would justify limiting the number of wells at a particular location to couplets. A downward (recharging)

4.2.7 Borehole Geophysical Logging

Geophysical well logging methods can significantly increase the amount of data gathered during a drilling and sampling program. Specifically, natural gamma and/or EM-39 well logging shall be utilized as appropriate to aid in stratigraphic correlation between boreholes. This method of well logging would be used to the top of bedrock depth. If extensive bedrock drilling is found necessary, then the well logging scope of work may be expanded to include the following techniques and logging instrumentation:

- 3-point caliper
- electrical potential
- spontaneous potential
- temperature and temperature differential

4.2.8 Soil and Air Quality Monitoring

A photoionization detector (PID) or an organic vapor analyzer (OVA) will be used during the exploratory drilling and sampling program. The use of these instruments will serve two functions: a) first as a means of monitoring the air quality during drilling and sampling for the presence of volatile organic contamination; and b) secondly, as a means of detecting contaminated soil samples.

Air quality monitoring will be conducted in accordance with the health and safety plan. The level of personal protective clothing and equipment

will be established by monitoring ambient air quality within the working area of the drilling location. Levels of personal protection established in the health and safety plan will be upgraded or downgraded based on measured organic vapors in the field.

Soil samples collected during exploratory drilling will be screened for contamination using a PID (or OVA). By inserting the probe of either the PID or OVA into the headspace of a sample jar containing a soil sample, the relative contamination level of the sample can be determined provided the sample has been allowed to equilibrate within the jar. This use of a PID or OVA and method of soil screening has been effective in the selection monitoring well screening depths, locating the depth and soil strata where contaminants are concentrated and in approximating the vertical limits of groundwater contamination.

4.2.9 Ecological Evaluation

An ecological evaluation will be performed to evaluate the ecology of the project site and vicinity. This evaluation will comprise two components which are the terrestrial survey and an aquatic survey. Both components of this evaluation will be qualitative and quantitative surveys of on-site and off-site vegetation and wildlife.

5.0 RI/FS TASKS

In order to accomplish the objectives set forth in Section 4.1, the following task-by-task scope of services is proposed which is based on the technical approach in Section 4.2.

5.1 Project Start Up

5.1.1 Task 1 - Data Review and Topographic Mapping

The initial effort of this project will be to review and compile existing data available through the NYSDEC Region 5 Hazardous Waste Group and the Clinton County Solid Waste Department. It is our understanding that the existing data available for this project site is limited to groundwater and surface water quality data obtained from sampling existing monitoring wells and some selected surface water monitoring points. Furthermore, subsurface hydrogeologic data specific to this site are limited to the conditions observed while excavating backhoe pits for the installation of the existing groundwater monitoring wells. The extent of specific existing data will be defined at the conclusion of this task. In addition, our review will include published geologic literature for the area and a residential well survey.

Topographic maps are currently being prepared from aerial photography taken during April, 1990. Two map scales will be produced, one at 400 feet per inch and another at 200 feet per inch. Aerial photography was flown at altitudes consistent with

the detail to be presented by each of the two map scales.

5.1.2 Task 2 - Site Access and Reconnaissance

Prior to the start up of the hydrogeologic and geophysical investigation, authorization to access private properties contiguous to county owned land will be obtained. Significant portions of the investigation will most likely require access to, and the installation of monitoring wells and sampling points on these contiguous properties. This task shall be performed by coordinating with the appropriate County officials and formerly requesting access permission from the contiguous property owners. Access agreements are paramount to the successful and thorough implementation of the project.

On April 11, 1990, representatives from the NYSDEC, Albany and Ray Brook Offices, Barton & Loguidice, P.C., and Clinton County Solid Waste Department met at the project site for a preliminary site reconnaissance. This reconnaissance familiarized all the parties involved with the layout of the landfill and vicinity, as well as the apparent off-site movement of landfill leachate.

Prior to the implementation of the hydrogeologic investigation, an additional reconnaissance will be performed. The objective of this visit would be to primarily lay out and stake the location of the

proposed monitoring wells, locate and stake the proposed geophysical survey alignment, and observe and note all leachate seepage locations. Upon completion of this reconnaissance, the hydrogeologic and geophysical investigation will be initiated.

5.1.3 Task 3 - Community Relations

A citizens' participation plan will be prepared, and Wehran and Barton & Loguidice, P.C., will assist Clinton County in disseminating information on the project to the public. The elements of the citizens' participation plan are as follows:

- Introduction to plan
- Basic site information
- Project description
- Identification of affected/interested public (contact list)
- Identification of Department contacts
- Identification of document repository
- Specific citizen participation activities
- Glossary of key terms and major program elements

The citizens' participation plan will establish responsibilities for these activities and provide the names and addresses of authorized representatives for response to public inquiries.

5.2 Geophysical and Hydrogeologic Investigations

5.2.1 Task 4 - Conductivity/Resistivity Survey

After a preliminary site reconnaissance, a conductivity or resistivity survey will be conducted. The survey shall consist of, as a minimum, four traverses aligned such that preliminary limits of contamination emanating from the landfill can be identified.

Based on our initial reconnaissance of the site, it is apparent that landfill leachate is seeping from the eastward side of the landfill as evidenced by the existence of a small leachate pond. From the pond it is believed the landfill leachate discharges to several small watercourses which flow to a small seasonal stream. This surface water drainage system is in a northeastward direction. The leachate pond and immediate vicinity apparently represent a groundwater discharge area which feeds the seasonal stream. The observance of this discharge area provides for a logical point to initially focus the proposed investigation.

Therefore, three of the geophysical survey traverses will be aligned to define the contaminant plume limits on the eastward side of the landfill. The remaining traverse will be aligned along the southern limits of the landfill adjacent and parallel to an unnamed stream. The three survey traverses positioned north of the landfill will be configured such that two traverses will be perpendicular to the

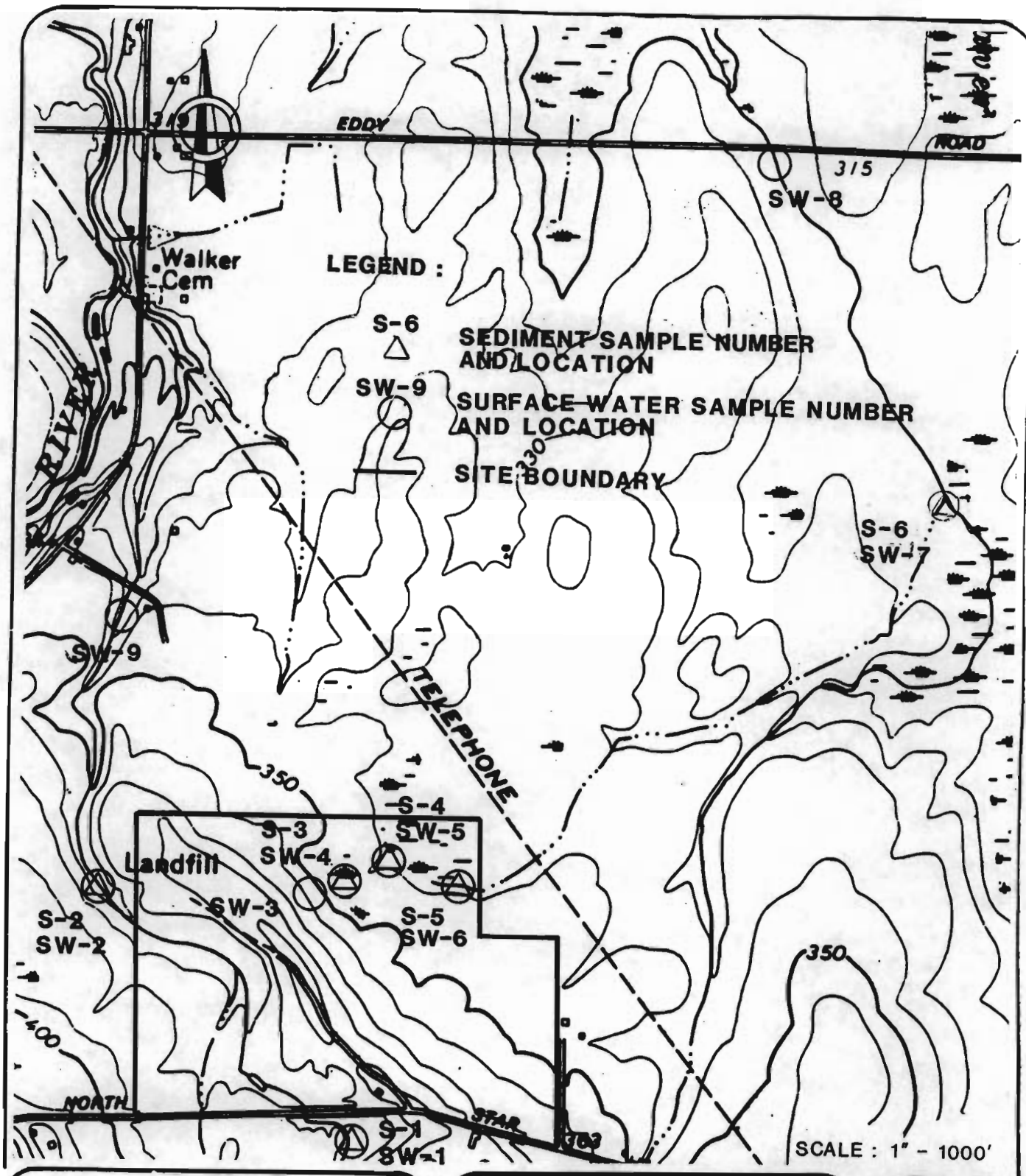
apparent leachate flow direction, and the third traverse would be aligned with the flow direction of the seasonal stream. Configured in this manner, the data obtained will be utilized to generate an isopleth contour map of the relative conductivity or resistivity. Such a map will be very useful in finalizing the location of monitoring well couplets and defining the areal extent of a contaminant plume. The anticipated equipment and procedures to be utilized are briefly discussed in the Sampling and Analysis Plan, Section 4.3.

5.2.2 Task 5 - Soil Gas Survey

An operating grid will be located over an area, corresponding with possible anomalies identified from the geophysical data. Initially, the survey points will be located at 100-foot spacings along the grid. Once the initial survey has been completed, additional survey points will be concentrated around areas detecting elevated organic readings. The equipment and procedures involved to conduct the soil gas survey are discussed in the Sampling and Analysis Plan, Section 4.3

5.2.3 Task 6 - Surface Water and Sediment Sampling

Surface water and sediment sampling shall be conducted upgradient (to the southwest) and downgradient (to the northwest) of the project site. The proposed surface water and sediment sample locations are shown on Figure 5-1. All sampling method procedures and analyses are presented in the sampling and analysis plan (SAP).



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PROPOSED SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

TOWN OF MOOERS CLINTON CO.

Figure 5-1

Project No. 244.19

The array of sampling locations has been designed to establish baseline water and sediment quality at the headwaters of an unnamed stream which bounds the project site on the westward side. In addition, the array of sampling locations will evaluate the impact resulting from landfill leachate discharge on these watercourses, and establish the approximate limits of any impact of water and sediment quality.

5.2.4 Task 7 - Borehole Drilling and Monitoring Well Construction

To achieve the subsurface exploration objectives established in Section 4.0, the procedures and tasks described in the subsequent paragraphs will be implemented.

Soil Sampling Method:

Critical to achieving the objective of the proposed drilling program is the collection of consistent and good quality split-spoon samples. The quality of the sample will be determined by the amount of recovery obtained by the split-spoon sampler. Good quality samples will have greater than 1.0 feet of recovery for a two-foot split spoon. If recovery consistently falls below 1.0 feet, alternative sampling methods will be considered. Alternative sampling methods will include, but not be limited to:

Replacement Monitoring Wells:

Five existing monitoring wells will be replaced according to the procedures established above. These wells will be screened at the uppermost water bearing zone. The SAP will incorporate these wells as additional monitoring points.

5.2.5 Task 8 - Soil Sample Organic Vapor Screening

Using a photoionization detector (PID) or Organic Vapor Analyzer (OVA), each soil sample logged at a drilling location will be tested for the presence of volatile organic contamination. During sample collection, the geologist will place a representative sample in a sample jar and then carefully seal the jar with aluminum foil and screw on lid.

Once properly sealed the sample will be allowed to equilibrate within the sample jar prior to being tested using a PID or OVA. Testing will involve carefully removing the sample lid and puncturing the aluminum foil seal with the PID or OVA probe. Two measurements will be recorded when apparent contaminants are present: a) the peak concentration measured in parts per million (PPM); and b) a sustained concentration measured in PPM. All measurements will be recorded in the field log for future reference and are to be used in screen interval selection, analytical soil sample selection

5.2.6 Task 9 - Borehole Geophysical Logging

If subsurface conditions observed during the exploratory borehole investigation suggest a complex series of intercolated coarse and fine grained strata are present, then natural gamma well logging will be conducted at each drilling location. The downhole well logging would be performed in the deepest well at each location. The gamma log would provide a stratigraphic signature at each location which would then be utilized as an aid in correlating stratigraphic units across the investigation area. This task would be performed by a subcontractor.

5.2.7 Task 10 - In-situ Variable Hydraulic Head Permeability Testing

In-situ variable head permeability testing (slug or bail testing) will be performed within each completed monitoring well after sufficient development of well has been performed. The slug and bail testing will provide in-place permeability data of unconsolidated and consolidated geologic units. Slug and bail testing involves the removal of a bail of water or the displacement of water within the well by the insertion of a slug. Upon creating an elevated or depressed head, the water level in the monitoring well is measured and recorded over the time it takes to achieve 90 percent recovery. It is assumed that the rate of inflow to the monitoring well screen after inducing a hydraulic head difference, is proportional to the hydraulic conductivity (k) and to the unrecovered head distance.

The following equation will be used to calculate the in-situ hydraulic conductivity of the saturated materials at the screened interval of the well (Cedergren, 1977).

$$k = \frac{r^2}{2L(t_2 - t_1)} \ln (L/R) \times \ln(h_1/h_2)$$

Where:

r = Screen radius
R = Gravel pack radius
L = Screen length
t_1 = Time interval corresponding to h_1
t_2 = Time interval corresponding to h_2
h_1 = Head ratio at time t_1
h_2 = Head ratio at time t_2
k = Hydraulic conductivity in cm/sec

Critical to the validity of the hydraulic conductivity data obtained from slug tests is the hydraulic communication between the well screen and the formation materials.

5.2.8 Task 11 - Staff Gauges

Surface water staff gauges will be installed at each surface water and sediment sampling point. These staff gauges will consist of a stake driven into the stream or watercourse sediment bed. Each stake will be surveyed to establish the coordinates and the elevation of each sampling point. During the initial and subsequent sampling events, a staff gauge reading will be taken and recorded for the evaluation of relative stream or watercourse flow.

5.2.9 Task 12 - Water Level Monitoring

As a means of determining the depth of groundwater and thereby the configuration of the groundwater surface, monitoring well water level measurements will be performed. Initially, monitoring well water levels will be taken at a minimum frequency of one per month at each completed monitoring well. This data will be used to generate a data base from which seasonal groundwater fluctuation in both vertical and horizontal gradients may be evaluated. Upon obtaining a complete year's worth of data, a seasonal high and low groundwater surface will be contoured.

5.2.10 Task 13 - Well Sampling and Analysis

Upon completion of the drilling and monitoring well installation program, each of the monitoring wells installed will be sampled for analytical analysis. Monitoring wells will be bailed such that a representative sample may be withdrawn. Sampling of the groundwater will follow immediately after bailing has been completed.

Each well will be sampled by the following general method:

- The static water level in each well will be measured and recorded. These data and the known dimensions of the well would permit the volume of water in the well to be calculated.

- Each well will be purged of at least three volumes of water or evacuated one and one-half times dependent upon the well hydraulics. The method that is employed will be specific to each well. Where rapid well recovery is present, peristaltic or bladder pumps will be utilized to purge the required well volumes.

- Samples will be collected using a dedicated Teflon bailed .

- pH and Specific Conductivity will be measured in the field upon collection of each sample.

- Groundwater samples collected for metals will be analyzed for "total" metals and "dissolved" metals. Samples for dissolved metals analysis will be field filtered according to the procedures given in Section 4.8.2 of the SAP.

- Samples will be preserved in accordance with USEPA protocol and shipped on ice to a NYSDEC approved laboratory.

All initial groundwater samples will be tested according to the protocol given in Table 5-1.

5.2.11 Task 14 - Air Quality Quantification

Air quality quantification will be performed over the landfilled area of the project site. This task will involve a geologist, the use of a combustible gas indicator, and an OVA or PID. Air

TABLE 5-1
MOOERS SANITARY LANDFILL
SUMMARY OF PROPOSED ANALYTICAL PARAMETERS

	MATRIX	NUMBER OF LOCATIONS	NUMBER OF SAMPLES	TCL (1) VOC	TCL (2) BNA	TOTAL PETROL. HYDROCARB.	TCL (3) PEST/PCB	CLP TCL (4) METALS	CLP (5) CYANIDE	pH (FIELD)	SPEC COND (FIELD)	TEMP (FIELD)	DO (FIELD)	TOTAL AMMONIA	HARDNESS	TOC	TDS	TSS	TOTAL SOLIDS	SPECIFIC GRAVITY
GROUNDWATER MONITORING WELLS																				
MONITORING WELLS	WATER	19	38	38	38		38	38	38	38	38	38					38	38		
MATRIX SPIKE	WATER		2	2	2		2	2												
MATRIX SPIKE DUPLICATE	WATER		2	2	2		2	2												
DUPLICATE SAMPLE	WATER		2	2	2		2	2	2								2	2		
TOTAL GROUNDWATER SAMPLES (7)		19	44	44	44		44	44	40	38	38	38					40	40		
SURFACE WATER																				
SURFACE WATER	WATER	18	18	18	18		18	18	18	18	18	18	18	18	18		18	18		
MATRIX SPIKE	WATER		2	2	2		2	2												
MATRIX SPIKE DUPLICATE	WATER		2	2	2		2	2												
DUPLICATE SAMPLE	WATER		2	2	2		2	2	2					2	2		2	2		
TOTAL SURFACE WATER SAMPLES (7)		18	24	24	24		24	24	20	18	18	18	18	20	20		20	20		
SEDIMENTS																				
SEDIMENTS	SOIL	6	6	6	6		6	6	6							6			6	6
MATRIX SPIKE	SOIL		1	1	1		1	1												
MATRIX SPIKE DUPLICATE	SOIL		1	1	1		1	1												
DUPLICATE SAMPLE	SOIL		1	1	1		1	1	1							1			1	1
TOTAL SEDIMENT SAMPLES		6	9	9	9		9	9	7							7			7	7
WASTE/SUBSUFACE SOILS																				
SOIL	SOIL	10	10	10	10		5	5												
MATRIX SPIKE	SOIL		1	1	1		1	1												
MATRIX SPIKE DUPLICATE	SOIL		1	1	1		1	1												
TOTAL SOIL SAMPLES (6)		10	12	12	12		7	7												
BLANK SAMPLES																				
GROUNDWATER FIELD BLANKS	WATER		0	0	0		0	0	0											
GROUNDWATER TRIP BLANKS	WATER		2	2																
SW/SED FIELD BLANKS	WATER		2	2	2		1	1	1											
SW/SED TRIP BLANKS	WATER		1	1																
SOIL/WASTE FIELD BLANKS	WATER		3	3	3		3	3												
SOIL/WASTE TRIP BLANKS	WATER		0	0																
TOTAL BLANK SAMPLES			8	8	5		4	4	1											
TOTAL SAMPLES		53	97	97	94		88	88	68	56	56	56	18	20	20	7	60	60	7	7

(1) SUPERFUNDED CLP METHODS, NYSDEC ASP 9/89 VOA
(2) SUPERFUNDED CLP METHODS, NYSDEC ASP 9/89 BNA
(3) SUPERFUNDED CLP METHODS, NYSDEC ASP 9/89 PEST/PCB
(4) SUPERFUNDED CLP METHODS, NYSDEC ASP 9/89 METALS
(5) EPA SW-846 METHOD 9010/9012
(6) NUMBER INCLUDES TEST BORINGS AND IS ESTIMATED; ACTUAL NUMBER WILL DEPEND UPON FINDINGS IN THE FIELD
(7) NUMBER INDICATES TWO COMPLETE ROUNDS OF SAMPLES

monitoring will be performed during calm atmospheric conditions and include:

1. A methane perimeter survey consisting of surveying the landfill perimeter with a combustible gas indicator. Readings are to be taken approximately 6 inches below grade in a hole made with a probe. Spacing between readings will be a maximum of 100 feet.

2. Using an OVA or PID to monitor air at ground surface and then plot the readings on a grid.

3. In the event that the OVA or PID detects an area of apparent impact, an air sample will be taken for analytical testing.

Air sampling will comprise the use of passive dosimeters. At each apparent "hot spot", as determined by the above procedure, a dosimeter will be placed within an inverted vessel for a timed period of approximately 8 hours. After the incubation time, the dosimeters shall be collected and sent to an analytical laboratory for analysis of indicator compounds (i.e., benzene, vinyl chloride and tetrachloroethylene). Knowing the diffusion rates of the indicator compounds and the incubation time, it is possible to determine a chemical concentration of these compounds. With the

concentrations known, the area-source model described on Page 21 of Air Guide 1 will be used to calculate the concentration for on-site receptors.

5.2.12 Task 15 - Ecological Evaluation

Terrestrial Survey:

An evaluation of the ecology of the Mooers Landfill site, as well as the surrounding area, will be conducted. This investigation will be conducted in accordance with the (Draft) Habitat Based Assessment, Guidance Document for Conducting Environmental Risk Assessments at Hazardous Waste Sites (Dec., 1989). The ecology of the area will be described in terms of on-site and off-site vegetation and wildlife. A specific list of plant and animal species (including mammals, birds and reptiles) occurring in the area will be provided. These lists will be based on field observations (sightings, track counts, nests, etc.), existing ecological surveys (if available), and if necessary, an evaluation of the habitat to determine what species could be found in the area based on individual species habitat requirements.

A general vegetative cover map of the site and surrounding area within 0.5 miles will also be constructed from aerial photos and field observations. The cover map will delineate vegetative communities by comparing species composition and structural diversity (i.e., foliage height, spatial distribution, percent cover, etc.) of each plant community.

Special resources (regulated wetlands, streams, lakes, significant habitats, endangered species, wild and scenic rivers) will be identified and described within a 2 mile radius and up to 9 miles downstream of the site. The location of the site in northern Clinton County will necessitate supplying this information for sections of Quebec, Canada. Special resources will be identified to the extent that this information is available from the Canadian, Ministries of the Environment. No field verifications will occur for the resources identified in Quebec.

Due to the fact that all wastes are presently buried, there appears to be a very limited direct contact route for exposure of wildlife to potential contamination (except leachate). There is undoubtedly a small population of wildlife species occupying the immediate vicinity of the site which could be affected, but their numbers are expected to be small. Subsequently, no provision for tissue analysis, toxicity testing and biotic indexing from on-site wildlife have been included in this work plan. If significant contamination is detected migrating off the site, or the potential for exposure to wildlife is determined to be greater than previously anticipated, tissue analysis, toxicity testing and biotic indexing will be reconsidered.

Aquatic Survey:

To evaluate baseline conditions in aquatic habitats in the vicinity of the site, a qualitative survey of the fisheries resources inhabiting the unnamed tributary of English River (located west of the site) and in the unnamed stream which flows east into Beaver Meadows will be performed. Aquatic habitats will be characterized by describing chemical and physical features of the habitat (i.e., water chemistry, temperature, DO, depth, substrate, flow, gradient, submergent vegetation, etc.). Fish sampling will be performed using an electroshocker and/or seine to obtain a representation of the species present in each stream. Sampling locations will be in similar habitats upstream and downstream, or where leachate outbreaks are known to contact the subject surface waters. A total of three sampling locations are proposed (one upstream, one adjacent to landfill and one downstream).

Fish captured would be identified by species and measured. Data will be presented in tabular form and will contain an assessment of the aquatic habitat in each sampling location.

A quantitative benthic macroinvertebrate survey will be conducted in the tributary both upstream and downstream of the identified leachate outbreak. Parameters to be measured include taxonomic composition, abundance, species diversity and richness.

The reporting format for the aquatic inventory will consist, in part, of species lists by taxon of invertebrates and vertebrates observed on the site and in the surrounding areas. Designations of general abundance (i.e., abundant, common, uncommon) will be given to each species. Special attention will be given to determining the status of any Federal- or State-listed endangered or threatened species.

Textural material will consist of descriptions of the faunal communities and an assessment of the species richness on the site. Any gross deviations in species composition from what might be expected in the existing available habitats will be discussed.

To aid in the assessment of the aquatic environments in the vicinity of the site, sediment criteria will be developed to evaluate the analytical results. Sediment criteria will be developed in accordance with procedures outlined in the December, 1989 Sediment Criteria Guidance Document provided by the NYSDEC.

During the course of this investigation, it is possible that the presence of significant contamination, combined with utilization of the site by wildlife species, may result in the discovery of a significant route of exposure and migration. In the event that contamination of biological communities is suspect, collection of terrestrial and aquatic biota samples for tissue analysis may be recommended. NYSDEC will be apprised of any developments regarding

the need for biota sampling. In the event that biota sampling is deemed appropriate at Mooers Landfill, a separate work plan and budget will be submitted for approval.

As part of the ecological evalution, identification of fish and wildlife Applicable or Relevant and Appropriate Requirements (ARAR's) will be performed. A fish and wildlife risk assessment will be performed to address the following:

- Identification of potential fish and wildlife exposure pathways including upper level consumers.

- Identification of critical toxicity values to assess acute and chronic effects in fish and wildlife.

- Potential for bio-accumulation of site contaminants.

- Potential for reduction in recreational values.

- Potential for reduction in habitat uses.

5.2.13 Task 16 - Data Validation and Evaluation

Data Validation:

Chemical analyses results obtained as part of this Task and Task 5 will be subjected to third party data validation. The data validation task will

verify that the analytical results were obtained following the protocols specified in NYSDEC Contract Laboratory Protocols. Data validation ensures that the analytical results can be relied upon in performing the risk assessment, evaluating potential remedial action alternatives and supporting a Record of Decision (ROD).

Data validation will be performed by a NYSDEC-approved third party subcontractor. Selection and approval of the data validator will be made prior to the initial sampling event. The selected subcontractor will ensure that the data analyses and documentation meet NYSDEC specifications. The scope of work for data validation is presented in Appendix C of the Sampling and Analysis Plan.

Data Evaluation:

Barton & Loguidice, P.C., will conduct an analysis of all data gathered in the remedial investigation to provide the necessary input to the Feasibility Study. The data collected to characterize the site will be organized and analyzed to identify the extent and nature of contamination, determine groundwater flow direction(s), and identify potential on-site source(s) of the contaminants. Field data and data resulting from laboratory analysis will be entered into a data base. Boring logs will be prepared for all completed borings, and stratigraphic information developed from the site borings will be displayed in geologic cross sections. Both the horizontal and vertical hydraulic gradients will be determined, which together with permeability

data will enable the calculation of groundwater flow rates at each location. Water level elevations measured at the wells will be used to develop plot(s) of the piezometric surface in the aquifer. Plan view groundwater contour maps, cross-sectional piezometric profiles and flow nets will be developed as applicable and appropriate. For all plans representing groundwater flow conditions, water elevation data will be noted adjacent to each monitoring location to facilitate review.

Test pit logs, soil and/or waste sampling results, air quality survey data and ecological survey results will be evaluated and plotted where appropriate. The water quality and sediment data will be evaluated and mapped to illustrate the areal extent of detected contaminants. The breakdown products of contaminants detected will be considered to help evaluate potential sources of the contaminants and their environmental behavior.

Tables summarizing the results of the various phases of the Remedial Investigation will be prepared and evaluated. The results of the evaluation will be discussed in the Remedial Investigation Report.

5.2.14 Task 17 - Baseline Risk Assessment

Based on the data obtained during the field investigation, Wehran will identify specific parameters/contaminants which may represent significant environmental and human health threats to the surrounding area. A computerized literature search (including the IRIS data base) will be

conducted on these contaminants, and a report focusing on potential human health effects will be prepared in accordance with the USEPA Guidelines for Environmental Risk Assessment (49 Fed. Reg. 46294 et seq.), the USEPA Superfund Public Health Evaluation Manual (USEPA, 1986) and other pertinent guidance manuals. Chemical contaminants identified at the site will be evaluated with respect to their toxic properties and their critical toxicity values. Brief toxicity profiles will be developed for each of these chemicals. This report will characterize and assess potential exposure routes, fate and transport of contaminants, human and environmental receptors, and current and potential risks.

5.3 Document Preparation

5.3.1 Task 18 - Remedial Investigation Report

The Remedial Investigation (RI) report preparation will assemble information on the nature and extent of the landfill contaminants and will generally characterize the site environmental conditions sufficiently to perform a preliminary risk assessment. The information and data will then be used to develop remedial alternatives.

This report will characterize the extent and nature of landfill contaminants and will discuss the degree of known air, soil, sediment, surface water and groundwater contamination. The hydrogeological characteristics at the site will be summarized and related to detected contamination problems.

5.3.2 Task 19 - Development of Alternatives

Based on the findings reported in the RI, site problem statements of each contaminated environmental medium will be established. Using this list of environmental problems, potential remedial responses will be reviewed. A second list of appropriate remedial responses will be developed utilizing the following criteria.

- Does the technology remediate the problem?
- Does the technology comply with existing regulations, and can it be permitted?
- How do the capital and operating costs for the technology compare to other alternatives?

It is anticipated that the alternatives developed will include the following:

- Treatment for source control that would eliminate the need for long-term management (including monitoring).

- Treatment as a principal element to reduce the toxicity, mobility, or volume of site waste.

- Containment of waste with little or no treatment, but providing protection of human health and the environment, primarily by controlling potential exposure or reducing the mobility of the waste.

- A no action alternative.

5.3.3 Task 20 - Review Meeting/Supplemental Remedial Investigation Report

The RI will have broadly defined the characteristics of the project site and vicinity in terms of the nature and extent of the on-site sources, presence or absence of contaminant pathways and potential exposure targets. Upon the completion of the RI report and the development of alternatives, a review meeting will be held. During the meeting, the data base generated to this stage of the RI/FS will be reviewed for completeness. Gaps in the data base will be identified and collected during a Supplementary RI.

The information collected during the Supplemental RI will be detailed and specific, focusing on the requirements necessary to complete the risk assessment and input into the latter phases of the FS. Such data might include deep wells to detect the presence or absence of contamination in the lower parts of the aquifer, chemical analyses for other chemical species, treatability studies, or other investigations not performed in Phase I. The scope of the Supplemental RI studies will be defined at the conclusion of the RI.

5.3.4 Task 21 - Feasibility Study/Initial Screening

The alternatives selected as a result of the RI will generally meet the remedial objectives. The purpose of this initial screening is to provide sufficient information on each alternative to enable rejection of those which are shown to be infeasible,

ineffective, or too costly. Alternatives will be evaluated in greater detail than during the screening process, by addressing actual operating characteristics and comparing against remediation requirements.

Additional field data collected during the Supplemental RI, will be incorporated. Results from the risk assessment will be used to; specify remediation requirements for each environmental medium that does not have regulatory cleanup standards, evaluate cumulative effects and ensure protection of human health and the environment. Soils remediation requirements, if any, will be formulated by this approach.

Evaluation categories are summarized as follows:

- Effectiveness: Alternatives will be evaluated as to whether they adequately protect human health and the environment; attain Federal and State Applicable or Relevant and Appropriate Requirements (ARARs) or other criteria, advisories, or guidance; significantly and permanently reduce the toxicity, mobility, or volume of hazardous constituents; are technically reliable, or are effective in other respects. Reliability includes the potential for failure and the need for replacement of the remedy.

- Implementation: Alternatives will be evaluated as to the technical feasibility and availability of the technologies each alternative would employ; the technical and institutional ability to monitor, maintain and replace technologies over time; and the administrative feasibility of implementing the alternative.

5.3.5 Task 22 - Review Meeting

Upon completion of the FS Initial Screening, a review meeting will be held to discuss the conclusions and recommendations made in this report. During the meeting, any alterations to the initial screening will be made final, and the detailed analysis on selected alternatives will be initiated.

5.3.6 Task 23 - Feasibility Study/Detailed Analysis

The alternatives will be evaluated against the broad factors of effectiveness, implementability and cost, using appropriate and more specific measures such as protectiveness, compliance with ARARs, reliability and technical feasibility. The detailed analysis of each alternative will include both short-term and long-term considerations for effectiveness, implementability and cost.

The most appropriate alternatives for each environmental medium will be selected based upon its attainment of the goal of implementing a feasible and practical action that meets performance goals at

minimum present worth. The selection will be made by ranking each alternative under the categories of effectiveness, implementation and economics.

The most appropriate alternatives will be recommended among those alternatives that meet the following four criteria:

- The alternative must utilize treatment technologies and permanent solutions to the maximum extent practicable as determined by technological feasibility, availability and cost effectiveness.

- The alternative must be protective of human health and the environment. This means that the remedy meets or exceeds ARARs or health-based levels established through a risk assessment when ARARs do not exist or when they are waived.

- Except under those circumstances listed in the National Contingency Plan (NCP), the alternative must attain applicable or relevant and appropriate Federal and State public health and environmental requirements that have been identified for a specific site.

- The alternative must be cost effective, accomplishing a level of protection that cannot be achieved by less costly methods.

The preferred remedies will reflect two preferences:

- Remedies that involve treatments that significantly reduce the toxicity, mobility, or volume of hazardous constituents as a principal element.

- Remedies that minimize the requirement for long-term management of residuals.

An alternative may be preferred that does not meet applicable or relevant and appropriate Federal and State public health or environmental requirements under the following circumstances:

- The alternative is an interim remedy and will become part of a more comprehensive final remedy that will meet applicable or relevant and appropriate Federal and State requirements.

- Compliance with the requirement will result in greater risk to human health and the environment than alternative options.

- Compliance with the requirements is technically impractical.

The recommended site remedial action will be chosen based upon the results of the selection of the most appropriate alternatives for each environmental medium. The combination of these alternatives will

be reviewed to ensure that the site remedial action meets or exceeds ARARs or other health-based levels. Additional technical information required prior to further development of the site remediation will be listed.

The results of the detailed analysis will be included in the final draft FS report, which will also include the development of alternatives and the initial screening.

6.0 PROJECT MANAGEMENT STRUCTURE

6.1 Project Organization

Barton & Loguidice, P.C., (B&L) is the prime engineering contractor for the Mooers Landfill RI/FS project. B&L will report directly to the Clinton County Highway Department, Landfill Division, for all services required on the project. With approval from the Clinton County Highway Department, B&L will have direct liaison with the New York State Department of Environmental Conservation (NYSDEC) throughout the duration of the project. The project management structure is presented in Figure 6-1.

The Project Officer will be Paul F. Dudden, P.E. Mr. Dudden is a Vice President at B&L with the authority to commit B&L's resources and resolve scheduling conflicts.

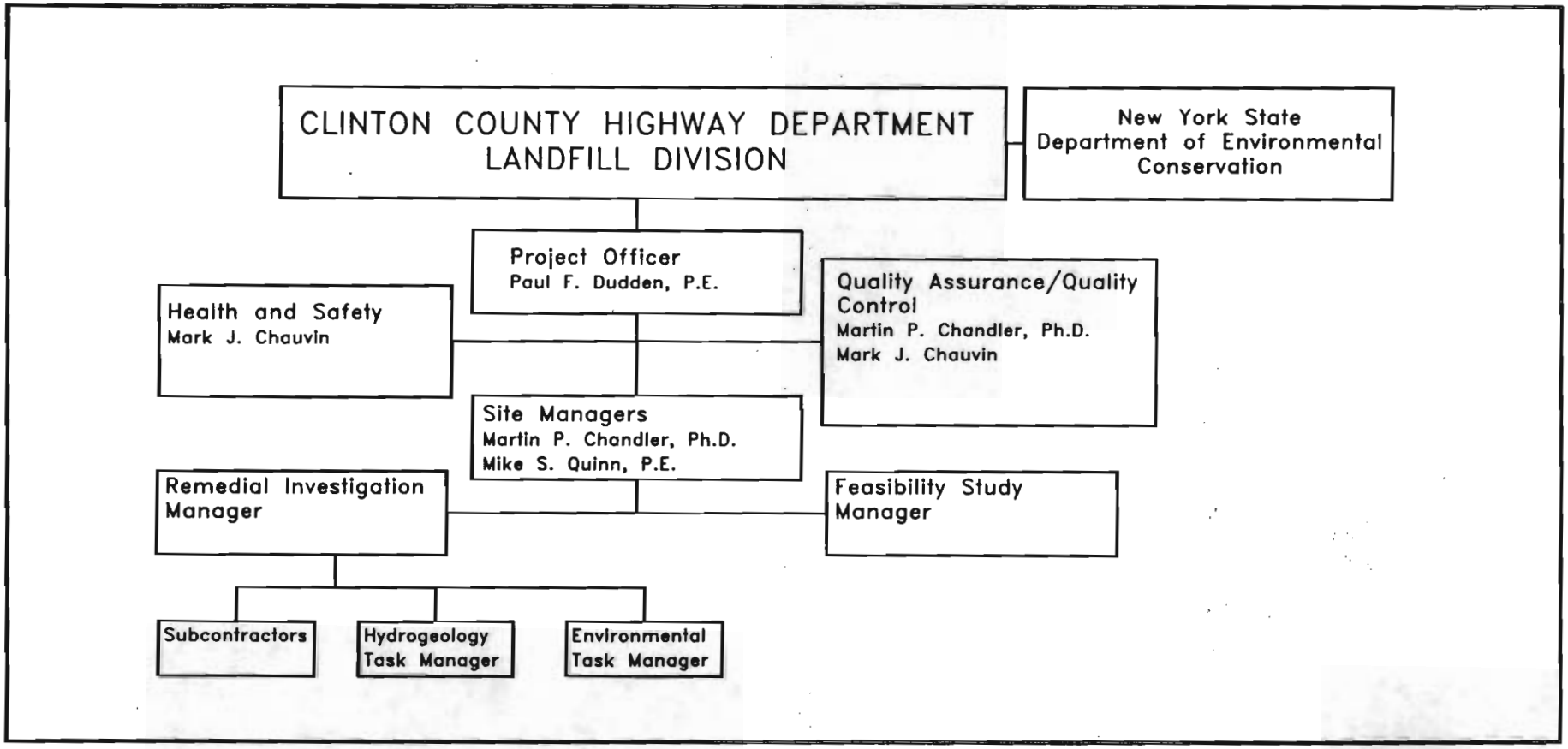
The Site Managers will be Martin P. Chandler, Ph.D., and Michael S. Quinn, P.E. The Site Managers will have primary responsibility for planning and implementation of the RI/FS project. The Site Managers will be the primary contact for all project-related communications with Clinton County and NYSDEC.

In addition, the Site Managers will be responsible for scheduling and implementing all Remedial Investigation tasks, including preparation of the RI report, the management of subcontractors for the field investigations, including drilling, surveying, laboratory analysis and data validation as needed.

Figure 6-1

MOOERS LANDFILL

PROJECT MANAGEMENT STRUCTURE



B&L

BARTON & LOGUIDICE, P.C.

CONSULTING ENGINEERS & LAND SURVEYORS

290 ELWOOD DAVIS ROAD / BOX 3107, SYRACUSE, NEW YORK 13220

Finally, the Site Managers will be responsible for implementing all Feasibility Study tasks, including the management of all subcontractors.

The Firm of Wehran New York, Inc., of Middletown, New York, will be a prime subcontractor and will perform the following project tasks:

- Ecological Evaluation
- Risk Assessment
- Analytical Data QA/QC

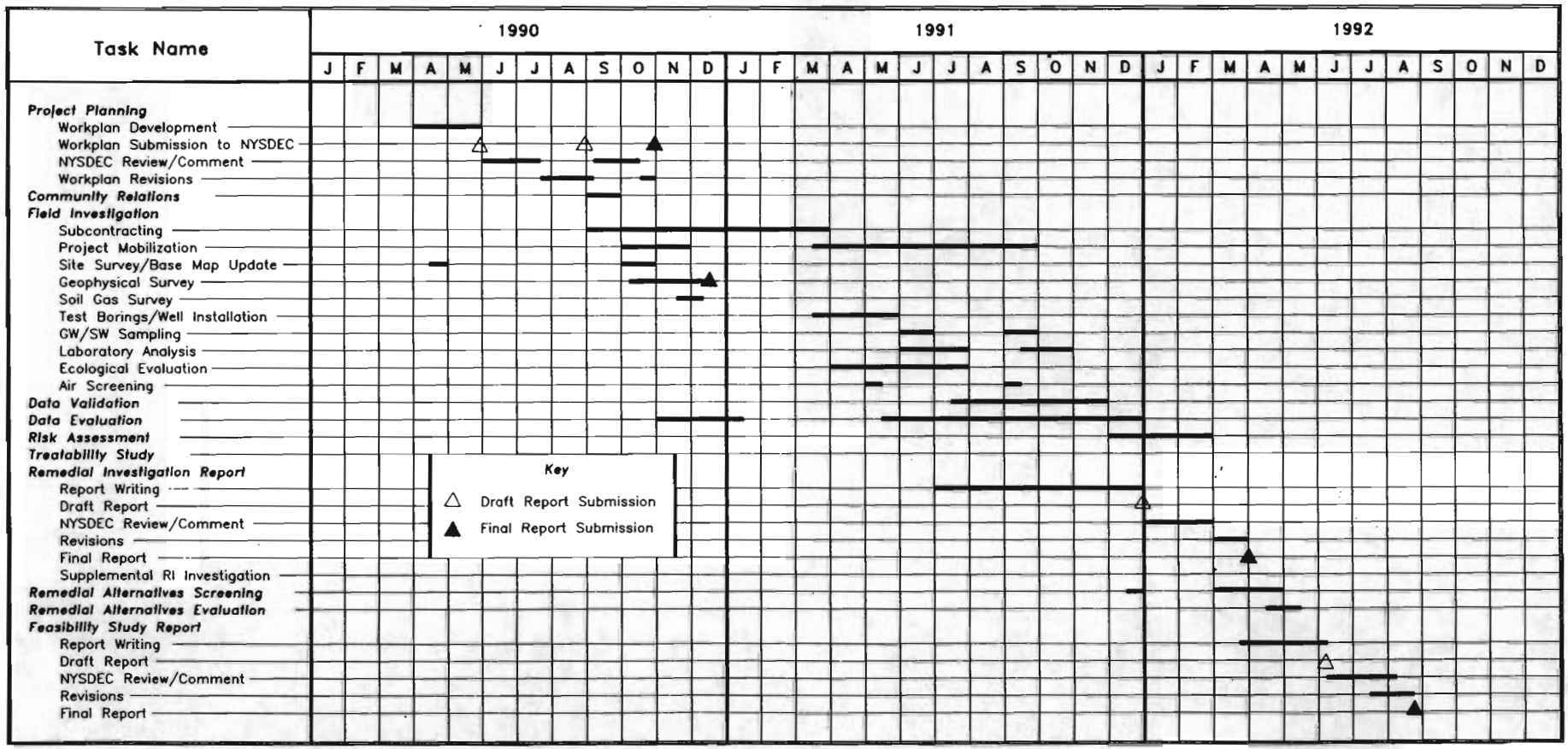
Analytical data QA/QC will be performed by NYSDEC approved personnel. QA/QC responsibilities include certifying that the field sampling procedures, analytical work, and data validation are performed in accordance with the approved Sampling and Analysis Plan - Appendix A. Wehran New York, Inc., has had considerable direct involvement at similar inactive hazardous waste sites and may be contracted to perform these tasks pending approval of qualified B&L personnel.

For any given field activity, a field operations leader will be designated. The designated leader will be responsible for on-site management of their respective site operations, including all on-site activities conducted by subcontractors.

The Quality Assurance/Quality Control (QA/QC) and Health and Safety Officers are corporate managers responsible for overall project quality and safety, respectively. These managers will coordinate with the Site Managers and Project Officer on issues relating to the Mooers Landfill RI/FS.

Figure 6–2

MOOERS LANDFILL
PROJECT SCHEDULE



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6.2 Project Schedule

The project schedule for the Mooers Landfill RI/FS is presented in Figure 6-2. The estimated duration of the project is 29 months. The schedule is based on preliminary assumptions concerning initiation and duration of field investigations as indicated in Figure 6-2, receipt of laboratory results within four weeks of sample collection, completion of data validation within four weeks following receipt of laboratory results and NYSDEC review of formal draft report submittals within 60 days of submittal.

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APPENDIX A

SAMPLING AND ANALYSIS PLAN (SAP)

The SAP is submitted under a separate cover.

APPENDIX B

HEALTH AND SAFETY PLAN

The Health and Safety Plan is submitted under a separate cover.

APPENDIX C

NYSDEC REVIEW AND COMMENT LETTERS, AND RESPECTIVE BARTON & LOGUIDICE, P.C. RESPONSE REFERENCE CHECKLISTS

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Thomas C. Jorling
Commissioner

OCT 0 1 1990

OCT 5 1990

Mr. Michael S. Quinn, P.E.
Project Engineer
Barton and Loguidice, P.C.
Box 3107
Syracuse, New York 13220

Dear Mr. Quinn:

RE: Mooers Landfill - Site #510005
RI/FS Final Draft Work Plan

The final draft RI/FS Work Plan, received on September 5, 1990, has been reviewed by the New York State Department of Health and this Department. The following comments were generated on the final draft Work Plan:

5.2.3 Surface Water and Sediment Sampling - Sampling locations S-6 and SW-7 should be moved to the tributary immediately west of the main stream.

5.2.11 Air Quality Quantification - The gas chromatograph data obtained from analysis of the dosimeters should be examined, in particular, for any compounds which are highly carcenogenic in air. PCE should be added to the site indicator compounds noted in the Work Plan. If the indicator compounds were not detected, assume the worst case scenario, that they are present at the detection level.

Next a rate of landfill gas generation should be determined using USEPA's figure of 220 cubic feet of gas per cubic yard of refuse per year. The refuse volume should include all municipal solid waste disposed of within the last 20 years. "Landfill gas" is assumed to be a 50-50 mixture of methane and carbon dioxide with trace non-methane organic compounds. Then the area-source model described on Page 21 of Air Guide 1 should be used to calculate the concentration for on-site receptors.

If the concentration of benzene, vinyl chloride, TCE or PCE on-site exceeds Ambient Guideline Concentrations (AGC's), additional analyses will be needed to determine air pathway risks and remedial controls.

5.2.12 Ecological Evaluation - The plan fails to incorporate changes in the ecological evaluation suggested by the Habitat Based Assessment nor does it discuss criteria that will be used to evaluate sediment results. The Habitat Based Assessment should be used as a guide in the ecological evaluation and the specific recommendations transmitted previously should be incorporated into the plan. In addition, the sediment criteria document should be used to determine standards for evaluating sediment analyses.

6.0 Project Management Plan - If Section 6 is to fulfill the requirements of a Project Management Plan required in the standard State Assistance Contract, then Section 6 must describe Clinton County's project management structure in addition to the information provided in the Work Plan.

The Project Management Plan must describe Clinton County's procedures for field oversight and specific recordkeeping, cost accounting and cost control responsibilities and procedures, and County personnel involved with the project. The Project Management Plan should describe how the County plans to identify eligible and ineligible costs, separate each category of costs in separate accounts, and maintain adequate accounting and fiscal records which will show the receipt and expenditure of all monies of the Project.

It is not mandatory that the municipal Project Management Plan as described in the standard State Assistance Contract be included with the RI/FS Work Plan. However, a Project Management Plan must be submitted and approved by this Department prior to any payments being made to the County under the EQBA Title 3 Program.

Appendix A - Sampling and Analysis Plan comments:

1. Laboratory Selection Criteria - Please note, DEC will not make any recommendation about selection of an analytical laboratory. It is the responsibility of the consultant to perform an audit and to determine the laboratory's ability to meet project specific needs. The lab chosen to do the analytical work must be familiar with NYSDEC ASP 9/89 and maintain DOH ELAP certification for all sub-categories of solid and hazardous waste.

2. Before actual sampling takes place, the consultant should submit the name and resume of data validators. Data validators must be independent of the analytical lab performing the work.

3. Because of the nature of contaminants found at the site use of dedicated or disposable sampling equipment, like bailers and trowels, is highly recommended.

4. Table 3-2, Field Blanks - Please note, the field blanks for TCL VOC's should not be preserved with 1:1 HC1 to PH <2.

In order to expedite the Remedial Investigation field work the State approves Section 5.2.1 Task 4 - Conductivity/Resistivity Survey and Section 5.2.2 Task 5 - Soil Gas Survey as described in the RI/FS Work Plan. Please make the necessary revisions to the final draft Work Plan based on the comments contained in this correspondence, and resubmit a revised final draft Work Plan within 30 days of your receipt of this letter. Along with the revised final draft Work Plan, please submit the Site Citizen Participation Plan.

The Department would also like the opportunity to review and comment on the Drilling Request for Proposals (RFP) before it is finalized. A source of clean drilling water should be identified in the RFP, and a sample from the intended source of drilling water should be analyzed prior to drilling.

If you have any questions, or would like to discuss any of the comments contained in this letter, please call me at 518-457-1641.

Sincerely,

Brian H. Davidson

Brian H. Davidson
Project Manager
Bureau of Eastern Remedial Action
Division of Hazardous Waste
Remediation

cc: W. Bingel
P. Dudden
R. Fedigan

BARTON & LOGUIDICE, P.C.
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OFFICE MANAGER:
ANNE R. PAWLICK

November 1, 1990

Mr. Brian H. Davidson
New York State Department of
Environmental Conservation
Division of Hazardous Waste
Remediation
50 Wolf Road
Albany, New York 12233-7010

Re: Mooers Landfill
RI/FS Work Plan and
Citizens Participation
Plan

File: 244.19

Dear Mr. Davidson:

Pursuant with your letter dated October 1, 1990, Barton & Loguidice, P.C., on behalf of Clinton County, has enclosed herewith the final Mooers Landfill Remedial Investigation/Feasibility Study Work Plan and ancillary documents including the Citizens Participation Program.

In addition, we have prepared a response reference checklist which addresses the NYSDEC comments pertaining to the final draft Work Plan documents submitted September 4, 1990. Both draft and final draft NYSDEC comments and the respective responses have been appended to this final Work Plan as Appendix C.

The Citizens Participation Program has been approved by Ms. Elizabeth Lowe, NYSDEC, Region 5, Citizen Participation Specialist.

If you have any further questions please feel free to contact me.

Very truly yours,

BARTON & LOGUIDICE, P.C.

Michael S. Quinn

Michael S. Quinn, P.E.
Project Engineer

MSQ/blh
cc: Mr. William Bingel

MOOERS LANDFILL WORK PLAN
NYSDEC COMMENT/RESPONSE REFERENCE CHECKLIST

Comment No.	Response to Comments
5.2.3	The surface water and sediment sampling locations S-6 and SW-7 have been adjusted to meet the NYSDEC recommendation.
5.2.11	The gas chromatograph data from analysis of the passive dosimeters proposed for air quality screening will include analysis for PCE. The inclusion of TCE was a typographical error which has been corrected to read tetrachloroethylene (PCE). Regarding the procedure outlined for calculating ambient air concentrations of benzene, vinyl chloride and tetrachloroethylene, it is Barton & Loguidice, P.C.'s (B&L) intention to submit a complete area source model calculation as a preliminary means of evaluating air quality impacts. In the event that the preliminary evaluation suggests potential impacts are present, as a result of landfill gas emissions, additional air sampling for pathway risk assessment or remedial controls will be performed during the supplement hydrogeological evaluation.
5.2.12	As per agreements made during a conference call on October 22, 1990, with Mr. Brian Davidson and Mr. Paul Carllela of the NYSDEC, B&L has made the following changes to the Ecological Evaluation text. 1. Under Terrestrial Survey, Paragraph 1, the phrase "Where possible" has been deleted. 2. Under Terrestrial Survey, Paragraph 3, the words "and described" have been inserted in the first sentence after the word "identified".

MOOERS LANDFILL WORK PLAN
NYSDEC COMMENT/RESPONSE REFERENCE CHECKLIST

Comment No.	Response to Comments
5.2.12 (Cont.)	3. Under Terrestrial Survey, Paragraph 4, the following has been inserted into the third sentence, "... toxicity testing and biotic indexing". In addition, the last sentence, same paragraph, has been restructured to read "... previously anticipated tissue analysis, toxicity testing and biotic indexing will be reconsidered".
6.0	It is not our intent that Section 6.0 fulfill the project management plan requirements stipulated as part of a standard State Assistance Contract. Rather, Section 6.0 is to serve as an outline of the project management structure. To this end, we have retitled this section as Section 6.0 - Project Management Structure to avoid any future misunderstandings. The Project Management Plan requirement outlined by the NYSDEC comment will be addressed during the State Assistance Contract Application process.
SAP - App. A	
1.	Section 5.4.2, Item 1, listed Item C "DEC recommendation" has been deleted from the text.
2.	Section 5.2.13 of the Work Plan states that the data validation will be performed by a NYSDEC approved third party subcontractor. An additional sentence has been added to the second paragraph of this section stipulating that selection of a data validator be made prior to the initial sampling event.
3.	Section 5.2.10, second paragraph, Bullet Number 3 of the Work Plan states that groundwater samples will be collected using dedicated teflon bailers. Sections 4.9 and 4.11 of the SAP state that surface water and leachate samples will be collected directly in sample containers. Lastly, Sections 4.10 and 4.2.1 of the SAP describes that a decontaminated stainless steel hand corer will be used to sample water course sediments.

MOOERS LANDFILL WORK PLAN
NYSDEC COMMENT/RESPONSE REFERENCE CHECKLIST

Comment No.	Response to Comments
SAP - App. A (Cont.)	
4.	Table 3-2 has been corrected. The reference to 1:1 HCL to PH<2 has been deleted.

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233 - 7010

Thomas C. Jorling
Commissioner

JUL 20 1990

JUL 23 1990

Mr. Michael S. Quinn
Project Engineer
Barton and Logoidice, P.C.
Box 3107
Syracuse, New York 13220

Dear Mr. Quinn:

RE: Mooers Landfill - Site No. 510005
RI/FS Draft Work Plan - June 1990

The draft RI/FS Work Plan for the Mooers Landfill, dated June 1990, has been reviewed by the New York State Department of Health and this Department. The following comments on the Work Plan were generated during the review:

1.0 Introduction - Page 1-2 - The Technical and Administrative Guidance Memorandum on Selection of Remedial Actions at Inactive Hazardous Sites, dated May 15, 1990, does not screen out alternatives based on cost.

3.0 Initial Evaluation - Page 3-3 - Department staff do not agree with the conclusion that it is most probable that surface water impacts do not reach the Eddy Road Stream Crossing. This conclusion is premature and therefore the Department recommends removing that sentence and the paragraph that follows it from the Work Plan.

3.23 Human Exposure and Toxicity - Page 3-8 - Add "methane gas and volatile compounds migrating with methane" as a potential route of exposure.

4.1 Project Objectives - Page 4-2 - Add "and any off site areas impacted by the site" after "source area" in the last bullet of the section.

The Work Plan should state on Page 4-3 that each task is described in more detail in Section 5.

4.2.2 The Department concurs that due to the difficult drilling conditions anticipated at this site, the number of borings should be limited and alternative methods to gathering information on subsurface conditions should be employed. The Department recommends that concurrent with the geophysical survey, a soil gas adsorption tube survey be performed downgradient of the site. A soil gas survey would compliment the geophysical survey and provide data which may be helpful in locating a groundwater contaminate plume, determining boring locations, and filling in data gaps.

4.2.3 Replacement of Existing Monitoring Wells - Page 4-4 - Replacement wells should be constructed of stainless steel 316, in accordance with Figure 5-2, and the locations should be shown on Figure 5.1.

4.2.4 The last sentence in the second paragraph on Page 4-5 should read "A downward (recharging) gradient...."

Page 4-6 - The anticipated approximate locations of the monitoring well couplets should be shown on Figure 5-1 or on a separate map, with the understanding that these locations are tentative and may be moved after reviewing the geophysical data and actual field conditions. In addition to the 14 new wells, three bedrock wells should be anticipated for the purposes of this Work Plan, and this should be reflected on Table 5-1.

4.2.5 Use of Multi-Cased Wells - The outer steel casing should be advanced two to four feet into bedrock and should be grouted in place.

5.1.3 Task 3 Community Relations - The Community Relations Plan should be included as a part of this RI/FS Work Plan. Enclosed for your use is a June 21, 1990 memorandum from Betsy Lowe, Region 5 Citizen Participation Specialist, which outlines the components of a Citizen Participation Plan.

5.2.1 Task 4 Conductivity/Resistivity Survey - Delete "Assuming relatively hemogeneous soils are present at the project site." Also, the conductivity or resistivity instruments that are anticipated for use on site should be identified and their capabilities discussed.

5.2.2 Task 5 - Surface Water and Sediment Sampling - It is recommended that two (2) surface water and one (1) sediment sample be added. An additional sediment and surface water sample should be taken in Beaver Meadows between SW-6 and SW-7 just before the confluence of the two streams. An additional surface water sample should be taken on the west stream, downstream from SW-2.

5.2.3 Task 6 - Borehole Drilling and Monitoring Well Construction - Page 5-7 - Changes to sampling method will be made only upon discussion with B and L geologist - add "and with NYSDEC approval."

Page 5-9- After..."drilling fluids and additives are to be noted in the field log," add "and must be preapproved by the NYSDEC."

Page 5-10 - The Work Plan should specify that no mud or additives can be used in any borings intended for use as overburden monitoring wells. Pure bentonite mud may be allowed in borings intended for bedrock wells, but only to advance a boring to rock or in exploratory borings not intended for use as monitoring wells. Revert mud should be considered for use in exploratory borings as it may hold the boring open better than bentonite.

The various drilling methologies and drilling equipment that will be acceptable for use on site should be discussed. For example, if an air rotary rig is used on site, it must be equipped with a compressor that has a two stage carbon filter to generate 100 percent oil free air and air emissions should be controlled.

Well development should also be discussed. When developing monitoring wells, readings for pH, tubridity, and specific conductance should be taken and development should continue until the readings stabilize. Borehole cuttings and well development water from off site wells should be containerized and brought back on site.

Page 5-11 - The determination of the depth of borings should be made by the B and L geologist after consultation with the on site NYSDEC representative.

Page 5-12 - Specifications should be added for the bentonite seal, and should include a one hour maximum hydration time. Also, the B and L geologist should be responsible for calculating the volumes of sand, bentonite and grout as a quality assurance check.

Figure 5-2 - Backfill at the bottom of a monitoring well, if needed, should be bentonite grout, tremied in place, with a 6-inch fine sand filter above.

Page 5-14 - The responsibilities of the B and L supervising geologist should include consultation with the on site NYSDEC representative.

5.2.4 Task 7 - Soil Sample Organic Vapor Screening - Many of the known site contaminants have a relatively high ionization potential which would require the use of an 11.7 eV probe on a photoionization detector (PID). Unfortunately, the 11.7 eV probe is very sensitive to moisture and, therefore, it has been proven to be ineffective in the field. The organic vapor analyzer (OVA) is capable of monitoring all the known site contaminants and has proven to be effective in the field. There an OVA is recommended.

5.2.8 Task 11 - Water Level Monitoring - An addition contour of seasonal low water levels would be helpful in evaluating site conditions.

5.2.9 Task 12 - Well Sampling and Analysis - Page 5-19 - Groundwater samples collected for metals analyses must not be field filtered, and should be analyzed for total metals only.

Table 5-1 - Summary of proposed analytical parameters. All SW-846 methods should be replaced by superfund CLP methods for VOA, BNA, Pest/PCB's and metals analyses. The lab chosen to do the analytical work must be familiar with NYSDEC ASP 9/89 and maintain DOH ELAP certification for all sub-categories of solid and hazardous waste.

Field Blanks - the number of field blanks should be reduced by using disposable or dedicated sampling equipment like bailers, towels, etc.

Trip Blanks - the trip blanks should be associated only with water samples for VOA analysis and the frequency is one per twenty.

There should be at least two (2) complete rounds of groundwater and surface water sampling. *Certain parameters may be deleted on the second round of sampling with concurrence from the NYSDEC.

The NYSDOH has conducted two rounds of residential well sampling in the vicinity of the site. The results of their sampling are enclosed and should be included in the RI Report.

5.2.10 Task 13 - Air Quality Quantification - The Department recommends to following three step approach:

1. Perform a methane perimeter survey of the landfill area with a combustible gas indicator with readings taken approximately 6" below grade in a hole made with a probe.

2. Traverse the site with an OVA taking readings at ground surface and plot the readings on a grid.

3. Take three or four air samples with a flux box at the locations with the highest OVA readings for analytical testing.

5.2.11 Task 14 Ecological Evaluation - Sediment criteria must be developed to evaluate analytical results. It is recommended that the equilibrium partitioning method be used as outlined in the enclosed sediment criteria guidance document.

The ecological evaluation proposed for the site should be performed following the guidelines in the enclosed Habitat Based Assessment Guidance Document. Specifically, in addition to work outlined in Section 5.2.11, the evaluation should include:

a. A description of significant resources within 2 miles of the site and downstream within 9 miles.

b. Identification of existing and potential fish and wildlife species utilizing described habitats.

c. Characterization of the streams including physical and chemical parameters.

d. Identification of fish and wildlife ARAR's.

e. Further evaluation of threatened fish and wildlife (if required) as outlined in Section II.B of the enclosed Habitat Based Assessment Guidance Document.

f. A fish and wildlife risk assessment.

5.2.12 Task 15 - Data Validation and Evaluation - The name and resume of the data validator should be submitted for review and approval. The data validator must be independent of the analytical laboratory chosen for the analysis. Please see the enclosed document entitled Data Validation Scope of Work - RI/FS Program.

5.3.2 Task 18 - Development of Alternatives - In developing remedial responses, requiring a technology to be commercially proven does not allow for innovative technology (see Page 4 of the enclosed Selection of Remedial Actions at Inactive Hazardous Waste Sites TAGM). Task 18 should generally follow the enclosed TAGM.

5.3.3 Task 19 - Supplemental Remedial Investigation Report - A general scope of work for a Supplemental Remedial Investigation and estimated costs to perform the work should be included. The supplemental RI costs should be included in the County's EQBA Title 3 Grant Application.

5.3.4 Task 20 - The first sentence should be rewritten to read "The alternatives selected as a result of the RI will generally meet the remedial objectives (see Page 5 of the Selection of Remedial Actions at Inactive Hazardous Waste Sites TAGM).

Page 5-29, Task 20, second paragraph - After "standards" add "and to evaluate cumulative effects." Also add "and will also be protective of human health and the environment."

Page 5-30 - Economics - Alternatives cannot be screened out based solely on cost at this point of the screening.

6.0 Project Schedule - The project schedule should have a starting point like Work Plan approval. It should also be shown on a bar chart or timeline.

The Work Plan should also include a project personal organizational chart, and should designate a qualified Quality Assurance Officer. The resume for the QA Officer must be included.

Sampling and Analysis Plan - Appendix A

Table 3-2 - All SW-846 methods should be changed to Superfund CLP methods from NYSDEC ASP 9/89 for VOA, BNA, Pest/PCB's and metals analyses.

ICHEM 300 or equivalent quality containers should be used for sampling.

Enclosed is a memorandum from Amitava Chakraboti which recommends considerations to be made and included in your laboratory contractual agreement.

Page 4-13 - Although the procedure recommended for split-spoon decontamination is the procedure recommended by USEPA, a shortened procedure would be acceptable since split spoon samples will be used primarily for soil identification and classification.

Health and Safety Plan Appendix B

Page 21 - An upgrade to Level B should be required if organic vapors in the work area exceed 25 ppm above background. A work stoppage should be required if organic vapors recorded in the work area exceed 50 ppm.

In Section 6.6, add "If fugitive emissions are leaving the site steps will be taken to eliminate community exposure."

Pursuant to the Order on Consent, the revised RI/FS Work Plan should be submitted 45 days from the date you receive this correspondence. Failure to submit the revised Work Plan in 45 days could jeopardize EQBA Title 3 funding.

If you have any questions, or if you would like to discuss any of the comments in this correspondence, please do not hesitate to call me at 518-457-1641.

Sincerely,

Brian H. Davidson

Brian H. Davidson
Project Manager
Bureau of Eastern Remedial Action
Division of Hazardous Waste
Remediation

cc: W. Bingel
P. Dudden
R. Fedigan, NYSDOH

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September 4, 1990

Mr. Brian H. Davidson
New York State Department of
Environmental Conservation
Division of Hazardous Waste
Remediation
50 Wolf Road
Albany, New York 12233-7010

Re: Mooers Landfill
RI/FS Work Plan

File: 244.19

Dear Mr. Davidson:

Enclosed please find a Final Draft copy of Mooers Landfill Work Plan and Appendices.

We have amended the Draft Work Plan to incorporate the NYSDEC comments as outlined by your letter dated July 20, 1990. Attached is a reference checklist which numbers each NYSDEC comment and states where corrections, alterations and additions have been made in the Final Draft Work Plan and ancillary documents.

If we can be of any further assistance, please do not hesitate to call.

Very truly yours,

BARTON & LOGUIDICE, P.C.

Michael S. Quinn

Michael S. Quinn, P.E.
Project Engineer

MSQ/blh

Enclosures

290 ELWOOD DAVIS ROAD / BOX 3107, SYRACUSE, NEW YORK 13220 / 315/457-5200 FAX 315/451-0052

MOOERS LANDFILL WORK PLAN
NYSDEC COMMENT/RESPONSE REFERENCE CHECKLIST

Comment No.	Response to Comments
1.0	Omitted phase "or too costly". See page 1-2 of Work Plan.
3.0	Omitted paragraph containing conclusion regarding extent of environmental impacts. See Section 3.1, Paragraph Nos. 6 and 7 of Work Plan.
3.23	Potential exposure route added to text. See Section 3.2.3 of Work Plan.
4.1	Editorial change made as specified. See Section 4.1 of Work Plan.
4.2.2	Soil gas survey has been added to project scope. See Section 4.2.3 of Work Plan.
4.2.3	Figure 5-3 specifies stainless steel 316 for monitoring well construction. Figure 4-1 has been added to the Work Plan showing existing and proposed monitoring well locations. Section 4.2.4 of the Work Plan reflects these changes.
4.2.4	Editorial change made as noted in Section 4.2.5 of the Work Plan. Proposed monitoring well couplet locations are shown on Figure 4-1. Refer to Section 4.2.5, Paragraph No. 3 of the Work Plan for additional discussion regarding the inclusion of three bedrock monitoring wells.
4.2.5	Multi-Cased Wells will be grouted per the NYSDEC recommendations. See Section 4.2.6 of the Work Plan for this revision.
5.1.3	Community relations Task No. 3 will comprise a Citizens' Participation Plan which will meet the minimum requirements outlined in the guidance memoranda prepared by Ms. Elizabeth Lowe, NYSDEC Region 6. See Section 5.1.3 of the Work Plan for the Citizens' Participation Plan elements.

Comment No.	Response to Comments
5.2.1	Editorial change made as specified in first paragraph of Section 5.2.1 of Work Plan. Section 5.2.1 of Work Plan refers to Section 4.3 of the SAP for an expanded discussion of the types and capabilities of the instrumentation to be utilized for the geophysical survey.
5.2.2	One sediment and two surface water sample locations have been added to Figure 5-1 per NYSDEC recommendation. See Figure 5-1 of the Work Plan.
5.2.3	The phrase "and with the NYSDEC approval" has been added to Sample Method, Paragraph No. 1 of the Work Plan. The phrase "and must be approved by the NYSDEC" has been added to Record Keeping, Paragraph No. 1, Bullet No. 4. Additional text has been added to clarify the use and restrictions regarding drilling additives. See Borehole Drilling Approach, Paragraph No. 4 of Work Plan. Borehole Drilling Approach, Paragraph No. 7 has been added to address concerns pertaining to drilling methodologies and equipment. This paragraph clearly states that an acceptable drilling methodology shall not introduce contaminants during any phase of the project. Barton & Loguidice feels it is prudent to leave the specific drilling methodology open, thereby any innovative and efficient drilling techniques will not be excluded. Discussion of various drilling methodologies and equipment would be superfluous at this point in the project. Once a driller and a proposed method have been selected, B&L will verify compliance to the conditions in Paragraph No. 7. The concerns expressed regarding well development are covered in Section 4.5 of the SAP, Appendix A. A statement directing the reader to this document has been added to the end of Section 5.2.3 of the Work Plan.

Comment No.	Response to Comments
5.2.3 continued	A statement has been added to Borehole Drilling Approach, Paragraph No. 5 regarding the procedure for establishing the borehole termination depth. B&L will consult with the NYSDEC on-site representative before selecting the termination depth. Specification of backfill materials is given in Section 4.4.6 of the SAP, Appendix A. A sentence has been added to Section 5.2.4, Monitoring Well Construction and Installation, Paragraph No. 3 directing the reader to the SAP. Section 5.2.4, Monitoring Well Construction and Installation, Paragraph No. 4, Bullet Nos. 2 and 3 place the responsibility of backfill verification onto the B&L geologist. Figure 5-2 has been revised to include the borehole backfill specification requiring a fine sand filter above a tremied or pellet bentonite seal. A seventh supervising geologist responsibility has been added to Monitoring Well Construction and Installation, Paragraph No. 4. B&L geologist shall consult with on-site NYSDEC personnel.
5.2.4	B&L personnel on site at Mooers Landfill will be trained to know the specific limitations of all instrumentation to be utilized to conduct the various project tasks. At this time B&L would like to reserve the right to select the most appropriate air monitoring equipment. The short comings as outlined by the NYSDEC are well taken, and if moisture and the use of a PID are found to be problematic, B&L will follow the NYSDEC recommendation to use an OVA.
5.2.8	A seasonal low water level contour map will be added to this task. Section 5.2.9 has been revised accordingly.

Comment No.	Response to Comments
5.2.9	Section 5.2.10, Paragraph No. 2, Bullet No. 5 has been revised to include a total metals analysis in addition to a filtered analysis. Table 5-1 has been edited to change SW-846 methods to superfund CLP methods for VOA, BNA, Pest/PCB's and metals analyses. The laboratory qualifications requirement for familiarity with NYSDEC ASP 9/89 and be DOH ELAP certified have been added to Section 5.4.1, Paragraph No. 4 of the SAP, Appendix A. The number of field blanks have been reduced since dedicated sampling equipment will be utilized when sampling groundwater. The number of trip blanks has been reduced to the NYSDEC recommended frequency of 1 per 20 samples. This frequency has also been applied surface water and sediment sampling. Table 5-1 of the Work Plan has been revised to include two complete rounds of groundwater and surface water sampling. The NYSDOH sampling and analysis data from surrounding residential wells has been filed for later submission in the RI Report.
5.2.10	Section 11, Air Quality Quantification has been revised to incorporate the recommendation made by the NYSDEC. Refer to Section 5.2.11 of the Work Plan.
5.2.11	Inserts and additional text have been added to Section 5.2.12 of the Work Plan. This material addresses the additional ecological evaluation requirements outlined.
5.2.12	The data validator has not been selected at this time. Prior to making a contractual agreement, the selected data validator must be approved by the NYSDEC as stated in Section 5.2.13 of the Work Plan. In addition, the data validator will meet the requirements outlined by the document, contained in Appendix C of the SAP, entitled "Data Validation Scope of Work - NYSDEC RI/FS Program".

Comment No.	Response to Comments
5.3.2	Section 5.3.2, Paragraph No. 1, Bullet No. 1 has been deleted from the text. Tasks 19 through Task 22 collectively follow the TAGM entitled "Remedial Actions at Inactive Hazardous Waste Sites". As stated in the Work Plan introduction, the RI/FS will be conducted in general accordance with relevant NYSDEC, Division of Hazardous Waste Remediation guidance.
5.3.3	Section 5.3.3, Paragraph No. 2 gives several examples of some potential supplemental remedial investigation tasks, and it also states that a scope of work will be prepared at the conclusion of the RI. A scope of work prepared prior to the RI will most certainly have little relevance once the data from the RI has been collected and analyzed. B&L feels it prudent to wait and establish a scope of work when specific knowledge of the site has been obtained.
5.3.4	Changes to text have been made pursuant with the NYSDEC comments. Economics as an evaluation category has been deleted from Section 5.3.4 of the Work Plan.
6.0	Section 6.0 of the Work Plan has been restructured to include a project management plan and revised schedule. A résumé of the QA/QC Officer(s) will be sent to the NYSDEC under a separate letter following this submission.
SAP-APP. A	
3.3.3	Table 3-2 has been revised to specify Superfund CLP methods of analytical analysis and the use of ICHEM 300 or equivalent sample containers.
4.4.4.1	The split spoon decontamination procedure outlined in Section 4.4.4.1, Item 10 of the SAP has been qualified to include only those samples to be submitted for analytical analysis.

Comment No.	Response to Comments
Health and Safety plant - APP. B	
6.6	Work conducted in level C protection where organic vapor concentrations do not exceed 50 ppm is typical and state-of-practice. A full-faced air purifying respirator equipped with organic vapor-acid gas combination cartridge has sufficient break through time within this range of organ vapor concentrations. The sentence as provided by the NYSDEC has been added to the text by Section 6.6 of the Health and Safety Plan.