UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK

TEN LANDFILLS
RCRA FACILITY INVESTIGATION
PHASE II WORK PLAN ADDENDUM

JUNE 1998

Prepared for:

U.S. Army Corps of Engineers
Baltimore District

USACE Contract No. DACA31-94-D-0017
Delivery Order No. 75

0285-659

US Army Corps
of Engineers

Malcolm Pirnie, Inc.
104 Corporate Park Drive
White Plains, NY 10602

UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

The United States Military Academy (USMA) is located on the western slope of the Hudson River at West Point, Orange County, New York. The USMA was established in 1802 as a training facility for officers in the military service. The Department of the Army (DA) owns, controls and operates the USMA. The location of the USMA is shown on Figures 1-1 and 1-2.

Various studies, assessments and investigations concerning the environmental conditions of the USMA have been conducted by the DA since 1980. Two recent work plans and two reports are particularly relevant to the development of this work plan. The first work plan is the January 1994 Resource Conservation and Recovery Act Facility Assessment Work Plan of Ten Landfills that described the investigation procedures to evaluate ten landfills located throughout the USMA. The ten landfills correspond to ten solid waste management units (SWMUs). SWMU No. USMA-15 has been divided into two landfills (USMA-15A and USMA-15B). The landfills and the corresponding SWMU Number are referred to as:

- PX Landfill (USMA-1)
- Michie Stadium Parking Lot Landfills, Lots A, B, C and E (USMA-2, 3, 4 and 6)
- Professor's Row Landfill (USMA-8)
- Village Farm Landfill (USMA-13)
- Morgan Farm Road Landfill (USMA-15A)
- High School Landfill (USMA-15B); and
- Camp Buckner Landfill (USMA-35).

The first report is the June, 1995 RFA of Ten Landfills Report. The report presented the findings of the 1994 RFA Work Plan.

Based upon the results presented in the RFA of Ten Landfills Report, the New York State Department of Environmental Conservation (NYSDEC) required the USMA to further assess the environmental conditions associated with nine of the Ten Landfills (except the Professor's Row Landfill) in a letter dated December 11, 1995. The Professor's Row landfill was excluded because it could not be located during the RFA investigation.

Subsequent to the NYSDEC requirement for further action, Delivery Order Number 0075 was issued by the United States Army Corps of Engineers (USACE) to Malcolm Pirnie, Inc. (Malcolm Pirnie) under Contract Number DACA31-94-D-0017 on April 18, 1996. A Work Plan Addendum (the second work plan) dated May 21, 1996 was written under the Delivery Order issued by the USACE.

The second report issued was the June 1997 Final RCRA Facility Investigation of Ten Landfills Report which presented the results of the 1996 Work Plan Addendum.

Based upon the results presented in the 1997 Final RFI of Ten Landfills Report, NYSDEC in its February 17, 1998 letter requested additional investigations. This Phase II Work Plan Addendum addresses that request.

1.2 PROJECT OBJECTIVE AND SCOPE

The USACE authorized Malcolm Pirnie to develop and implement a Phase II Work Plan Addendum for the Ten Landfills (Figures 1-3a and 1-3b). The objective of this addendum is to perform additional sampling and investigation of the Michie Lots B and E, PX, and Camp Buckner Landfills as requested by the NYSDEC in it's February 17, 1998 letter. This objective will be met by completing the following tasks:

1) Collection of one round of groundwater samples from monitoring wells LBMW-03, LEMW-01, LEMW-02, LEMW-03, LEMW-04 and LEMW-05. These monitoring wells are located at the Michie Stadium Lots B and E Landfills. Groundwater samples (filtered and unfiltered) will be analyzed for Target Analyte List (TAL) metals.

2) Installation and development of up to two additional monitoring wells (PXMW-05 and PXMW-06) at the PX Landfill.

3) Collection of quarterly groundwater samples from the four existing monitoring wells and two proposed monitoring wells located at the PX Landfill and from the one existing monitoring well at the Camp Buckner Landfill. Groundwater samples (filtered and unfiltered) will be analyzed for TAL metals.

4) Collection of up to three groundwater seep samples downslope of the PX Landfill. Groundwater seep samples (unfiltered) will be analyzed for TAL metals.

2.0 SCOPE OF WORK

The 1994 RFA Work Plan and CDAP outlined the procedures necessary to conduct the RFA. The procedures described in this Scope of Work reference the RFA Work Plan and CDAP as appropriate.

The Scope of Work consists of a groundwater investigation that will be conducted at several of the landfills. The groundwater investigation consisted of five specific tasks:

- Monitoring Well Installation;
- Monitoring Well Development;
- Monitoring Well Survey;
- Monitoring Well Sampling; and
- Groundwater Seep Sampling.

Each of these tasks are described in the following sections.

2.1 MONITORING WELL INSTALLATION

Up to two monitoring wells will be installed at the PX Landfill as part of this Work Plan Addendum. The monitoring wells will be situated so that they are located hydraulically upgradient from monitoring well PXMW-01 (Figures 2-1).

Monitoring well PXMW-01 is believed to be located hydraulically upgradient from the PX Landfill. However, historical results of groundwater samples collected from monitoring well PXMW-01 indicated that the relevant NYSDEC water quality standards for several metals including cadmium, chromium, copper, lead, manganese, mercury and zinc were exceeded. Therefore, two monitoring wells, PXMW-05 and PXMW-06, are proposed to be installed upgradient from monitoring well PXMW-01 (Figure 2-1); to evaluate if there

is some other source or if the elevated concentrations are a result of radial flow from the landfill.

The USACE Scope of Work, dated January 22, 1996 requires wells to be installed into the first water bearing zone. It is important to note that monitoring well PXMW-01 is only approximately 11 feet deep and was installed on top of bedrock. Site visits indicate bedrock outcrops upgradient from monitoring well PXMW-01. As a result, it may not be possible to install overburden monitoring wells upgradient from monitoring well PXMW-01. In the event bedrock is encountered at a depth too shallow to facilitate the installation of overburden monitoring wells, PXMW-05 and PXMW-06 will not be installed and the NYSDEC will be notified. If it is possible to install the wells, the well screens will be placed to straddle the water table.

Boreholes for the monitoring wells will be drilled with a truck-mounted drill rig capable of installing a well to the specifications in the Chemical Data Acquisition Plan (CDAP) and Standard Operating Procedure (SOP) Number 1, contained therein. Where possible, soil samples will be collected using a split spoon sampler to visually classify the material. Eight inch boreholes will be used for the installation of the monitoring wells.

Well risers and screens will be constructed of flush joint, threaded, 4-inch diameter schedule 40 PVC. Well screens will be factory-slotted with 0.01 inch openings. The screen length for each well will be determined in the field based on drilling observations and hydrogeologic conditions encountered. Morie Sand No. 1 or equivalent will be used as a sand pack in the borehole annulus. The sand pack will extend 2 feet above the screen whenever possible. The top of the sand pack will be sealed using a three-foot thick layer of hydrated bentonite pellets. The remainder of the annulus will be sealed with cement grout. Flush mount protective casing will be installed. This well construction is identical to the construction of the previously installed wells.

2.2 MONITORING WELL DEVELOPMENT

At least 48 hours after the completion of the monitoring well installation, each newly installed well will be developed using a centrifugal or submersible pump and dedicated discharge hose. Each well will be developed for one hour or until the turbidity of the groundwater discharge is 50 nephelometric turbidity units (NTU), whichever occurs first.

2.3 MONITORING WELL SURVEY

The newly installed wells will be surveyed by a New York licensed surveyor to obtain vertical and horizontal reference points. Ground elevations will be measured to the nearest 0.1 foot and well casings to the nearest 0.01 foot. All vertical measurements will be referenced to existing site data (e.g. previously installed and surveyed monitoring wells).

2.4 MONITORING WELL SAMPLING

Groundwater samples will be collected from monitoring wells located at the Michie Stadium, PX and Camp Buckner Landfills, a minimum of two weeks after the completion of the well development. Prior to the collection of groundwater samples, groundwater level measurements will be obtained from each of the monitoring wells.

A minimum of three to five times the standing water volume in each well will be evacuated prior to groundwater sample collection. Well evacuation will be accomplished using a 2-inch or 4-inch diameter submersible pump. The pump and electric cable will be properly decontaminated between wells (following the procedures outlined in SOP Number 6 of the CDAP) and dedicated discharge hose will be used. Groundwater samples will be collected when 90 percent of the drawdown has recovered or within 2 hours, whichever occurs first.

Groundwater samples will be collected from the following monitoring wells at the frequency described below.

- One round of groundwater sampling at monitoring wells LBMW-03 and LEMW-01 through LEMW-05 (Michie Stadium Landfills);

- Quarterly groundwater sampling for one year at monitoring well CBMW-03 (Camp Buckner); and

- Quarterly groundwater sampling for one year at monitoring wells PXMW-01 through PXMW-06 (PX Landfill).

Both filtered (10 μm) and unfiltered groundwater samples will be analyzed for metals during each sampling round. Samples will not be filtered in the field. Instead samples will be shipped to the laboratory and the laboratory will filter the samples receipt. Sample bottles will be labeled appropriately to identify those to be filtered b laboratory. Further, one duplicate, one field blank and one matrix spike will be collec an unfiltered sample and analyzed for TAL metals during each sampling round.

If preservative is used in bottle - sample must be field filtered!

2.5 GROUNDWATER SEEP SAMPLING

Up to three groundwater seep samples (PXSP-01 through PXSP-03) will be collected downgradient from the PX Landfill (Figure 2-2). Unfiltered seep samples will be collected directly into the sample container and will be analyzed for TAL metals.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

3.1 DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) are specific, pre-determined goals for data quality that must be achieved for the data to be useful to the investigation. The DQOs have been developed to ensure that the various sampling activities and analyses produce data that are valid and useful to this program. The DQOs must be supported by a certain level of quality that varies depending on the intended use of the data. For example, field screening data are not required to be of the same quality as laboratory analyses because the field screening is typically used only to decide where samples should be collected for laboratory analyses. The data quality levels required for specific data uses and the type of analyses needed to achieve a particular quality level are defined as follows:

1. Level 1 - Field screening or analysis using portable instruments. Results are often not compound specific and typically not quantitative, but collection of data of this quality is important because results are available in real-time.

2. Level II - Field analyses using more sophisticated portable analytical instruments; in some cases the instruments may be set up in a mobile on-site laboratory. There is a wide range in the quality of the data that can be generated, depending upon the use of suitable calibration standards, reference materials, sample preparation equipment and the training of the instrument operator(s). Results are available in real-time or within several hours.

3. Level III - Analyses performed in an off-site laboratory using standard documented procedures. Level III analyses may or may not use contract laboratory procedures (CLP); but, although QA/QC may be rigorous, Level III analyses do not usually use the validation or documentation procedures required of Level IV CLP analysis.

4. Level IV - All analyses requiring DQO Level IV will be performed by a CLP certified laboratory. Level IV is characterized by rigorous QA/QC protocols and documentation.

5. Level V - Non-standard methods. Analyses may require method modification and/or development. Method development or method modification may be required for specific constituents or detection limits.

Groundwater samples submitted for laboratory analyses will be of Level III data quality. Level III data quality should ensure that the data collected during this investigation will be useful in meeting the objectives of the Phase II Work Plan Addendum.

3.2 QUALITY ASSURANCE/QUALITY CONTROL PARAMETERS

To measure and control the quality of analysis, and to ensure that the DQOs are met, certain analytic quality assurance/analytic quality control parameters are defined and utilized in data analysis activities for this site. They are defined as follows:

Precision

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a measurement of the variability of a group or measurements compared to their average value.

Accuracy

Accuracy measures the bias in a measurement system. Sources of error include the sampling process, field contamination, preservation, handling, shipping, sample matrix, sample preparation and analysis techniques. In this project, sampling accuracy will be evaluated through the results of field duplicates, while analytical accuracy will be assessed through surrogate spike and a matrix spike recoveries.

Comparability

Comparability expresses the confidence with which one data set can be compared with another. By using standard sampling, analytical and reporting procedures, this allows the comparability of all data generated in this project with historical data bases and data that may be required in later phases.

Completeness

The completeness objectives for this project will require that at a minimum, 90 percent of the analytical data meet the data quality objectives.

Representativeness

The representativeness of samples will be assured by the collection procedures outlined in this plan and the equipment maintenance procedures included in the appendices and by the selection of appropriate environmental monitoring points.

Sensitivity

The data generated during the sampling activities will be sensitive enough to meet the NYSDEC groundwater quality criteria.

3.3 SAMPLE HANDLING SHIPPING AND CHAIN-OF-CUSTODY

The sample handling and sample custody procedures described below will be followed during all sampling events. These procedures are similarly described in the RFA Work Plan and CDAP and are summarized in Table 3-1. A chain-of-custody form will be initiated at the laboratory and will accompany the sample bottles from the laboratory into the field. Upon receipt of the bottles and cooler, the sampler will sign and date the first "received" blank space. After each sample is collected and appropriately identified, entries will be made on the chain-of-custody form which will include: sampler names and signatures, sampling station identification, date, time, type of sample and the required analysis.

Table 3-1
United States Military Academy
Ten Landfills
Sample Handling Procedures

Parameter	Matrix	Holding Time	Preservation	Sample Container
TAL Metals	Water	6 months	Cool to 4°C HNO_3, to pH<2	500 ml polyethylene bottle

P:\0285659\REPORT\TABLE3-1.WPD

After sampling has been completed, the sample containers will be cleaned and the containers will be placed into coolers. Ice packs will be placed in the coolers to keep the samples cold (4°C). Packing material will be placed in the coolers and around the containers to prevent the sample containers from moving and breaking. The sampler will sign and date the next "relinquished" blank space on the chain-of-custody form.

The samples will either be transported to the laboratory under custody of sampling personnel or they will be shipped by an overnight air express service. If the samples are shipped by an air express service, the name of the carrier will be entered under the next "received" blank and the airbill number will be entered on the form. The chain-of-custody form will be placed in a plastic bag and attached to the inside cover of the cooler. Whether transported by sampling personnel or shipped, two or more custody seals will be signed, dated and placed on each shipping containers, located in a manner that would indicate if the container were opened in transit. Wide, clear plastic tape will be placed over the seals to ensure that seals are not accidentally broken during shipment.

All samples will be received by the laboratory with 48-hours of collection. Samples will be received by laboratory personnel, who will assume custody of the samples, and sign and date the next "received" blank on the chain-of-custody form.

The holding time of a sample is defined as the maximum allowable time between sample collection and analysis and/or extraction, based on the analyte of interest, stability factors, preservatives (if any) and sample matrix. Holding times are specified in the USEPA SW-846 methods and in USACE and NYSDEC guidance documents.

3.4 DECONTAMINATION

All sampling equipment will be decontaminated to prevent cross-contamination of samples. The equipment will be decontaminated before entering the sample location,

between intrusive activities and before equipment is removed from the site. Specific procedures for decontamination are provided in SOP Number 6 of the CDAP.

4.0 REPORTS

Two types of reports will be developed and submitted to the USACE, USMA and NYSDEC:

- Quarterly analytical data reports will present the findings of each groundwater sampling round.

- The final report will present and interpret the findings of the groundwater sampling rounds.

The final report will incorporate any comments received by the USACE, USMA, or NYSDEC.

5.0 PROJECT SCHEDULE

It is estimated that approximately fifteen months will be required to complete all of the Phase II Work Plan Addendum tasks and activities. The proposed Project Schedule is presented on Table 5-1.

Table 5-1
United States Military Academy
Ten Landfills Investigation
Project Schedule

Activity	Date	Elapsed Time
Receipt of Delivery Order	May 5, 1998	
Submit Draft WP Addendum to USACE and USMA	May 26, 1998	3 Weeks After Delivery Order
Approval of Draft WP Addendum by USACE and USMA	June 5, 1998	
Submit Final WP Addendum to NYSDEC	June 12, 1998	1 Week After Draft WP Addendum Approval
Approval of Final WP Addendum by NYSDEC	June 19, 1998	
Site Mobilization; Monitoring Well Installation/Development	June 29, 1998	10 Days After Final WP Addendum Approval
Survey of Monitoring Well Locations	July 6, 1998	1 Week After Site Mobilization
Round 1 Groundwater Sampling: LBMW-03, LEMW-01 through LEMW-05, CBMW-03, PXMW-01 through PXMW-06, PXSP-01 through PXSP-03	July 20, 1998	2 Weeks After Well Development
Round 1 Analytical Report	August 24, 1998	5 Weeks After Sample Collection
Round 2 Groundwater Sampling: CBMW-03, PXMW-01 through PXMW-06	October 19, 1998	3 Months After Round 1 Sample Collection
Round 2 Analytical Report	November 23, 1998	5 Weeks After Sample Collection
Round 3 Groundwater Sampling: CBMW-03, PXMW-01 through PXMW-06	January 18, 1999	3 Months After Round 2 Sample Collection
Round 3 Analytical Report	February 22, 1999	5 Weeks After Sample Collection
Round 4 Groundwater Sampling: CBMW-03, PXMW-01 through PXMW-06	April 19, 1999	3 Months After Round 3 Sample Collection
Round 4 Analytical Report	May 24, 1999	5 Weeks After Sample Collection
Submit Draft Report	June 28, 1999	10 Weeks After Round 4 Groundwater Sampling
Approval of Draft Report	July 9, 1999	
Submit Final Draft	August 6, 1999	4 Weeks After Draft Report Approval

6.0 PROJECT ORGANIZATION

Malcolm Pirnie has established a project team for the USMA Phase II Work Plan Addendum whose collective qualifications and experience are strongly suited for the successful completion of the project. The proposed responsibilities of the key staff are summarized below:

John Isbister will be Technical Director. Mr. Isbister will have overall responsibility for quality and timeliness of the work performed.

Terrance Haelen will be Project Manager. In this capacity, Mr. Haelen will be responsible for the successful completion of each task including coordination and supervision of engineers and scientists, and adherence to the approved scope, schedule and budget.

Greg Stanzione will be Quality Assurance Manager. Mr. Stanzione will be responsible for the independent technical review of the project.

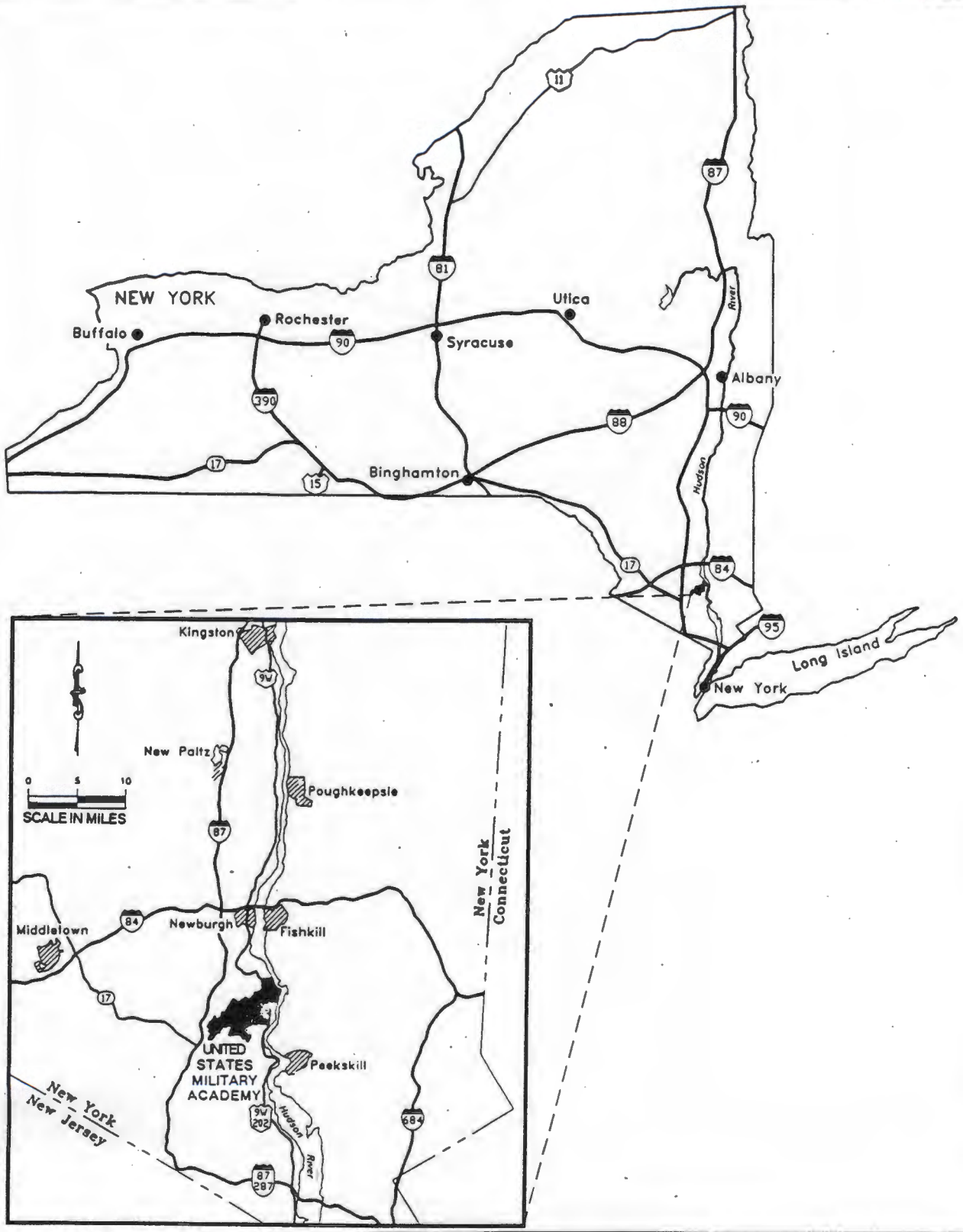
Charles Trione will be Project Leader. Mr. Trione will be responsible for the development of work plans, coordination of subcontractors, and the interpretation and presentation of the data.

John Ifkovits will be Field Manager. Mr. Ifkovits will be responsible for the implementation of the RFA Work Plan Addendum. As part of Mr. Ifkovits responsibilities, he will:

- Maintain all quality assurance policies that pertain to sampling, sample shipment, environmental monitoring, field activities and record deliverables.

- Direct all field activities.

Mark McGowen, Corporate Health and Safety Officer. Mr. McGowen will review and approve the site-specific Health and Safety Plan and resolve any health and safety issues that may arise.



Source: WCFS, 1994 RFA

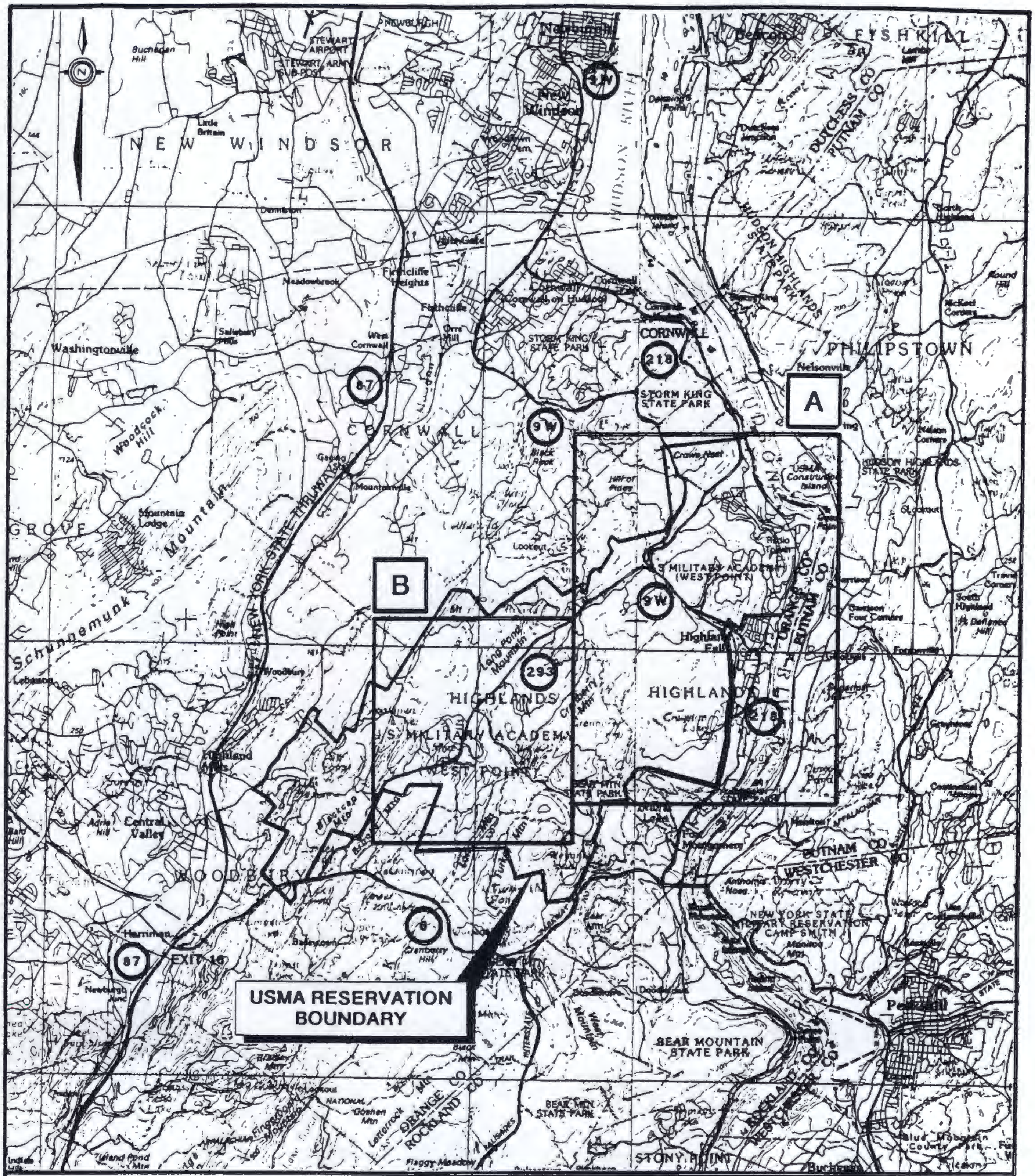
MALCOLM PIRNIE

UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK

LOCATION MAP

SCALE AS NOTED

FIGURE 1-1



0 2 4 MI

SCALE

NOTE:
KEY MAPS A AND B ARE SHOWN AS FIGURES 1–3A AND 1–3B.

Source: WCFS, 1994 RFA

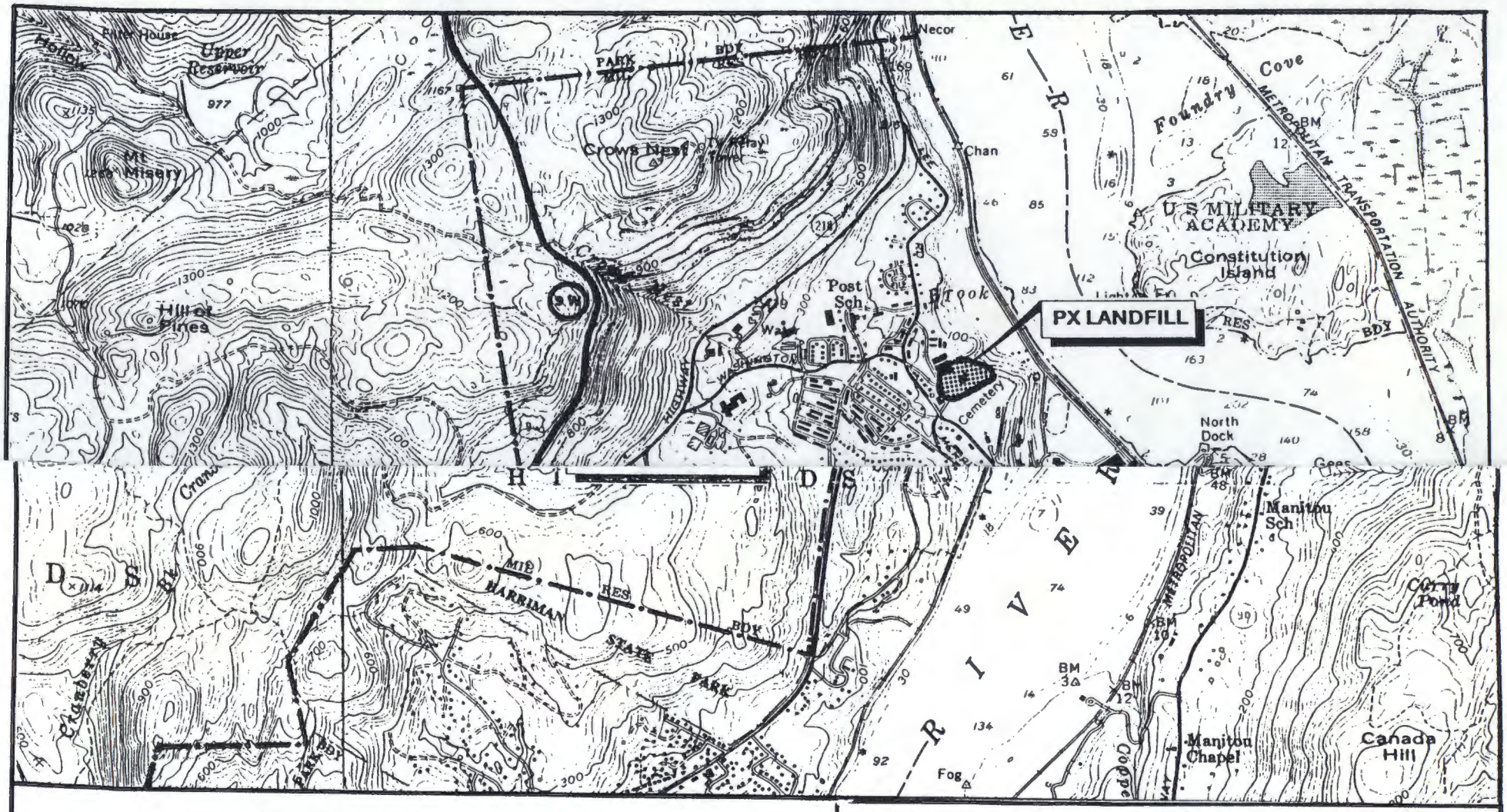
MALCOLM PIRNIE

UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK

VICINITY MAP

SCALE AS NOTED

FIGURE 1-2



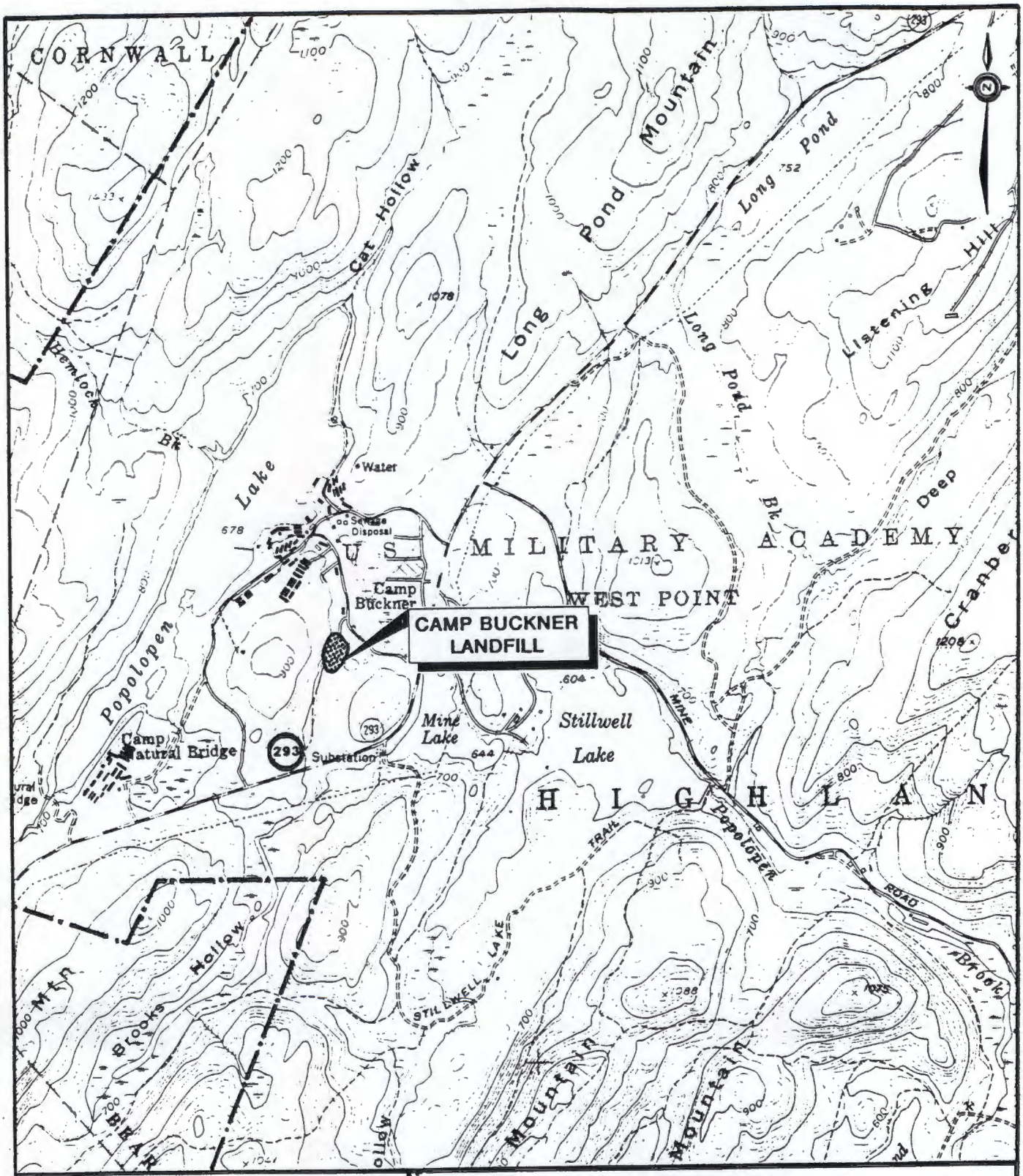
MALCOLM PIRNIE

UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK

NINE LANDFILLS LOCATION MAP

SCALE AS NOTED

FIGURE 1-3a



0 2000 4000 FT

SCALE

LEGEND:

USMA RESERVATION BOUNDARY

NOTE:
LANDFILL LOCATION IS APPROXIMATE.

Source: WCFS, 1994 RFA

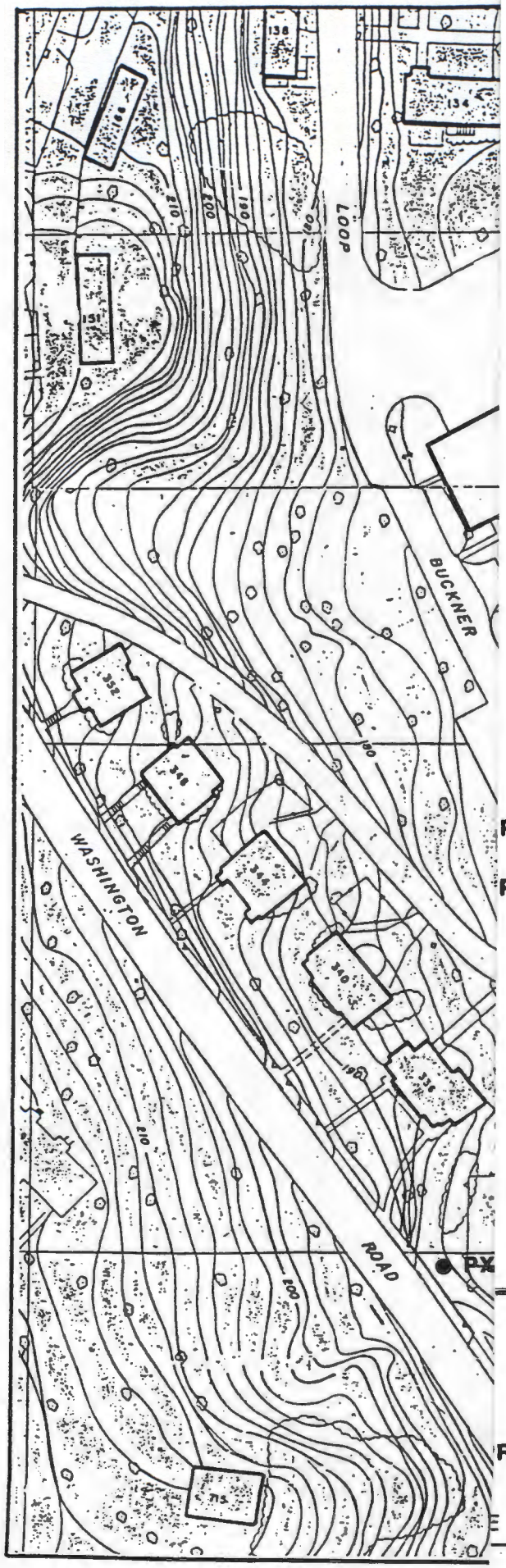
MALCOLM PIRNIE

UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK

CAMP BUCKNER LOCATION MAP

SCALE AS NOTED

FIGURE 1-3b



LEGEND:

PXMW-01 EXISTING MONITORING WELL

PXMW-05 PROPOSED MONITORING WELL

0 100 200 FT

SCALE

MALCOLM PIRNIE

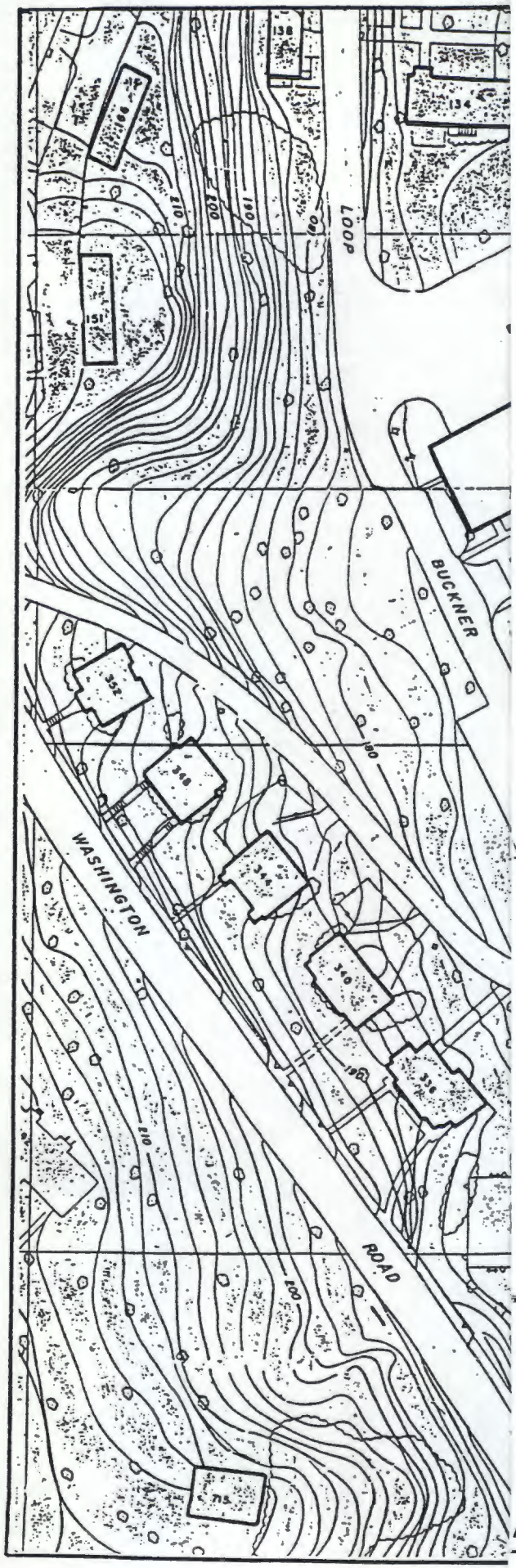
UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK

ROPOSED MONITORING WELL LOCATIONS

PX LANDFILL

E AS NOTED

FIGURE 2-1



LEGEND:

PXSP-01 PROPOSED SEEP SAMPLE

0 100 200 FT

SCALE

MALCOLM PIRNIE

UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK

PROPOSED SEEP SAMPLE LOCATIONS
PX LANDFILL

AS NOTED

FIGURE 2-2