WORK PLAN
for the
REMEDIAL INVESTIGATION
and FEASIBILITY STUDY

Sunnyside Yard
Queens, New York

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WORK PLAN for the REMEDIAL INVESTIGATION and FEASIBILITY STUDY

Sunnyside Yard
Queens, New York

March 14, 1989

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Prepared for:

National Railroad Passenger Corporation
Washington, D.C.

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ROUX

Doc #AM05502Y.2B.1

19 Wells with

11, Watertable monitoring Wells

CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

This Work Plan for a Remedial Investigation/ Feasibility Study (RI/FS) for National Railroad Passenger Corporation's (AMTRAK) Sunnyside Yard (Yard), Queens, New York was prepared by Roux Associates, Inc. (Roux Associates) in accordance with the provisions of the Order On Consent (OOC), Index #W2-0081-87-06, between the New York State Department of Environmental Conservation (NYSDEC), AMTRAK and New Jersey Transit Corporation. In addition, an Interim Remedial Measures (IRMs) Work Plan is provided to mitigate separate phase petroleum that underlies a small area of the Yard.

The original work plan was submitted to the NYSDEC on March 14, 1989. Comments from the New York State Departments of Environmental Conservation and Health were sent to Roux Associates on November 2, 1989, and a response to the comments was sent to the NYSDEC on January 3, 1990.

This revised work plan has incorporated the comments and responses to the original work plan. Changes to the March 1989 work plan are underlined to assist in the review of the document.

The initial field tasks of the Remedial Investigation (RI) are designed to address the nature, extent (including off-site) and the potential migration pathways of separate phase petroleum containing low concentrations of PCBs which has been previously identified in a limited area of the Yard (Area 1). Additionally, the RI has been designed to develop hydrogeologic, soil quality and ground-water quality information to determine the nature and extent of any other areas of contamination at the Yard.

In the event that the site-wide soil and ground-water sampling program identifies other areas of concern, a more detailed characterization of these areas can be undertaken during the Additional Field Investigations portion of the RI (Task IV).

Currently, there are no known problems with odors or Volatile Organic Compounds (VOCs). Only non-volatile polychlorinated hydrocarbons (PCBs) have been detected. Therefore, extensive air monitoring is not proposed. However, based on the results of Health and Safety air monitoring performed during field work, the need for air monitoring will be addressed and incorporated into the RI.

Information developed during the Remedial Investigation will be used to support the performance of a Feasibility Study (FS) to identify and evaluate alternatives for remedial or corrective action.

In developing the Work Plan, consideration was given to the requirements of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the United States Environmental Protection Agency (USEPA) Interim Final guidance document entitled, "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (USEPA, 1988).

The USEPA (1988) RI/FS Guidance Document incorporates requirements set forth by SARA and supersedes the following USEPA guidance documents that were developed prior to SARA.

- "Guidance on Remedial Investigations Under CERCLA" (USEPA, 1985b); and

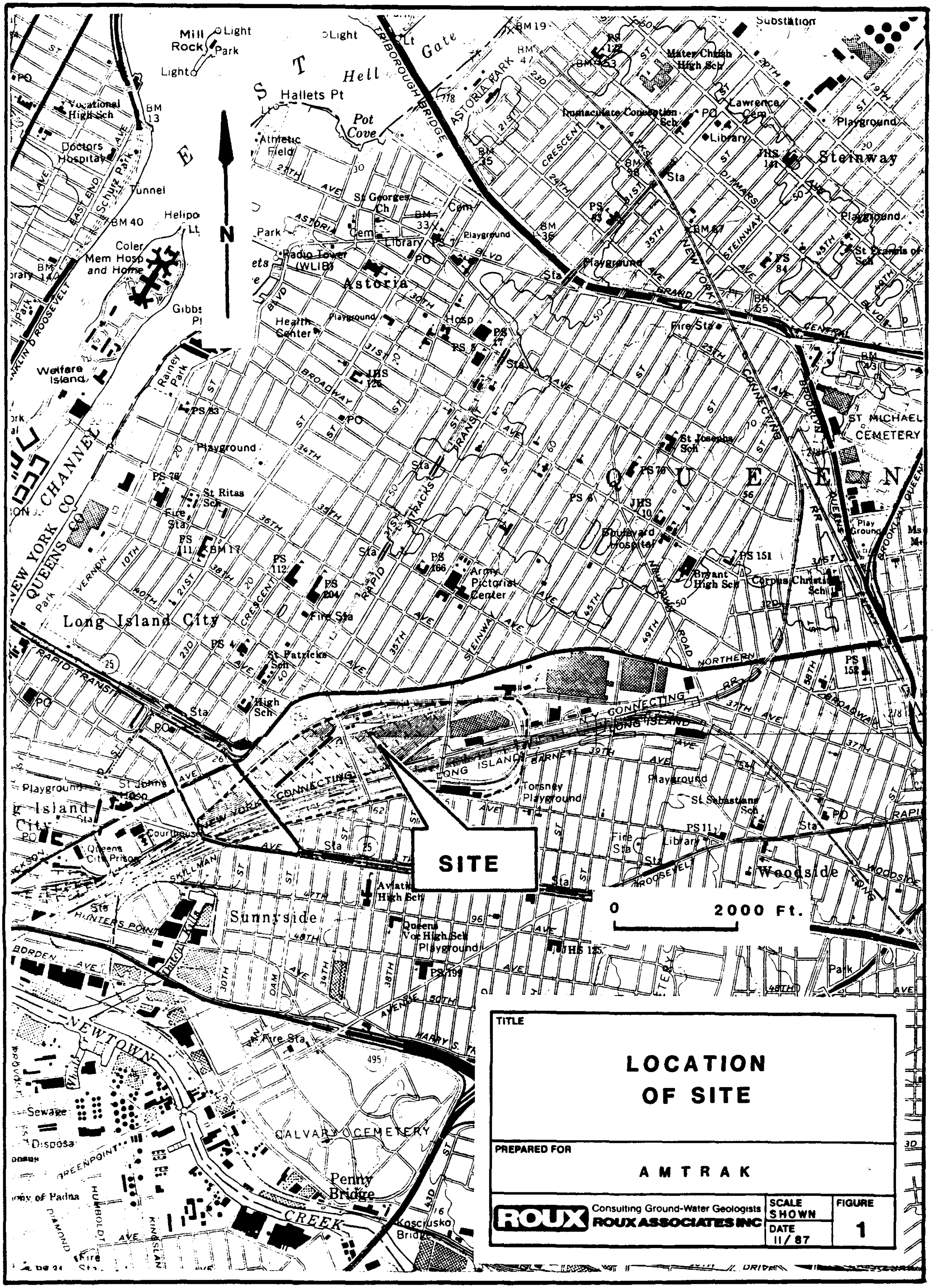
- "Guidance on Feasibility Studies under CERCLA" (USEPA, 1985a).

2.0 BACKGROUND

The Yard is located in an urban area in northwestern Queens County, New York, and is surrounded by commercial, industrial and residential areas (Figure 1). The Yard occupies approximately 105 acres and functions primarily as a maintenance facility for electric locomotives and railroad cars. Prominent structures in the Yard include car washing facilities, engine and car shops, storage buildings and offices (Figure 2). The Yard was acquired by AMTRAK on April 1, 1976 from the Consolidated Rail Corporation, which had acquired the Yard on the same date from the Pennsylvania Tunnel and Terminal Company, which owned the Yard since the 1910s.

In 1986, the consulting firm of Geraghty and Miller, Inc., Plainview, New York, was retained by AMTRAK to investigate the possibility of petroleum hydrocarbon contamination in the vicinity of the former diesel fuel storage area located in the north central portion of the Yard (Area 1). As a result of this investigation, petroleum hydrocarbon-contaminated soil and separate phase petroleum hydrocarbons were identified in a small portion of Area 1 measuring approximately 300 feet in diameter.

The probable source of the oil identified within Area 1 was leakage from the former diesel fuel storage area (Figure 3). This area contained nine underground storage tanks (USTs) with an average capacity of 10,000 gallons each. It is our understanding that AMTRAK abandoned the last of the tanks in 1984. All of the tanks have been pumped out, filled with sand and their fill pipes sealed with cement.



TITLE

LOCATION OF SITE

PREPARED FOR

AMTRAK

ROUX Consulting Ground-Water Geologists ROUX ASSOCIATES INC

SCALE	FIGURE
SHOWN	1
DATE 11/87	

PCBs were detected in separate phase petroleum hydrocarbons in concentrations ranging from 5 parts per million (ppm) to 360 ppm (Geraghty & Miller, Inc., 1986). The higher concentrations of PCBs (i.e. greater than 25 ppm) were limited to a small area adjacent to the diesel fuel storage area. The approximate extent of PCBs in separate phase petroleum in 1986 is shown in Figure 3. In addition, PCBs were detected at relatively low concentrations (less than 25 ppm) in shallow soil samples (0 to 2 feet). No PCBs were detected in any of the ground-water samples analyzed (Geraghty and Miller, Inc., 1986). It should be noted, however, that most of the ground-water samples were taken beyond the petroleum hydrocarbon (PHC) plume and that ground water beneath the area of highest PCB concentration was not tested.

Hydrogeologic information developed by Geraghty and Miller, Inc. indicates that shallow ground water underlying the Yard occurs in the Upper Glacial Aquifer and is under water table conditions. Regionally, ground-water flow in the area is in a northwest direction toward the East River. Ground water in aquifers underlying the area is not used for domestic or industrial purposes because of generally poor water quality resulting from regional salt water intrusion and inorganic and organic contamination from industrial sources (Buxton et al, 1981).

In addition to Area 1, 15 other areas at the Yard (Figure 2) have been identified by Roux Associates as possible sources of contamination based on the results of site inspections and discussions with AMTRAK personnel. A brief description of the each of the remaining 15 areas is provided below.

Area 2: Material Control Area - The material control area was used for the temporary, outside storage of new materials and supplies received at the Yard.

Area 3: Gas Tank Area - The gas tank area is comprised of UST used to store gasoline for the fueling of AMTRAK road vehicles.

Area 4: Fuel Oil Tank Area - The fuel oil tank area is comprised of an underground fuel oil tank used to store heating oil for the facility boiler.

Area 5: Transformer Area - Two transformers containing PCBs are located in this area.

Area 6: Storage Area - The storage building and outside storage platform are located in this area. Various waste materials contained in drums are temporarily stored in the building and on the storage platform.

Area 7: Drum Storage Area - The drum storage area contains both paved and unpaved areas and is used to store drums containing waste materials.

Area 8: Transformer Area - The transformer area contains two transformers that use oil containing PCBs.

Area 9: Compressor Area - The compressor area is comprised of an air compressor and fuel oil storage tank used to operate the compressor. Soil stains have been observed on the ground surface surrounding these units.

Area 10: Transformer Area - One PCB transformer is located in this area.

Area 11: Empty Drum Area - The empty drum area is used to temporarily store empty, 55-gallon drums.

Area 12: Car Washer Area - The car washer area is used to wash railroad cars entering the Yard.

Area 13: Storage Area - Several transformers which do not contain PCBs are stored in this area.

Area 14: Empty Drum Area - This area is used to store empty 55-gallon steel drums on a concrete pad.

Area 15: Empty Drum Area - Empty 55-gallon steel drums are stored on the ground in this area.

Area 16: Underground Storage Tank Area - Twelve gasoline USTs are in this area. The tanks are currently empty and are scheduled for removal.

<u>Additional areas may be identified during the random soil sampling phase of the RI (Task III)</u>.

3.0 INTERIM REMEDIAL MEASURES

In accordance with the OOC, Roux Associates has developed an Interim Remedial Measures (IRMs) Work Plan designed specifically to recover separate phase petroleum hydrocarbons detected in Area 1 of the Yard (Figure 3). The proposed IRMs are based on Roux Associates' review of site-specific hydrogeologic and contaminant information that was developed during a previous investigation.

3.1 Objectives

The objectives of the IRMs Work Plan are to minimize the flow of separate phase petroleum hydrocarbons from the former diesel fuel storage area (Area 1). All IRMs work will be performed in a manner that does not interrupt Yard operations. Separate phase petroleum, contaminated soil or ground water recovered/excavated during these remedial efforts will be disposed offsite in accordance with applicable State and Federal regulations. The IRMs are temporary measures and will be terminated when AMTRAK and New Jersey Transit determine that such measures are no longer effective, needed or appropriate. The final remedial alternative will be selected during the FS.

3.2 Scope of Work

Based on information developed during a previous investigation, (Geraghty and Miller, Inc. 1986), a small area of the Yard located near the former fuel storage area (Figure 3) has been identified as having PCB levels in excess of 25 ppm. The highest concentrations of PCB contamination were detected near monitoring wells MW-4 (320 ppm), MW-5 (150 ppm) and MW-7 (360 ppm).

The IRM will be conducted in phases. The first step will be to recover the PCB contaminated oil in the area near the former fuel storage area (Figure 3).

IRMs designed to recover separate phase petroleum hydrocarbons in this area will be comprised of 3 large diameter (approximately 4 feet) recovery sumps at locations shown in Figure 3. Each recovery sump will be constructed of precast, perforated concrete rings, which will be stacked to a depth of approximately 6 to 8 feet below land surface so that the recovery sump will penetrate several feet into the water table. The annular space between the concrete rings and the outer soil wall will be backfilled with a coarse gravel to prevent siltation of the recovery sumps. The sumps will be covered to provide for safety and to prevent odors.

A product-only, "scavenger-type" recovery pump will be installed in each recovery sump. Based on the apparent thicknesses of separate phase petroleum hydrocarbons measured previously in this area (greater than 4 feet in thickness), it is anticipated that the operation of the product-only pumps will generate a significant gradient toward the recovery sumps.

The petroleum hydrocarbons will be discharged from the recovery sumps into appropriate above-ground storage tank(s) and/or drums, and disposed in accordance with applicable

Resource Conservation and Recovery Act (RCRA), NYSDEC (Part 371) and Toxic Substances Control Act (TSCA) regulations.

Additional sumps can be installed to recover oil that cannot be captured by the sump system described above.

3.3 Performance Monitoring

Water level and product accumulation information will be developed to monitor the effectiveness of the IRMs in reducing separate phase petroleum hydrocarbon accumulations in ground water underlying Area 1. Water level and separate phase thickness measurements will be made on all existing monitoring wells located in Area 1 at weekly intervals for the first month following system startup and on a monthly basis thereafter during the performance of the IRMs. This information will be utilized to refine, if necessary, the design of the IRMs to effectively capture the petroleum hydrocarbons. In addition, oil samples will be collected from monitoring wells MW-1, MW-2, MW-3, MW-5, MW-7, MW-8, MW-9, MW-10 and MW-15 prior to system startup and quarterly thereafter to establish the present extent and magnitude of PCB contamination. All oil samples collected will be analyzed for PCBs.

3.4 Contingency Plans

If oil chemistry, water level and product accumulation information obtained in connection with the performance monitoring evaluation indicate that separate phase petroleum hydrocarbon contamination extends beyond the lateral extent of the recovery sumps cone of influence, the capacity of the system may be increased by installing ground-water depression pumps. If ground-water recovery is considered desirable and/or necessary, ground-water quality information will be developed and submitted to the New York City Department of Environmental Protection (NYCDEP) to determine if untreated ground water can be discharged directly to the sewer system.

Finally, use of existing or proposed monitoring wells as recovery wells may become desirable to enhance separate phase petroleum hydrocarbon recovery efforts. This decision will be made following the evaluation of the effectiveness of the IRMs.

4.0 REMEDIAL INVESTIGATION SCOPE OF WORK

The RI is designed to develop information on the nature and extent of contaminants and the hydrogeologic characteristics of the Yard. These data will be used during the FS to identify and evaluate remedial alternatives.

The RI scope of work is organized into the following tasks to permit the efficient acquisition of data necessary to support the FS and to assist in refining the scope of subsequent tasks.

- o TASK I: Reconnaissance Program - The reconnaissance program will include the review of existing information, interpretation of historical aerial photographs, a review of facility records regarding potential spills and operations history and the inspection of existing monitoring wells.

- o TASK II: Hydrogeologic Investigation - This task consists of a facility-wide hydrogeologic investigation and additional investigations of Area 1 to characterize the shallow ground-water system underlying the Yard. This investigation will aid in understanding contaminant migration at the Yard for use in evaluating both baseline Yard conditions and the impact of remedial alternatives.

- o TASK III: Soil Investigation - This task consists of a soil sampling program designed to determine the extent of soil contamination in areas of concern (excluding Area 1) at the Yard. Information developed from this program will be used to identify potential contaminant source areas.

- TASK IV: Subsequent Field Investigations - The presence of potential sources identified during these soil and ground-water investigations (TASKS I, II and III) will be, if necessary, investigated in greater detail through additional soil and ground-water delineation work.

4.1 Project Operation Plans

Project operation plans have been prepared which outline standard operating procedures to be followed during the performance of the RI/FS. These plans are included as Appendices to the Work Plan.

	Project Operations Plans	Appendix
o	Health and Safety Plan	A
o	Sampling and Analysis Plan	B
o	Site Management Plan	C
o	QA/QC Plan	D

4.2 TASK I: Reconnaissance Program

A reconnaissance program will be performed to develop and evaluate preliminary information necessary to characterize Yard conditions. Specifically, the reconnaissance program consists of:

- the review of all available hydrogeologic information pertinent to characterizing hydrogeologic conditions at the Yard, including a review of regional hydrogeologic and ground-water studies and any previous environmental reports;

- the review of historical aerial photographs to identify any features (e.g. existing or former oil storage facilities, soil staining, etc.) that may represent a potential source area for petroleum hydrocarbon contamination;

- the review of facility records and plans to identify potential spill areas and determine facilities operation histories;

- identify to the extent possible, types of materials stored in the new materials and waste storage areas (areas 2, 6 and 7).

- the preparation of detailed small scale (i.e. approximately 1 inch is equal to 40 feet) and large scale (i.e. approximately 1 inch is equal to 100 feet) base maps of the Yard;

- the inspection and inventory of existing monitoring wells to identify locations where resurveying, well repairs or well redevelopment is necessary; and

- the measurement of water levels and product accumulations in all existing monitoring wells at the Yard.

o A review of existing storm sewer maps, topographic maps, aerial photographs, and field reconnaissance will be undertaken to locate and map out drainage pathways. Based on the information obtained, a decision will be made as to whether additional sampling is necessary to meet the objectives of the RI.

4.3 TASK II: Hydrogeologic Investigation

A comprehensive investigation of hydrogeologic, soil quality and ground-water quality conditions will be conducted at the Yard to provide information on site-wide soil and ground-water conditions. Hydrogeologic properties of the Upper Glacial Aquifer underlying the Yard will be determined by measuring water levels, field and laboratory testing of permeabilities and the field examination of the lithologic characteristics of soil samples. Soil boring, well installation and all sampling procedures are discussed in detail in the Sampling Analysis Plan (Appendix B). Hydrogeologic information developed during the RI study will be used during the FS to assist in developing and evaluating remedial alternatives.

4.3.1 Facility-Wide Hydrogeology

Eleven water-table monitoring wells (MW-24 through MW-34) and twenty-five soil borings (S-16 through S-40) are proposed at locations shown in Figure 2 to develop site-wide hydrogeologic and soil and ground-water quality information.

All monitoring wells will be installed according to the procedures outlined in Appendix B. In general, water-table monitoring wells will be constructed of 4-inch diameter PVC screen and casing. If required by the NYSDEC, 304 stainless steel screens will be used instead of the PVC screens. Well screens will extend approximately two feet above the water table to monitor any separate phase hydrocarbons which may be present.

Hollow-stem auger drilling rig equipment will be used to install the monitoring wells and soil borings. Split-spoon core barrel samples will be collected continuously (every 2 feet) from land surface to the water table, and every 5 feet below the water table. The lithology of the core samples will be described and will be screened in the field for the presence of volatile organic compounds (VOCs) and petroleum hydrocarbons through visual examination and the use of portable VOC detection equipment (i.e. photoionization detectors).

A minimum of one discrete soil sample per well/boring location will be selected for analysis for petroleum hydrocarbon compounds (PHCs). The surface sample (0 to 2 feet) will be analyzed, and in wells or borings where the water level is deep, the sample just above the water table will also be analyzed. Sample selection will be biased toward intervals that exhibit visual evidence of contamination or elevated photoionization detector (PID) measurements. In addition, approximately seven samples (i.e. representing approximately 20 percent of the total samples collected) will also be analyzed for Superfund Target Compound List (TCL) PCBs and lead. All chemical analyses will be performed by a Contract Laboratory Program (CLP) approved laboratory.

Slug tests will be performed on selected monitoring wells to develop site-specific hydraulic conductivity (permeability) information. In addition, where feasible, Shelby tubes will be collected during the installation of monitoring wells for laboratory measurement of vertical and horizontal permeabilities to supplement the slug test data. Published permeability information, where available, will also be reviewed for comparison with the range of permeabilities developed in connection with the field testing program. This information, together with the determination of hydraulic gradient data, will be utilized to determine probable rates of ground-water movement.

Following the installation and development of the proposed monitoring wells, a comprehensive round of ground-water samples will be collected from all newly installed monitoring wells according to the procedures outlined in Appendix B. All ground-water samples will be analyzed for PHCs (USEPA Method 418.1) and TCL PCBs (USEPA Method 625).

4.3.2 AREA 1: Former Fuel Storage Area

Eight additional monitoring wells and 15 soil borings (Figure 3) are proposed for installation in Area 1 to further define the extent of separate phase oil, both onsite and offsite. Justifications for the monitoring well locations are provided below.

WELL NUMBER	JUSTIFICATION
MW-16 and MW-17	Determine shallow ground-water quality and flow conditions and the extent of separate phase product, downgradient of the former fuel storage area.
MW-18, MW-19, MW-20 and MW-21	Determine shallow ground-water quality, ground-water flow and separate phase product accumulations, downgradient and offsite from the former fuel storage area.

MW-22	Determine shallow ground-water quality, ground-water flow and separate phase product accumulation information upgradient of the former fuel storage area.
MW-23	Determine water level information and ground-water quality information in deeper deposits.

A minimum of one discrete soil sample per monitoring well/soil boring location will be selected for analysis for PHCs and TCL PCBs. In addition, approximately five of the soil samples (representing twenty percent of the total samples collected) will also be analyzed for lead.

All soil samples will be screened for VOCs with a photoionization meter. Sample selection will be biased toward intervals that exhibit visual evidence of contamination or elevated photoionization detector (PID) measurements.

Following the installation of all proposed monitoring wells in Area 1, a round of ground-water and oil samples will be collected to characterize ground-water quality conditions. Oil samples will be collected from all monitoring wells containing free product and will be analyzed for TCL PCBs, specific gravity and kinematic viscosity. In addition, ground-water samples will be collected from the following monitoring wells:

o MW-16	o MW-23
o MW-17	o MW-1
o MW-18	o MW-3
o MW-19	o MW-5
o MW-20	o MW-7
o MW-21	o MW-9
o MW-22	o MW-13

Targeted compound list

All ground-water samples collected in Area 1 will be analyzed for PHCs and TCL PCBs. In addition, ground-water samples collected from monitoring wells MW-1, MW-5, MW-7, MW-9, MW-17, MW-18 and MW-22 will be analyzed for lead, TCL VOCs plus 15 additional peak library search (USEPA Method 624) and base/neutrals (BNs) plus 15 (USEPA Method 625). These expanded library search analyses are recommended because a significant component of dissolved phase, fuel oil-related contaminants are non-targeted compounds (Kramer and Hayes, 1987).

4.4 TASK III: Soil Investigation

4.4.1 Soil Boring and Sampling

Soil quality conditions in additional areas of concern (Area 2 through Area 15) will be investigated through the drilling and sampling of 55 (S-41 through S-95) soil borings (Figure 2).

All soil borings will be drilled to a depth of approximately ten feet below land surface. The lithology of the core samples will be described and will be screened in the field for the presence of VOCs and PHCs through visual examination and the use of portable VOC detection equipment (i.e., photoionization detectors). Split-spoon sampling and field screening procedures are provided in Appendix B.

4.4.2 Types of Analyses

A minimum of one discrete sample collected from each borehole will be analyzed for PHCs. Samples collected near transformers (Areas 5, 8, 10 and 13) will also be analyzed for TCL PCBs.

TCL analyses at those areas where materials other than PCBs may have been stored and at several random locations across the Site will be conducted. These areas and sampling locations (shown on Figures 2 and 3) are outlined below:

	Soil	Ground Water
Area 2/Material Control Area	S-43	MW-28
Area 6/Storage Area	S-63	MW-9
Area 7/Drum Storage Area	S-69	MW-9 (same as area 6)
Area 11/Empty Drum Area	S-71	MW-33
Area 14/Empty Drum Area	S-80	--
Area 15/Empty Drum Area	S-82	MW-25
Area 15/Underground Storage Tank Area	S-90	MW-32
Area 1/Former Diesel Storage Area	-	MW-23 (Deeper Well) MW-16 (Shallow Well)
Random Sampling Locations	S-22, S-30 S-33, S-37 S-39	MW-29, MW-34

(Note: The TCL metals fraction will include all analyses specified and not just lead.)

The analytical data from surface samples (0-2 feet below land surface) will be used to evaluate the potential for direct contact exposure pathway and for contamination of surface runoff. As the vadose zone is thin (approximately 5-8 feet), these surface samples will be adequate to evaluate if any impacts to vadose zone soils have occurred.

4.4.3 Soil Gas Survey

To address the concern of possible migration of subsurface vapors into nearby buildings, a soil gas vapor program will be designed following the delineation of the extent of separate phase PHCs. This survey will be conducted in the areas shown on Figure 3 (near the Engine House, Metro Shop and along the southern edge of the offsite buildings between proposed wells MW-19 and MW-21). The survey will start with a large grid (100 L feet on centers) and based on the results obtained in the field, areas of high readings will be broken down into a smaller grid. Additional sampling points will be selected based on the field results. For quick results in the field, a photoionization meter will be used. The protocol for volatile organic screening using vapor probes is included in Appendix B, Sampling and Analysis Plan.

4.5 TASK IV: Subsequent Field Investigations

Based on hydrogeologic, soil and ground-water quality information developed during TASKS I, II and III, data gaps may be identified where additional site-specific delineation work is needed to define Yard conditions. Following the completion of these tasks, to the extent necessary, a revised sampling plan will be developed and submitted to the NYSDEC as an addendum to this Work Plan.

4.6 Remedial Investigation Report

At the completion of the RI, a draft report will be prepared which includes all of the data collected during the investigation together with findings and conclusions. The report will summarize Yard characteristics to support the FS and will follow the suggested USEPA format (USEPA, 1985b). It will be submitted to and reviewed by the NYSDEC in accordance with the OOC.

5.0 FEASIBILITY STUDY

The Feasibility Study (FS) is the process designed to evaluate and select the appropriate remedial response for the Yard. Data collected during the RI to characterize Yard conditions will be used in the FS to identify, screen and evaluate remedial alternatives suitable for site-specific conditions.

This FS Scope of Work was developed in accordance with applicable USEPA guidance documents for conducting RI/FS investigations, (USEPA 1985a; 1985b; and 1988) the NCP and the 1986 SARA amendments.

5.1 Applicable, Relevant and Appropriate Requirements

Applicable, relevant and appropriate requirements (ARARs) will be developed during the performance of the FS to assist in selecting cleanup objectives, if necessary. Preliminary ARARs for ground water at the Yard will include New York State ground-water classifications and quality standards (Parts 703) for ground water. For New York State the water quality standards is 0.1 ug/l (6 NYCRR 703). Preliminary ARARs for soil and separate phase petroleum hydrocarbons will be TSCA, PCB spill cleanup policy, RCRA requirements outlined in 40 CFR Part 261, and 6 NYCRR Parts 370-373. The current New York State Standards for soild is 10mg/kg for total PCB's. However, during the FS, acceptable concentrations for PCBs in surface soil will be determined using risk assessment based on soil concentration, oral carcinogenic potency factor, ingestion rate, and exposure period. Air quality is not expected to be a problem at the Yard, so ARARs for air will not be evaluated except as required for any proposed treatment program which creates an air emission source.

The list of ARARs will be submitted to the NYSDEC during the FS and will include chemical location and action specific ARARs.

5.1.1 Chemical-Specific ARARs

To assist in establishing cleanup levels for chemicals of concern at the Yard, preliminary ARARs will be determined. An example of a chemical-specific ARAR is a RCRA maximum concentration limit.

5.1.2 Location-Specific ARARs

Location-specific ARARs set restrictions on remedial activities which are dependent on the characteristics of the Yard or its immediate environment. The universe of location-specific ARARs can be significantly reduced after a site inventory is conducted to evaluate the applicability of other environmental laws to the Yard. An example of a location-specific ARAR is the National Historic Preservation Act of 1966 (NHPA).

5.1.3 Action-Specific ARARs

Action-specific ARARs generally set performance, design or other similar controls or restrictions on particular types of activities related to management of hazardous substances or pollutants. Examples of action-specific ARARs are RCRA and Clean Water Act requirements.

5.2 General Response Actions and Associated Technologies

General response actions are identified using Site-specific information developed during the RI. The associated remedial technologies are similar to those provided in the USEPA Guidance Document entitled "Guidance on Feasibility Studies Under CERCLA" (USEPA, 1985a).

Specific technologies that will be included are those which will address the SARA, Section 121 (B) preferences for permanence and alternatives which result in permanent decreases in one or more of the waste characteristics. In addition, associated containment or disposal requirements of potential treatment technologies will be identified.

5.2.1 Identify and Screen Technologies

Specific remedial technologies will be identified in each general response category. Identified technologies may address both source control and management of migration measures. Examples of general response actions and related technologies are provided below.

GENERAL RESPONSE ACTION	TECHNOLOGIES
No Action	----------

Containment	Capping;ground-water containment barrier walls; bulkheads; gas barriers.
Pumping	Ground-water pumping; liquid removal; dredging.
Collection	Sedimentation basins; French drains; gas vents; gas collection systems.
Diversion	Grading; dikes and berms; stream diversion ditches; trenches; terraces and benches; chutes and downpipes; levees; seepage basins.
Complete Removal	Tanks; drums; soils; sediments; liquid wastes. On-site treatment Incineration; solidification; land treatment; biological, chemical, and physical treatment.
Off-site Treatment	Incineration; biological, chemical, and physical treatment
In-Situ Treatment	Permeable treatment beds; bioreclamation; soil flushing; neutralization; land farming.
Storage	Temporary storage structures.
On-site Disposal	Landfills; land application.
Off-site Disposal land application.	Landfills; surface impoundments;

The suitability of remedial technologies for the Yard will be evaluated using site-specific data developed during the RI. Remedial alternatives which are technologically unfeasible because of site-specific conditions will be eliminated from further consideration during this stage of the FS.

5.2.2 Development of Alternatives

Technologies that have passed the screening stage will be combined, where appropriate, to form remedial alternatives. The remedial alternatives considered will include:

- alternatives for off-site treatment or disposal;
- alternatives for on-site treatment, containment or disposal;
- alternatives which attain or exceed applicable and/or relevant public health or environmental standards;
- alternatives which do not attain applicable and/or relevant public health or environmental standards, but reduce the likelihood of present or future threat from the hazardous substances. This will include an alternative which closely approaches the level of protection provided by the ARARs; and
- no action.

5.3 Initial Screening of Remedial Alternatives

Following the development of remedial alternatives designed to mitigate contamination at the Yard, alternatives will be screened according to the following criteria.

1. Effectiveness - Adverse effects on the environment or public health will preclude further consideration of a remedial alternative. Those alternatives that satisfy the objectives of the FS and substantially contribute to the protection of public health and the environment will pass the screening process.

2. Implementability/Acceptable Engineering Practices - Remedial alternative technologies will be evaluated to determine if they are feasible for the location and conditions of the release, are applicable to the problem, represent a reliable means of addressing the problem and will achieve the objectives in a reasonable time period.

3. Cost Considerations - Alternatives will be screened based on cost considerations. An alternative that far exceeds the cost of other alternatives evaluated and does not provide substantially greater public health protection, environmental protection or technical reliability will be excluded from further consideration. Cost estimates will be based on site-specific conditions and will be screened based on a consideration of capital, operating and maintenance costs and a present worth analysis.

5.4 Detailed Analysis of Remedial Alternatives

A detailed evaluation will be performed for all remedial alternatives that pass the initial screening process. The detailed analysis of each remaining remedial alternative will be followed by a comparative evaluation to permit the selection of the preferred alternative. The detailed analysis will provide information for the following criteria:

- o effectiveness;
- o implementability;
- o costs; and
- o institutional concerns.

These criteria are discussed below.

5.4.1 Effectiveness

The expected effectiveness of each remedial alternative will be determined for the following major categories:

1. Protection of Human Health and the Environment - The factors to be considered in determining the degree of protection provided by each remedial alternative are primarily the elimination or reduction of releases or potential releases, the potential adverse environmental impacts and mitigation of those potential impacts.

2. Compliance with ARARs - Each alternative will be evaluated to establish if the elimination or reduction of potential or existing releases exceeds or attains

ARARs. This evaluation includes considering the long term requirements and goals of the Solid Waste Disposal Act.

3. Reduction in Volume, Toxicity and Mobility - Each remedial alternative will be evaluated to determine the potential for the alternative to reduce the volume, toxicity and mobility of the hazardous substances, pollutants and contaminants. The assessment includes determining volume reduction capabilities, the degree to which the treatment is irreversible (i.e., destruction capability) and treatment residuals.

4. Short Term and Long Term Effectiveness - The short term exposure risks and environmental risks of each alternative will be evaluated in terms of considering the reduction of existing lists and the time required to achieve protection. The long term effectiveness/permanence of the alternatives will be factors considered for each alternative and will include issues such as the type and degree of long-term management required.

5.4.2 Implementability

A detailed analysis of the technical aspects of each remedial alternative will be performed for each of the following considerations:

1. Performance - Performance is evaluated according to each remedial alternative's ability to perform desired functions (effectiveness) and the length of time the effectiveness can be reasonably maintained (useful life).

2. Reliability - Reliability is evaluated according to operation and maintenance requirements and demonstrated and expected reliability. Operation and maintenance requirements include the frequency and complexity of operation in maintenance and the availability of labor and materials. Demonstrated and expected reliability is based on previous experience at other sites.

3. Implementability - Implementability includes construction considerations and the time required to implement the remedial alternative. Construction considerations include, but are not necessarily limited to site conditions and equipment availability, ease of permitting and time constraints. The time factor will include consideration of implementation (scheduling) requirements and time needed to provide beneficial results.

4. Safety - Safety is evaluated in terms of the threat to nearby receptors and workers implementing the remedial alternative.

5.4.3 Costs

A detailed cost analysis will be prepared for each alternative and the potential for future remedial costs if the alternative remedial action were to fail. The following will be included in the cost analysis for each remedial alternative:

- capital, operating and maintenance costs; and
- present worth analysis (calculate annual costs and present worth).

5.4.4 Institutional

Institutional factors such as regulatory requirements, permits, community relations and corporate concerns regarding each alternative will also be presented.

5.5 Feasibility Study Report

A draft report which provides details on the development, screening, detailed analysis and comparative evaluation of the remedial alternatives will be prepared following USEPA guidance formats (USEPA, 1988). It will be submitted to and reviewed by the NYSDEC in accordance with the OOC.

6.0 REFERENCES

Buxton, H.T., Soren, J., Posner, A. and P.K. Shernoff, 1981. Reconnaissance of the Ground-Water Resources of Kings and Queens Counties, New York. U.S. Geological Survey Open-File Report 81-1186.

Geraghty and Miller, Inc., 1986. Results of Hydrogeologic Investigation at the AMTRAK, Sunnyside, Queens, New York Train Yard.

Kramer, W.H. and T.J. Hayes, 1987. Water Soluble Phase of Number 2 Fuel Oil: Results of Laboratory Mixing Experiment. New Jersey Geological Survey Technical Memorandum 87-4.

USEPA, 1985a. Guidance on Feasibility Studies Under CERCLA. EPA/540/G-85/003.

USEPA, 1985b, Guidance on Remedial Investigations Under CERCLA. EPA/540/G-85/002.

USEPA, 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. OSWER Directive 9335.3-01.

APPENDIX A

APPENDIX A

Health and Safety Plan

APPENDIX A

Health and Safety Plan

1.0 INTRODUCTION

This plan outlines health and safety procedures to be followed by Roux Associates, Inc.'s (Roux Associates) employees and subcontractors hired by Roux Associates during any site investigation and cleanup activities performed at the Yard. This health and safety plan was developed in accordance with current OSHA guidelines outlined in 29 CFR Part 1910.

These procedures include emergency chain of command, personnel protective equipment, basic safety equipment, air monitoring, training program, employee medical surveillance program, and decontamination of personnel and equipment.

A Health and Safety Officer (HSO) will be appointed to ensure all that all Health and Safety Plan (HASP) activities are correctly implemented. The HSO's resume will be submited to NYSDEC prior to the start of the investigation.

2.0 EMERGENCY PROCEDURES

If a medical emergency occurs, only limited first aid will be available onsite. If the victim(s) cannot be transported without substantial risk, call for an ambulance. If the victim(s) can be transported without substantial risk of additional injury, the nearest hospital is :

Astoria General Hospital
25-10 30th Avenue
Astoria, NY
General Number : (718) 932-1000

2.1 Emergency Phone Numbers

In case of the need for emergency help, the following phone numbers will be maintained at the site:

Police Emergency	911
AMTRAK Police	(212) 560-7113 (ATS: 521-7113)
AMTRAK Environmental Control	(212) 560-7249
AMTRAK Yard Facility Manager	(212) 560-7565
Fire Emergency	847-6600
Ambulance	911
Poison Control Center	(800) 962-1253
National Response Center	(800) 424-8802

2.2 Chain of Command

In case of difficulties at the site requiring notification of Roux Associates the following is Roux Associates' contacts listed in order of priority:

Roux Associates, Inc.
775 Park Avenue, Suite 255
Huntington, New York 11743
(516) 673-7200

Bhoj Roopnarine, P.E., Roux Project Manager
Home Phone Number (201) 338-4830

Roux Health and Safety Officer (To Be Appointed)

3.0 PERSONNEL PROTECTIVE EQUIPMENT

Based on the available information, it is anticipated that a modified version of Level D protection will be adequate for most tasks to be performed at the site.

The modified level D protection will consist of:

(a) Coveralls, disposable (poly-coated Tyvek)

(b) Gloves, chemical resistant, disposable

(c) Boots, chemical resistant, disposable

(d) Hard hat

(e) Safety glasses or ~~chemical~~ splash goggles.

A photoionization analyzer will continuously monitor the work zone for changes in organic vapor levels. Level D areas are defined as areas where gross ambient organic vapor levels (monitored on a real time basis) are from site background to 5 ppm.

Level D protection will be upgraded to Level C protection if concentrations of organic vapors exceed 5 parts per million (ppm) or toxic airborne substances are known or suspected.

Level C areas are defined as areas where gross ambient organic vapor levels (monitored on a real-time basis) are greater than 5 ppm but less than 500 ppm or where the presence of toxic airborne substances are known or suspected.

Level C Protection consists of:

(a) Full face air-purifying respirator (OSHA/NIOSH approved)

(b) Coveralls, disposable (poly-coated Tyvek or Saranex)

(c) Gloves, chemical resistant, disposable (taped to coveralls)

(d) Boots, chemical resistant, disposable (taped to coveralls)

(e) Hard hat

Work will cease if levels of organic vapors exceed 500 ppm. If this condition persists in the work zone, the work plan will be modified to a higher level of protection.

When the possibility exists that explosive gases may be released from the soils during excavation and drilling operations, the atmosphere will be monitored with an explosimeter. When levels approach the lower explosive limit (25 percent L.E.L.), work will cease until explosive gases have sufficiently dispersed.

It will be the responsibility of the senior on-site Roux Associates representative to inform all on-site Roux Associates personnel of the level of personnel protection required in all work situations. All contractors and subcontractors are responsible for supplying their personnel with the necessary safety equipment.

Basic safety equipment will be kept on-site for monitoring and responding to emergency situations. In addition to equipment previously mentioned, basic safety equipment will include, but is not limited to, the following:

(a) portable eye wash

(b) ABC type fire extinguishers

(c) first aid kits

(d) photoionization analyzer

4.0 EMPLOYEE MEDICAL SURVEILLANCE PROGRAM

All Roux Associates employees involved in field operations have had medical examinations. Follow-up exams are conducted at a frequency of every 12 months for employees involved in field investigations. All contractors and subcontractors are responsible for their own medical surveillance programs.

5.0 TRAINING PROGRAM

All personnel who enter work zone (the designated area where activities are being performed pursuant to this Work Plan) must have received a minimum of forty hours of comprehensive health and safety training in accordance with 29 CFR Part 1910. An EPA-approved health and safety training seminar was attended by Roux Associates' personnel at the Westchester County Fire Training Center in Valhalla, New York. All contractors and subcontractors will assume responsibility for the training of their personnel.

It will be required that all Roux Associates personnel (including all contractors and subcontractors) scheduled to perform work in the work zone review a copy of this Health and Safety Plan.

In addition to the procedures outlined in this Plan, all Roux Associates personnel (including all contractors and subcontractors) will be informed of any applicable Yard safety rules to be observed while working at the Yard.

6.0 DEFINITION OF WORK AREAS AND DECONTAMINATION PROCEDURES

Based on health and safety considerations, certain areas at the Yard where soil sample collection is being conducted may be considered a restricted "workzone" while work is taking place. If restricted access is necessary, the appropriate work zone, including but not limited to any drill rig and all associated sampling equipment located therein, will be a restricted access area. Entry to and exit from the work zone will be provided only to those persons directly involved in tasks associated with the work plan and only if the prescribed level of personnel protection is worn. Prior to leaving a restricted access area all personnel and equipment will be decontaminated.

<u>If 5 ppm is exceeded in the work (exclusion) zone, air monitoring will be undertaken between the exclusion zone and the nearest downwind, non-RI related target population. Work will be suspended if readings exceed 5 ppm outside of the exclusion zone.</u>

Areas are defined as levels C or D corresponding to the level of personnel protection required for each situation.

6.1 Restricted Access Area Level D

Level D access will be areas in which no health hazards are known to exist and where organic vapor concentrations are below 5 ppm. All Roux Associates personnel entering the work zone are required to be wearing Level D personnel protection as described in Section 3.0 of this Health and Safety Plan.

Decontamination procedures prior to leaving Level D areas will consist of brushing loose soil from clothing and equipment, and washing equipment with mild detergent and water. Disposable gloves, boots, scoops, paper towels and Tyvek suits will be discarded in the trash receptacles provided within these areas. Drill rigs will be brushed clean of soil and, if necessary, proceed to the heavy equipment cleaning zone.

6.2 Restricted Access Area Level C

Level C access will be those areas where organic vapors exceed 5 ppm (but less than 500 ppm), or where the presence of toxic airborne substances are known or suspected to exist.

Entry to Level C areas will be provided only to those Roux Associates and subcontractor personnel wearing Level C personnel protection as described in Section 3.0 of this Plan.

Level C areas will be delineated into a work zone and a decontamination zone. The decontamination zone will be provided with a plastic liner to contain wash solutions and contaminated soil. When exiting the work zone, workers will enter the decontamination zone. Instruments, sample containers, and reusable equipment will be placed on a plastic covered table. These items will be cleaned with the appropriate solutions. The workers will then decontaminate their protective clothing. Disposable items will be discarded in trash receptacles which will be provided within the decontamination area.

After decontamination, personnel will leave the decontamination zone, with respirators being removed last. Drilling and heavy equipment will be cleaned of gross contamination while in the work zone, after which the equipment will be moved to the heavy equipment cleaning area.

Liquid wastes generated in Level C restricted access areas will be drummed for proper disposal. Dry material such as suits and gloves will be disposed of in accordance with state and federal guidelines.

7.0 WORK IN OFF-SITE BUILDINGS

As specific buildings are identified for intrusive work, a site-specific HASP will be prepared prior to entry into areas which are currently not occupied. The HASP will address precautions to be taken during drilling, coordination of work with other building activities, air monitoring and evacuation procedures. The HASP for buildings cannot be prepared until permission to enter the specific buildings requiring intrusive work has been obtained and inspections of these buildings made.

APPENDIX B

APPENDIX B

Sampling and Analysis Plan

APPENDIX B

SAMPLING AND ANALYSIS PLAN

1.0 OBJECTIVES

This plan describes the types of samples to be collected and the procedures to be followed during site characterization and remedial investigation activities for the Yard. Data generated by this plan will be used to support the screening and evaluation of remedial alternatives for the site.

2.0 SAMPLING LOCATIONS

The locations of all proposed monitoring wells and soil borings are identified in Figure 2 of the Work Plan. The rationale for the selection of these locations is provided in Section 4.0 of the Work Plan. All monitoring well and soil boring locations will be surveyed vertically to a reference datum (mean sea level) by a licensed New York State professional land surveyor.

3.0 SAMPLE CATALOGING

Soil samples extracted from borings will be identified by the prefix S (Soil Boring). The boring location number will follow the prefix. When more than one soil sample is collected from a single boring, the recorded sampling depth interval will distinguish each sample. An example is "S-4, 3-4 feet", which identifies a sample collected from soil boring number four at a depth interval of 3 to 4 feet below land surface.

4.2 Equipment Cleaning Procedures

Drilling or digging will, in general, be performed beginning in areas of least contamination and proceed toward areas of greatest known contamination.

If contamination is detected during drilling/digging operations (based on photoionization detector readings or visual observations), the drill rig will be taken to an area where it can be cleaned according to the procedures outlined below prior to moving to the next sampling location.

The cleaning procedure will be as follows:

(a) remove all loose material and soil;

(b) thoroughly wash with detergent and tap water utilizing a scrub brush;

(c) rinse with tap water;

(d) steam clean;

(e) air dry;

(f) all waste and wash and rinse fluid will be collected and disposed of properly.

4.3 Sampling Tool Cleaning Procedures

Prior to soil sampling, all tools used for sample collection will be cleaned in the following manner:

(4) Equipment used for filling sample containers will be cleaned prior to each subsequent use.

(5) Any soil samples selected for laboratory analyses will be placed on ice and protected from light immediately after collection and until delivery to the laboratory.

4.5 Sample Containers

It will be the responsibility of the contracted laboratory to provide clean sampling containers for the requested analyses. The sampling containers will be filled according to laboratory specifications.

4.6 Sample Handling

All samples intended for laboratory analyses must be placed on ice and protected from light immediately after collection and during transport to lab. The following preservation techniques and holding times will be observed for soil samples.

PARAMETER	PESERVATIVE	HOLDING TIME
Volatile Organic Compounds (VOCs)	Cool to 4°C	10 days before extraction 10 days after extraction
Petroleum Hydrocarbons (PHCs)	Cool to 4°C	28 days
Base/Neutral Organic Compounds (BNs)	Cool to 4°C	5 days before extraction, 40 days after extraction
Lead	Cool to 4°C	6 months
Polychlorinated Biphenyls (PCBs)	Cool to 4°C	5 days before extraction 40 days after extraction

4.7 Field Quality Control

A total of 10 percent field replicates should be collected to validate the precision of the sampling technique.

If soil samples are being collected for VOC analysis, a trip blank will accompany the sample container through the entire sampling program. The trip blank will be prepared by the laboratory and will consist of a 40 ml vial for VOCs. The results of these analyses will validate both glassware cleaning and field sampling handling techniques.

4.8 Record Keeping

All field data will be recorded in the field sampler's bound notebook. This data will include: weather conditions, location of boring, depth of sample and the sequence in which the borings were taken. A chain of custody will be implemented during sample collection.

4.9 Analytical Laboratory

All soil samples will be submitted via chain of custody to a Contract Laboratory. Samples will be analyzed according to Contract Laboratory Plan (CLP) procedures, however, CLP QA/QC follow-up documentation will not be requested.

<u>As soon as NYSDEC approves the analytical suites, numbers of samples, and analytical methods for the RI, price quotes and turn-around times will be requested from several labs.</u>

A list of the labs selected to quote on this work will be submitted to NYSDEC for review. A second laboratory that is acceptable to NYSDEC will be selected to validate all CLP data.

5.0 PROTOCOL FOR MONITORING WELL INSTALLATION

This protocol outlines procedures and equipment used in the drilling and installation of monitoring wells at the Sunnyside Yard, Queens, New York. Wells will be installed by a licensed driller using a hollow stem auger drilling rig.

All necessary state and local permits and utilities markouts will be obtained and completed prior to beginning drilling at the site. Proposed drilling locations may be moved slightly based on utilities or railroad track locations.

5.1 Drilling Equipment Preparation

Prior to use, the drill rig, and all tools and accessories will be thoroughly cleaned to remove all remnants of previous drilling operations (e.g., dirt, mud, dust and liquids). Cleaning of the drill rig shall include the wheels or tracks, undercarriage, chassis and cab. The cleaning of the drilling equipment will consist of but not be limited to:

- (a) brushing, sweeping and/or vacuuming loose dirt;
- (b) detergent wash and tap water rinse;
- (c) steam cleaning; and
- (d) air drying.

All downhole tools and sampling equipment, as well as tools which come into immediate contact with this equipment, will be cleaned in the same manner as the drilling equipment. Split-barrel samplers, drill stems and all other downhole tools must be free of grease, oil and other forms of contamination during the drilling and installation of the well.

5.2 Drilling Procedures

When sufficient information regarding environmental conditions at the site is available, the order of well drilling will proceed from areas of least contamination to areas of greatest known contamination.

5.3 Drilling Equipment Cleaning Procedures

Following cursory cleaning of drill stems and downhole tools at the well (Section 4.2), the rear of the rig will be cleaned of all loose material and soil. All contaminated clothing, gloves, boot covers and rags will be disposed of in on-site receptacles. Following the preliminary cleaning, all drilling equipment, including the mud tub (where applicable), will be transported to a designated cleaning area.

Prior to drilling startup, an on-site area will be designated for equipment cleanup. The area will be designed or prepared in such a way that all washing fluids and soils (drill cuttings) can, if necessary, be collected for proper disposal. After preliminary cleaning between well sites has been completed, drilling equipment which includes, but is not limited to, drill stems, auger flights and other tools and equipment which came in contact with either soil or ground water will be taken to the designated cleaning area. The cleanup procedure will be as follows:

(a) Thorough wash with detergent and tap water utilizing a scrub brush;

(b) Rinse with tap water;

(c) Steam clean;

(d) Air dry;

(e) All waste and wash and rinse fluid will be collected and disposed of properly.

This cleanup will be performed after each monitoring well has been installed and prior to movement of any equipment to the next well location.

Upon completion of the drilling program, contaminated soil from the drilling process and washing fluids will be disposed of in accordance with applicable state and federal regulations.

5.4 Monitoring Well Installation

Monitoring wells will be drilled and installed by a licensed driller. The monitoring well will be constructed in accordance with NYSDEC specifications. The 19 water-table monitoring wells will be installed to an approximate depth of 15 feet below land surface with well screens set approximately two feet above the existing water table. The one deeper monitoring well (MW-23) will be installed to an approximate depth of 40 feet below land surface.

All monitoring wells will be constructed of four-inch diameter PVC with 10 feet long, 20 slot, flush threaded well screens. If required by the NYSDEC, 304 stainless steel screens will be used instead of the PVC. The wells will be gravel packed with the pack extending approximately one to two feet above the well screen. The annular space above the gravel pack will be filled with a layer of granular bentonite followed by a bentonite-based grout to approximately two feet below grade. An outer locking, steel protective casing will be placed over the well casing and the remaining unfilled portion of the annulus filled with concrete.

Split-spoon soil samples will be collected during drilling at continuous two-foot intervals above the water table and every five feet thereafter. Split-spoon samples will be examined for lithology, evidence of contamination (presence of oil, odor) and degree of saturation. In addition, each split-spoon will be tested for the presence of VOCs using PID equipment. All PID readings will be recorded in the field book. Finally, all split-spoon samples will be retained onsite in masonry jars for potential future use.

All wells will be developed after installation. The wells will be developed until the discharged water is clean (i.e., turbidity is less than or equal to 50 NTUs) or a minimum of one hour of continuous development has elapsed. Wells will be developed by mechanical surging and pumping. Since the source of contamination is defined, well development water will be disposed of on-site by allowing it to infiltrate into the ground, and contained to preclude run-off from the site. The area used, the "recharge pit," will be covered with clean soil when it is no longer needed.

5.5 Record Keeping

All field data will be recorded by the on-site Hydrogeologist in a bound notebook. This data will include, but not be limited to, weather conditions, well location, depth of well, sequence in which the wells were completed and well completion data. A drill log will be completed for each well by the on-site Hydrogeologist. The compiled logs will be based on drill cuttings, rig reaction and split spoon samples, if taken.

Data compiled in the logs will also include: soil color and type, approximate grain size, physical characteristics (e.g., moisture, visible contamination), horizon depth and thickness, depth to ground water and PID readings.

6.0 PROTOCOL FOR GROUND-WATER SAMPLE COLLECTION

This protocol outlines procedures and equipment for the collection of representative ground-water samples from monitoring wells at the Sunnyside Yard, Queens, New York. After collection these samples will be submitted to a certified contract laboratory for analyses including but not limited to volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), base/neutrals (BNs) and total petroleum hydrocarbon concentrations (PHCs).

6.1 Equipment Cleaning Procedures

The following cleaning procedures will apply for equipment used for the collection of ground-water samples.

6.1.1 Purging Equipment

Submersible pumps, discharge hoses, and cables will be cleaned prior to initial use and after pumping each well in the following manner:

(a) external surfaces will be brushed free of all loose material, washed with detergent solution and rinsed with clean tap water;

(b) internal surfaces will be cleaned by placing the pump in a clean drum containing detergent solution followed by clean tap water and allowing the pump to operate;

(c) cleaning solutions will be contained and disposed of properly;

(d) pump, discharge hose and cable will be wrapped in plastic sheeting for transportation and storage.

6.1.2 Bailers

Bailers will be cleaned prior to initial use and after each subsequent use in the following manner:

(a) detergent wash;

(b) tap water rinse;

(c) distilled water rinse ;

(d) pesticide-grade methanol rinse;

(e) distilled water rinse;

(f) air dry;

(g) wrap in aluminum foil for transportation and storage.

All wash and rinse fluids shall be collected and disposed of properly.

6.2 Sample Collection and Handling

Sampling will be performed by a two-person team with experience in environmental sampling. The senior member of the team (sample coordinator) will be responsible for complete documentation of sampling which will be kept in a bound field notebook with pages numbered sequentially in ink, appropriately dated and signed. The sampling team will be responsible for the preservation and chain of custody records for all samples until they are transported to the laboratory for analysis.

Monitoring wells will be unlocked immediately prior to initiating sampling procedures. All wells will be re-secured when sampling is completed and at any time the sampling crew leaves the area of the well.

The diameter, water level and total depth of each well will be measured to calculate the volume of the water column. Measurements will be made with either a steel tape or electric water-level indicator (M-scope), to the nearest 0.01 foot. The tape or M-scope will be cleaned prior to initial use by the following procedure:

(a) wipe with acetone soaked paper towel;

(b) air dry;

(c) wrap in foil for transportation and storage.

After each use, the tape or M-scope will be wiped dry and cleaned in accordance with a, b and c above.

Prior to development, the volume of water in each well will be calculated. All wells will be pumped before any sampling takes place. The amount of water removed will be determined by the condition of the well and the ability of the aquifer to transmit water. In no case will a well be sampled unless all water standing in the well casing has been replaced by fresh ground water from the aquifer. Pumping will continue until a minimum of 3 volumes of water have been removed from each well. All wells will be pumped, and allowed to recover prior to the collection of any samples.

Samples will be obtained after the pumping procedure is completed. If possible, samples will be taken with a bottom loading teflon bailer. Bailers will be cleaned in accordance with bailer cleaning procedures. Clean polypropylene cord will be used to lower bailers into the wells. New cord and new disposable gloves will be used on each well. Disposable gloves will be worn when handling bailers and cord. Care will be taken to prevent bailers or cord from coming into contact with any contaminants.

One bailer volume from each well will be discarded prior to collecting a sample. Bailers will be lowered gently into the wells to minimize agitation of the ground water.

Ground-water samples will be poured from the bailers directly into bottles previously prepared. Pouring will be accomplished in a manner that will minimize agitation of samples.

If the degree of contamination of the wells is known, they should be sampled in ascending order of contamination, with the least contaminated well being sampled first.

If there is no access through which to introduce a bailer into the well (i.e., there is a pump in the well or the well head is buried) the well will be sampled from the sampling port, such as a faucet, closest to the well head. Water will be run at a maximum flow rate through the sampling port for at least ten minutes prior to sampling. For sampling, the flow rate will be reduced to minimize agitation.

All samples must be placed on ice and protected from light immediately after collection and during transport to the laboratory.

The following holding times, containers and preservatives will be used:

PARAMETER	CONTAINER(1)	PRESERVATIVE(2)	MAXIMUM (3) HOLDING TIME
Volatile Organic Compounds +15	40 ml septum vial with/teflon container, must not contain air bubbles	Cool to 4°C	7 days
Polychlorinated Biphenyls (PCBs) extraction	Glass with teflon lined lid	Cool to 4°C	5 days until extraction days, 40 days after
Base/Neutrals +15	Glass with teflon lined lid	Cool to 4°C	5 days until until extraction, 40 days after ex traction
Lead	Plastic	Filter,HNO_3 to pH<3, Cool to 4°C	6 months
Petroleum Hydrocarbon Compounds	Glass with foil or teflon lined lid	Cool to 4°C	28 days

(1) All samples should be collected with a 1 inch air space in container, with the exception of Volatile Organics.

(2) All samples must be stored at 4°C from time of collection until arrival at lab.

(3) If holding time is exceeded, the data may be considered qualitative or unusable.

6.3 Quality Assurance/Quality Control

Field sample collection procedures will be monitored through the use of field replicates, travel blanks and field blanks.

6.3.1 Field Replicates

A total of 10 percent field replicates will be collected for purposes of validating the precision of the sampling technique.

6.3.2 Travel Blank

A travel blank will accompany the samples through the entire sampling program. The travel blank will be prepared by the laboratory. The travel blank will be analyzed for volatile organics when returned to the laboratory. The results of this analysis will validate both glassware cleanliness, field sampling and handling techniques. A minimum of one travel blank must accompany each shipment of samples delivered to the laboratory.

6.3.3 Field Blank

Prior to any sampling, a field blank will be collected. After cleaning the bailer, the blank will be collected from a final rise of deionized/distilled water. The analytical laboratory performing the analysis will supply the deionized/distilled water. Analysis of this field blank for volatile organics will verify the efficacy of the equipment cleaning procedure.

6.4 Record Keeping

The following records will be maintained by the field sampler during the sampling program.

6.4.1 Field Data

All field data will be recorded in the field sampler's bound notebook. This data will include: weather conditions, volume of water removed from the well, static water depth prior to sampling, and the sequence in which the samples were collected.

6.4.2 Chain of Custody

A chain of custody form will be completed following the sample collection.

7.0 PROTOCOL FOR VOLATILE ORGANIC SCREENING OF SITE USING VAPOR PROBES

1. Drive a pre-cleaned 1/4-inch slide hammer with hardened tip to the top of the desired zone to be sampled.

2. Place a pre-cleaned 1/4-inch diameter stainless steel probe with perforated section into the hole.

3. Drive the perforated section of probe six inches into the undisturbed soil to be sampled.

4. Cap the probe with 1/4-inch Swage-lok fitting with teflon tubing.

5. Attach a vacuum pump to the tubing and evacuate three to five probe volumes of soil gas and then clamp tubing.

6. Place tip of photoionization meter into tubing creating an air-tight seal and release clamp.

7. Record reading on photoionization meter in field book and on base map.

APPENDIX C

APPENDIX C

Site Management Plan

APPENDIX C

SITE MANAGEMENT PLAN

1.0 INTRODUCTION

The Site Management Plan identifies operating procedures which have been developed to minimize exposure, risks and/or the spread of contamination during field investigations at the Yard. Specifically, the Plan addresses the following principal concerns and considerations:

- protocol for decontamination of field equipment;
- site security/access procedures;
- enforcement of safety procedures; and
- coordination of field activities.

Strict adherence to the conditions imposed by the Site Management Plan will be required of all on-site personnel (contractors and observers) to ensure efficient and safe field operations.

2.0 EQUIPMENT DECONTAMINATION

The decontamination of field equipment (i.e. drill rig, drilling tools, sampling equipment, etc.) is essential to avoid the spread of contamination beyond the work zone as well as to avoid cross-contamination during subsequent sampling operations. Heavy equipment decontamination will be performed at central staging areas and wash water will be contained within these areas. Wash water will be obtained from the nearest hydrant, tap or other source of portable water. Decontamination procedures for a specific items are described below.

Sampling Devices - Split-spoon core samplers, hand augers, pumps, and bailers will be cleaned between uses following the protocols outlined in Appendix B.

Tools - Tools such as wrenches and shovels used during the drilling operation that come into contact with sediment and/or water from the borehole will be cleaned with a scrub brush and soapy water. A steam cleaner and scrub brush will be used for decontaminating larger tools.

Heavy Equipment - The drill rig and all drilling equipment (i.e. split spoons, auger flights, etc.) will be steam cleaned prior to and at the conclusion of the program. This measure ensures that no transfer of contamination occurs between this and other drilling locations and eliminates the possibility of exposing the public to contaminated equipment. In addition, all heavy equipment will be steam cleaned immediately after the completion of each borehole or monitoring well where contamination (e.g. odors, visible staining, PID readings) was detected to eliminate the possibility of spreading contaminants from one drill hole to the next. Similarly, split-spoon sampling equipment will be routinely decontaminated to minimize the chances of vertical cross contamination in the soil sampling program.

3.0 SITE SECURITY

No one will be admitted to a work zone without the express approval of the project hydrogeologist and AMTRAK. The project manager or his designee will maintain a separate log which will record the time of arrival to departure from the work zone during field operations for all personnel, their affiliation and the reason for their presence.

In addition, at night, the drilling rig and other heavy equipment will remain on the site and be parked in a secured area provided by the facility manager of the Yard.

4.0 ENFORCEMENT OF SAFETY PROCEDURES

It will be the responsibility of the project manager and his designee to enforce the established health and safety procedures outlined in Appendix A. All workers within each work zone, including all subcontractors, will be given oral and written instructions regarding site health and safety procedures by both the contractor and AMTRAK. The project hydrogeologist will, if necessary, stop ongoing work at any time if an unsafe condition occurs until the condition is corrected.

5.0 COORDINATION OF FIELD ACTIVITIES

The project manager, project hydrogeologist and subcontractor representatives will meet with the facility manager of the Yard throughout the project to coordinate schedules, discuss access requirements, review all safety concerns, and establish procedures to arrange access to necessary areas for the specific periods required to perform the various field activities.

APPENDIX D

APPENDIX D

Quality Assurance/Quality Control

APPENDIX D

QUALITY ASSURANCE/QUALITY CONTROL

1.0 INTRODUCTION

This Quality Assurance/Quality Control (QA/QC) Plan presents the policies, organization, objectives and functional activities that will be utilized to ensure that all data collected during and recorded by this study are representative of existing conditions.

2.0 PROJECT ORGANIZATION

The contractor will be responsible for the overall management of the project, including field supervision of all drilling and sampling activities. Primary responsibility for project management is with the project manager. Responsibility for all environmental and hydrogeologic data and QA/QC review is with the project officer, project manager, and project hydrogeologists. Where quality assurance problems or deficiencies requiring special action are identified, the project officer, project manager and/or project hydrogeologist will identify and implement the appropriate corrective action.

3.0 FIELD ORGANIZATION

The field investigation will be organized according to the sampling activities to be undertaken. For on-site sampling work, the actual sampling team make-up will depend on the type and extent of sampling that will consist of a combination of the following:

- o Project Manager;

- o Project Hydrogeologist;
- o Health and Safety Officer; and
- o Sampling Coordinator.

The project manager will be responsible for the coordination of the personnel onsite and for providing technical assistance when required. The project manager or his designee will be present whenever sampling occurs and will also keep a general site log describing activities conducted in the work zone, identifying personnel entering the work zone and noting general observations regarding work zone activity.

The project hydrogeologist will be responsible for providing technical supervision of the drilling subcontractor during the installation and development of the monitoring wells. In addition, the project hydrogeologist will be responsible for geologic logging and soil sampling to be performed during the installation of the monitoring wells and the drilling of soil borings.

The health and safety officer will be responsible for assuring that all team members adhere to the applicable health and safety requirements. In addition, the health and safety officer will regularly update equipment or procedures based upon new information gathered during site inspections. Based on this information, the levels of protection proposed for the work zone will be modified appropriately.

The sampling coordinator will be responsible for the coordination of all sampling efforts and will assure the availability and maintenance of the necessary shipping/packing materials and sampling equipment. The sampling coordinator will: 1) supervise the completion of all sampling documentation; 2) ensure the proper handling and shipping of the samples; 3) be responsible for the accurate completion of a field notebook; and 4) provide close coordination with the project manager.

4.0 QUALITY ASSURANCE OBJECTIVES

The general quality assurance objective is to ensure the environmental monitoring data (laboratory chemical data) developed is of known and acceptable quality. The environmental data collection efforts will adhere to QA/QC procedures developed by Roux Associates, Inc. for the collection and preservation of environmental samples and by the analytical laboratory for its analyses.

4.1 Precision

The QA/QC aim in testing the precision is to demonstrate the reproducibility of the data. The precision of analytical project measurements will be evaluated and reported along with the method reference number in the manner consistent with previously published data on precision. Moreover, precision measurements will be done with high purity materials, knowledgeable laboratory personnel, internal quality controls and will be based on contract laboratory program (CLP) criteria.

4.2 Accuracy

Accuracy is the relationship of the reported data to the "true" value, and will be: 1) reported with the data; 2) attained by independent audits using standards which are different from those used during routine operations, and 3) consistent with any previously published accuracy data from the applicable literature, federal and state regulations and the CLP program.

4.3 Completeness

Completeness is a measure of the amount of data obtained from a measurement program, compared to the amount that would be expected to be obtained under normal conditions. The database will be routinely assessed on the basis of expected versus actual data to ensure that it meets the completeness objective.

4.4 Representativeness

All data should be representative of the actual conditions at the sampling location. Considerations and evaluations of representativeness of the data include, but are not limited to, the location being sampled, the methods used to obtain environmental samples at the site, and the appropriateness of the analytical method to the type of sample obtained.

4.5 Comparability

All data will be reported in units consistent with both federal and state regulations, methods and guidelines. Comparability between databases will also be achieved by citing standardized sampling and analysis methods in data formats. Any deviation in the standard operating procedures will be noted and data will be qualified for comparative purposes.

5.0 SAMPLE HANDLING

All samples (soil, water and oil) will be collected according to the appropriate protocols (Appendix B). Samples will be placed in the appropriate pre-cleaned jars or bottles provided by the laboratory for the specific analyses to be performed. All jars and bottles will be prelabeled with the following information:

- o the borehole or well number;
- o sample depth (if appropriate);
- o type of sample;
- o date and time of collection; and
- o affiliation of person collecting sample.

6.0 SAMPLE CUSTODY

Samples collected during the site investigation will be the responsibility of identified persons from the time they are collected until they or their arrived data are incorporated into the final report. Stringent chain-of-custody procedures will be followed to maintain and document sample possession at all times.

7.0 BLANKS AND SPLIT SAMPLES

Trip blanks, field blanks and split samples will be used to verify the quality of the field sampling and the laboratory results. A brief description of each follows.

Trip Blank - Trip blanks for VOCs will be prepared by the analytical laboratory and shipped along with the sample bottles and will be analyzed at the same time as all other samples.

Field Blank - The efficacy of the field cleaning protocols will be monitored by a generous use of field blanks. Laboratory pure water will be run through newly cleaned bailers just prior to sampling to obtain a field blank. The sample will then be handled in the same manner as the actual samples.

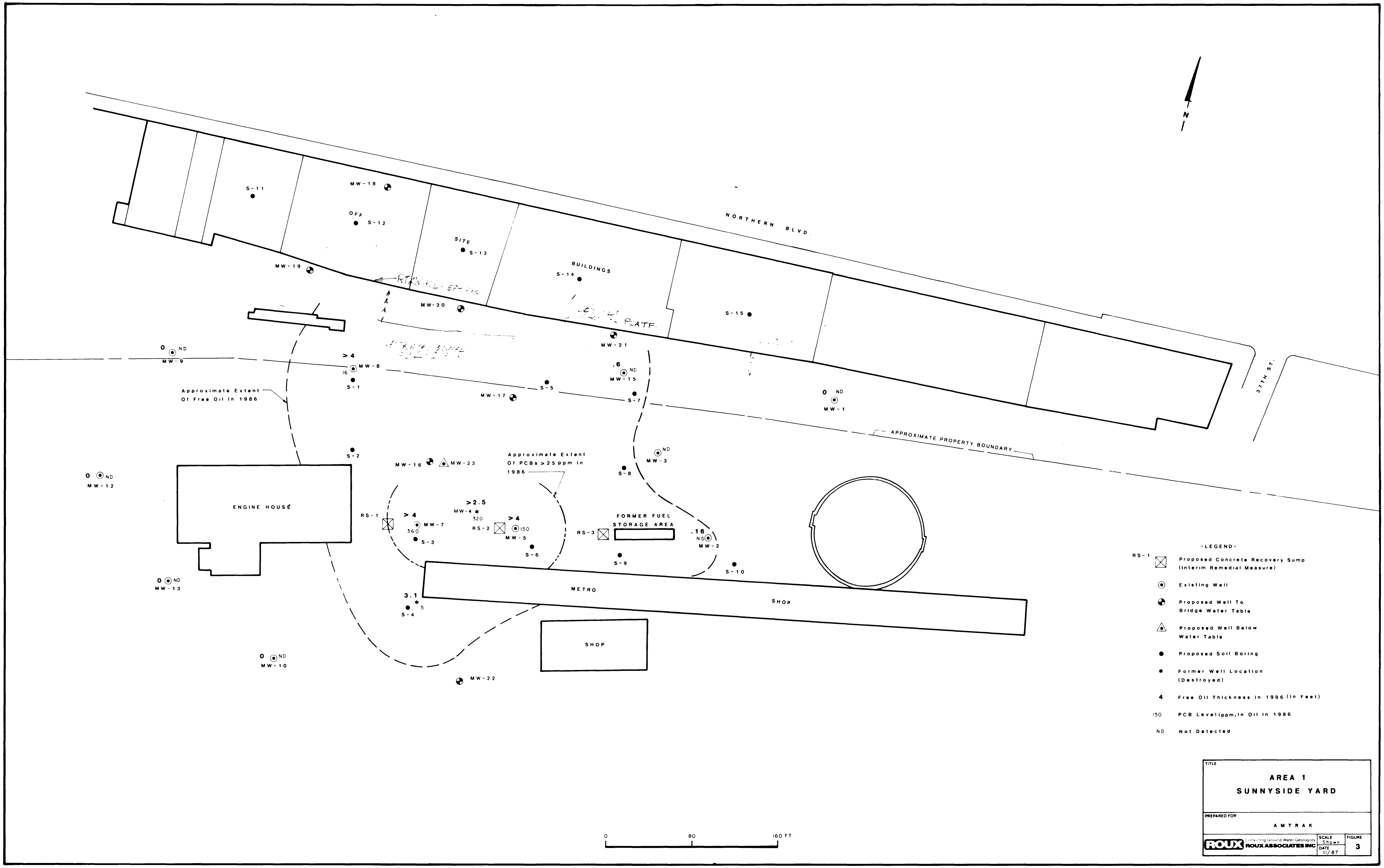
Duplicate Samples - "Blind" duplicate samples will be collected and submitted to the analyzing laboratory for comparison of analytical results. Also, duplicate samples of water, organic liquid, soil or sediment will be made available to the NYSDEC upon request. The NYSDEC will provide all sample bottles for duplicate splits.

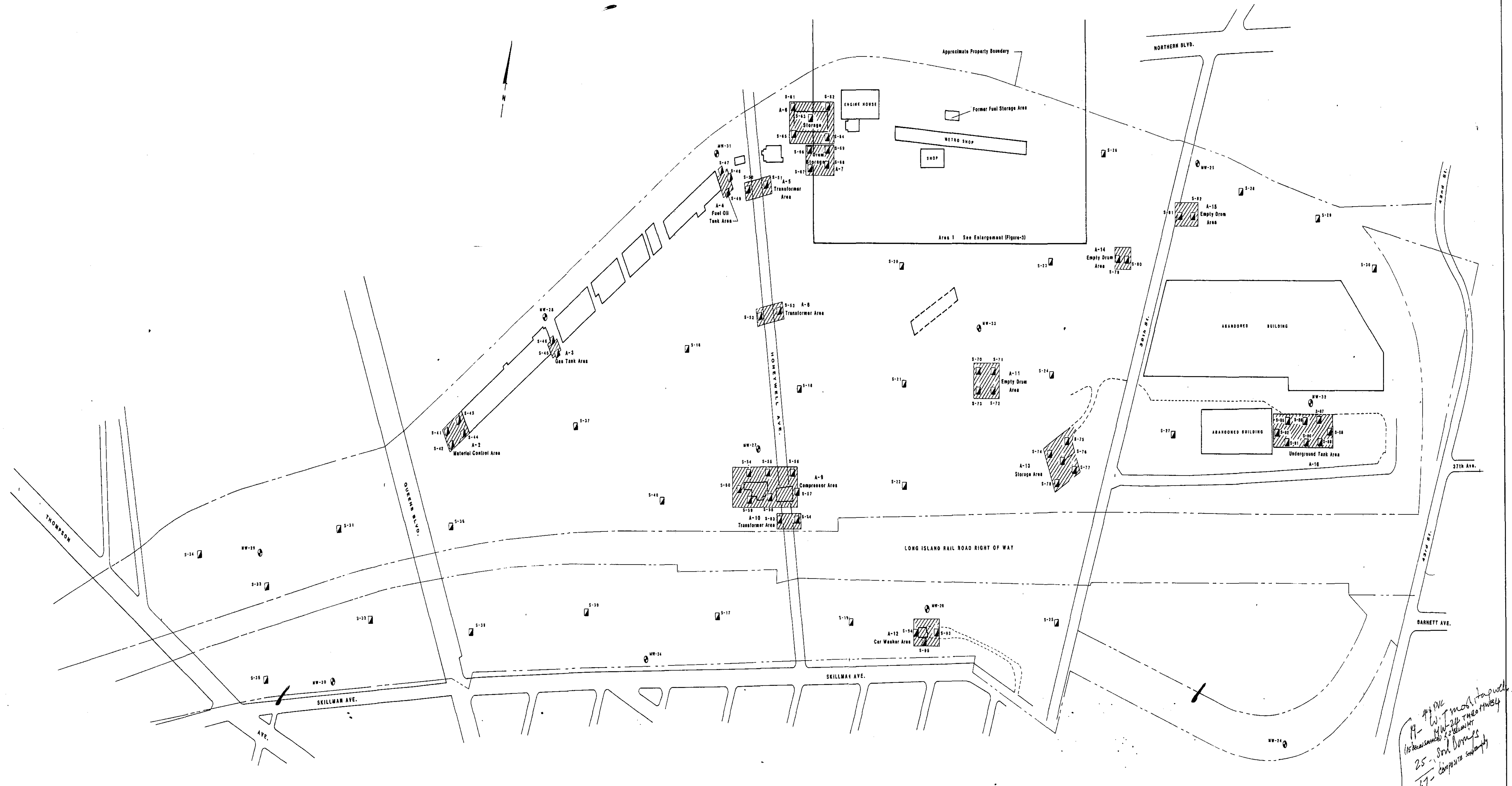
8.0 RECORD KEEPING

All information pertinent to field activities will be recorded in a bound, waterproof field book. Duplicates of all notes will be prepared and kept in a secure place away from the site. Proper documentation will consist of detailed records of all work accomplished. Photographs will be used to document field observations where appropriate. Items, such as the date, time, location and sequential number of the photograph and roll number will be recorded in the field book.

Each sample collected in the field will be labeled using waterproof ink. Label information (e.g. sample number, data, time, etc.) will also be recorded in the log book.

Strict chain-of-custody procedures will be maintained for each sample. The chain of custody will be in accordance with procedures approved by the NYSDEC.


NORTHERN BLVD.
37TH ST.
APPROXIMATE PROPERTY BOUNDARY
N
S-11
MW-18
OFF
S-12
SITE
S-13
BUILDINGS
S-14
S-15
MW-19
MW-20
MW-21
PLATF.
0 ND MW-9
>4 MW-8 16
S-1
Approximate Extent Of Free Oil In 1986
MW-17
S-5
.6 ND MW-15
S-7
0 ND MW-1
S-2
MW-16
MW-23
Approximate Extent Of PCBs >25ppm In 1986
ND MW-3
S-8
0 ND MW-12
ENGINE HOUSE
RS-1
>4 MW-7 360
S-3
>2.5 MW-4 320
RS-2
>4 150 MW-5
S-6
RS-3
FORMER FUEL STORAGE AREA
S-9
.16 ND MW-2
S-10
0 ND MW-13
3.1 5 S-4
METRO
SHOP
SHOP
0 ND MW-10
MW-22
-LEGEND-
RS-1 Proposed Concrete Recovery Sump (Interim Remedial Measure)
Existing Well
Proposed Well To Bridge Water Table
Proposed Well Below Water Table
Proposed Soil Boring
Former Well Location (Destroyed)
4 Free Oil Thickness In 1986 (In Feet)
150 PCB Level (ppm) In Oil In 1986
ND Not Detected
0 80 160 FT
TITLE
AREA 1
SUNNYSIDE YARD
PREPARED FOR
AMTRAK
ROUX
Consulting Ground Water Geologists
ROUX ASSOCIATES INC
SCALE Shown
DATE 11/87
FIGURE 3



-LEGEND-

APPROXIMATE SOIL SAMPLING POINT

APPROXIMATE MONITORING WELL LOCATION

AREA FOR COMPOSITE SOIL SAMPLING

0 200 400FT.

TITLE

SAMPLING LOCATIONS

SUNNYSIDE YARD

PREPARED FOR

A M T R A K

ROUX ASSOCIATES INC

SCALE Shown

DATE 12/87

FIGURE 2