Presented to:

Report

Presented by:

United States Air Force Center for Environmental Excellence

Plattsburgh AFB
New York

CHP
BX 2335

Phase II Contamination Assessment and Remedial Activities

April 1996

Document Control Number: PLT-10K77000-M17-00053

JE®

JACOBS ENGINEERING GROUP INC.
1300 N. 17th. Street, Suite 602
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LIST OF ACRONYMS AND ABBREVIATIONS

AF	Air Force
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AST	Aboveground Storage Tank
BGS	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
BX	Base Exchange
CFR	Code of Federal Regulations
CHP	Central Heating Plant
cm/sec	centimeters per second
DO	Delivery Order
EPA	U.S. Environmental Protection Agency
EV	equivalent volume
I-87	Interstate Highway 87
IDM	Investigation Derived Material
IRP	Installation Restoration Program
ISE	oxidation/reduction potential
Jacobs	Jacobs Engineering Group Inc.
kV	kilovolt
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
MH	manhole
ml	milliliter
MP	measuring point
MS/MSD	matrix spike/matrix spike duplicate
MTBE	Tert-Butyl Methyl Ether
ND	nondetect
NIST	National Institute of Standards and Technology
NYSDEC	New York State Department of Environmental Conservation
NYDOH	New York Department of Health
OFW	organic free water
OVA	organic vapor analyzer
PAFB	Plattsburgh Air Force Base
PAH	polyaromatic hydrocarbons
PCB	polychlorinated biphenyl
PID	Photoionization Detector
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
QA	quality assurance

QC	quality control
SC	specific conductivity
semi-VOCs	semi-volatile organic compounds
TCE	trichloroethene
TPH	total petroleum hydrocarbon
TRPH	total recoverable petroleum hydrocarbons
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
UST	underground storage tank
VOCs	volatile organic compound

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EXECUTIVE SUMMARY

Jacobs Engineering Group, Inc. (Jacobs) completed the following report, Phase II Contamination Assessment and Remedial Activities, IRP 30: BX Station and IRP 31: Central Heating Plant (CHP) for the Plattsburgh Air Force Base (PAFB) in support of Contract Number F41624-94-D-8115 between the United States Air Force and Jacobs. This contract includes a provision for Jacobs to provide remedial support services to the AFCEE Program, PAFB, Plattsburgh, NY.

Site Description

PAFB is located in the northeastern part of the state of New York, adjacent to the west shore of Lake Champlain. The installation occupies an area of approximately 4,856 acres and is bordered to the north and west by the City of Plattsburgh and to the southeast by other communities. . The Saranac River is also located along the northern edge of the base. The Salmon River and agricultural properties bound the base to the south. The terrain slopes gently to the east toward Lake Champlain.

Regional Setting

The base lies within the Lake Champlain Valley, which trends north-south between the Adirondack Mountains to the west and the Green Mountains to the east. Groundwater in the Plattsburgh area occurs in both unconsolidated overburden deposits and consolidated bedrock. The Adirondack Mountains to the west of Plattsburgh represent the major recharge area for the region, and Lake Champlain represents the regional discharge area. Locally, water yields from wells screened in unconsolidated deposits vary from several hundred gallons per minute (gpm) to only a few gpm. Significant discharge areas include the Saranac and Salmon Rivers.

Objective

The objective of the support service completed by Jacobs consisted of the completion of a Phase II Investigation to provide hard data and analytical results on the subsurface media at IRP Site 30 (BX station) and IRP Site 31 (CHP) on the presence and extent of contamination. The ultimate

goal of these objectives was to obtain clean closures at both sites as defined by the New York Department of Environmental Conservation (NYDEC).

BX Station Site Description

The BX Station (IRP 30) is located on the southern corner of the intersection of New York Road and Kansas Avenue. The site consists of a one-story brick building which contains three automotive repair bays with hydraulic lift. The reservoirs for the hydraulic oil are located below each repair bay. Residential homes are located east of Kansas Avenue and south of the athletic field and a school is located to the west of the site. Surface water from the site drains into the storm sewer network which runs underneath the site to the south. Site specific geology includes a unit consisting of generally fine to medium grained sand with trace layers of coarse sand, fine gravel, silt and fill material. Analysis of hydraulic head measured September 15, 1995, indicates that groundwater flows to the east.

CHP Site Description

The Central Heating Plant (CHP) site is located on the eastern corner of the intersection of New York Road and Arizona Avenue. The CHP site consists if a large concrete building housing electrical generation units. Drainage ditches and storm sewers intersect the site and carry run-off away from the site. Site specific geology includes a unit consisting of generally fine to medium grained sand with trace layers of coarse sand, fine gravel, silt, and fill material. Analysis of hydraulic heads measured on September 15, 1995, indicates groundwater flows to the east.

Specifically, Jacobs completed remedial and assessment activities from September 11 to September 20, 1995, at the IRP 30 BX Station, and IRP 31 CHP (Figure ES-1). Also, OHM Remediation Services Corporation completed a sampling event in January, 1996, at the BX Station for which the analytical sampling results are incorporated into this report. A detailed listing of each activity conducted at the IRP sites is presented in Table ES-1.

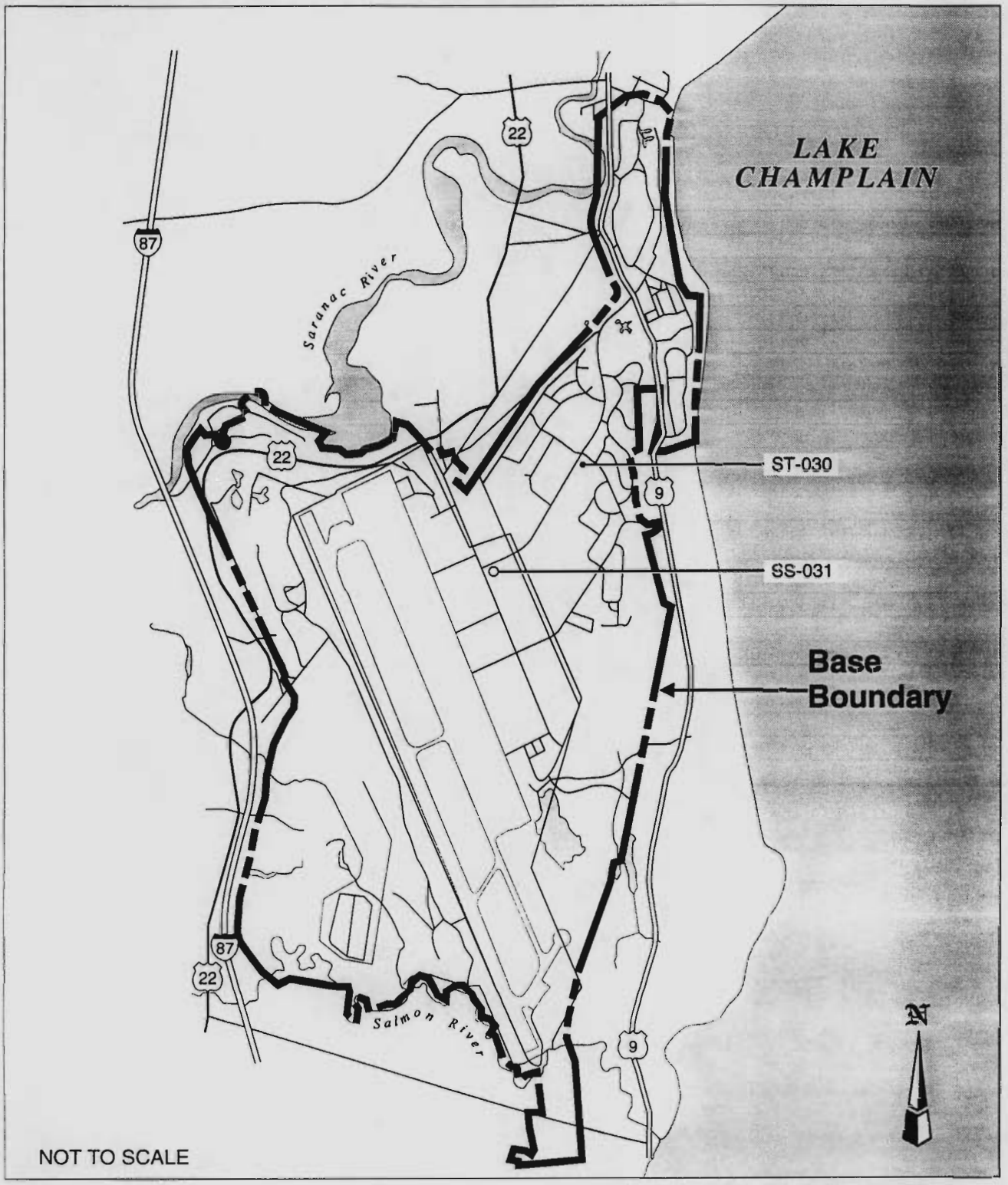

Figure ES-1
Site Locations

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project No.: 10K77002
Drawn by: J.L. & L.R. Date: 03/26/96	Drawing File Name: K770-05.CDR

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Table ES-1
FIELD PROGRAM SUMMARY

ACTIVITY	BX STATION	CHP PLANT
Well Installation	2	2
Well Abandoned	2	-
Remedial Excavation	2	1
Cubic yards removed	484	50
Bio-Cell Treatment: Cubic yards treated	484	50
Grid soil samples	24	-
Ground water samples	12	6
Subsurface soil samples	4	2
Excavation soil samples	10	1
Sewer Aqueous samples	6	-
Sewer Solid samples	2	-
Immunassay samples	11	1

Jacobs conducted the following tasks during this investigation:

- Conducted removal actions at the BX Station and CHP sites;
- Identified and delineated areas of contamination at the BX Station and CHP sites; and
- Constructed and operated an on-site remediation system for contaminated soils.

Jacobs completed these tasks through completion of the following activities:

- Installation of monitoring wells;
- Abandonment of monitoring wells;
- Collection of subsurface soil, groundwater, storm/water/sediment samples for analytical and field immunoassay testing;
- Soil excavation;
- Soil treatment; and
- Surveying.

Remedial Activities

The remedial activities included: excavation of contaminated soil from three separate excavations within the two IRP's, (Table ES-2) and transportation of the soil from IRP 30 and 31 to the biocell, field analysis of immunoassay samples to control excavations; collection and laboratory analysis of 11 excavation sidewall soil samples; collection of grid soil samples; and collection of one analytical sample from the stockpiled soil at IRP 31 for a profile analysis.

Table ES-2
REMEDIAL EXCAVATIONS SPECIFICATIONS

	IRP 30 BX STATION		IRP 31 CENTRAL HEATING PLANT
	NORTHERN EXCAVATION	SOUTHERN EXCAVATION	SWALE AREA EXCAVATION
Size *	38' X 70'	80' X 40'	IRREGULAR
Depth	≈ 2.5 FEET	≈ 2.0 FEET	≈ 3 FEET
Approximate Cubic Yards Removed	≈ 247	≈ 237	50
How Excavated	JOHN DEERE K907 TRACK HOE	JOHN DEERE K907 TRACK HOE	JOHN DEERE K907 TRACK HOE
Soil Disposition	BIOCELL	BIOCELL	BIOCELL
Side Wall Confirmatory Sampling	7 SAMPLES	4 SAMPLES	1 SAMPLE
418.1	7	4	1
ImmunoAssay (TPH)	5	4	5

* = MEASUREMENT IS PRESENTED AS N-S SIDEWALL LENGTH BY E-W SIDEWALL LENGTH.

Contamination Assessment Activities

Contamination Assessment activities included the installation of four monitoring wells, development of four monitoring wells, abandonment of two existing monitoring wells, collection and analysis of 18 groundwater samples from monitoring wells, collection and analysis of two storm drain solid samples and six storm drain liquid samples, and collection of six subsurface analytical samples. Field screening by immunoassay on various samples was also conducted for soils, water, and investigation derived material (IDM) (Table ES-3). One sample, from the soil excavated at the CHP, was collected and submitted to the laboratory for chemical analysis for disposal parameters.

Table ES-3
BX STATION AND CHP ASSESSMENT ACTIVITIES

	IRP 30 BX STATION	IRP 31 CENTRAL HEATING PLANT
WELL ABANDONMENT	2	0
WELL INSTALLATION	2	2
WELL DEVELOPMENT	2	2
WELL SAMPLING	12	6
ANALYSES	BNA 8270, VOA + MTBE 8021	BNA 8270, VOA + MTBE 8021
SUBSURFACE SOIL SAMPLES FOR LABORATORY ANALYSIS	4	3
ANALYSES	BNA 8270, VOA + MTBE 8021	BNA 8270, VOA + MTBE 8021
STORM SEWER LIQUID/SOLID SAMPLES	6/2	0
ANALYSES	418.1, 8260	
TOTAL IMMUNOASSAY SAMPLES	21	14
SOILS RELATED TO EXCAVATIONS	11	5
SOILS RELATED TO STORM DRAIN	4	0
RAIN WATER COLLECTED FROM EXCAVATION	2	0
INVESTIGATION DERIVED MATERIAL	4	9

Sampling Results

From analysis of the sampling results, the following compounds exceeded applicable regulatory requirements as stated in the New York State Petroleum-Contaminated Soil Guidance document.

TABLE ES-4
ANALYTICAL RESULTS EXCEEDING APPLICABLE REGULATORY REQUIREMENTS

SAMPLE ID	PARAMETER	LOCATION	CONCEN-TRATION	QUALIFER	ACTION LIMIT	MATRIX	FIGURE LOCATION
12/09/95/0805/30/1700	Benzo(a)anthracene	MW-30-005	47 ppb	J	.04 ppb	soil	Figure 3-4
12/09/95/0805/30/1700	Chrysene	MW-30-005	61 ppb	J	.04 ppb	soil	Figure 3-4
12/09/95/0805/30/1700	Benzo(b)fluoranthene	MW-30-005	72 ppb	J	.04 ppb	soil	Figure 3-4
12/09/95/0805/30/1700	Benzo(k)fluoranthene	MW-30-005	68 ppb	J	.04 ppb	soil	Figure 3-4
12/09/95/0805/30/1700	Benzo(a)pyrene	MW-30-005	77 ppb	J	.04 ppb	soil	Figure 3-4
12/09/95/0805/30/1700	Indeno(1,2,3-cd)pyrene	MW-30-005	55 ppb	J	.04 ppb	soil	Figure 3-4
12/09/95/0805/30/1700	Benzo(ghi)perylene	MW-30-005	61 ppb	J	.04 ppb	soil	Figure 3-4
12/09/95/1100/30/2605	Benzene	MW-30-002	0.89 ppb	B	0.7 ppb	water	Figure 3-5
12/09/95/1345/30/2607	MTBE	MW-30-004	180 ppb	–	50 ppb	water	Figure 3-5
12/09/95/1345/30/2607	Benzene	MW-30-004	45 ppb	–	0.7 ppb	water	Figure 3-5
14/09/95/1700/30/2619	MTBE	MW-30-005	7100 ppb	–	50 ppb	water	Figure 3-5
14/09/95/1700/30/2619	Benzene	MW-30-005	5000 ppb	–	0.7 ppb	water	Figure 3-5
14/09/95/1700/30/2619	Xylenes (total)	MW-30-005	3400 ppb	–	5 ppb	water	Figure 3-5
14/09/95/1700/30/2619	Ethylbenzene	MW-30-005	600 ppb	–	5 ppb	water	Figure 3-5
14/09/95/1700/30/2619	1,2,4 Trimethylbenzene	MW-30-005	470 ppb	–	5 ppb	water	Figure 3-5
14/09/95/1700/30/2619	Naphthalene	MW-30-005	100 ppb	–	10 ppb	water	Figure 3-5
MW-2335-4	Benzene	MW-30-004	127.0 ppb	–	0.7 ppb	water	Figure 3-5
MW-2335-4	MTBE	MW-30-004	174.0 ppb	–	50.0 ppb	water	Figure 3-5
MW-2335-5	Benzene	MW-30-005	3900.0ppb	–	0.7 ppb	water	Figure 3-5
MW-2335-5	Ethylbenzene	MW-30-005	571.0 ppb	–	5.0 ppb	water	Figure 3-5
MW-2335-5	Xylenes	MW-30-005	1810.0ppb	–	5.0 ppb	water	Figure 3-5
MW-2335-5	1,2,4 Trimethlybenzene	MW-30-005	433 ppb	–	5.0 ppb	water	Figure 3-5
MW-2335-5	MTBE	MW-30-005	3480 ppb	–	50.0 ppb	water	Figure 3-5
MW-2335-2	Benzene	MW-30-002	2.0 ppb	–	0.7 ppb	water	Figure 3-5

Samples which exceeded regulatory requirement are associated with the groundwater at the BX Station and subsurface soil samples collected adjacent to the northern excavation at the BX Station. Also, elevated levels of BTEX and MTBE compounds were identified in the storm sewer network down gradient of the BX Station.

Recommendations

Based on the remedial activities and assessment activities conducted by Jacobs to date, the following recommendations for each IRP are presented.

BX Station

From correspondence with Art Stemp, New York State Spill Control Representative, the northern and southern excavation should be backfilled with approved clean soils and the surface cover returned to native state (Appendix A). Quarterly sampling of existing monitoring wells should be conducted to verify the effectiveness of the removal of the tanks and soils currently being completed by OHM Remediation Services at the BX Station and the viability of natural degradation of organic compounds in the groundwater at the BX Station. Upgradient water samples should be collected from the storm drain network for EPA Method 8021 + MTBE to verify the BX Station as the source of contamination in the storm drain network and quarterly sampling should be completed at previous sampling points in the storm drain network to verify the effectiveness of the removal actions being completed at the BX Station.

CHP Site

No further activities are recommended at the site.

1.0 INTRODUCTION

The support services provided by Jacobs during performance of this task were conducted according to the Air Force Installation Restoration Program (AF IRP). The objectives of the AF IRP are "The identification, investigation, research and development, and cleanup of contamination from hazardous substances, pollutants, and contaminants." The goal of these objectives is Close-out, which implies that all necessary actions have been taken, documented and accepted by the appropriate authorities, in order to protect the public and the environment.

1.2 SITE DESCRIPTION

Plattsburgh Air Force Base (PAFB) is located in the northeastern part of the state of New York, adjacent to the west shore of Lake Champlain (Figure 1-1). The installation, which is scheduled for closure, occupies an area of approximately 4,856 acres. The base is bordered to the north and west by the City of Plattsburgh and to the southeast by other communities. The Saranac River is also located along the northern edge of the base. The Salmon River and agricultural properties bound the base to the south. Interstate Highway 87 (I-87) delineates the western limit of the base. The terrain slopes gently to the east toward Lake Champlain.

Climate

Plattsburgh receives an average of 41.4 inches of precipitation (equivalent rainfall) annually, including 63 inches of snow. The maximum recorded 24 hour rainfall is 1.8 inches and the maximum recorded 24 hour snowfall of 15 inches. Relative humidity averages 66 percent annually. The average daily maximum temperature is 53° F, and the average daily minimum is 34° F (URS, 1994).

Regional Geology

PAFB is located within the St. Lawrence-Champlain Lowlands Physiographic province of New York State. The base lies within the Lake Champlain Valley, which trends north-south between the Adirondack Mountains to the west and the Green Mountains to the east.

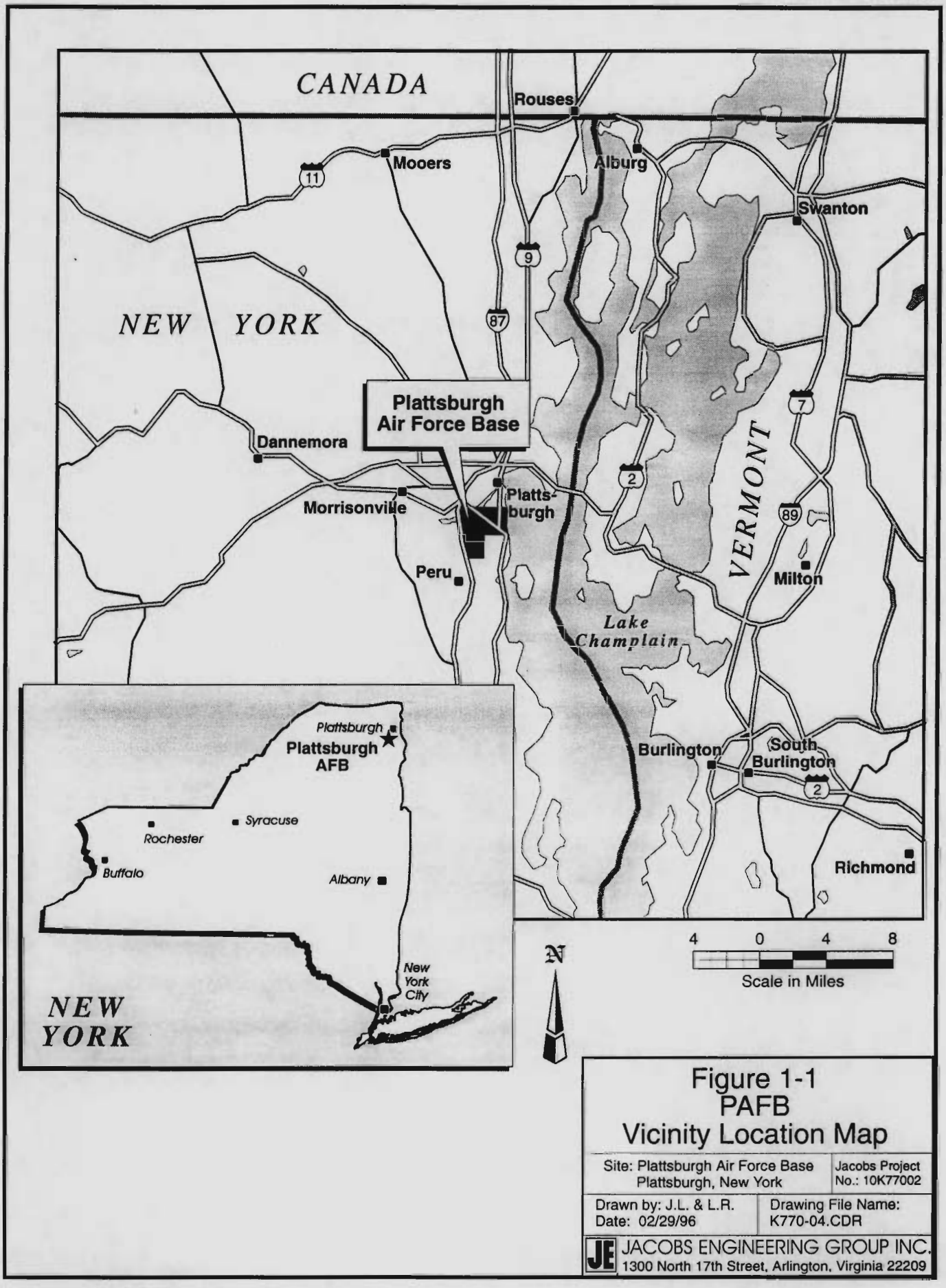

Figure 1-1
PAFB
Vicinity Location Map

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project No.: 10K77002
Drawn by: J.L. & L.R. Date: 02/29/96	Drawing File Name: K770-04.CDR

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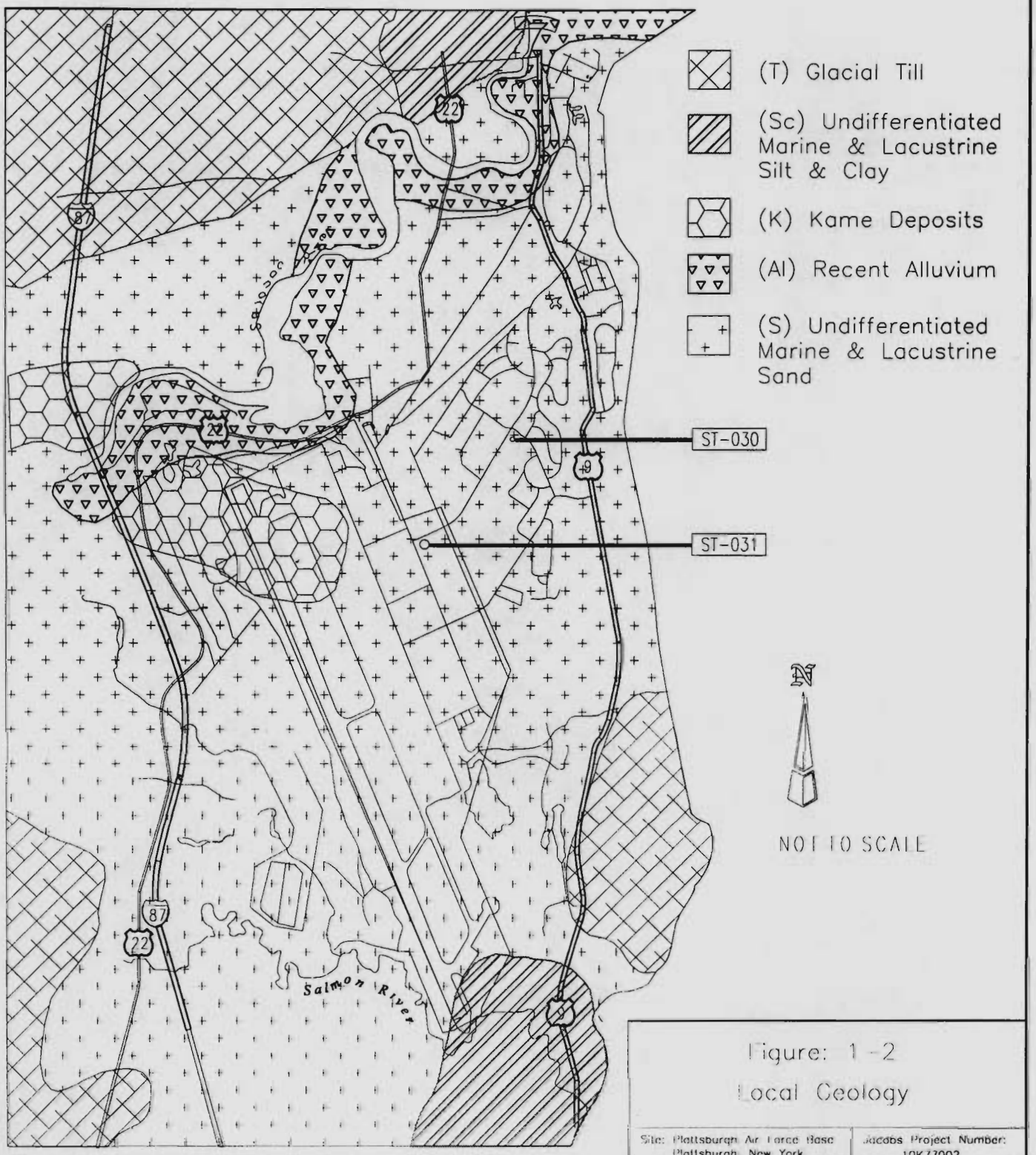
The Laurentide ice mass retreated northward through the Champlain Valley approximately 10,000 years ago during the most recent Pleistocene glacial retreat. Upon retreat, the glacier deposited large quantities of glacial meltwaters, which formed glacial lakes. Lake Champlain, which was once a proglacial lake, assumed a number of temporary water levels, during the glacial retreat. These water levels are recognizable from the different beach levels found in the area. The water levels were influenced primarily by the amount of meltwater generated by the waning glacial mass, and by isostatic uplift in the area, which regionally is estimated to have been approximately 500 feet. The highest water reached was approximately 680 feet elevation. Presently, Lake Champlain has a surface elevation of 95 feet. (URS, 1994)

Unconsolidated Sediments

The unconsolidated surficial deposits in the vicinity of PAFB have been mapped as the following with description (Figure 1-2):

- Alluvial sediments: occur primarily in valleys (e.g., Salmon and Saranac Rivers). Composed of sand and gravel, with varying amounts of silt on floodplains. (Al)
- Kame deposits: generally coarse to fine gravel and/or sand with lateral variability in texture and permeability. Occur near the northwest portion of PAFB. (K)
- Glaciomarine and glaciolacustrine silt and clay: generally laminated to massive silt and clay of low permeability. The silt and clay deposits indicate deposition in deep water. These deposits at PAFB occur surficially at the south end of the flightline apron, in the Golf Course Drainage Area, and at the mouth of the Salmon River. (Sc)
- Glaciomarine and glaciolacustrine sand: stratified, fine to medium sand, permeable, with variable thickness. This unit represents the most laterally extensive surficial deposit at PAFB. (S)
- Glacial till: variably textured (boulders to silt and clay) deposit that is typically well-graded. Generally indicates that deposition occurred beneath glacial ice. Permeability varies with degree of compaction. Surficially, these deposits occur in the southeast portion of PAFB. (T) (URS, 1994)



Source: URS, 1994

Figure: 1-2

Local Geology

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 05/01/96	Drawing File Name: GEOLOGIC.DWG

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Bedrock

Underlying the unconsolidated overburden deposits is Ordovician Age bedrock, which consists of a series of thinly to thickly bedded limestones and dolostones with medium to microptic textures. These consolidated rocks underlying the Champlain Valley dip to the east, forming an artesian aquifer. (URS, 1994)

Regional Hydrogeology

Groundwater in the Plattsburgh area occurs in both unconsolidated overburden deposits and consolidated bedrock. Groundwater movement in these media is controlled by aquifer characteristics, infiltration, and runoff. The Adirondack Mountains to the west of Plattsburgh represent the major recharge area for the region, and Lake Champlain represents the regional discharge area. Other locally significant discharge areas include the Saranac and Salmon Rivers, just north and south of PAFB, respectively.

Water yields from wells screened in unconsolidated deposits vary from several hundred gallons per minute (gpm) to only a few gpm. In general, the sand and sand-and-gravel deposits provide the highest water yields. The silt and clay deposits, being of low permeability (10^{-6} to 10^{-4} cm/sec), are poor aquifers. The glacial till deposits are variably-textured, which influences both permeability and water yields. In general, the till is well graded and produces only low (1-20 gpm) water yields.

Groundwater movement in the bedrock is controlled by physical characteristics of the rock. These include primary porosity, secondary fractures, faults, bedding plains, joints, and solution cavities. Average well yields from bedrock wells set in bedrock in the vicinity of PAFB range from 2 to 200 gpm. (URS, 1994)

1.2.1 BX Station Site Description

The BX Station (IRP 30) located on the southern corner of the intersection of New York Road and Kansas Avenue (Figure 1-3). The major surficial features of the BX Station include: buildings, paved lot, peripheral landscaped areas, athletic field, and roadways. The BX Station site consists of a one-story brick building which contains three automotive repair bays with hydraulic lifts and a reservoir for hydraulic oil is located below each repair bay. Immediately surrounding the building is a paved lot with concrete based fuel pump islands. The paved lot is surrounded by curbing except for accessways. A roadway intersects the lawned area to the southeast of the site and an athletic field is directly south of this roadway. Residential homes border east of Kansas Avenue and south of the athletic field. A school is located to the southwest of the site. Surface water from the site drains into the storm sewer network which runs along Kansas Avenue (Figure 1-4).

Site specific geology interpreted from data collected during well installation procedures conducted by Jacobs indicate a unit consisting of generally fine to medium grained sand with trace layers of coarse sand, fine gravel, silt and fill material. This unit was identified to include an olive brown sand subunit, a dark gray sand subunit, and fill material. Groundwater elevations at the site are shown in Table 1.2.1A Static water levels measured on September 15, 1995, indicate that groundwater flow direction is to the east (Figure 1-5).

Table 1.2.1A
BX STATION GROUNDWATER ELEVATIONS

MW-030-001	MW-030-002	MW-030-003	MW-030-004	MW-030-005	MW-030-006
168.18 ft.	160.93 ft.	160.99 ft.	156.95 ft.	162.27 ft.	160.84 ft.

1.2.2 CHP Site Description

The CHP site is located on the eastern corner of the intersection of New York Road and Arizona Avenue (Figure 1-6). The major surficial features include buildings, paved lots, peripheral landscaped areas, ditches or drainage channels, wetlands, and a stand of hardwoods. The CHP site consists of a large concrete building housing electrical generation units. Immediately surrounding

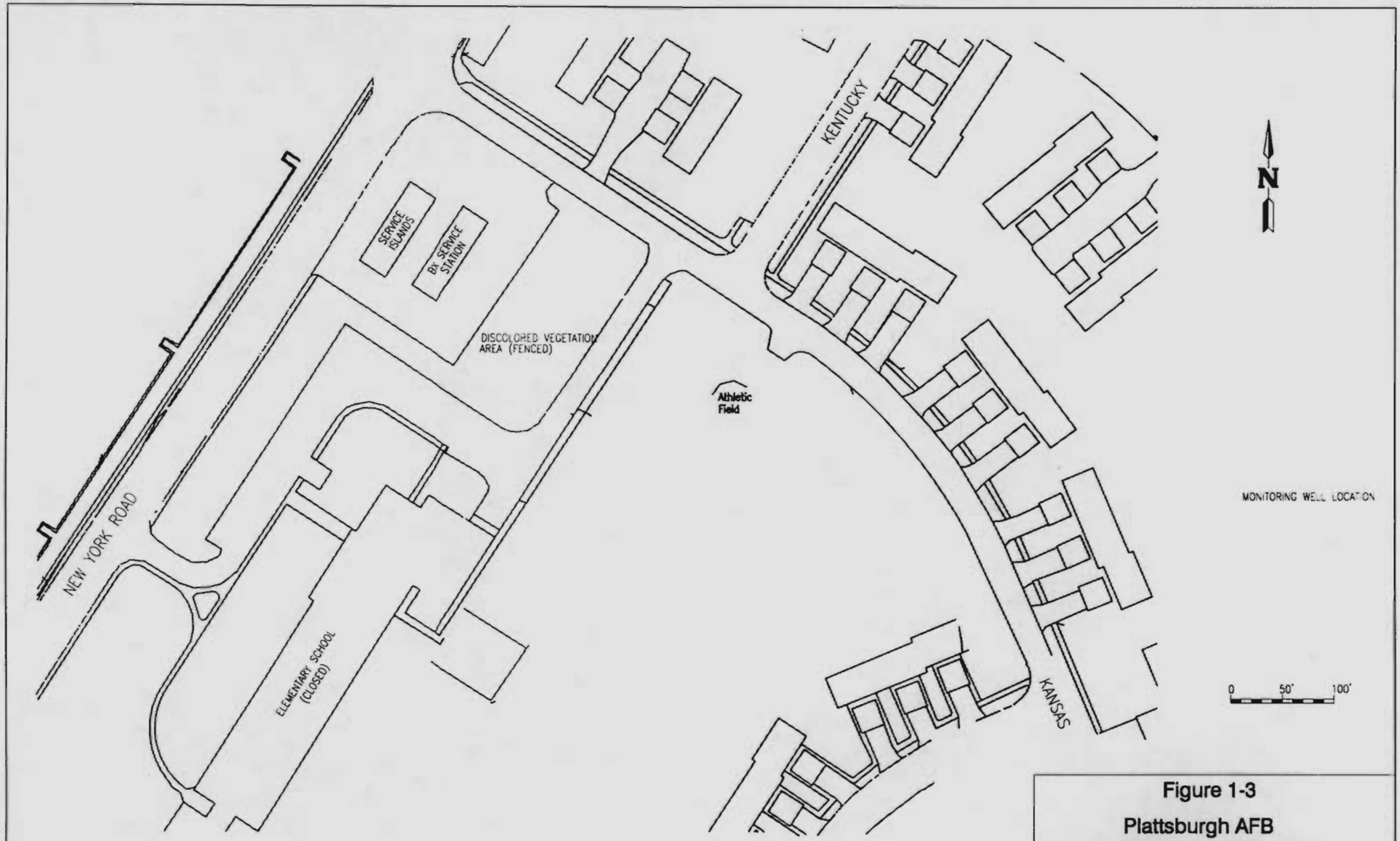

Figure 1-3

Plattsburgh AFB
BX Service Station Area

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10IC7002
Drawn By: L. Robertson Date: 03/01/96	Drawing File Name: BXTOPO.DWG

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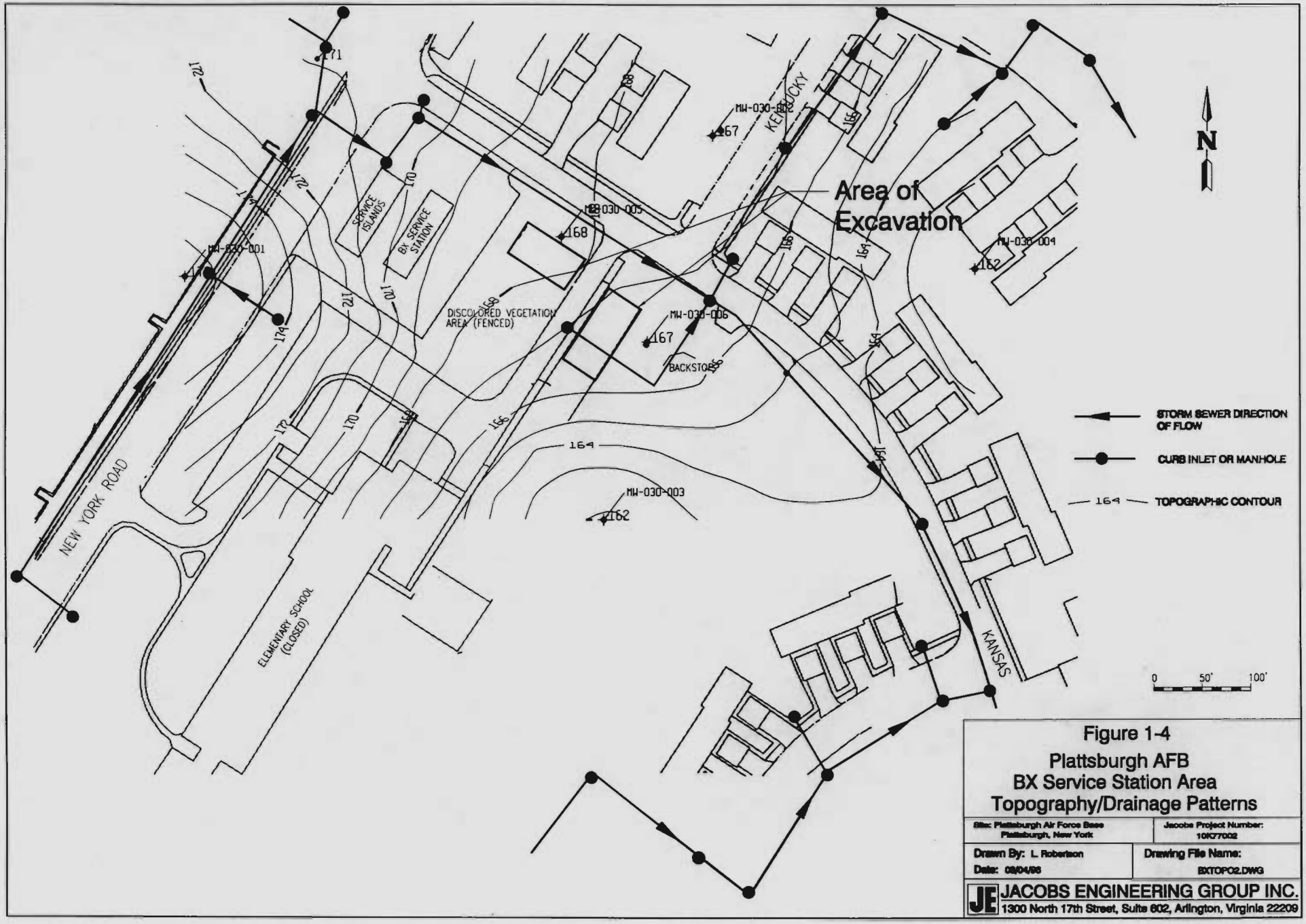

Figure 1-4
Plattsburgh AFB
BX Service Station Area
Topography/Drainage Patterns

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L Robertson Date: 09/04/96	Drawing File Name: BXTOPO2.DWG

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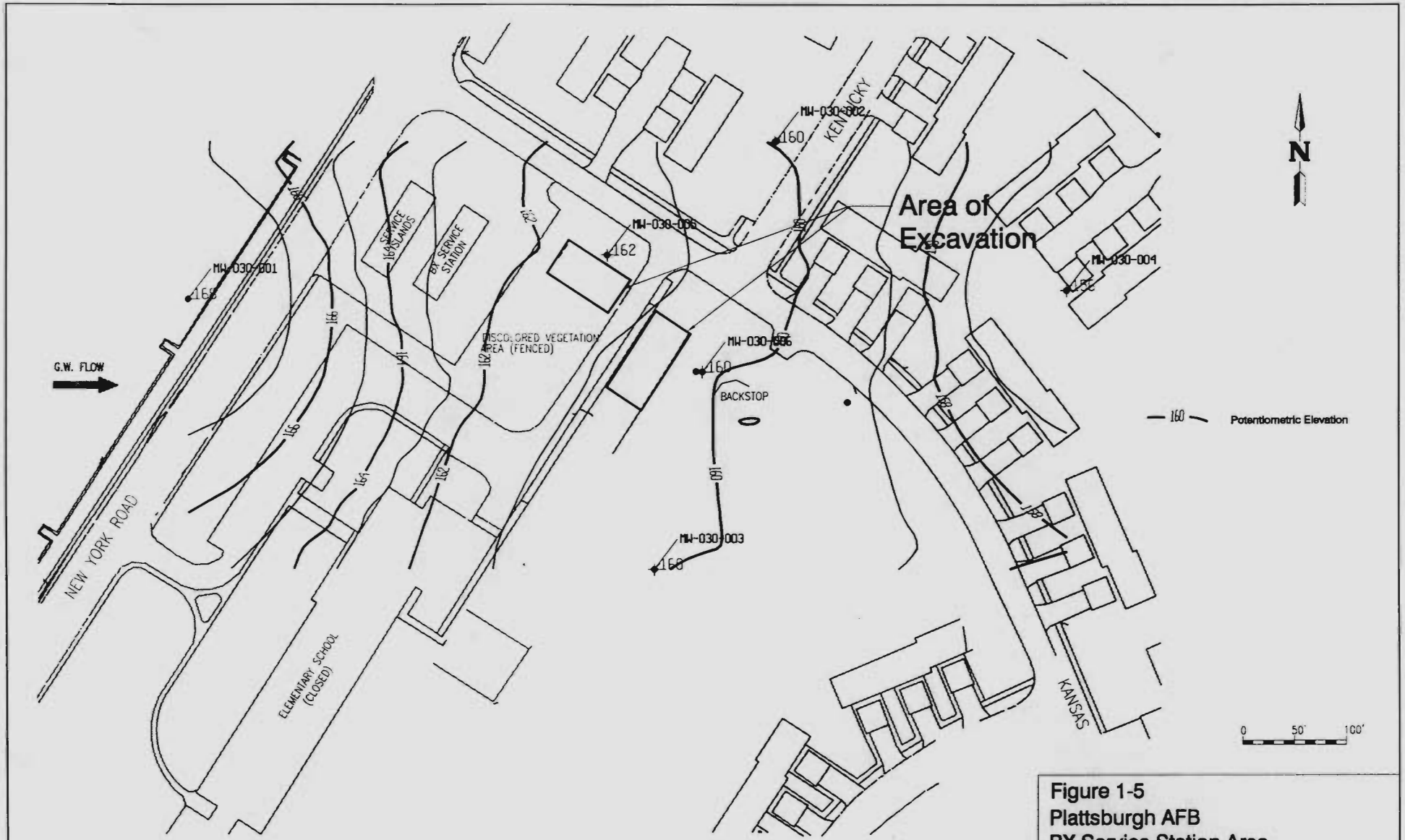

Figure 1-5
Plattsburgh AFB
BX Service Station Area
Groundwater Contour/ Flow Pattern

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10K07002
Drawn By: L. Robertson Date: 05/04/98	Drawing File Name: BXgwTOPO.DWG

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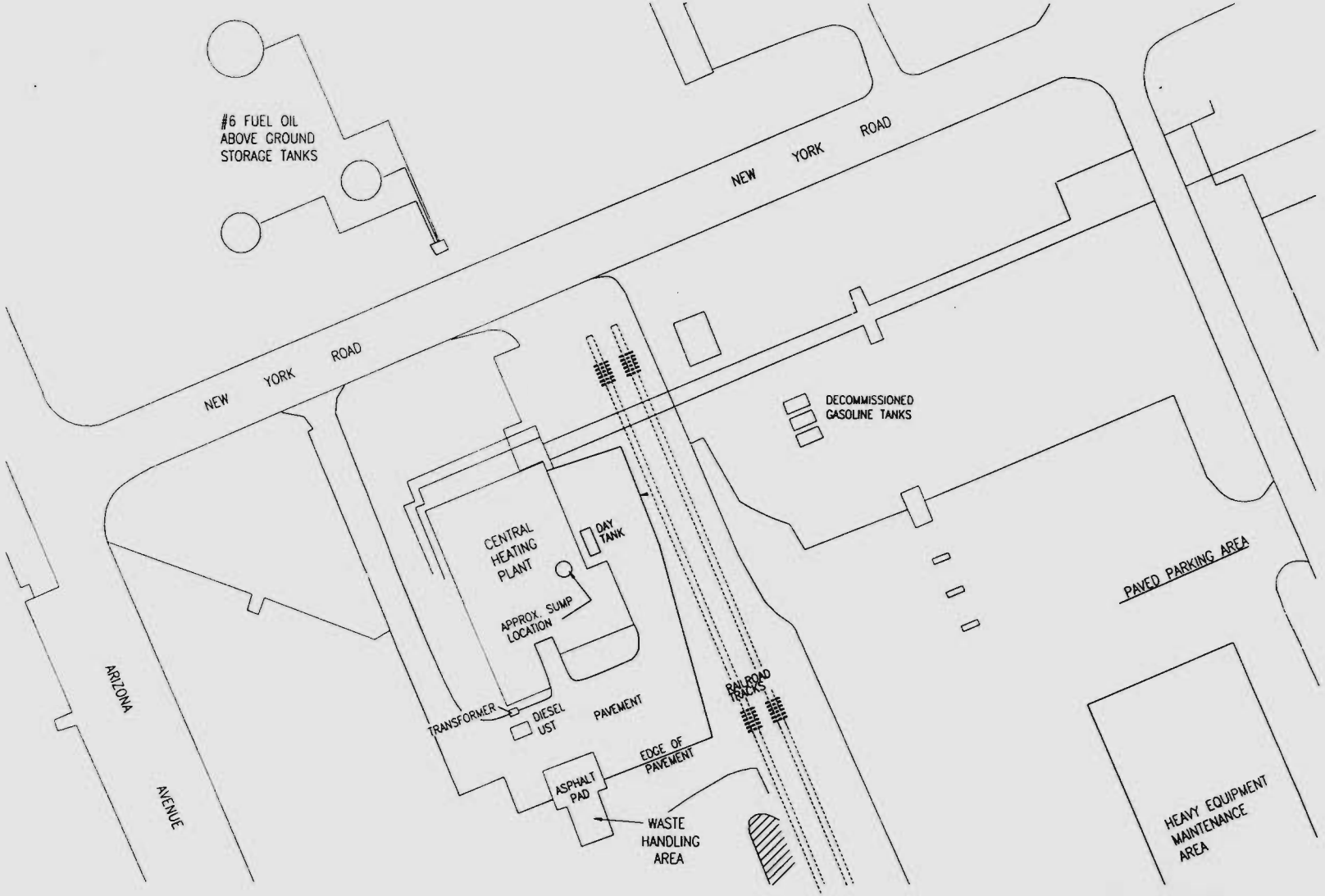

Figure 1-6
Plattsburgh AFB
Central Heating Plant
Site Map

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10IC7002
Drawn By: L. Robertson Date: 03/09/98	Drawing File Name: CHPSITE.DWG

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the building are mowed lawns, parking area, and railroad tracks. To the south of the CHP plant is a stand of mixed hardwoods and wetlands (URS, 1994). North of the CHP plant lies two 130,000 gallon ASTs for No. 6 fuel oil and one 420,000 gallon AST for No. 6 fuel oil (Figure 1-6). Drainage ditches are present on both sides of the railroad tracks and storm sewers intersect the site which carry run-off away from the site (Figure 1-7).

Site specific geology interpreted from data collected during well installation by Jacobs indicate a unit consisting of generally fine to medium grained sand with trace layers of coarse sand, fine gravel, silt, and fill material. This unit was identified to include a yellowish brown sand subunit and fill material. Ground water elevations at the site are shown in Table 1.2.2A. Static water level measurements taken on September 15, 1995, indicate groundwater flow direction is to the east southeast (Figure 1-8).

Table 1.2.2A
CHP GROUNDWATER ELEVATIONS

MW-031-001	MW-031-002	ME-031-003	MW-031-004	MW-031-005	ME-031-006
190.89 ft.	187.73 ft.	189.22 ft.	186.39 ft.	190.66 ft.	191.42 ft.

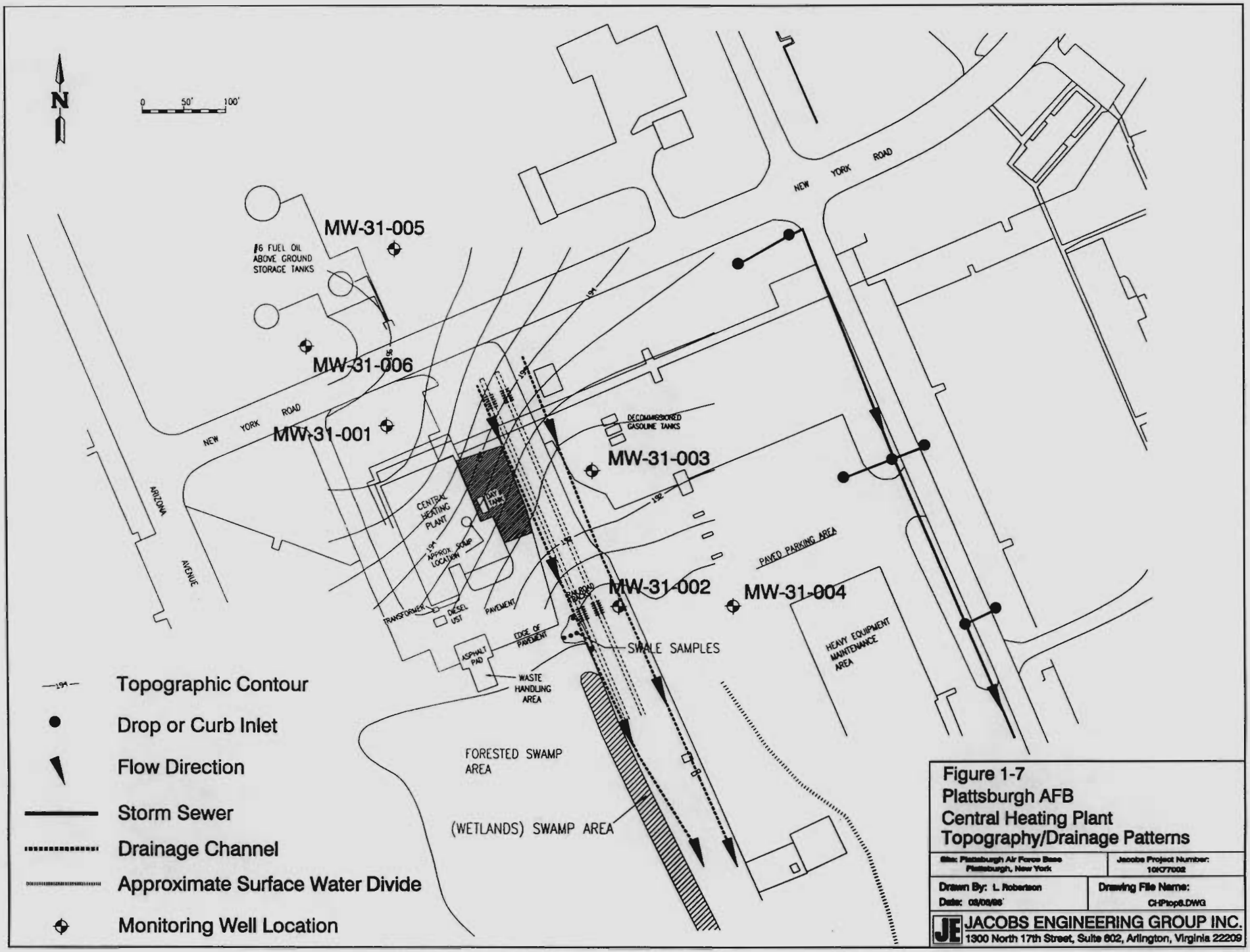

Figure 1-7
Plattsburgh AFB
Central Heating Plant
Topography/Drainage Patterns

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 03/03/03	Drawing File Name: CHPlot8.DWG

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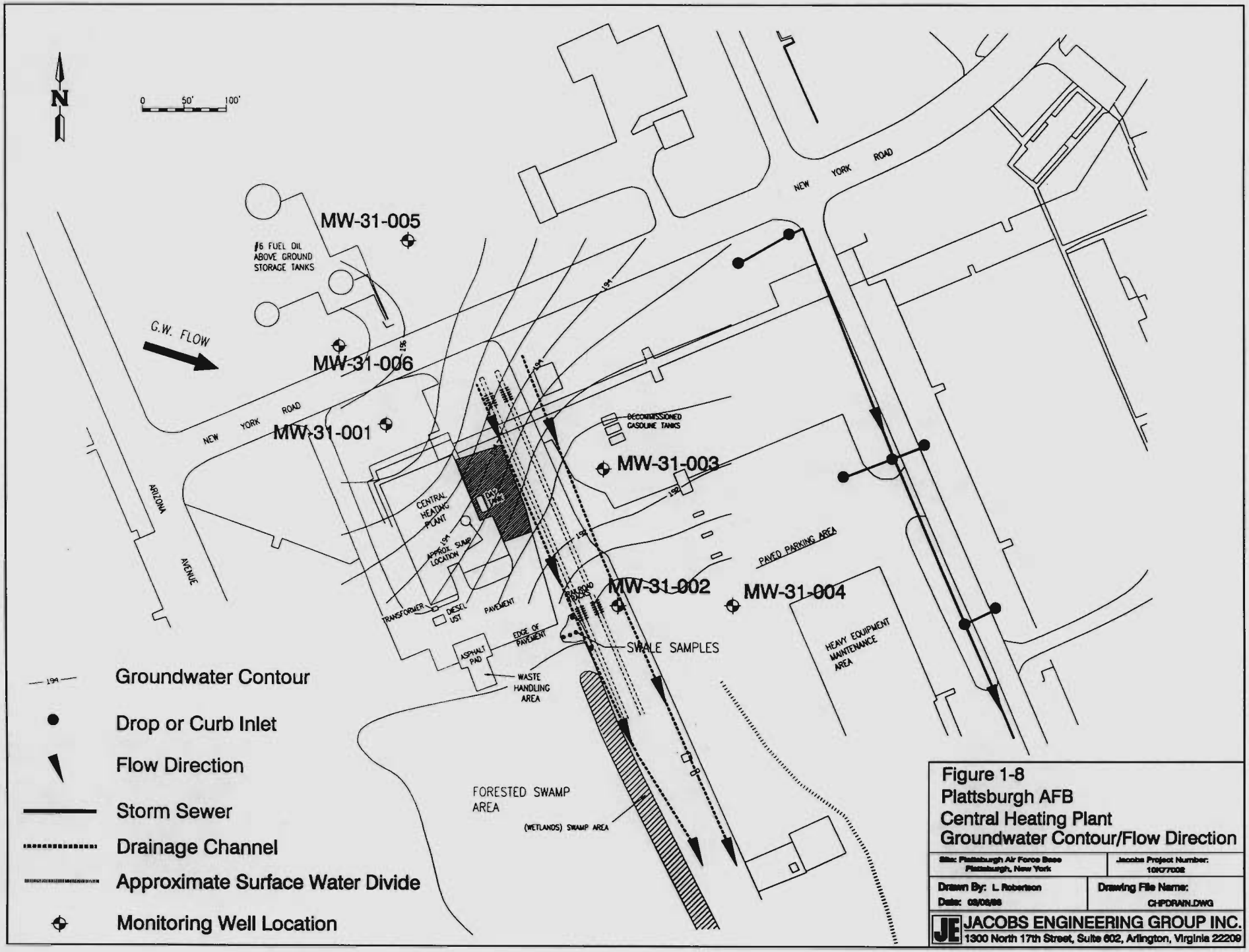

Figure 1-8
Plattsburgh AFB
Central Heating Plant
Groundwater Contour/Flow Direction

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 03/08/06	Drawing File Name: CHPDRAIN.DWG

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2.0 PROJECT ACTIVITIES

The project activities for these tasks under Delivery Order (DO) 0002, Contract Number F41624-94-D-8116 were conducted to achieve objectives of the AF IRP and specific objectives outlined in the Final Environmental Clean-up Plan, Jacobs 1995.

2.1 OBJECTIVES

The objectives of the AF IRP are "the identification; investigation, research and development, and clean-up of contamination from hazardous substances, pollutants and contaminants." The objective of the Phase II Investigation was to provide hard data and analytical results on the subsurface media at IRP Site 30 (BX station) and IRP Site 31 (CHP) on the presence and extent of contamination. The ultimate goal of these objectives was to obtain clean closures at both sites as defined by the New York Department of Environmental Conservation (NYDEC).

2.1.1 Base Exchange Service Station

The primary objectives at the BX station were to excavate contaminated soil exceeding the clean-up objectives, obtain analytical data exhibiting "the complete removal of the soil exceeding the clean-up criteria and to initiate remediation of the soil in a biocell to achieve the goal of site closure."

A secondary objective was to assess and verify any impacts to groundwater and/or surrounding soils and determine the eventual impact to potential receptors.

2.1.2 Central Heating Plant

The primary objectives for the CHP were to remove the contaminated soil in the swale south of the CHP facility, and verify complete removal via analytical results.

A secondary objective was to assess and verify any impacts to groundwater and/or surrounding soils and determine the eventual impact to potential receptors.

2.2 FIELD ACTIVITIES

The field activities completed during this phase were conducted in two IRP's and at the airfield. Remedial activities and assessment activities were conducted at IRP 30 (BX Station) and at IRP 31 (CHP). The construction of a bioremediation biocell was completed at the airfield.

Remedial Activities

The remedial activities included: excavating contaminated soil from three separate excavations within the two IRP's, (Table 2.2.A) and transporting the soil from IRP 30 and 31 to the biocell; field analysis of immunoassay samples to control excavations; collection and laboratory analysis of 11 excavation sidewall soil samples; collection of grid soil samples; and collection of one analytical sample from the stockpiled soil at IRP 31 for a profile analysis and determination of the capability for treatment at the biocell. Table 2.2.A presents a breakdown of activities in each IRP.

Table 2.2.A
REMEDIAL EXCAVATIONS SPECIFICATIONS

	IRP 30 BX STATION		IRP 31 CENTRAL HEATING PLANT
	NORTHERN EXCAVATION	SOUTHERN EXCAVATION	SWALE AREA EXCAVATION
Size *	38' X 70'	80' X 40'	IRREGULAR
Depth	≈ 2.5 FEET	≈ 2.0 FEET	≈ 3 FEET
Approximate Cubic Yards Removed	≈ 247	≈ 237	50
How Excavated	JOHN DEERE K907 TRACK HOE	JOHN DEERE K907 TRACK HOE	JOHN DEERE K907 TRACK HOE
Soil Disposition	BIOCELL	BIOCELL	BIOCELL
Side Wall Confirmatory Sampling	7 SAMPLES	4 SAMPLES	1 SAMPLE
EPA Method 418.1	7	4	1
ImmunoAssay (TPH)	5	4	5

* = MEASUREMENT IS PRESENTED AS N-S SIDEWALL LENGTH BY E-W SIDEWALL LENGTH.

Assessment Activities

Contamination Assessment activities included the installation of four monitoring wells, development of four monitoring wells, abandonment of two existing monitoring wells, collection and analysis of 30 groundwater samples from monitoring wells, collection of two storm water sewer liquid samples and six storm water drain solid samples, and collection of six subsurface analytical samples. Field screening by immunoassay on various samples was also conducted for soils, water, and investigation derived material (IDM) (Table 2.2.3.A). One sample from the soil excavated at the CHP was collected and submitted to the laboratory for chemical analysis on disposal parameters.

2.2.1 Subcontractor Usage and Their Roles

Presented in Table 2.2.1 are the subcontractors Jacobs utilized and their roles in conducting the activities presented in this section.

Table 2.2.1A
SUBCONTRACTOR USAGE AND THEIR ROLES

SUBCONTRACTOR	ROLE
Adirondak Environmental	Excavating, Biocell Const., Soil Transporting/ IDM Transport
Tri-State Drilling	Well Installation, Subsurface soil boring advancement, well abandonment
Ecology & Environment	Laboratory Services
Design Engineering & Land Surveying	Surveying

2.2.2 Remedial Activities

Remedial Activities were initiated in September and consisted of excavating contaminated soil from known hot spots at two locations associated with the BX station (IRP 30) and one location associated with the CHP (IRP 31).

Excavated soil from the two IRPs was transported to the newly constructed biocell at the airfield for bioremediation. The biocell is eighty (80) feet by eighty (80) feet in area and rests on a

concrete pad. The biocell was constructed with three inches of sand as a base, then three layers of 6-mil plastic liner, covered with nine inches of protective sand. The liner was wrapped over bermed soil 24-inch high around the perimeter of the cell. The berm was then surrounded with hay bales. A total of 84 cubic yards of clean sand was imported to construct the biocell. Approximately 534 cubic yards of excavated soil was placed in the biocell in three separate lifts. The first lift was placed down and 456 pounds of 19:3:3 fertilizer (Nitrogen:Phosphorus:Potassium) was added and rototilled. After placement of the second lift of excavated soil, an additional 359 pounds of 19:3:3 fertilizer was added and rototilled. Approximately 50 cubic yards of contaminated soil from the CHP (IRP 31) was then added. The soil/fertilizer mixture was tested for pH and was found to be "7", thus no lime was added. Presently, the maintenance of the bio-cell is being completed by another firm under contract to PAFB.

Prior to the contaminated soil from the CHP excavation being placed in the biocell, the excavated soil from the CHP was stockpiled on two layers of 6-mil plastic liner during excavating procedures. The stockpile was located on the asphalt paved area of the vehicle maintenance yard. Sampling for disposal criteria was conducted and based on the results it was deemed that the soil could be bioremediated at the biocell. After receiving NYDEC approval for bioremediation, the CHP excavated soil was transported to the biocell and incorporated, as discussed above.

Specifics of the remedial activities at each site are presented in the subsequent sections.

2.2.2.1 BX Station Remedial Activities

Historical Remedial Actions

The BX Gas Station, Building 2335, is located on the southern corner of the intersection of New York and Kansas Avenues. The gas station was renovated in the early to mid-1960's. There is no information obtained regarding activities that occurred before renovation. During renovation, a

550 gallon steel underground storage tank (UST) for waste oil was relocated to the south side of Building 2335. Another 550 gallon UST for waste oil was located west of Building 2335. A third steel UST for No. 2 fuel oil was added south of the building. In addition, base drawings show the location of seven steel 3,000 gallons USTs that were reportedly used for storing gasoline. Six of the seven USTs were abandoned in place by filling them with sand in the early 1980's. The remaining 3,000 gallon UST contained diesel fuel. Following abandonment of the six USTs, three 10,000 gallon fiberglass USTs were installed (1983) near the north side of Building 2335.

The three 10,000 gallon fiberglass USTs failed leak tests conducted in April, 1990. A groundwater investigation was initiated at the site by the Base because of the failed integrity tests. The investigation revealed hydrocarbon contamination at the site and the steel No. 2 fuel oil tank was found to contain 7 inches of water and only 30 inches of fuel. Based on the investigation, the New York State Department of Environmental Controls (NYSDEC) required that the Base remove the fuel oil tank, install a petroleum recovery system, and continue to test the fiberglass USTs. In August, 1990, 1,500 gallons of sludge, water, and fuel were removed from the site and disposed of off Base. The No. 2 fuel oil steel UST was removed (no replacement) and the three fiberglass USTs were replaced by November, 1990, with double-walled fiber reinforced plastic tanks, dispenser piping, and leak detection.

As part of the groundwater investigation and recovery system, four monitoring wells, tests pits, and a recovery well were installed along the north and east sides of Building 2335. Contaminated groundwater and fuel were extracted from the recovery well and were treated by an oil/water separator and carbon filter. The separated fuel was collected and properly disposed of, and treated water was discharged to the sanitary sewer. The treatment system was in operation from May, 1990, to September, 1990, and was stopped because free product ceased to appear in the recovery well. Sampling of the monitoring wells in September 1990 detected the following: volatile organic compounds (VOCs); benzene (600 parts per billion [ppb]),

ethlybenzene (20 ppb), trichloroethene (28 ppb), and butyl benzene (20 ppb). The recovery system has been removed.

The other three steel USTs (diesel fuel and two waste oil tanks) passed leak testing in 1990. However, these tanks were replaced in 1993 with double-walled, leak detecting, overfill protected USTs as a preventive measure.

On April 26, 1993, an area of discolored vegetation (stressed) (approximately two square feet) was discovered southeast of the site. A NYSDEC spill response team visited the site shortly thereafter and dug a test pit with a shovel. Approximately two inches of floating fuel was discovered in the excavation.

Present Remedial Actions

The remedial actions for this phase of work focused on bioremediation of soils contaminated with residual petroleum product at the BX Station (IRP 30) and the CHP (IRP 31). At two separate locations associated with the BX Station (Figure 2-1) soils were excavated with a John Deere K907 track hoe down to groundwater (approx. 2.5 feet BGS). The soil was loaded into eight cubic yard dump trucks, covered, and transported to the newly constructed biocell at the airfield. The northern excavation measures 38 feet X 70 feet X 2.5 feet deep and the southern excavation 40 feet X 80 feet X 2 feet deep. Each excavation was initiated at the known "Hot Spot" and excavating proceeded in a radiating format with field screening guiding the direction and extent. At both locations the originally estimated excavation were reached and it appeared that contamination still existed as evidenced by soil discoloration and staining. At the direction of Air Force personnel, additional soil sampling was completed to define the potential excavation limits. Twenty-four (24) subsurface soil samples were collected along a grid pattern with fifteen foot centers. The grids were located south and west of the excavations. Figure 2-2 exhibits the grid locations layout, and each sample point.

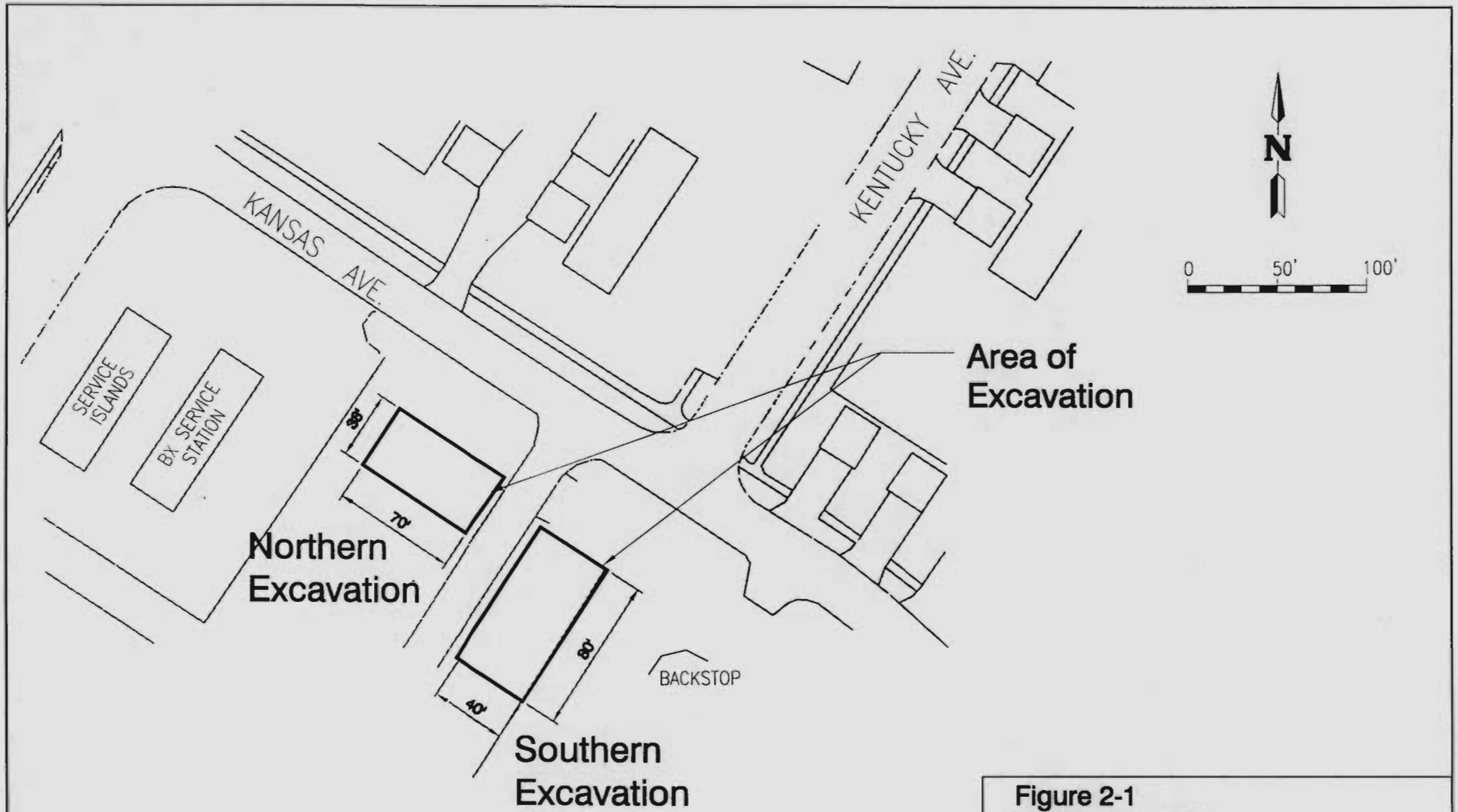

Figure 2-1
Plattsburgh AFB
BX Service Station Area
Excavation Area

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 03/05/98	Drawing File Name: BXTOPO5.DWG

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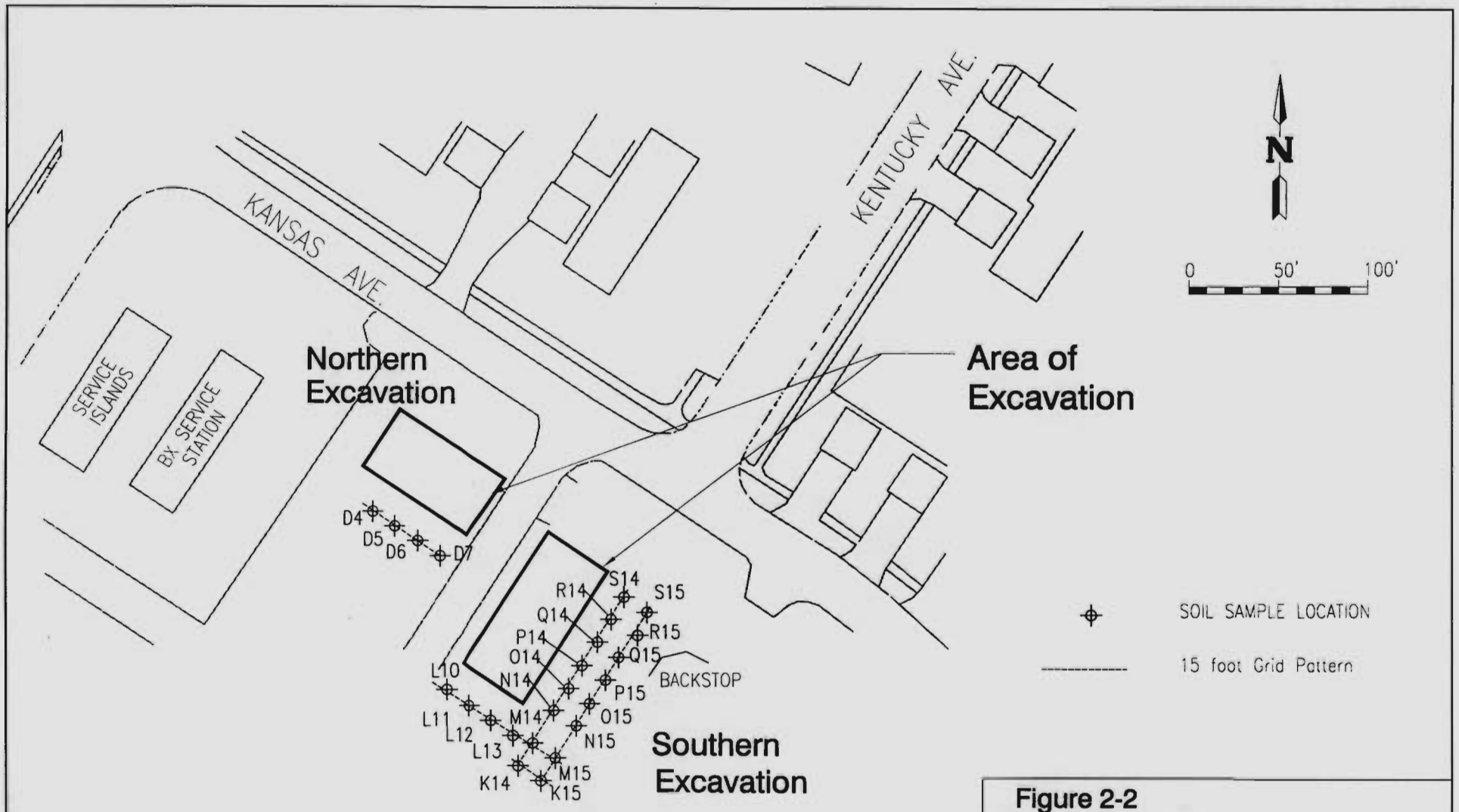

Figure 2-2
Plattsburgh AFB
BX Service Station Area
Soil Sample Locations

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 03/05/98	Drawing File Name: BXTOPO4.DWG

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The 24 subsurface soil samples collected along the 15 foot grid pattern were obtained from a depth of approximately 2 to 2.5 feet below ground surface. Table 2.2.2.1A presents each sample. Each sample was collected with a drill rig utilizing a 2-1/2 foot long, 2-1/2 inch diameter split spoon sampler being driven by a 130 lb. hammer. The spoon containing the sample was then removed from the ground and opened. A PID reading was taken immediately upon opening. The soil core was then placed in a certified clean sample jar then sealed, labeled, chilled, and sent to the laboratory via overnight delivery. Analysis for these samples consisted of EPA Method 418.1, Total Recoverable Petroleum Hydrocarbons.

Table 2.2.2.1A
SUBSURFACE SOIL SAMPLES FROM 15 FOOT GRID PATTERN

GRID LOCATION IDENTIFIER	EXCAVATION ASSOCIATION	SAMPLE NUMBER	ANALYSIS CONDUCTED
D-4	West side northern excavation	14/09/95/1635/2423/D4	EPA 418.1
D-5	West side northern excavation	14/09/95/1630/2422/D5	EPA 418.1
D-6	West side northern excavation	14/09/95/1620/2421/D6	EPA 418.1
D-7	West side northern excavation	14/09/95/1620/2420/D7	EPA 418.1
K-14	West side southern excavation	14/09/95/1505/30/2401/K14	EPA 418.1
K-15	West side southern excavation	14/09/95/1536/2408/K15	EPA 418.1
L-10	West side southern excavation	14/09/95/1554/2419/L10	EPA 418.1
L-11	West side southern excavation	14/09/95/1555/2419/L11	EPA 418.1
L-12	West side southern excavation	14/09/95/1553/2418/L12	EPA 418.1
L-13	Southern side southern excavation	14/09/95/1551/2417/L13	EPA 418.1
M-14	Southern side southern excavation	14/09/95/1510/30/2402/M14	EPA 418.1
M-15 **	Southern side southern excavation	14/09/95/1538/2409/M15	EPA 418.1
OHM-M-15	Southern side southern excavation	OHM-M-15	EPA 418.1
N-14	Southern side southern excavation	14/09/95/1515/30/2403/N14	EPA 418.1
N-15	Southern side southern excavation	14/09/95/1534/2410/N15	EPA 418.1
O-14	Southern side southern excavation	14/09/95/1525/30/2404/O14	EPA 418.1
O-15	Southern side southern excavation	14/09/95/1541/2411/O15	EPA 418.1
P-14	Southern side southern excavation	14/09/95/1530/30/2405/P14	EPA 418.1
P-15	Southern side southern excavation	14/09/95/1542/2412/P15	EPA 418.1
Q-14	Southern side southern excavation	14/09/95/1531/30/2406/Q14	EPA 418.1
Q-15	Southern side southern excavation	14/09/95/1545/2413/Q15	EPA 418.1
R-14	Southern side southern excavation	14/09/95/1532/30/2407/R14	EPA 418.1
R-15	Southern side southern excavation	14/09/95/1545/2414/R15	EPA 418.1
S-14	Southern side southern excavation	14/09/95/1549/2416/S14	EPA 418.1
S-15	Southern side southern excavation	14/09/95/1547/2415/S15	EPA 418.1

Excavation Confirmatory Samples

In both remedial excavations confirmatory soil samples were collected from each sidewall. In the northern excavation, samples consisted of four single point aliquots. A total of seven samples were collected from the northern excavation, three from each eastern sidewall, two from the western sidewall and one each from the northern and southern sidewalls. Figure 2-3 exhibits the location of the samples. The northern portion of the northern excavation appears to have encountered the old recovery system trench, as coarse angular gravel was observed which had a strong petroleum odor.

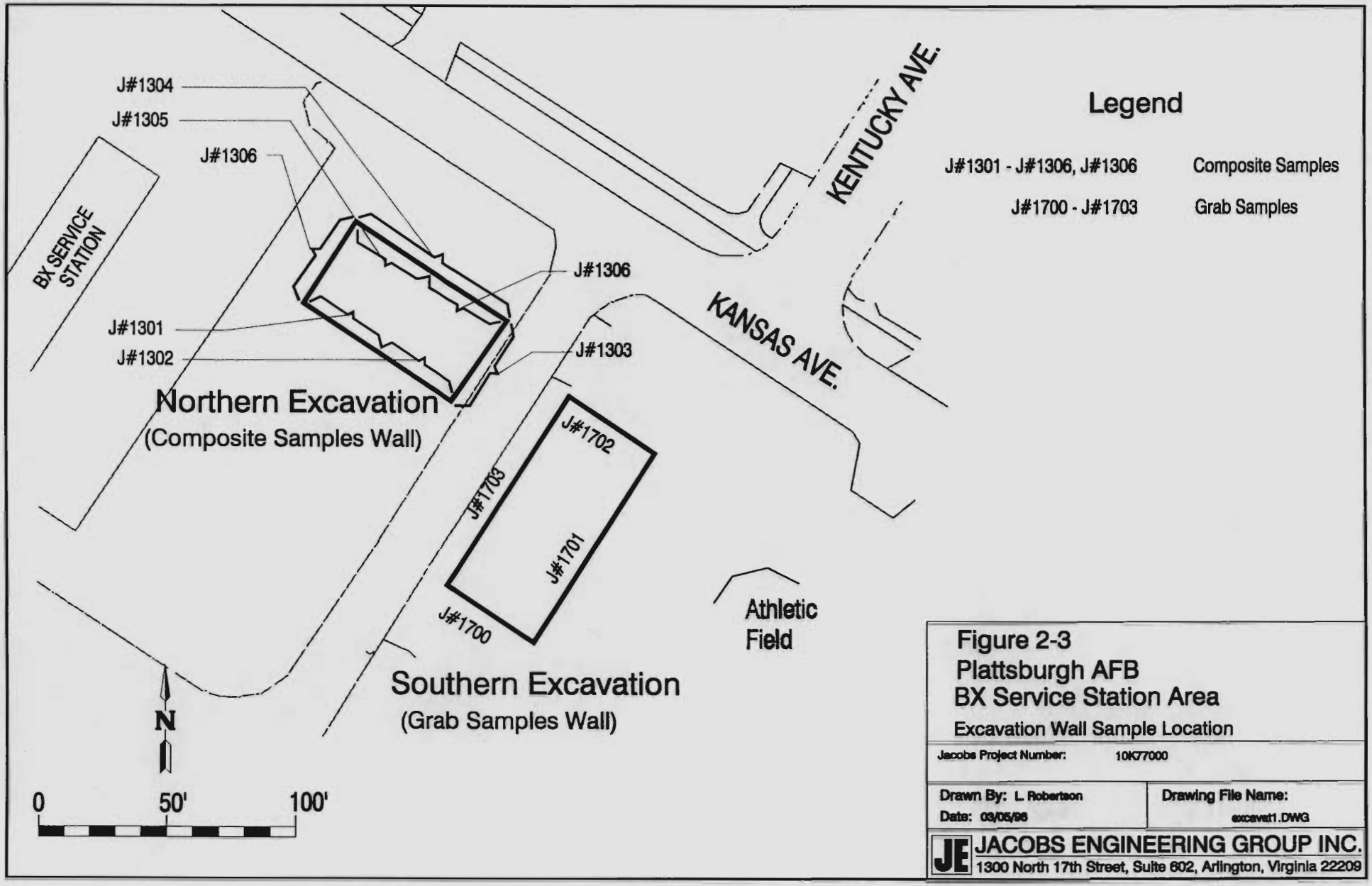
The southern excavation had four single point samples collected, one location within each sidewall. Each sample from both excavations was collected, labeled, chilled, and shipped overnight to the laboratory. Analytical analysis consisted of EPA Method 418.1 for Total Recoverable Petroleum Hydrocarbons (Figure 2-3).

TABLE 2.2.2.1B
NORTHERN AND SOUTHERN EXCAVATIONS SAMPLING

EXCAVATION LOCATION	SAMPLE NUMBER	ANALYSIS CONDUCTED
Northern West wall	14/09/95/1735/1301NWW	EPA 418.1
Southern West wall	14/09/95/1740/1302/SWW	EPA 418.1
South wall	14/09/95/1740/1303/SW	EPA 418.1
East wall	14/09/95/1745/1304EW	EPA 418.1
Northern East wall	14/09/95/1655/1305/NEW	EPA 418.1
North wall	14/09/95/1800/1306/NW	EPA 418.1
Southern East wall	14/09/95/1805/1308/SEW	EPA 418.1
West wall	19/09/95/1121/30/1700	EPA 418.1
South wall	19/09/95/1121/30/1701	EPA 418.1
East wall	19/09/95/1121/301702	EPA 418.1
North wall	19/09/95/1121/30/1703	EPA 418.1

2.2.2.2. Central Heat Plant Remedial Activities

The remedial activities for this phase of the project focused on removing soils, via excavating, that are contaminated with residual petroleum product presumed to be #2 heating oil. The excavated contaminated soil was stockpiled on plastic on the asphalt parking lot of the vehicle


J#1304
J#1305
J#1306
BX SERVICE STATION
KENTUCKY AVE.
J#1306
J#1301
J#1302
J#1303
KANSAS AVE.
Northern Excavation
(Composite Samples Wall)
J#1702
J#1703
J#1701
J#1700
Athletic Field
Southern Excavation
(Grab Samples Wall)
N
0
50'
100'
Legend
J#1301 - J#1306, J#1306 Composite Samples
J#1700 - J#1703 Grab Samples
Figure 2-3
Plattsburgh AFB
BX Service Station Area
Excavation Wall Sample Location
Jacobs Project Number: 10K77000
Drawn By: L. Robertson
Date: 03/05/98
Drawing File Name: excavat1.DWG
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maintenance yard. However, after being sampled for disposal and asphalt batching parameters, it was determined that the oil was suitable for bioremediation. The soil was eventually transported to the biocell and incorporated with the contaminated soil from IRP 30 for bioremediation.

Historical Remedial Activities

The Central Heating Plant was constructed in the late 1950's. The site includes two 130,000 gallon aboveground storage tanks (ASTs), one 420,000 gallon AST, one 20,000 gallon UST, one 1,000 kilovolt (kV) electrical substation, and one underground expansion tank (size unknown). The three ASTs are across New York Avenue from the main structure and store No. 6 fuel oil. The ASTs are equipped with steam tracer lines. The 20,000 gallon UST along the east side of the facility also stores No. 6 heating fuel and is used by the heat plant as a "day" tank. The electrical substation is in the southwest corner of the facility and does not include any PCB-containing equipment. The expansion tank is on the west side of the facility and is used to cool and condense spent steam/water treated with lime and soda ash before being discharged to the sanitary sewer.

There have been reported releases at the site. Along the east side of the facility in the product transfer area, approximately 3,500 gallons of No. 6 heating oil was released prior to 1985. Another No. 6 heating oil spill of approximately 200 gallons also occurred, but the exact date is unknown.

Present Remedial Activities

Approximately 50 cubic yards of soil were excavated from the CHP swale area located south of the CHP. Figure 2-4 is a map of IRP 31 and exhibits the swale area. The excavated soil was stockpiled on 6 mil plastic on the asphalt parking lot of the vehicle maintenance area. The stockpiled soil has been sampled and analyzed and is contaminated with residual petroleum

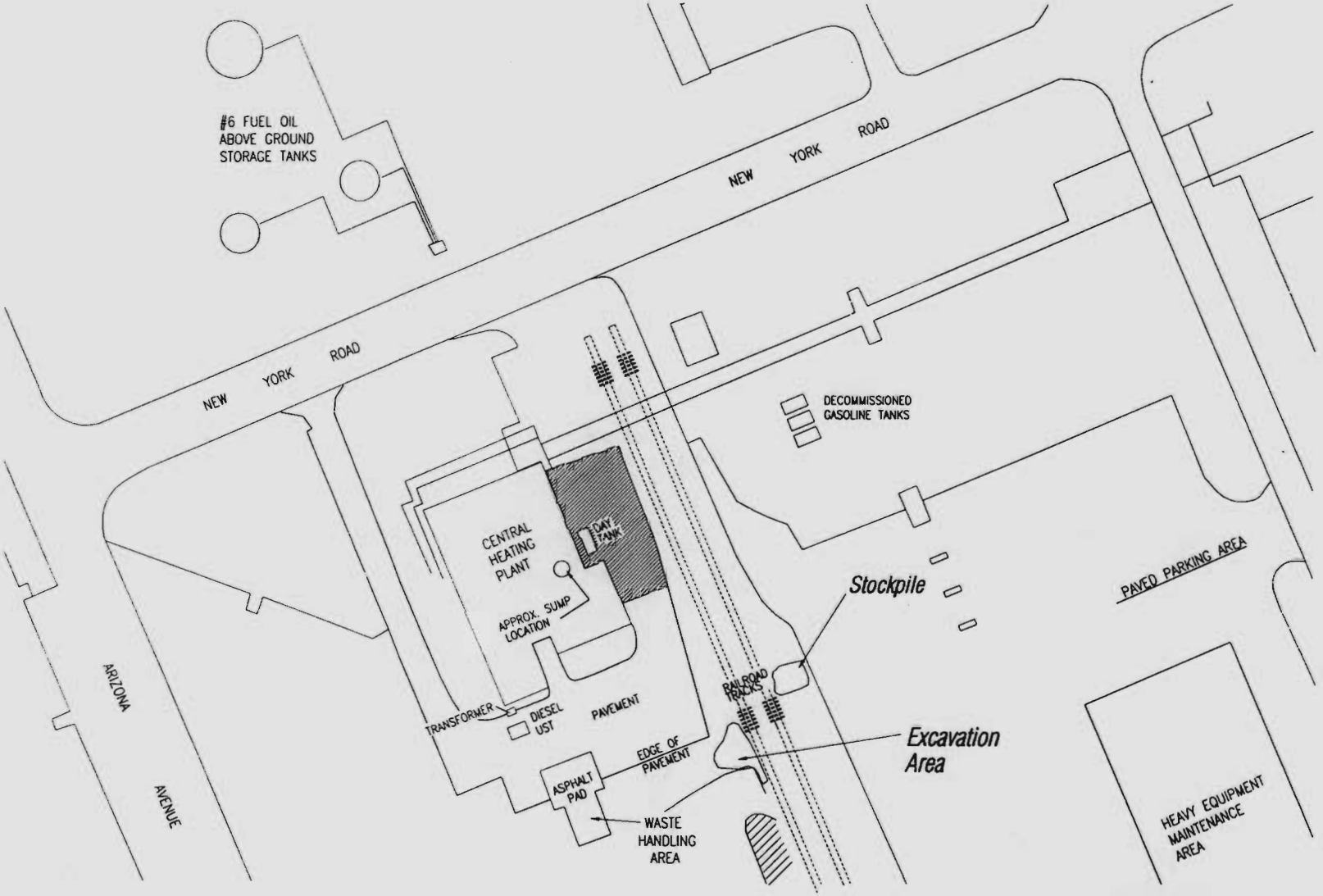

Figure 2-4
Plattsburgh AFB
Central Heating Plant
Excavation Areas

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10IC7002
Drawn By: L. Robertson Date: 03/08/98	Drawing File Name: CHPEX3.DWG

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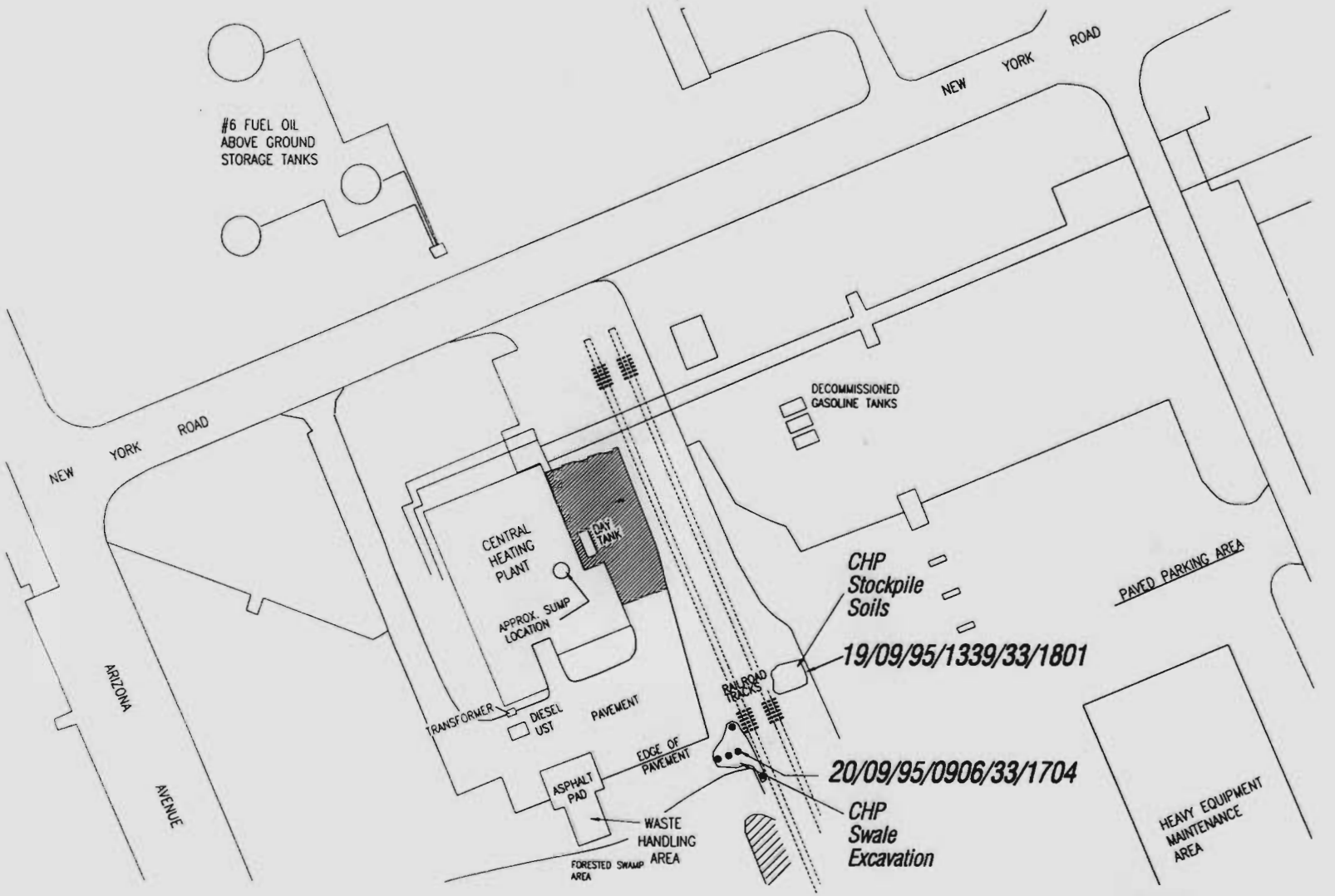
product. The stockpiled soil was originally to be disposed of by incorporation into asphalt batching.

The excavating occurred in three phases. In the first phase approximately 21 cubic yards of soil was excavated. Soil samples were then collected from the excavated area and tested with soil immunoassay kits. Results indicated that all but one was below detection limits. The sandy soil in the western portion of the excavation, where it was still shallow, had levels greater than 60 ppm. Excavating then commenced and an additional 23 cubic yards was removed, based on field screening and visual observations.

Following the second removal episode, sampling was then completed and the analytical results indicated additional excavating was necessary. On September 20, 1995, the track hoe was moved back into place and an additional 6 cubic yards was removed and placed on the stockpile. At the request of Air Force personnel, Jacobs made trial excavations up towards the blacktop area near the CHP to examine for other areas with any residue. No detections were encountered within these excavations with the PID.

Confirmation sampling was conducted in the CHP swale area excavation (Figure 2-5). One sample was collected by obtaining a composite sample consisting of five aliquots. These aliquots were collected from the excavation wall side and placed directly into the sampling container. The sample was sealed, labeled, chilled and shipped via overnight delivery to the laboratory. The sample was analyzed utilizing EPA Method 418.1 for TRPH (Table 2.2.2.2A).

A composite sample was collected from the stockpiled soil, and was analyzed for various parameters to verify the soils characteristics for asphalt batching. Based on these results, and costs associated with asphalt batching, it was determined that the soil was suitable for bioremediation and could be placed on the biocell constructed at the airfield (Table 2.2.2.2.A).



• *Excavation Sample Location*

Figure 2-5
Plattsburgh AFB
Central Heating Plant
Excavation Sampling Locations

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L Robertson Date: 03/21/96	Drawing File Name: CHPEX4.DWG

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Prior to initiating the placement of the stockpiled soil on the biocell, the analytical results were presented to Mr. Art Stemp of NYDEC to obtain NYDEC approval of the soil being bioremediated. Verbal NYDEC approval was obtained (documented in field logbook) and the soil was transported to the biocell and incorporated with the soil from the BX station undergoing bioremediation.

TABLE 2.2.2.2A
CHP EXCAVATION SAMPLING

SAMPLE ID	LOCATION	ANALYSIS
20/09/95/0906/33/1704	Excavation wall	418.1
19/09/95/1139/33/1801	Stockpile	PCBs, 8021+MTBE, 8270, 418.1 Reactivity, and RCRA Metals

2.3 CONTAMINATION ASSESSMENT ACTIVITIES

In conjunction with the soil remedial activities at the BX station and CHP, additional contamination assessment activities occurred. The activities included: installation of four monitoring wells, two in each IRP; collection of seven subsurface soil samples from the monitoring well borings; abandonment of two existing wells in IRP 30; collecting and analyzing 18 groundwater samples (twelve from IRP 30 and six samples from IRP 31); collection and analysis of seven storm drain samples; and field screening on 20 soil samples and 15 liquid samples with immunoassay kits. Table 2.2.3A exhibits the breakdown of each of the assessment activities and which IRP and media it was related to. Groundwater sampling will be discussed in Section 2.2.4, Groundwater Assessment.

Table 2.3A
BX STATION AND CHP ASSESSMENT ACTIVITIES

	IRP 30 BX STATION	IRP 31 CENTRAL HEATING PLANT
WELL ABANDONMENT	2	0
WELL INSTALLATION	2	2
WELL DEVELOPMENT	2	2
WELL SAMPLING	12	6
ANALYSES	BNA 8270, VOA + MTBE 8021	BNA 8270, VOA + MTBE 8021
SUBSURFACE SOIL SAMPLES FOR LAB ANALYSIS	4	3
ANALYSES	BNA 8270, VOA + MTBE 8021	BNA 8270, VOA + MTBE 8021
STORM SEWER LIQUID/SOLID SAMPLES	6/2	0
ANALYSES	418.1, 8260	
TOTAL IMMUNOASSAY SAMPLES	21	14
Soils Related To Excavations	11	5
Soils Related To Storm Drain	4	0
Excavation Collected Rain Water	2	0
Investigation Derived Material	4	9

2.3.1 BX Station Contamination Assessment Activities

2.3.1.1 BX Station Well Abandonment

The Jacobs team abandoned two 10 feet deep previously installed 2-inch diameter monitoring wells, 1990-2 and 1990-3 at the BX station. The wells appeared to be in poor condition with no surface protection at all.

Abandonment procedures consisted of pulling the two-inch PVC riser and screen from the ground. The open boring was then backfilled with a 10% bentonite/cement grout mixture via a tremie pipe. The well boring was backfilled to the surface. No monument or marker of any kind was left to mark the former well. Figure 2-6 exhibits the location of the former wells in relation to the BX station. The PVC riser and screen were decontaminated and cut-up into two foot sections and disposed of.

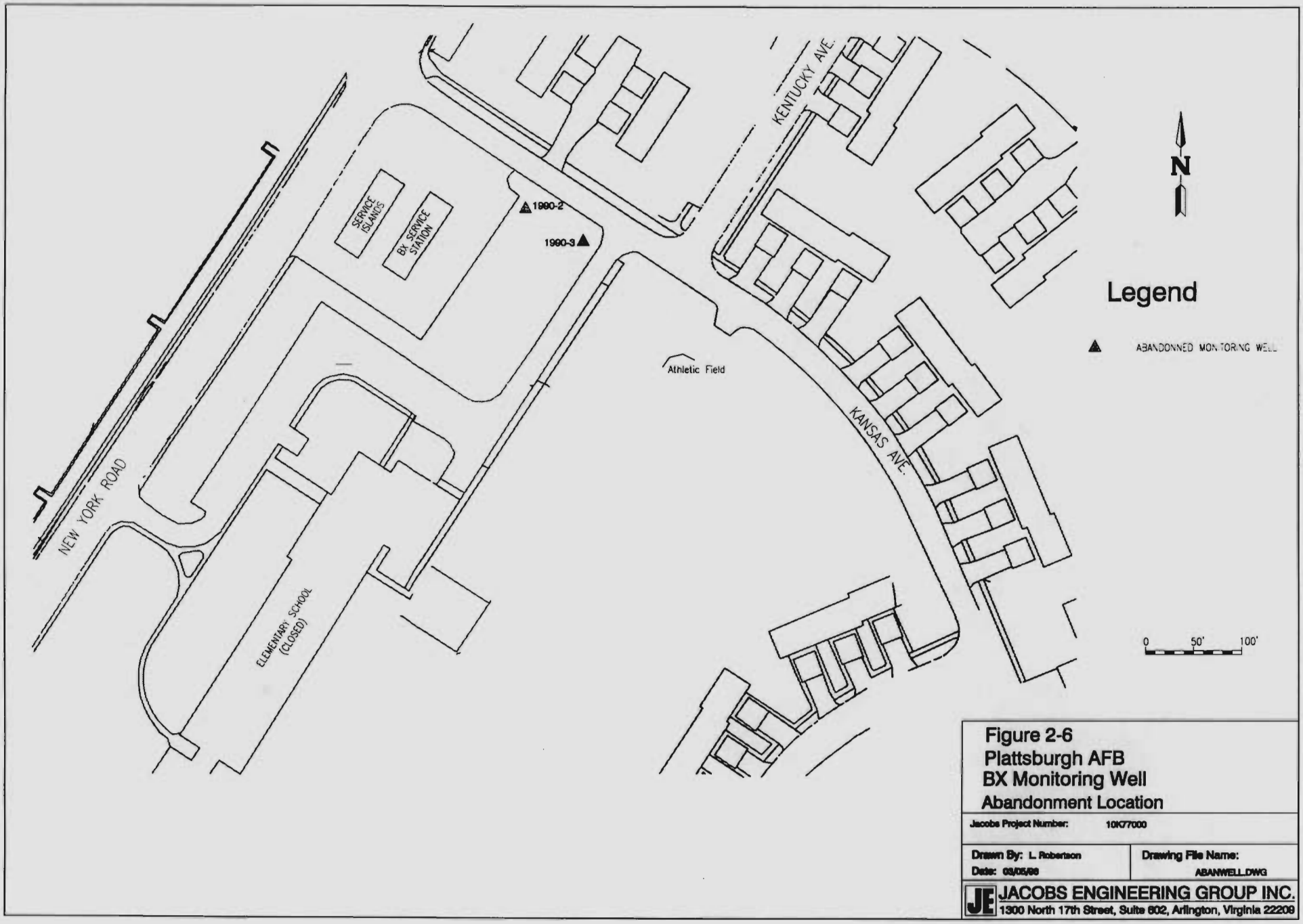

Figure 2-6
Plattsburgh AFB
BX Monitoring Well
Abandonment Location

Jacobs Project Number: 10K77000

Drawn By: L. Robertson
Date: 03/05/98

Drawing File Name: ABANWELL.DWG

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2.3.1.2 BX Station Subsurface Soil Assessment

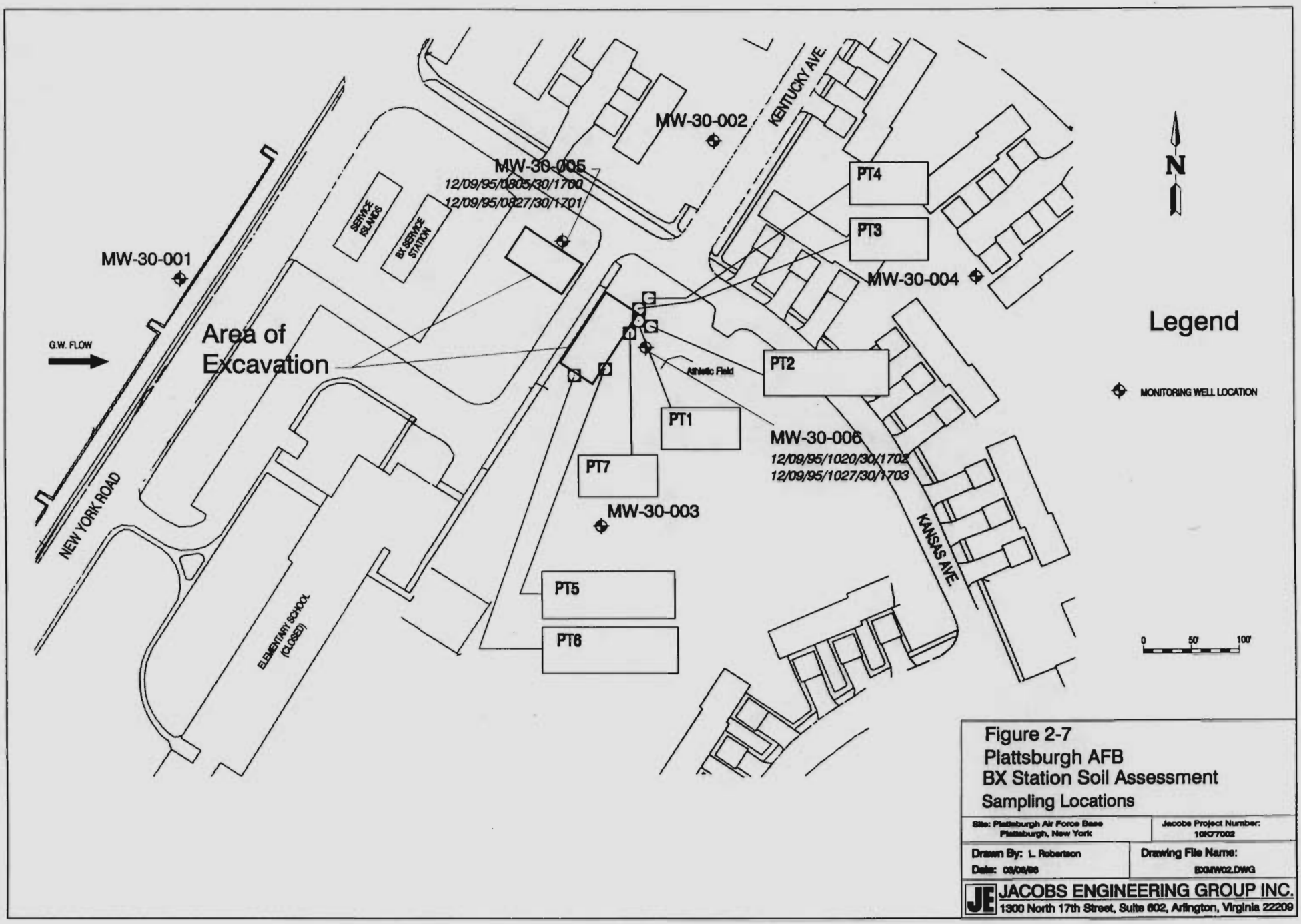
In additional to the subsurface soil samples collected at the BX station during the grid sampling, subsurface soil samples were also collected during monitoring well boring advancement for laboratory analysis. Subsurface soil samples were also collected at selected locations for field screening by immunoassay tests. Figure 2-7 exhibits locations of the monitoring wells and field screen test locations.

Subsurface samples collected during the advancement of the well borings were obtained by driving a 2 1/2 foot long, 2 1/2 inch diameter split spoon sampler with a 130 lb. hammer from a drill rig. In well boring MW-30-005, two samples were taken -- one at 0-2 feet and another at six to eight feet. In well boring MW-30-006, two additional samples were taken -- one at a depth of four to six feet and another at six to eight feet. Each sample was containerized in a laboratory certified clean sample jar, sealed, labeled, chilled, and shipped via overnight delivery to the laboratory. Samples were analyzed for VOCs by EPA Method 8021 + MTBE, and semi-VOCs by EPA Method 8270. Table 2.3.1.2A presents the samples, identifier, depth, and location where the sample was collected.

Table 2.3.1.2.A
BX STATION MONITORING WELL BORING SOIL SAMPLE INFORMATION

SPECIFIC LOCATION	DEPTH SAMPLE COLLECTED	SAMPLE ID #:	ANALYSIS
BX-MW-005	0-2 Feet	12/09/95/0805/30/1700	8021 + MTBE & 8270
BX-MW-005	6-8 Feet	12/09/95/0827/30/1701	8021 + MTBE & 8270
BX-MW-006	4-6 Feet	12/09/95/1020/30/1702	8021 + MTBE & 8270
BX-MW-006	6-8 Feet	12/09/95/1027/30/1703	8021 + MTBE & 8270

Field immunoassay subsurface soil samples were also collected and analyzed. The samples were collected by auguring a hole approximately 18 inches deep and then collecting a sample. Samples were collected 5 and 15 feet south of the southern excavation, 5 and 15 feet east of the southern excavation, 5 feet south of the southern excavation at two locations toward the west


MW-30-002
KENTUCKY AVE.
MW-30-005
12/09/95/0905/30/1700
12/09/95/0927/30/1701
SERVICE ISLANDS
BX SERVICE STATION
MW-30-001
PT4
PT3
MW-30-004
G.W. FLOW
Area of Excavation
Athletic Field
PT2
PT1
MW-30-006
12/09/95/1020/30/1702
12/09/95/1027/30/1703
PT7
MW-30-003
NEW YORK ROAD
KANSAS AVE.
PT5
PT6
ELEMENTARY SCHOOL (CLOSED)
N
Legend
MONITORING WELL LOCATION
0
50'
100'
Figure 2-7
Plattsburgh AFB
BX Station Soil Assessment
Sampling Locations
Site: Plattsburgh Air Force Base
Plattsburgh, New York
Jacobs Project Number:
10K77002
Drawn By: L. Robertson
Date: 03/06/98
Drawing File Name:
BGMW02.DWG
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side, and five feet west of the west side of the southern excavation. (Figure 2-7) Table 2.3.1.2B presents the sample ID, location, and depth:

Table 2.3.1.2B
BX STATION SUBSURFACE SOIL FIELD IMMUNOASSAY INFORMATION

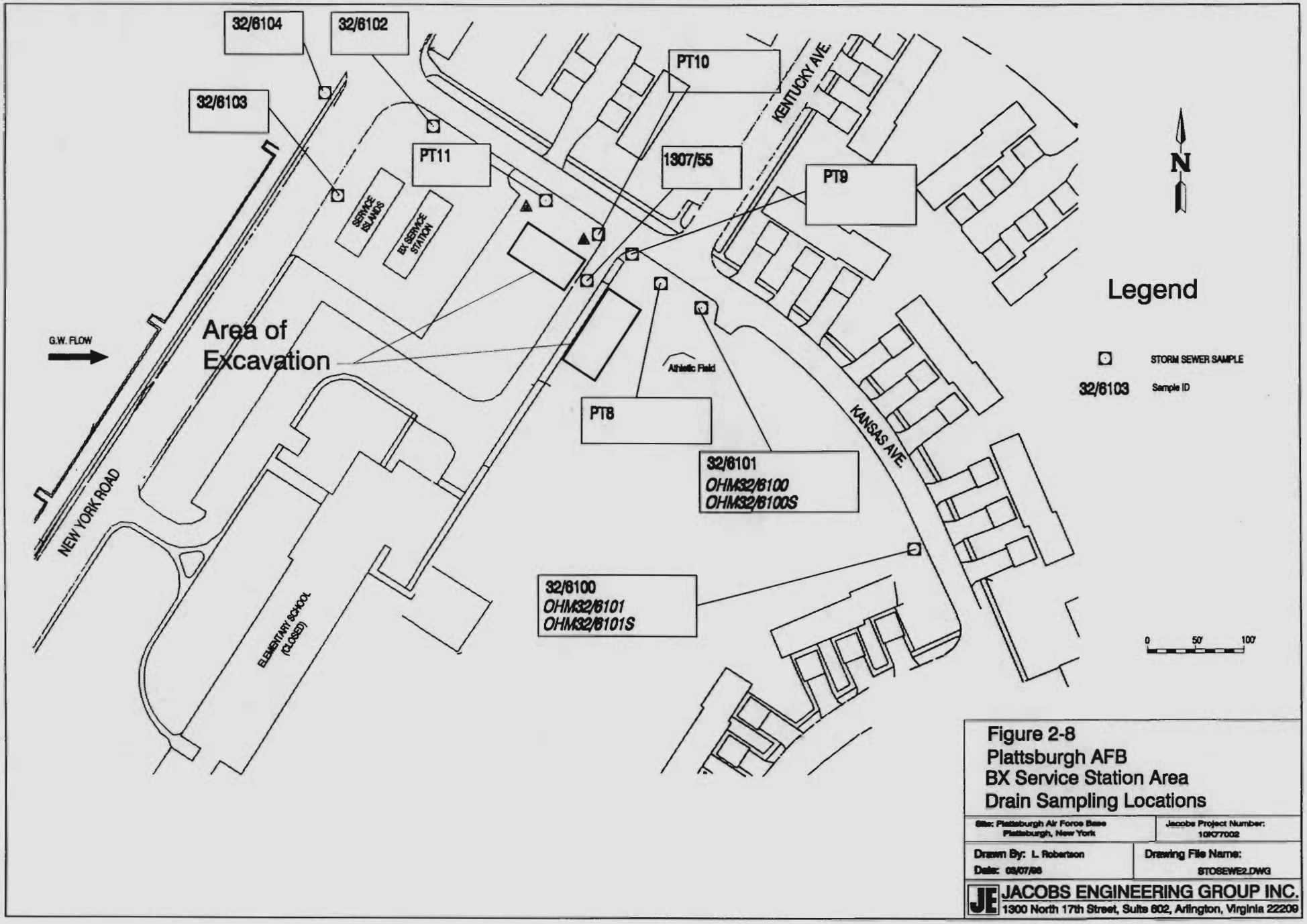
SAMPLE IDENTIFIER	LOCATION	DEPTH BGS (FT)
PT 1	5 Feet South of Southern Excavation	1.5
PT 2	15 Feet South of Southern Excavation	1.5
PT 3	5 Feet East of Southern Excavation	1.5
PT 4	15 Feet East of Southern Excavation	1.5
PT 5	5 Feet West of Southern Excavation	1.5
PT 6	5 Feet South of Southern Excavation	1.5
PT 7	5 Feet South of Southern Excavation	1.5

2.3.1.3 Storm Drain Assessment

Due to the close proximity of a major (60-inch diameter) storm drain to the former USTs and the remedial excavations, immunoassay sampling was conducted. Subsurface soil samples were also collected along the storm drain paralleling Kansas Avenue. These samples were collected in the same manner as field immunoassay samples for the soil assessment. Table 2.3.1.3A presents the sample identifier, and location where the sample was collected (Figure 2-8).

Table 2.3.1.3A
BX STATION STORM DRAIN RELATED SUBSURFACE SOIL SAMPLE IMMUNOASSAY INFORMATION

SAMPLE IDENTIFIER	COLLECTION LOCATION	DEPTH BGS (ft)
PT 8	Storm drain area, 15 feet west of Kansas Ave., most southern collection, equal to south boundary southern excavation	1.5
PT 9	Storm drain area, 5 feet west of Kansas Ave. even with southern excavation northern limit	1.5
PT 10	Storm drain area, 6 feet west of Kansas Ave., even with northern excavation southern boundary	1.5
PT 11	Storm drain area, 6 feet west of Kansas Ave., even with northern excavation northern boundary	1.5


32/6104
32/6102
32/6103
PT10
KENTUCKY AVE.
PT11
1307/55
PT9
SERVICE ISLANDS
BX SERVICE STATION
N
Legend
STORM SEWER SAMPLE
32/6103 Sample ID
G.W. FLOW
Area of Excavation
Athletic Field
PT8
KANSAS AVE.
32/6101
OHM32/6100
OHM32/6100S
NEW YORK ROAD
ELEMENTARY SCHOOL (CLOSED)
32/6100
OHM32/6101
OHM32/6101S
0
50'
100'
Figure 2-8
Plattsburgh AFB
BX Service Station Area
Drain Sampling Locations
Site: Plattsburgh Air Force Base
Plattsburgh, New York
Jacobs Project Number:
10IC7002
Drawn By: L. Robertson
Date: 03/07/98
Drawing File Name:
STOSEWE2.DWG
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The storm drain parallels Kansas Avenue (Figure 2-8) along the western side with a flow direction to the southeast then curving to the south. The outfall of the storm drain is Lake Champlain. A total of four samples were collected from four different manholes. Samples were collected by lowering a 2-inch Teflon disposable bailer into the flow, allowing the bailer to fill, then raising the bailer and filling laboratory certified clean sample containers. The containers were then sealed, labeled, chilled and sent to the laboratory via overnight courier. The samples were analyzed for TRPH via EPA Method 418.1. Figure 2-8 details the storm drain and exhibits the manhole locations where the liquid samples were collected. Unfortunately two sample containers were broken during shipment. The manholes were resampled by OHM at a later date. Table 2.3.1.3B presents data on each sample location.

Table 2.3.1.3B
BX STATION STORM DRAIN SAMPLING/INFORMATION

STORM DRAIN IDENTIFIER	LOCATION	LEL READING	O2 READING	PETROLEUM ODOR	DEPTH TO BOTTOM (ft)	DEPTH TO WATER (ft)
MH #1	on SW corner of Kansas Ave. and New York Rd.	0%	20.0%	MODERATE	13.4	12.7
MH #2	Along Kansas Ave. near backstop location	0%	20.1%	SLIGHT	11.25	10.9
MH #3	Adjacent to the Bus Stop on Kansas Ave., just south of athletic fields	0%	20.0%	SLIGHT	9.7	9.45
MH #4	in front of BX Station along New York Rd.	0%	20.8%	STRONG	12.65	12.15
MH #5	Directly across New York Rd. from MH #4 and front of BX Station	0%	20.6%	NONE NOTED	11.90	11.74

Table 2.3.1.3B (Continued)
BX STATION STORM DRAIN SAMPLING/INFORMATION

STORM DRAIN IDENTIFIER	FLOW DIRECTION	ADDITIONAL INLETS SIZE/DIR. FROM	SAMPLE METHOD	SAMPLE NUMBER	ANALYSES CONDUCTED
MH #1	Southeast down Kansas Ave. toward MH #2	12"/NE	Teflon Bailer	19/09/95/1015/32/6102	TRPH EPA 418.1
MH #2	Southeast down Kansas Ave. toward MH #3 South down Kansas Ave. toward Lake Champlain	8"/W	?	OHM32/6100	EPA 8260
				OHM326100S 19/09/95/1000/32/6101 broken in shipment	EPA 418.1
MH #3	South parallel of Kansas Ave.	12"/W	?	OHM32/6101	EPA 8260
				OHM32/6101S 19/09/95/0945/32/6100 broken in shipment	EPA 418.1
MH #4	Southeast toward #1	4"/S	Teflon Bailer	19/09/95/1030/32/6103	TRPH EPA 418.1
MH #5	Southeast toward #4	14"/N	Teflon Bailer	19/09/95/1045/32/6104	TRPH EPA 418.1

2.3.2 CHP Contamination Assessment Activities

2.3.2.1 CHP Well Abandonment

Jacobs did not abandon any wells associated with the CHP.

2.3.2.2 CHP Subsurface Soil Assessment

The only soil assessment activities at the CHP conducted during this phase were during monitoring well boring advancement. A total of three subsurface soil samples were collected; three samples out of the MW 31-005 well boring, one at five to seven feet BGS; and the other two at 9-11 feet BGS. All the samples were collected with a 2 1/2 foot long, 2 1/2 inch split spoon sampler. The samples were sealed, labeled, chilled, and sent to the laboratory via overnight delivery. Table 2.3.2.2A presents the location, depth, sample ID, and analysis. (Figure 2-9).

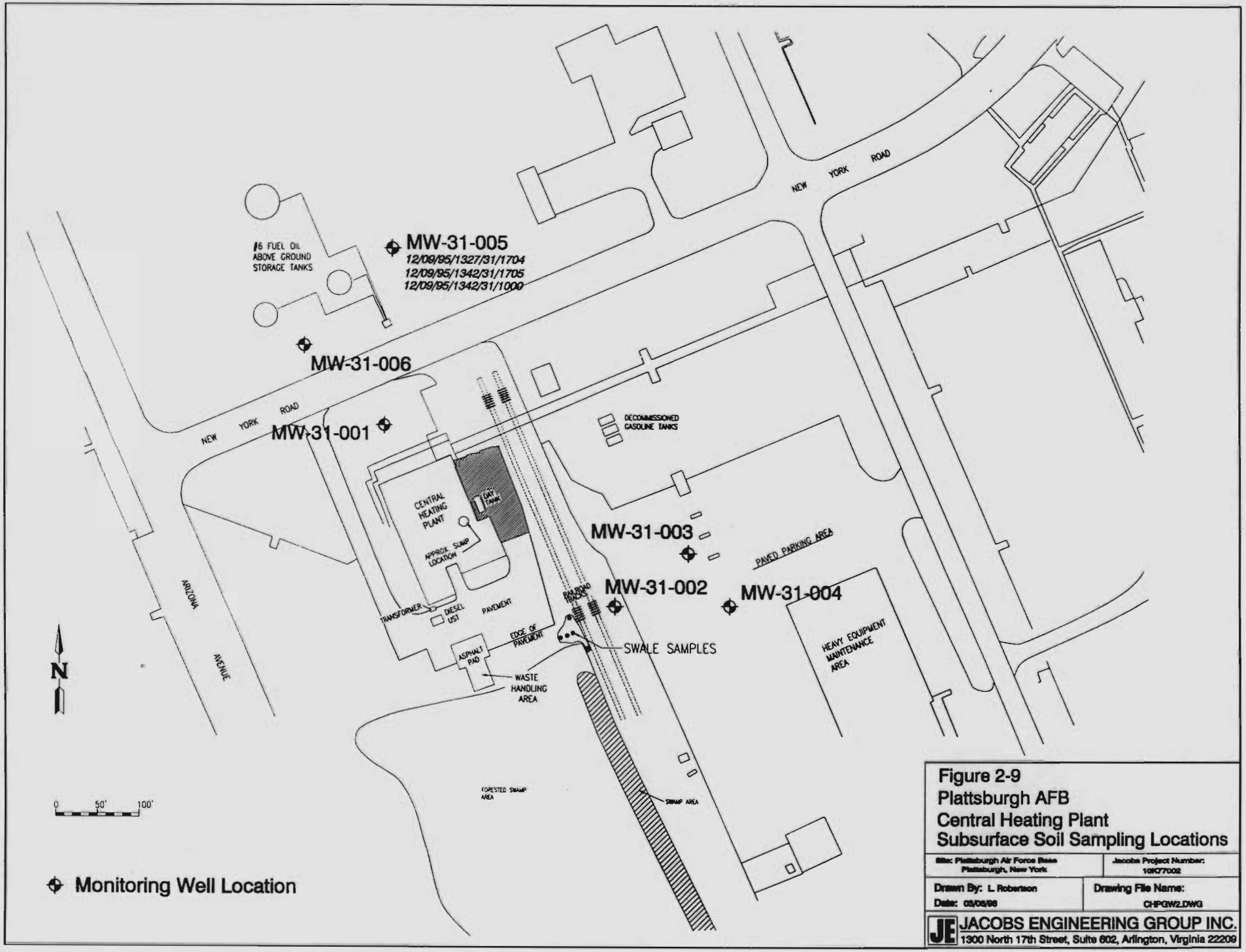

Figure 2-9
Plattsburgh AFB
Central Heating Plant
Subsurface Soil Sampling Locations

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10R07002
Drawn By: L. Robertson Date: 03/06/98	Drawing File Name: CHPGW2.DWG

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Table 2.3.2.2A
CHP MONITORING WELL BORING SOIL SAMPLE INFORMATION

SPECIFIC LOCATION	DEPTH SAMPLE COLLECTED	SAMPLE ID #:	ANALYSIS
MW-031-005	5-7	12/09/95/1327/31/1704	8021 + MTBE & 8270
MW-031-005	9-11	12/09/95/1342/31/1705	8021 + MTBE & 8270
MW-031-005	9-11 duplicate	12/09/95/1342/31/1000	8021 + MTBE & 8270

2.3.2.3 CHP Storm Drain Assessment

No samples of the storm drain network at the CHP was completed by Jacobs.

2.4 GROUNDWATER ASSESSMENT

Two monitoring wells were installed at the BX Station (IRP 30) and two at the CHP (IRP 31). All well installation procedures followed the AFCEE Handbook (RI/FS) for well installation. No major deviations from the SOPs occurred. One drill rig, a Mobil Drill 57, was employed for monitoring well installation activities. Boreholes were advanced and completed through hollow-stem auger techniques. Boreholes were advanced with a 8 1/4-inch inner diameter (I.D.) hollow-stem auger.

Continuous split-spoon sampling was completed until the target depth was reached. The screen plug, screen, casing, and vented well cap were placed into the borehole and set at the target depth. Filter pack material (#1 sand) was then deposited into the annular space around the screen and up to 2 feet above the screen. The well screen was then surged. The filter pack was then measured for settlement. When settlement occurred, additional filter pack was added. The above procedures were repeated until no settlement occurred. A bentonite seal 1 to 2 feet thick was overlain on top of the filter pack by depositing bentonite chips on the filter pack, exposing the chips to water, and allowing to hydrate. The bentonite seal was allowed to hydrate for a

minimum of one hour. The remaining annular space was filled with a neat grout cement mixture with 5% bentonite to the ground surface. A locking cap and protective steel outer casing was set into the neat grout cement over the well at the surface.

Well completion consisted of placing a sloping concrete pad around the well and installation of four concrete-filled protective bumper posts. A total of 4 boreholes were advanced with a total of 4 wells installed. Specific well design parameters are listed in Table 2.4A. Blow counts, sample interval and ID, air monitoring results, lithology logs, well construction and equipment employed are found in boring logs presented in Appendix B. Figure 2-10 and 2-11 shows the location of newly installed monitoring wells at IRP 30 and IRP 31, respectively.

Table 2.4A
MONITORING WELL DESIGN INFORMATION

MEASUREMENT	MW-030-005	MW-030-006	MW-031-005	MW-031-006
NORTHING	1703433.45	1703325.37	1701301.12	1701178.50
EASTING	729217.56	729305.92	726936.24	726857.68
GROUND ELEVATION	165.22	162.70	195.85	196.81
DEPTH TO TOP OF NEAT CEMENT	165.32	165.70	195.92	196.90
DEPTH TO TOP OF BENTONITE SEAL	164.79	164.70	195.20	196.50
DEPTH TO TOP OF FILTER PACK	163.79	163.70	194.20	196.00
DEPTH TO TOP OF SCREEN	163.04	162.70	193.20	195.39
DEPTH TO BOTTOM OF SCREEN	153.04	153.70	183.20	185.39

2.5 WELL DEVELOPMENT

Well development was completed on installed wells 24 hours after installation. To develop a newly installed monitoring well, water was removed from the well through pumping or bailing at a rate high enough to remove finer materials from the well. After the removal of a sufficient volume of water (usually at least one equivalent volume (EV), which is defined as the volume of water in the well plus the volume of the filter pack), a surge block constructed of solid Schedule

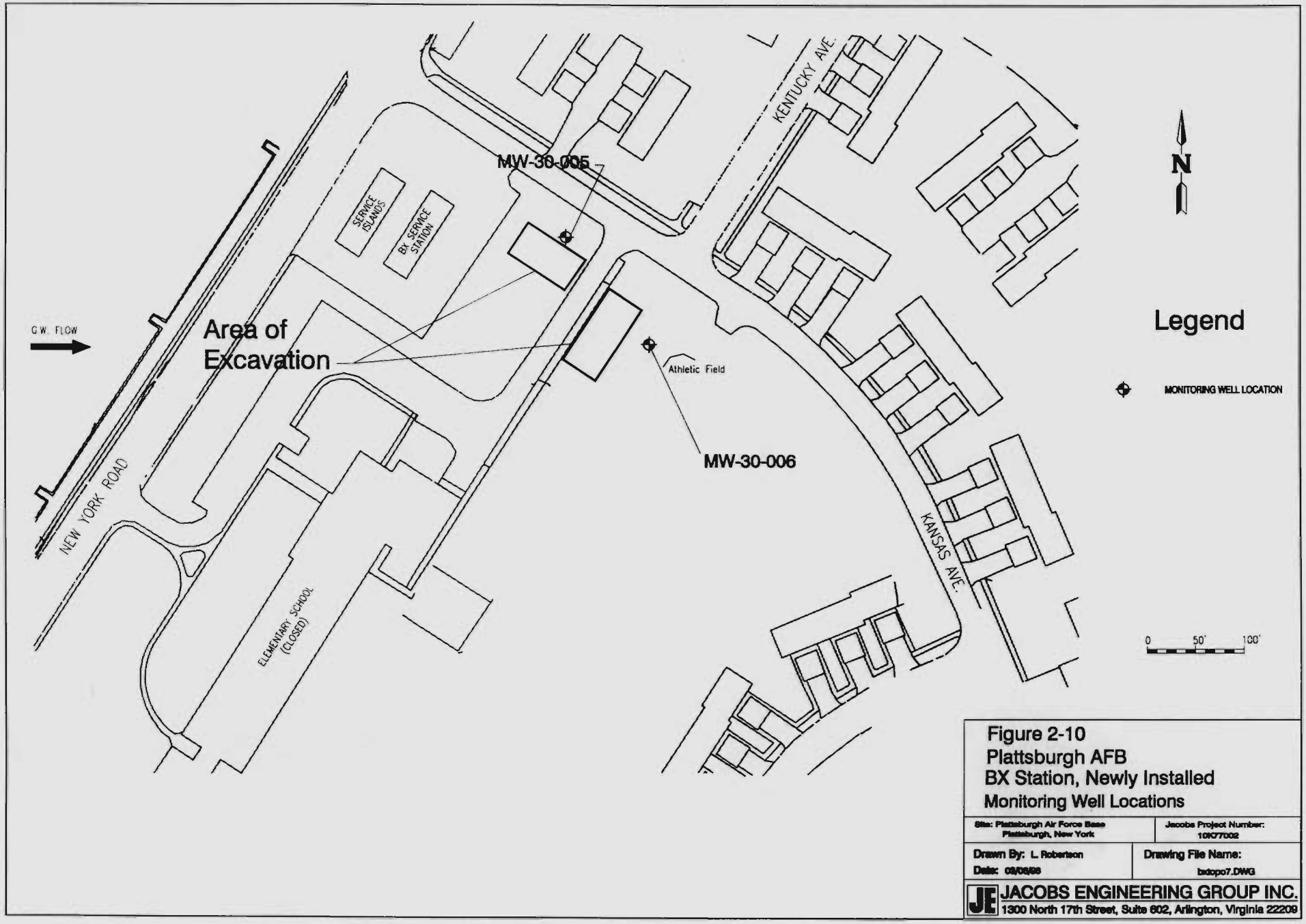

Figure 2-10
Plattsburgh AFB
BX Station, Newly Installed
Monitoring Well Locations

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10077002
Drawn By: L. Robertson Date: 03/06/08	Drawing File Name: bdopo7.DWG

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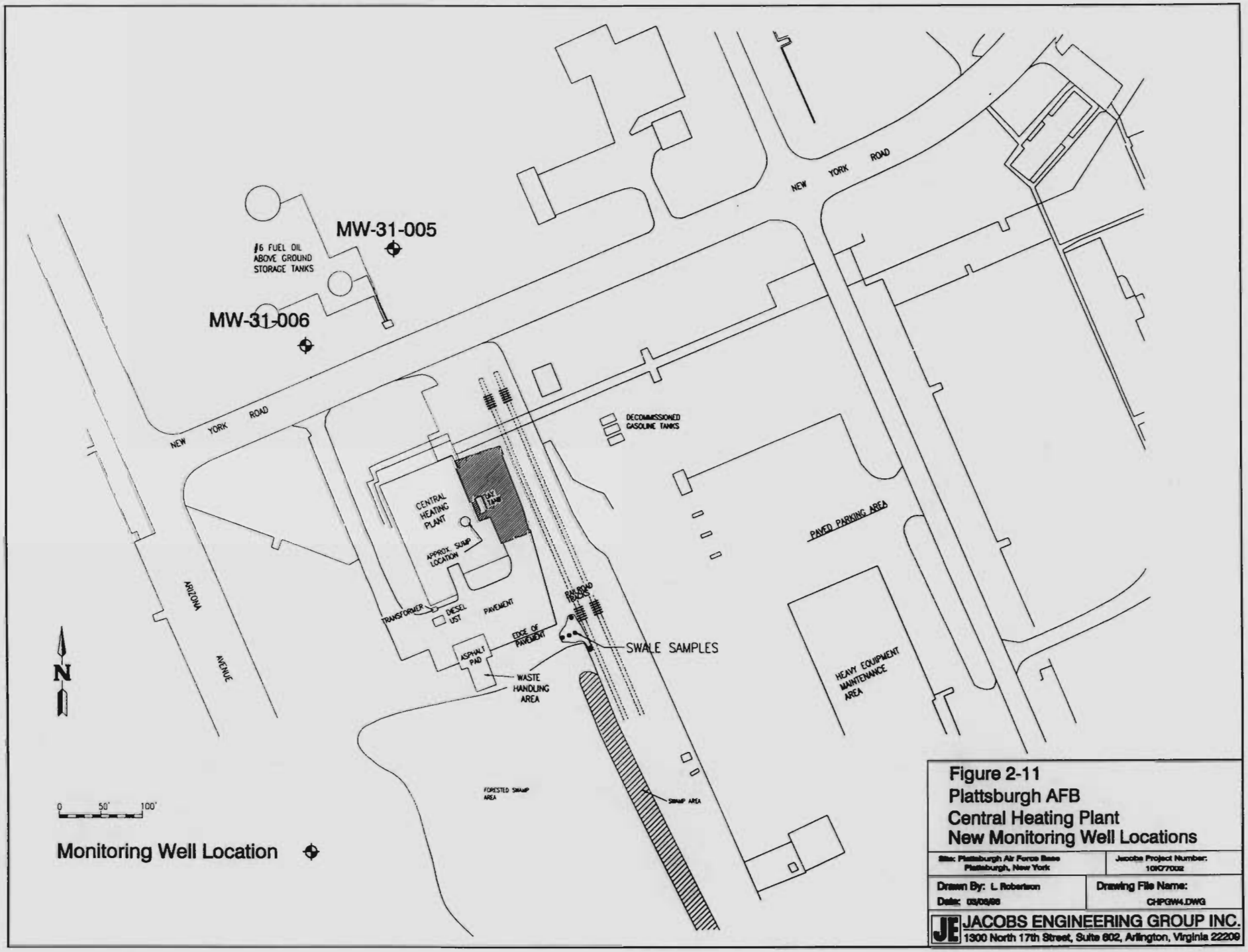

Figure 2-11
Plattsburgh AFB
Central Heating Plant
New Monitoring Well Locations

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10IC7002
Drawn By: L. Robertson Date: 03/08/98	Drawing File Name: CHPGW4.DWG

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40 polyvinyl chloride (PVC) circular rings was lowered into the well at the top of the screen. A surging motion was then initiated with the surge block on the top half of the screen for five to ten minutes to remove finer materials in and around the filter pack. The block was removed and water was pumped or bailed until a reduction in finer materials was observed. This procedure was then conducted on the bottom half of the screen. This practice was repeated until the well produced a sufficient amount of water for parameter stabilization and/or the water had cleared to a significant degree. The well was then pumped or bailed of water while chemical parameters were analyzed for stabilization. These chemical parameters consisted of pH, temperature, dissolved oxygen, salinity, conductivity, redox potential (oxidation-reduction potential), and turbidity. These parameters were analyzed every EV removed through employment of water quality analyzer (YSI). Well development was considered complete once: temperature stabilized ± 1° Celsius, pH stabilized ± 0.1 standard units, electrical conductivity stabilized ±5%, and turbidity remains within a 10% range for 30 minutes. Pertinent information is presented in Table 2.5A (IRP 30) and Table 2.5B (IRP 31).

Table 2.5A
MONITORING WELL DEVELOPMENT BX STATION (IRP 30)

Well MW-030-005

Elev. TOC= 3.0 ft. ; Elev. Bottom of Well = 12ft. BGS ; Elev. Water Table 3.0 ft. BGS IEV= 11.76 gal.

Time	Run Time (min)	PH	Temp (°C)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)	Notes: Depth to GW from TOC*
1231	0	6.63	16.1	.1	1.352	-82	4	1500	10.08
1240	9	6.62	16.2	.1	1.360	-86	3	1500	10.25
1248	17	6.54	16.2	.1	1.332	-80	1	1500	10.33
1255	24	6.68	16.1	.1	1.332	-79	2	1500	10.50
1304	35	6.66	16.1	.1	1.331	-80	3	1500	10.50

Well MW-030-006

Elev. TOC= 0.67 ft. ; Elev. Bottom of Well= 9.58 ft. BGS ; Elev. Water Table 1.83 ft. BGS IEV= 10.85 gal.

Time	Run Time (min)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)	Notes: Depth to water from TOC*
1440	5	6.53	16.8	18.50	.2	.474	-32	147	1200	5.0'
1450	10	5.63	16.5	15.03	.2	.464	-12	9	1200	5.25'
1500	20	5.65	16.5	13.22	.2	.464	-13	4	1200	5.33'
1510	30	5.64	16.4	10.58	.2	.460	-13	2	1200	5.33'
1520	40	5.63	16.4	10.62	.2	.462	-13	1	1200	5.33'

Table 2.5B
MONITORING WELL DEVELOPMENT CHP (IRP 31)

Well MW-031-005

Elev. TOC= 2.5 ft. ; Elev. Bottom of Well= 12.6 ft. BGS ; Elev. Water Table 5.1 ft. BGS IEV= 9.96 gal.

Time	Run Time (min)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)	Notes: Depth to water from TOC*
0920	0	6.53	16.6	7.97	.2	.292	-14	12	2000	7.86'
0930	10	6.54	16.0	6.79	.2	.300	-15	8	2000	7.86'
0940	20	6.52	16.0	6.99	.1	.308	-15	7	2000	7.86'
0950	30	6.58	16.0	6.69	.1	.295	-14	6	2000	7.86'
1000	40	6.50	16.0	6.59	.1	.297	-15	6	2000	7.86'

Well MW-031-006

Elev. TOC= 3.5 ft. ; Elev. Bottom of Well= 11.78 ft. BGS ; Elev. Water Table 6.08 ft. BGS IEV= 11.52 gal.

Time	Run Time (min)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)	Notes: Depth to water from TOC*
1130	0	6.76	18.3	4.87	.3	.594	-1	25	1200	9.74'
1140	10	6.76	18.2	4.92	.3	.592	-0	1	1200	9.74'
1150	20	6.75	18.2	4.15	.3	.594	-1	0	1200	9.74'
1200	30	6.72	18.2	3.96	.3	.588	-0	0	1200	9.74'

2.6 GROUNDWATER SAMPLING

The monitoring wells sampled during this investigation consisted of the four existing wells at the BX Station along with the two newly installed wells and the four existing monitoring wells at the CHP along with the two newly installed wells. Groundwater sampling commenced with placement of a polyethylene sheeting around the well and under 55-gallon drums utilized for purge water containerization. Measurements of static water level were taken prior to any well purging or groundwater sampling activity. Static water level was measured to the nearest 1/100th of one foot (0.01 ft.) from the water surface to an established measuring point (MP) notched on the riser casing. Each monitoring well was purged with a low-flow Grundfos II Redi-Flow submersible pump equipped with a Teflon-lined polypropylene sampling hose or a Teflon bailer to remove stagnant water prior to groundwater sampling. This will assure that water samples are representative of groundwater conditions. The following protocol were employed for purging of the well:

- The pump was lowered slowly into the well and set at a point near the middle of the screened interval.
- A water level indicator was lowered into the well and set at a point immediately below the static water level.
- Purging began and the flow rate was adjusted to minimize drawdown.
- The water level was monitored continuously as the well was being purged.
- Physical chemistry parameters were monitored every EV volume as the well was purged. The next subsection discusses measurements of these parameters.

The physical water chemistry parameters pH, temperature, oxidation/reduction potential (ISE), specific conductivity (SC), turbidity, salinity, and dissolved oxygen (DO) were monitored with in-line instruments. Readings of the physical parameters were recorded every EV as the monitoring well was purged. Monitoring wells were purged until stabilization of parameters

within ± 10% of the two previous readings had been achieved. Water quality analyses were completed through use of a YSI.

If the parameters were not stabilized to within ± 10% of the previous two readings before five well volumes had been removed from the well, the well was considered adequately purged and available for water sampling upon removal of six well volumes. Groundwater samples were collected with a disposable teflon bailer. Samples were secured in containers, labeled, packed and shipped to the laboratory via overnight delivery.

Monitoring Well Purging Bx Station (IRP 30)

MW-030-001

Elev. TOC= 176.27 ft. ; Elev. Bottom of Well= 156.34 ft. BTOC ; Elev. Water Table 168.22 IEV=15.3 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)
1439	20	7.75	11.0	1.89	0.3	0.714	-113	61	Bailed
1455	31	6.58	10.4	1.90	0.2	0.488	-78	68	Bailed
1510	42	6.58	10.3	1.87	0.2	0.488	-67	48	Bailed
1522	53	6.59	10.6	1.89	0.2	0.484	-40	55	Bailed
1530	64	6.40	10.2	1.91	0.2	0.484	-58	56	Bailed
1539	68								Bailed
1551	79	6.33	9.9	1.89	0.2	0.490	-55	59	Bailed

MW-030-002

Elev. TOC= 167.43 ; Elev. Bottom of Well= 150.38 ; Elev. Water Table 161.06 IEV= 13.1 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)
0855	0	7.54	14.4	1.71	0.6	1.38	-123	7.9	Bailed
0904	13	6.97	14.2	1.92	0.5	1.08	-120	115	Bailed
0911	26	7.02	14.6	2.74	0.5	1.04	-107	106	Bailed
0937	39	7.06	14.4	2.21	0.5	1.05	-106	87	Bailed
1003	52	7.15	15.0	4.2	0.5	1.04	-102	79	Bailed
1014	65	7.19	14.9	4.09	0.5	1.03	-107	67	Bailed
1033	78	7.06	15.2	2.51	0.5	1.028	-92	44	Bailed

MW-030-003

Elev. TOC= 161.88 ft. ; Elev. Bottom of Well= 148.37 ; Elev. Water Table 147.24 IEV= 13.13 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)
1641	13	6.75	13.4	3.32	0.4	0.842	-58	284	Bailed
1646	26	6.78	13.0	3.52	0.4	0.834	-90	115	Bailed
1651	39	6.78	13.1	3.14	0.4	0.848	-83	72	Bailed
1700	52	6.73	13.3	3.56	0.4	0.860	-66	92	Bailed
1705	65	6.73	13.1	3.03	0.4	0.842	-80	54	Bailed
1713	78	6.87	13.4	3.20	0.4	0.850	-67	64	Bailed

MW-030-004

Elev. TOC= 162.34 ft. ; Elev. Bottom of Well= 145.06 ; Elev. Water Table 156.8 IEV= 15.5 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)
1238	15.5	7.07	15.7	2.55	0.4	0.806	-119	425	Bailed
1244	31	6.99	15.2	3.72	0.4	0.762	-107	270	Bailed
1251	46.5	7.04	15.4	4.99	0.4	0.750	-98	43	Bailed
1259	62	7.00	15.2	4.36	0.4	0.740	-100	108	Bailed
1306	77.5	7.06	15.4	6.05	0.4	0.746	-98	51	Bailed
1313	93	7.03	15.4	3.83	0.4	0.742	-106	117	Bailed

MW-030-005

Elev. TOC= 168.28 ft. ; Elev. Bottom of Well= 153.04 ; Elev. Water Table 162.31 IEV= 11.4 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (gal./min)	Notes: Depth to GW from TOC*
1600	10	6.59	16.4	0.98	0.6	1.126	-98	6	1	7.75'
1610	20	6.57	16.1	0.62	0.6	1.117	-106	2	1	7.96'
1620	30	6.59	16.1	0.27	0.6	1.250	-120	1	1	8.03'
1630	40	6.61	16.1	0.19	0.7	1.324	-128	2	1	8.03'
1640	50	6.61	16.1	0.27	0.7	1.314	-134	1	1	8.03'
1650	60	6.61	16.1	0.25	0.7	1.284	-123	1	1	8.03'

Well MW-030-006

Elev. TOC= 163.57 ft. ; Elev. Bottom of Well= 153.22 ; Elev. Water Table 161.38 IEV= 10.0 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (gal./min)	Notes: Depth to water from TOC*
1435	10	6.65	16.3	0.95	0.2	0.502	-114	9	1	3.80'
1445	20	6.62	16.1	0.46	0.2	0.490	-117	9	1	4.10'
1455	25	6.63	16.2	0.40	0.2	0.466	-121	2	.5	4.26'
1505	30	6.64	16.1	0.58	0.2	0.484	-122	1	.5	4.35'

Monitoring Well Purging CHP Station (IRP 31)

Well MW-031-001

Elev. TOC= 198.45ft. ; Elev. Bottom of Well= 181.25 ; Elev. Water Table 191.01 IEV= 13.5 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)
1620	13	7.03	18.1	2.93	0.3	0.550	46	94	Bailed
1628	28	7.16	17.7	2.54	0.3	0.566	64	156	Bailed
1633	42	7.00	17.1	4.2	0.3	0.602	62	248	Bailed
1637	56	6.94	16.8	3.13	0.3	0.618	65	223	Bailed
1642	69	7.01	17.0	5.23	0.3	0.612	50	242	Bailed
1647	84	6.99	16.4	3.03	0.3	0.628	44	138	Bailed

Well MW-031-002

Elev. TOC= 193.68 ft. ; Elev. Bottom of Well= 176.57 ; Elev. Water Table 187.82 IEV= 15.2 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)
0918	15	9.35	15.3	2.64	0.2	0.456	18	28	Bailed
0938	30	6.53	15.6	3.14	0.2	0.430	99	64	Bailed
0943	45	5.97	15.8	3.80	0.2	0.430	123	49	Bailed
0951	60	5.97	15.7	1.61	0.2	0.432	118	15	Bailed
0959	75	6.16	15.8	4.39	0.2	0.436	120	46	Bailed
1005	90	6.17	15.9	2.95	0.2	0.440	124	62	Bailed

Well MW-031-003

Elev. TOC= 194.77 ft. ; Elev. Bottom of Well= 177.52 ; Elev. Water Table 189.29 IEV= 15.5 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)
1204	15	7.18	20.2	3.59	0.2	0.506	110	203	Bailed
1212	30	7.23	20.2	4.09	0.2	0.504	79	146	Bailed
1221	45	7.22	20.2	2.50	0.2	0.508	60	120	Bailed
1230	60	7.12	20.1	1.77	0.2	0.508	44	91	Bailed
1246	75	7.13	20.2	2.58	0.2	0.508	18	139	Bailed
1255	90	7.16	20.2	1.94	0.2	0.508	17	106	Bailed

Well MW-031-004

Elev. TOC= 190.25 ft. ; Elev. Bottom of Well= 176.13 ; Elev. Water Table 186.55 IEV= 14.3 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (mL/min)
1117	14	7.02	20.4	3.00	0.3	0.564	4	59	Bailed
1125	28	6.83	20.5	3.57	0.3	0.530	-39	117	Bailed
1133	42	6.91	19.7	3.52	0.3	0.536	-29	200	Bailed
1144	57	7.02	20.6	4.57	0.2	0.508	-54	113	Bailed
1152	72	6.87	20.7	4.78	0.2	0.506	-44	129	Bailed
1159	86	6.95	20.6	4.63	0.2	0.504	-41	141	Bailed

Well MW-031-005

Elev. TOC= 198.35 ft. ; Elev. Bottom of Well= 183.20 ; Elev. Water Table 190.77 IEV= 9.3 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (gal./min)	Notes: Depth to water from TOC*
0900	10	6.36	16.0	1.38	0.2	0.306	53	-1	2	7.89
0905	20	6.33	16.0	1.28	0.1	0.294	75	0	2	7.90
0910	30	6.33	16.1	1.28	0.1	0.290	89	-1	2	7.91
0915	40	6.31	16.1	1.26	0.2	0.296	94	-1	2	7.92

Well MW-031-006

Elev. TOC= 199.97 ; Elev. Bottom of Well= 185.39 ; Elev. Water Table 191.48 IEV= 7.4 gal.

Time	Volume Removed (gal.)	pH	Temp (°C)	DO (mg/L)	Salinity (%)	Conductivity (mS/cm)	ISE (mV)	Turbidity (NTU)	Flowrate (gal./min)	Notes: Depth to water from TOC*
1003	10	6.69	18.6	0.90	0.3	0.598	48	7	2	8.91'
1008	20	6.69	18.5	0.76	0.3	0.598	50	1	2	8.91'
1013	30	6.68	18.5	0.57	0.3	0.588	53	-1	2	8.91'
1018	40	6.68	18.5	0.53	0.3	0.590	54	-1	2	8.91'

Table 2.6A contains the well ID, sample ID, and analysis completed on the collected groundwater samples. MW-030-001 through MW-030-004 are existing monitoring wells. MW-030-005 and MW-030-006 are newly installed monitoring wells. Jacobs incorporated a singel sample ID for each analysis completed.

Table 2.6A
BX STATION GROUNDWATER SAMPLING INFORMATION

Well ID	Sample ID	Analysis
MW-030-001	11/09/95/1615/30/2602 11/09/95/1615/30/2601	8021 + MTBE and 8270
MW-030-002	12/09/95/1100/30/2605 12/09/95/1100/30/2606	8021 + MTBE and 8270
MW-030-003	11/09/95/1730/30/2603 11/09/95/1730/30/2604	8021 + MTBE and 8270
MW-030-004	12/09/95/1345/30/2607 12/09/95/1345/30/2608	8021 + MTBE and 8270
MW-030-005	14/09/95/1700/30/2619 14/09/95/1700/30/2620	8021 + MTBE and 8270
MW-030-006	14/09/95/1520/30/2617 14/09/95/1520/30/26118	8021 + MTBE and 8270
MW-030-001	MW2335-1	8021 and 8270
MW-030-002	MW2335-2	8021 and 8270
MW-030-003	MW2335-3	8021 and 8270
MW-030-004	MW2335-4	8021 and 8270
MW-030-005	MW2335-5	8021 and 8270
MW-030-006	MW2335-6	8021 and 8270

Table 2.6B contains the well ID, sample ID, and analysis completed on the collected groundwater samples. MW-031-001 through MW-031-004 are existing monitoring wells. MW-031-005 and MW-031-006 are newly installed monitoring wells. Jacobs incorporated a single sample ID for each analysis completed.

Table 2.6B
CHP GROUNDWATER SAMPLING INFORMATION

Well ID	Sample ID	Analysis
MW-031-001	12/09/95/1655/31/2609 12/09/95/1655/31/2610	8021 and 8270
MW-031-002	13/09/95/1030/31/2611 13/09/95/1030/31/2612	8021 + MTBE and 8270
MW-031-003	13/09/95/1030/31/2613 13/09/95/1030/31/2614	8021 + MTBE and 8270
MW-031-004	14/09/95/1030/31/2615 14/09/95/1030/31/2616	8021 + MTBE and 8270
MW-031-005	15/09/95/0930/31/2621 15/09/95/0930/31/2622	8021 + MTBE and 8270
MW-031-006	15/09/95/1030/31/2623 15/09/95/1030/31/2624	8021 + MTBE and 8270

Figures 2-12 and 2-13 show the groundwater sampling locations for IRP 30 and 31, respectively.

2.7 CHRONOLOGY OF FIELD WORK

Presented in this section is the chronological order of events conducted during this phase of the work. The Table is separated with two major columns; one for Assessment related activities and the other for remedial activities.

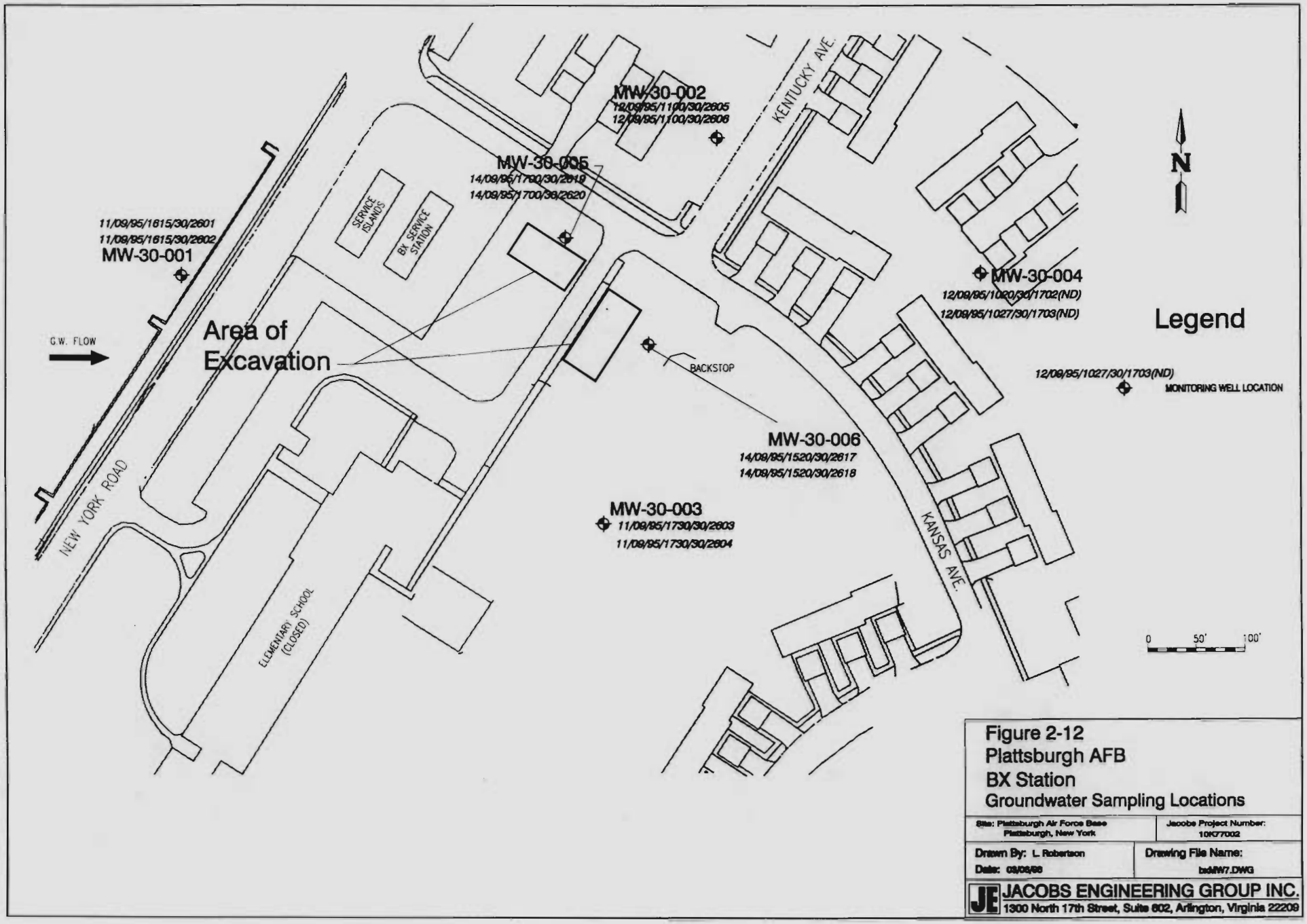

Figure 2-12
Plattsburgh AFB
BX Station
Groundwater Sampling Locations

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 03/08/98	Drawing File Name: bxMW7.DWG

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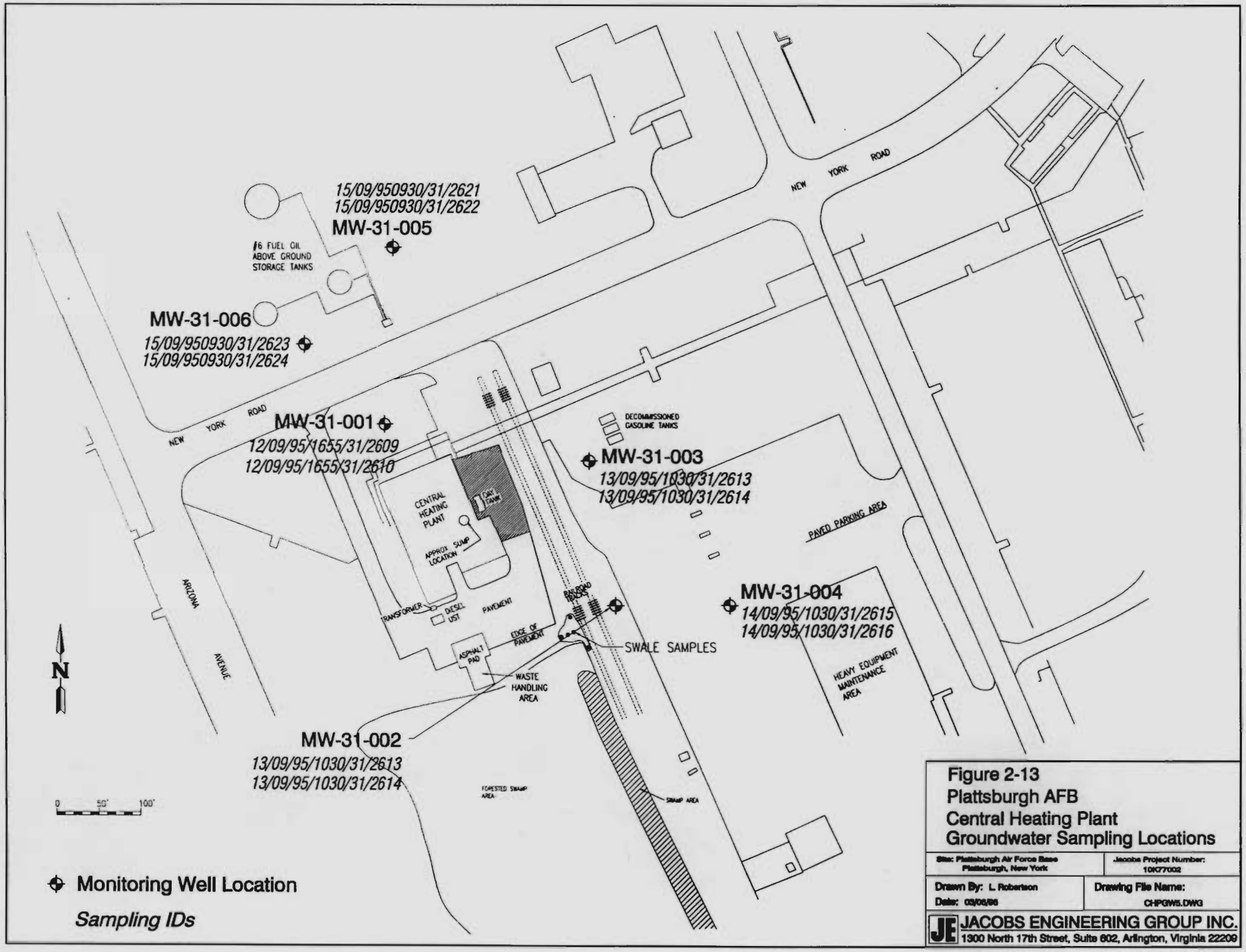

Figure 2-13
Plattsburgh AFB
Central Heating Plant
Groundwater Sampling Locations

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson	Drawing File Name: CHPGW5.DWG
Date: 03/06/96	

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Monday, September 11, 1995	
Assessment Activities	Remediation Activities
Kick-off Meeting Health & Safety Meeting Equipment calibration Unlocked and opened existing wells at IRP 31 and obtained water level measurements from: MW-31-001, MW-31-002, MW-31-003, MW-31-004, MW-1990-2, and MW-1990-3 Purged, ran parameters, and sampled MW-30-001 Purged, ran parameters, and sampled MW-30-003 Equipment post-calibration and secure site. Packaged and shipped all samples via overnight courier to laboratory	Mobilization Kick-off Meeting Health & Safety Meeting Underground utility clearance conducted Initiated construction of biocell Secured BX Station site for excavation
Tuesday, September 12, 1995	
Health & Safety Meeting Calibrated Equipment Drilled MW-30-005 monitoring well boring, collected subsurface soil samples, and set well Purged, ran parameters, and sampled MW-30-002 Drilled MW-30-006 monitoring well boring, collected subsurface soil samples, set well Drilled MW-31-005 monitoring well boring, collected subsurface soil samples, set well Purged, ran parameters, and sampled MW-30-004 Drilled MW-31-006 monitoring well boring, collected subsurface soil samples, set well Purged, ran parameters, and sampled MW-30-004 Equipment post-calibration and secure site. Packaged and shipped all samples via overnight courier to laboratory	Health & Safety Meeting Commenced excavation at northern excavation at BX Station Completed construction of biocell

Wednesday, September 13, 1995	
Health & Safety Meeting Calibrated equipment Abandoned MW-1990-2 and MW-1990-3 Purged, ran parameters, and sampled MW-31-002 Developed newly installed well MW-30-006 and MW-30-005 Purged, ran parameters, and sampled MW-31-003 Collected and analyzed IDM samples by immunoassay test Equipment post-calibration and secure site. Shipped and packaged all samples via overnight courier to laboratory	Health & Safety Meeting Completed removal of contaminated soil from northern excavation, fenced off northern excavation Decontaminated excavation equipment Measured off area to locate known hot spot in southern excavation area Set-up decontamination area near southern excavation Fenced off 3 sides of southern excavation Added 456 pounds of 19:3:3 fertilizer to biocell Covered northern excavation with 5 mil poly sheeting Attempted to rototill biocell, equipment insufficient to reach necessary depth, had large piece of equipment mobilized to site Continued excavation in southern excavation Sampled northern excavation for immunoassay testing
Thursday, September 14, 1995	
Health & Safety Meeting Calibrated equipment Developed monitoring well MW-31-005 and MW-31-006 Purged, ran parameters, and sampled MW-31-004 Purged, ran parameters, and sampled MW-30-006 Purged, ran parameters, and sampled MW-30-005 Collected and analyzed IDM samples from purge and development water for immunoassay test Equipment post-calibration and secure site. Shipped and packaged all samples via overnight courier to laboratory	Health & Safety Meeting Delay: Heavy rain and thunderstorms Results of immunoassay are greater than 60 ppm Continued excavating in southern excavation Collected 24 subsurface soil samples from 15 foot grid pattern around excavations Collected confirmatory sample from northern excavation sidewalls Completed southern excavation Decontaminated excavation equipment, secured and covered southern excavation

Friday, September 15, 1995	
Health & Safety Meeting Calibrated Equipment Purged, ran parameters, and sampled MW-31-005 Purged, ran parameters, and sampled MW-31-006 Initiated and completed all well completions at both IRP sites. Collected and analyzed IDM samples by immunoassay tests Equipment post-calibration and secure site. Packaged and shipped all samples via overnight courier to laboratory	Health & Safety Meeting Mobilized track-hoe to CHP area Commenced excavating CHP swale area Finished excavating, and covered stockpile Covered biocell and cleaned up area Sampled swale excavation for immunoassay testing Conducted immunoassay test on CHP swale samples; one result >60 ppm, initiated additional excavating in sandy soil in western portion of excavation Collected soil from CHP swale stockpile for asphalt batching/disposal characteristics Collected and analyzed rainwater samples in BX Station excavations by immunoassay tests
Saturday, September 16, 1995	
Demobilized 1/3 of crew Surveyed 6 monitoring wells at BX Station Surveyed 6 monitoring wells at CHP. Equipment post-calibration and secure site.	Health and Safety Meeting Obtained 4 soil samples for Immunoassay tests at BX Station southern excavation
Monday, September 18, 1995	
Equipment post-calibration and secure site.	Health & Safety Meeting Calibrated Equipment Repaired fencing around excavations Secured plastic on biocell Sampled CHP swale excavation from area that previously tested positive for immunoassay field test Collected 3 subsurface soil samples for immunoassay field test at BX Station southern excavation perimeter

Tuesday, September 19, 1995	
Health & Safety Meeting Calibrated equipment Equipment post-calibration and secure site.	Health & Safety Meeting Collected confirmatory samples from southern excavation sidewalls at BX Station Collected soil sample from swale pile for profile analysis
Wednesday, September 20, 1995	
Health and Safety Meeting Calibrated equipment Collected 5 water samples from the storm sewer. Equipment post-calibration and secure site. Packaged & shipped all samples via overnight courier.	Health and Safety Meeting Continued excavation at CHP swale Attempted trial excavations toward asphalt at CHP Collected confirmation sample from CHP swale excavation
Thursday, September 21, 1995	
Demobilized	Turned in key Demobilization Meeting Demobilized

2.8 FIELD QUALITY ASSURANCE/QUALITY CONTROL

Jacobs instituted Quality Assurance/Quality Control procedures to ensure that field activities were conducted according to the Sampling Analysis Plan. These procedures involved employing specific mechanisms concerning decontamination of field equipment, documentation of field activities, and investigative derived waste handling and disposal.

Decontamination of field equipment was completed to ensure that cross contamination and spreading of contamination did not occur. Decontamination of equipment consisted of the following protocol:

- Gross decon of equipment with Organic Free Water (OFW) and alkalnox
- Triple methanol rinse

- OFW rinse
- Nitric Acid rinse (if applicable)
- OFW rinse, including an air drying period
- Containment of equipment in aluminum foil or visquine.
- Before monitoring well installation activities and after each well boring completion, the drill rig and tools were deconned in a self-contained decon pad through a alkanox and water wash and a hot water steam rinse.

2.8.1 Field Documentation

Information relevant to field activity was recorded in a bound logbook using waterproof ink. A master list was kept of the field logbooks, and each logbook was labeled with a unique document control number.

Information was recorded in a legible fashion. Any errors were corrected by marking a single line through the old information, initialing and dating the correction, and recording the new information. A brief explanation for the change will be included when appropriate (i.e., if the change is due to something other than a simple transcription error). No blank lines were left on a page. A single blank line or partial blank line (such as at the end of a paragraph) will have a single line drawn through it to the margin of the page. If only part of a page is used, the remainder of the page should have an "X" drawn across it.

Field teams recorded sufficient details of the sampling/investigation event to enable any subsequent user of the information to reconstruct the event without having to rely on the sampler's recollection. A list is included with the names of the field team. Each page was signed and dated.

The following unique distinguishing information was recorded for each sample collected:

- Project;
- Sample number and the sample location;
- Designation and/or description of the sample location;
- Climatic conditions, including approximate temperature, wind and cloud cover, and precipitation;
- Sample matrix;
- Method of sampling and appropriate details;
- Time of collection; and

Associated field measurements, such as photoionization detector (PID) measurements of background and headspace, and radiation meter readings above background levels (if applicable).

Additional information included (if applicable):

- List of equipment used and identification numbers of all instruments that require calibration;
- Depth at which the sample was collected;
- Volume of water removed during well purging (if not using micropurge method);
- Observations and comments, such as sample color or odor;
- Decontamination procedures used in the field;
- Ambient activities that may affect sample representativeness (traffic, industrial discharge, etc..);
- Field calibrations performed on equipment and instruments, such as field calibration of the YSI 3800 Water Quality Logger for dissolved oxygen;
- List of key activities completed and times of completion, in chronological order; and
- Listing of any measurements taken with appropriate units included. For groundwater sampling, list in a table the key parameters obtained form the YSI 3800 Water Quality Logger, including time, pH, temperature, dissolved oxygen, conductivity, salinity, oxidation/reduction potential, turbidity, flow rate, depth to water, and comments.

All field equipment used for measuring physical properties was calibrated at the frequency and by the procedure prescribed by the manufacturer, unless experience dictates a more frequent interval. If the manufacturer did not provide a calibration schedule, the Task Manager generated one based on information and support provided by the manufacturer. This schedule was maintained with the equipment as part of the calibration log.

The calibration log includes the following information:

- Name and signature of person making entry;
- Date of entry;
- Name of equipment and its identification number;
- Decontamination status;
- Reference list of procedures used for calibration;
- Manufacturer, log number, and expiration date of calibration standards;
- Measurement results including acceptance or unacceptance; and
- Corrective action taken (if necessary).

The equipment was calibrated with appropriate standards and buffers that are traceable to the National Institute of Standards and Technology (NIST), or with a traceable, nationally recognized standard with proper documentation. All documentation of standards and buffers were maintained with the project records.

Decontamination water from field activities was containerized in drums near the point of generation and stored on visquine. At the end of field activities, the contents of the tank were sampled for applicable levels of contamination by immunoassay testing. If it was determined that the decontamination water met the applicable standard, then the water was disposed of by dumping the water onto the ground surface near and down gradient of the point of generation and allowed to percolate into the ground surface. If the decontamination water was above the applicable standard, then the drums were transported to the on-site water treatment plant for

disposal. Personal Protective Equipment (PPE) and solid waste was containerized in plastic bags, secured in one storage area and disposed of on-site at the appropriate treatment facility.

Photoionization Detector (PID)

The MicroTIP (PID) (Various models) measures, displays, and records the concentration of airborne photoionizable gases and vapors.

The MicroTIP PID will be recalibrated daily both prior to and following use. The calibration gas (100 ppm isobutylene ±2%) in air and zero grade air was used in conjunction with a calibration kit (Part No. 390033) to perform the calibration.

Water Quality Logger

Physical characteristics of water were measured and recorded using a water quality logger. The YSI Inc. 3800 Water Quality Logger measures pH, temperature, dissolved oxygen (DO), conductivity, salinity, turbidity, and oxidation-reduction potential.

The measurement characteristics requiring calibration are detailed below. All other measuring devices were calibrated at the factory and require no field calibration.

pH

The pH probe was calibrated daily both prior to and following use. A three-point calibration was employed using pH 4.00, pH 7.00, and pH 10.00 buffer solution The calibration buffer solution was certified to an accuracy of ±0.01 at 25°C and by YSI Inc. brand. The procedure for three-point pH calibration is detailed in the YSI Inc. 3800 instruction manual.

Dissolved Oxygen

The Water Quality Logger was calibrated for DO daily both prior to and following use. Calibration was also performed if a new DO membrane was installed or if environmental

conditions changed significantly since the last calibration. Calibration was performed in an atmosphere saturated with water. The calibration procedure for DO is discussed in the YSI Inc. 3800 instruction manual.

Turbidity

The Water Quality Logger was initially calibrated for turbidity with a three-point calibration using 0 ntu, 200 ntu, and 800 ntu standards. Following the initial three-point calibration, calibration to 0 ntu was performed daily both prior to and following use.

2.9 LABORATORY ANALYSIS

2.9.1 Analytical Program

Soil, groundwater, purge water, and water and sediment from sanitary sewers, were collected and sampled during field activities at both sites. All soil samples from well borings and groundwater samples were analyzed for VOCs by EPA Method SW 8021 + MTBE and for semi-VOCs by EPA Method SW 8270. All soil samples collected in the excavations and BX Station grid, and storm sewers were analyzed for Total Recoverable Petroleum Hydrocarbons by EPA Method 418.1. Storm water and sediment samples collected by OHM were analyzed for VOCs by EPA Method SW 8021 and for semi-VOCs by EPA Method SW 8270. Parameters analyzed for in these methods are listed in Table 2.9.1A. Also, a limited amount of soil samples around the BX Station excavation, sewer sediment and purge water from monitoring well development and sampling were collected and analyzed by PETRO-Risc Immunoassay Test.

In order to verify that samples were not cross-contaminated through ambient filed conditions, equipment, contact, transportation, and/or laboratory equipment, Jacobs collected a series of Quality Assurance\Quality Control (QA\QC) samples during the sampling events. OHM also collected QA\QC samples during it's sampling event. QA/QC samples are cross-referenced with media samples in Table 2.9.1B

Table 2.9.1A
COMPOUNDS ANALYZED FOR BY THE VARIOUS EPA METHODS

EPA Method 8270 BNA		
phenol	hexachlorobutadiene	n-nitrosodiphenylamine
bis(2-chloroethyl) ether	4-chloro-3-methylphenol	4-bromophenylphenylether
2-chlorophenol	2-methylnaphthalene	hexachlorobenzene
1,3-dichlorobenzene	hexachlorocyclopentadiene	pentachlorophenol
1,4-dichlorobenzene	2,4,6-trichlorophenol	phenanthrene
benzyl alcohol	2,4,5-trichlorophenol	anthracene
1,2-dichlorobenzene	2-chloronaphthalene	fluoranthene
2-methylphenol	2-nitroaniline	di-n-butylphthalate
bis(2-chloroisopropyl)ether	dimethylphthalate	pyrene
4-methylphenol	acenaphthylene	butylbenzylphthalate
n-nitroso-di-n-propylamine	3-nitroaniline	3,3'-dichlorobenzidine
hexachloroethane	acenaphthene	benzo(a)anthracene
nitrobenzene	2,4-dinitrophenol	bis(2-ethylhexyl)phthalate
isophorone	4-nitrophenol	chrysene
2-nitrophenol	dibenzofuran	di-n-octylphthalate
2,4-dimethylphenol	2,4-Dinitrotoluene	benzo(b)fluoranthene
benzoic acid	2,6-Dinitrotoluene	benzo(k)fluoranthene
bis(2-chloroethoxy)methane	diethylphthalate	benzo (a)pyrene
2,4-dichlorophenol	4-chlorophenylphenylether	indeno(1,2,3-cd)pyrene
1,2,4-trichlorobenzene	fluorene	dibenzo(a,h)anthracene
naphthalene	4-nitroaniline	benzo(ghi)perylene
4-chloroaniline	4,6-dinitro-2-methylphenol	

8021		
Bromoform	1,1,1-Trichloroethane	1,2-Dibromo-3chloropropane
Bromomethane	1,1,2-Trichloroethane	1,3,5-Trimethylbenzene
Carbon tetrachloride	Trichloroethylene	1,3-Dichloropropane
Chlorodibromomethane	Trichlorofluoromethane	Bromobenzene
Chloroethane	Vinyl chloride	4-Isopropyltoluene
Chloroform	Benzene	Bromochloromethane
Chloromethane	Chlorobenzene	Dibromomethane
Dichlorobromomethane	1,2-Dichlorobenzene	Ethylene dibromide
Dichlorodifluoromethane	1,3-Dichlorobenzene	Hexachlorobutadiene
1,1-Dichloroethane	2,2-Dichlropropane	Isopropylbenzene
1,2-Dichloroethane	1,4-Dichlorobenzene	n-Butylbenzene
1,1-Dichloroethylene	Ethylbenzene	n-Propylbenzene
trans-1,2-Dichloroethene	Toluene	Naphthalene
1,2-Dichloropropane	Xylenes	o-Chlorotoluene
1,1-Dichloropropene	1,1,1,2-Tetrachloroethane	p-Chlorotoluene
cis-1,3-Dichloropropylene	1,2,3-Trichlorobenzene	sec-Butylbenzene
trans-1,3-Dichloropropylene	1,2,3-Trichloropropane	Styrene
Methylene chloride	1,2,4-Trichlorbenzene	tert-Butyl methylether
1,1,2,2-Tetrachloroethane	1,2,4-Trimethylbenzene	tert-Butylbenzene
Tetrachloroethylene	1,2-cis-Dichloroethylene	

EPA Method 8021 + MTBE
Tert-Butyl Methyl Ether
Benzene
Toluene
Ethylbenzene
Xylenes (total)
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
sec-Butylbenzene
p-isopropyltoluene
n-Butylbenzene
Naphthalene

EPA Method 418.1 TRPH

Cyanide-Releasable

Sulfide-Releasable

Ignitability

Metals
Silver
Arsenic
Barium
Cadmium
Chromium Total
Lead
Selenium
Mercury

PCBs
PCB-1242
PCB-1254
PCB-1221
PCB-1232
PCB-1248
PCB-1260
PCB-1016

Table 2.9.1B
QA/QC CROSS REFERENCE INFORMATION

Date	Quality Control	Sample ID	Analysis	Results
11 September	Trip Blank	11/09/95/1730/34/5001	8021 + MTBE	ND
Cross Reference Samples				
11/09/95/1615/30/2601		11/09/95/1730/30/2603		
Date	**Quality Control**	**Sample ID**	**Analysis**	**Results**
12 September	Trip Blank	Trip Blank	8021 + MTBE	ND
Cross Reference Samples				
12/09/95/1100/30/2605		12/09/95/1345/30/2607		
12/09/95/1655/31/2609				
Date	**Quality Control**	**Sample ID**	**Analysis**	**Results**
12 September	Trip Blank	12/09/95/0800/30/5011	8021 + MTBE	ND
Cross Reference Samples				
12/09/95/0805/30/1700		12/09/95/0827/30/1701		
12/09/95/1020/30/1702		12/09/95/1027/30/1703		
12/09/95/1120/30/5009		12/09/95/1327/30/1704		
12/09/95/1342/30/1705		12/09/95/1342/30/1000		
Date	**Quality Control**	**Sample ID**	**Analysis**	**Results**
13 September	Trip Blank	13/09/95/1030/34/5004	8021 + MTBE	ND
Cross Reference Samples				
13/09/95/1030/31/2611		13/09/95/1315/31/2613		
Date	**Quality Control**	**Sample ID**	**Analysis**	**Results**
14 September	Trip Blank	14/09/95/1235/34/5005	8021 + MTBE	ND
Cross Reference Samples				
14/09/95/1235/31/2615		14/09/95/1255/34/2001		
14/09/95/1520/30/2617		14/09/95/1700/30/2619		
Date	**Quality Control**	**Sample ID**	**Analysis**	**Results**
15 September	Trip Blank	15/09/95/0930/34/5006	8021 + MTBE	ND
Cross Reference Samples				
15/09/95/0930/31/2621		15/09/95/1030/31/2623		
Date	**Quality Control**	**Sample ID**	**Analysis**	**Results**
12 September	Equipment Rinse (soil)	12/09/95/1120/30/5009	8021 + MTBE, 8270	ND
Cross Reference Samples				
12/09/95/0805/30/1700	12/09/95/0827/30/1701	12/09/95/1020/30/1702		
12/09/95/1027/30/1703	12/09/95/1327/30/1704	12/09/95/1342/30/1705		
12/09/95/1342/30/1000	14/09/95/1505/30/2401/K14	14/09/95/1510/30/2402/M14		
14/09/95/1515/30/2403/N14	14/09/95/1525/30/2404/O14	14/09/95/1530/30/2405/P14		
14/09/95/1531/30/2406/Q14	14/09/95/1532/30/2407/R14	14/09/95/1534/2410/N15		
14/09/95/1536/2408/K15	14/09/95/1538/2409/M15	14/09/95/1541/2411/O15		
14/09/95/1542/2412/P15	14/09/95/1545/2414/R15	14/09/95/1545/2413/Q15		
14/09/95/1547/2415/S15	14/09/95/1549/2416/S14	14/09/95/1551/2417/L13		
14/09/95/1553/2418/L12	14/09/95/1554/2419/L10	14/09/95/1555/2419/L11		
14/09/95/1620/2421/D6	14/09/95/1620/2420/D7	14/09/95/1630/2422/D5		
14/09/95/1635/2423/D4	14/09/95/1655/30/1305/NEW	14/09/95/1738/30/1301/NWW		
14/09/95/1740/30/1303/SW	14/09/95/1740/30/1302/SWW	14/09/95/1745/30/1304/EW		
14/09/95/1800/30/1306/NW	14/09/95/1800/30/1307/SS	14/09/95/1805/30/1308/SEW		

Date	Quality Control	Sample ID	Analysis	Results
12 September	Duplicate (soil)	12/09/95/1342/30/1000	8021 + MTBE, 8270	ND
		Cross Reference Samples		
	12/09/95/1342/30/1705			
Date	Quality Control	Sample ID	Analysis	Results
14 September	Duplicate (groundwater)	14/09/95/1255/34/2001	8021 + MTBE	1.8 ppb Toluene, 1.3 ppb Naphthalene
		Cross Reference Samples		
	14/09/95/1235/31/2615			
Date	Quality Control	Sample ID	Analysis	Results
14 September	Duplicate (groundwater)	14/09/95/1255/34/2002	8270	ND
		Cross Reference Samples		
	14/09/95/1235/31/2616			

Date	Quality Control	Analysis	Results
18 September	Method Blank	8240 VOA	Methylene Chloride 1.4 J
		Cross Reference Samples	
15/09/95/0930/31/2621	15/09/95/1030/31/2623	15/09/95/0930/34/5006	
15/09/95/1600/31/1800			
Date	Quality Control	Analysis	Results
27 September	Method Blank	8021	ND
		Cross Reference Samples	
19/09/95/1139/33/1801			
Date	Quality Control	Analysis	Results
16 September	Method Blank	8021	ND
		Cross Reference Samples	
11/09/95/1615/30/2601	11/09/95/1730/30/2603	11/09/95/1730/34/5001	
Date	Quality Control	Analysis	Results
14 September	Method Blank	8021	ND
		Cross Reference Samples	
12/09/95/1120/30/5009	12/09/95/1100/30/2605	12/09/95/1345/30/2607	
12/09/95/1655/31/2609	Trip Blank (un-numbered)	12/09/95/0800/30/5011	
Date	Quality Control	Analysis	Results
15 September	Method Blank	8021	ND
		Cross Reference Samples	
12/09/95/0805/30/1700	12/09/95/0827/30/1701	12/09/95/1020/30/1702	
12/09/95/1027/30/1703	12/09/95/1327/30/1704	12/09/95/1342/30/1705	
12/09/95/1342/30/1000			
Date	Quality Control	Analysis	Results
15 September	Method Blank	8021	ND
		Cross Reference Samples	
13/09/95/1030/31/2611	13/09/95/1315/31/2613	13/09/95/1030/34/5004	
Date	Quality Control	Analysis	Results
19 September	Method Blank	8270 Acid Phenol	ND

Cross Reference Samples			
14/09/95/1235/31/2616	14/09/95/1255/34/2002	14/09/95/1520/30/2618	
14/09/95/1700/30/2620			
Date	**Quality Control**	**Analysis**	**Results**
18 September	Method Blank	8270 Acid Phenol	ND
Cross Reference Samples			
11/09/95/1615/30/2602	11/09/95/1730/30/2604		
Date	**Quality Control**	**Analysis**	**Results**
19 September	Method Blank	8270 Acid Phenol	ND
Cross Reference Samples			
12/09/95/1100/30/2606	12/09/95/1345/30/2608	12/09/95/1655/31/2610	
12/09/95/1120/30/5009			
Date	**Quality Control**	**Analysis**	**Results**
15 September	Method Blank	8270 Acid Phenol	ND
Cross Reference Samples			
13/09/95/1030/31/2612	13/09/95/1315/31/2614		
Date	**Quality Control**	**Analysis**	**Results**
19 September	Method Blank	8270 Acid Phenol	ND
Cross Reference Samples			
15/09/95/0930/31/2622	15/09/95/1030/31/2624		
Date	**Quality Control**	**Analysis**	**Results**
19 September	Method Blank	8270 Base Neutral	ND
Cross Reference Samples			
14/09/95/1235/31/2616	14/09/95/1255/34/2002	14/09/95/1520/30/2618	
14/09/95/1700/30/2620			
Date	**Quality Control**	**Analysis**	**Results**
18 September	Method Blank	8270 Base Neutral	ND
Cross Reference Samples			
11/09/95/1615/30/2602	11/09/95/1730/30/2604		
Date	**Quality Control**	**Analysis**	**Results**
19 September	Method Blank	8270 Base Neutral	ND
Cross Reference Samples			
12/09/95/1100/30/2606	12/09/95/1345/30/2608	12/09/95/1655/31/2610	
12/09/95/1120/30/5009			
Date	**Quality Control**	**Analysis**	**Results**
20 September	Method Blank	8270 Base Neutral	ND
Cross Reference Samples			
13/09/95/1030/31/2612	13/09/95/1315/31/2614		
Date	**Quality Control**	**Analysis**	**Results**
19 September	Method Blank	8270 Base Neutral	ND
Cross Reference Samples			
15/09/95/0930/31/2622	15/09/95/1030/31/2624		
Date	**Quality Control**	**Analysis**	**Results**
20 September	Method Blank	8270 BNA	ND

Cross Reference Samples		
12/09/95/0805/30/1700	12/09/95/0827/30/1701	12/09/95/1020/30/1702
12/09/95/1027/30/1703	12/09/95/1327/30/1704	12/09/95/1342/30/1705
12/09/95/1342/30/1000		

Date	Quality Control	Analysis	Results
28 September	Method Blank	8270 BNA	ND

Cross Reference Samples		
19/09/95/1139/33/1801		

Date	Quality Control	Analysis	Results
20 September	Method Blank	TRPH	71 mg/kg
28 September	Method Blank	TRPH (re-run of above)	ND

Cross Reference Samples		
19/09/95/1139/33/1800		

Date	Quality Control	Analysis	Results
06 October	Method Blank	TRPH	ND

Cross Reference Samples		
19/09/95/1121/30/1700	19/09/95/1121/30/1701	19/09/95/1121/30/1702
19/09/95/1121/30/1703	19/09/95/1015/32/6102	19/09/95/1030/32/6103
19/09/95/1045/32/6104		

Date	Quality Control	Analysis	Results
06 October	Method Blank	TRPH	ND

Cross Reference Samples		
20/09/95/0906/33/1704		

Date	Quality Control	Analysis	Results
15 September	Method Blank	TRPH	ND

Cross Reference Samples		
14/09/95/1549/2416/S14	14/09/95/1525/30/2404/O14	14/09/95/1530/30/2405/P14
14/09/95/1531/30/2406/Q14	14/09/95/1532/30/2407/R14	

Date	Quality Control	Analysis	Results
19 September	Method Blank	TRPH	ND

Cross Reference Samples		
14/09/95/1545/2413/Q15	14/09/95/1620/2420/D7	14/09/95/1534/2410/N15
14/09/95/1538/2409/M15	14/09/95/1541/2411/O15	14/09/95/1800/30/1307/SS
14/09/95/1805/30/1308/SEW	14/09/95/1738/30/1301/NWW	14/09/95/1740/30/1302/SWW
14/09/95/1745/30/1304/EW	14/09/95/1655/30/1305/NEW	14/09/95/1740/30/1303/SW
14/09/95/1800/30/1306/NW	14/09/95/1505/30/2401/K14	14/09/95/1554/2419/L10
14/09/95/1630/2422/D5	14/09/95/1635/2423/D4	14/09/95/1620/2421/D6

Date	Quality Control	Analysis	Results
20 September	Method Blank	TRPH	70 mg/kg

Cross Reference Samples		
14/09/95/1553/2418/L12	14/09/95/1510/30/2402/M14	14/09/95/1551/2417/L13
14/09/95/1555/2419/L11	14/09/95/1515/30/2403/N14	14/09/95/1545/2414/R15
14/09/95/1542/2412/P15	14/09/95/1547/2415/S15	

Date	Quality Control	Analysis	Results
23 January 1996	Trip Blank	8021	Methylene Chloride 0.457 mg/L

Cross Reference Samples			
MW2335-1	MW2335-2	MW2335-3	
MW2335-4	MW2335-5	MW2335-6	
Date	**Quality Control**	**Analysis**	**Results**
31 January 1996	Method Blank	8021	ND
Cross Reference Samples			
MW2335-1	MW2335-2	MW2335-3	
MW2335-4	MW2335-5	MW2335-6	
Date	**Quality Control**	**Analysis**	**Results**
22 January 1996	Trip Blank	8260	Methylene Chloride 0.630 mg/L
Cross Reference Samples			
OHM32/6100	OHM32/6101		
Date	**Quality Control**	**Analysis**	**Results**
22 January 1996	Method Blank	8021	ND
Cross Reference Samples			
OHM32/6100	OHM32/6101		
Date	**Quality Control**	**Analysis**	**Results**
22 January 1996	Method Blank	TRPH	ND
Cross Reference Samples			
OHM32/6100S	OHM32/6101S		
Date	**Quality Control**	**Analysis**	**Results**
31 January 1996	Method Blank	8270	ND
Cross Reference Samples			
MW2335-1	MW2335-2	MW2335-3	
MW2335-4	MW2335-5	MW2335-6	

2.9.2 Chronology of Laboratory Analyses

Listed below are the individual laboratories, sampling methods and associated sampling events completed during the investigation.

Ecology and Environmental: Jacobs September, 1995, Sampling Event

- EPA Method SW 8021 + MTBE
- EPA Method SW 8270
- EPA Method 418.1
- RCRA Metals
- Ignitablility
- Cyanide
- Sulfide

OHM Remediation Services Corporation: OHM's January, 1996, Sampling Event

- EPA Method SW 8021
- EPA Method SW 8270
- EPA Method SW 8260

2.10 DATA EVALUATION

Jacobs completed data validation through employment of a trained data validation professional to complete an independent review on all reported sample results summary information. Data qualifiers are assigned based on the method used, the statement of work guiding the analysis, and appropriate documents as stated in Section 2.3.1. The scope of the review included, as a minimum:

- verification of sample identification information and corresponding laboratory identifications;
- review of sample matrix information in terms of potential interferences and appropriateness of method selection of sample analysis;

- sample holding times, in terms of dates of preparation, extraction, and analysis;
- assessment of laboratory's compliance with method used for sample analysis;
- assessment of the suitability of instrumentation and equipment used for sample analysis;
- assessment of method detection limits or sample quantitation limits reported;
- assessment of laboratory operational and sample QC results in terms of the following:
    * surrogate spike recovery
    * field and laboratory sample blank results
    * matrix and matrix spike duplicates results
    * other laboratory control samples results
- assignment and definition of data qualifiers

2.10.1 Data Validation Report

All analyses were independently validated for usability and completeness under the supervision of Jacobs QA/QC manager. This data validation was completed to the extent possible under the USEPA Region III National Functional Data Validation Guidelines, and the Region II supplemental guidance.

The overall QA objective is to develop and implement procedures for sample and data collection, sample shipment, and reporting, that will allow QA reviewers to determine, with reasonable certainty, whether the field and laboratory data collected meet the criteria and end points established in the Sampling Analysis Plan. The QA objectives will be achieved through the implementation of specific procedures and protocol described in the USEPA Regional III guidelines to the extent possible. QA objectives will be evaluated by determining the accuracy, precision, completeness, representativeness, and comparability of the data. Results of data validation are reported by the associated qualifiers in the analytical tables.

The results of Jacobs data review are discussed and separated according to the individual laboratory.

Ecology and Environment

The following comments are listed by the batch and sampling date.

Job 9502.094 Sampling Date 9/11/95: Quality control samples' results were within acceptance criteria for blanks, MS/MSD, and the method spike (blank spike or Lab Control Standard) for these methods. No discrepancies were noted. The data should be acceptable as reported.

Job 9502.103 Sampling Date 9/12/95: Quality control samples' results were within acceptance criteria for blanks, MS/MSD, and the method spike (blank spike or Lab Control Standard) for these methods. No discrepancies were noted. The data should be acceptable as reported.

Job 9502.122 Sampling Date 9/13/95: Quality control samples' results were within acceptance criteria for blanks, MS/MSD, and the method spike (blank spike or Lab Control Standard) for these methods. No discrepancies were noted. The data should be acceptable as reported.

Job 9502.131 Sampling Date 9/14/95: Percent Accuracy results were higher than acceptance limits for TRPH spiked samples. A method blank was reported contaminated, but was not associated with these samples. Data are appropriately qualified in the attached Form 1s.

Job 9502.132 Sampling Date 9/14/95: Quality control samples' results were within acceptance criteria for blanks, MS/MSD, and the method spike (blank spike or Lab Control Standard) for these methods. No discrepancies were noted. The data should be acceptable as reported.

Job 9502.152 Sampling Date 9/15/95: Sample 15/09/95/0930/34/(trip blank) missed holding times for volatiles analysis by 2 days. Also, the MSD recovery for the Method 8021 was lower than acceptance limits. Data are appropriately qualified in the attached Form 1s.

Job 9502.197 Sampling Dates 9/19-20/95: According to the chain of custody form, TRPH by Method 418.1 was requested for samples 32-2(6101) and 32-3(6100), but results were not provided. No other discrepancies were noted. The other data should be acceptable as reported.

OHM Remediation Services Corporation

General Comments

The Chain of Custody Record of samples OHM32/6100, OHM326100S, OHM32/6101, OHM326101S, OHM-M-15, and OHMTBLK list the sampling dates as "1-10-95" when the correct date was "1-10-96." This error is also noted on one of the "relinquished" and both of the "received" signature blocks. The dates should be corrected.

The following comments are listed by the batch and sampling date.

Sampling Date 1/10/96:

Method 8260 (volatile organics by GC/MS) matrix spiked (MS) sample recoveries for some compounds are slightly lower than acceptance criteria. This caused the precision to be slightly higher than acceptance criteria. Surrogate recoveries in each sample were within limits. The data can be accepted without further qualification. The lab should check for an error in reporting the value of methylene chloride in the trip blank (0.630 mg/L). This is many times greater than typical lab contamination (usually less than 0.02 mg/L), and may be a typographical error on the reporting form. If there was such a high concentration present in the trip blank, there would have been a dilution run. If the contamination is from the lab during sample analysis, then methylene chloride would have been reported at detectable levels in other samples analyzed at the time. The Total Recovery Petroleum Hydrocarbon data is acceptable as reported.

Quality control sample results were within acceptance criteria for blanks, MS/MSD, and the method spike (blank spike or Lab Control Standard) for these methods.

Sampling Date 1/23/96:

For Method 8021, the lab should check for error in reporting the value of methylene chloride in the trip blank (0.457 mg/L). This same problem is discussed in the previous sampling batch. Stryene, xylene, and trichloroethylene values in MW2335-1 and MW2335-4 were not confirmed on second GC column analysis, which is likely because their concentrations are at or near the reporting limits. There were other compounds present which could have interfered. The lab didn't indicate a dilution was performed, but the reporting limits for sample MW2335-5 are 100 times higher than other samples. MW2335-3 appears to have been diluted 5-fold. Apparently the lab had no trouble confirming these hits. It would be appropriate for the lab to use a data qualifier which indicates the result was confirmed on second column, rather than address the subject in the narrative.

Method 8270 sample MW2335-5 had two (2) acid surrogates outside lower acceptance limits. This sample should have been rerun. This conflicts with the lab's footnote to the surrogate recovery report, which says "It is laboratory policy to allow one surrogate per sample fraction (acid, base-neutral or pesticide) to exceed the stated QC limits."

Quality control sample results were within acceptance criteria for blanks, MS/MSD, and the method spike (blank spike or Lab Control Standard) for these methods. Qualifiers identified during this validation are listed with the specific parameter in Section 3.0 Sampling. Listed in the table below are qualifiers associated with non-detections.

Table 2.10.1A
TITLE

MATRIX	ID	QUALIFIER	PARAMETERS
water	15/09/95/1030/34/2623	UL	Total Xylenes
water	15/09/95/0930/31/2621	UL	Total Xylenes
water	15/09/95/0930/34/5006	UL	EPA Method 8021 + MTBE
water	MW-2335-5	UJ	EPA Method 8270

3.0 REMEDIAL ANALYTICAL RESULTS

The analytical results associated with the excavation are presented in the following sections. The results are exhibited on the referenced figures and data qualifiers are presented in the analytical tables.

3.1 IRP 30 - BX-STATION REMEDIAL SAMPLING RESULTS

A total of seven samples were collected from the walls of the northern excavation and four from the southern excavation at the BX Station. All samples were analyzed for TRPH by EPA Method 418.1. The only sample resulting in positive quantification for TRPH was sample 14/09/95/1800/1306/NW, which was collected from the north wall of the northern excavation. Listed in Table 3.1.A are the sample type, location, identification number and analytical results. The sampling results are exhibited on Figure 3-1.

Table 3.1.A
BX STATION EXCAVATION SAMPLING RESULTS

Excavation Sample Collected	Sample Type	Sample ID	Analytical Results	Qualifier
Northern	Soil	14/09/95/1745/1304/EW	ND	-
Northern	Soil	14/09/95/1800/1306/NW	530 mg/kg	K
Northern	Soil	14/09/95/1655/1305/NEW	ND	-
Northern	Soil	14/09/95/1735/1301/NWW	ND	-
Northern	Soil	14/09/95/1740/1303/SW	ND	-
Northern	Soil	14/09/95/1805/1308/SEW	ND	-
Northern	Soil	14/09/95/1740/1302/SWW	ND	-
Southern	Soil	19/09/95/1121/30/1700	ND	-
Southern	Soil	19/09/95/1121/30/1701	ND	-
Southern	Soil	19/09/95/1121/30/1702	ND	-
Southern	Soil	19/09/95/1121/30/1703	ND	-

Twenty-four subsurface soil samples were collected along a grid pattern on fifteen foot centers. The grids were located south and east of the excavations. The samples were analyzed for TRPH by EPA Method 418.1. The results are listed in the Table 3.1.B and identified on Figure 3-2. All samples analyzed were non-detect for TRPH indicating that no TRPH was detected in the grid sampling locations.

NOTE: ALL SOIL SAMPLES NON-DETECT FOR TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

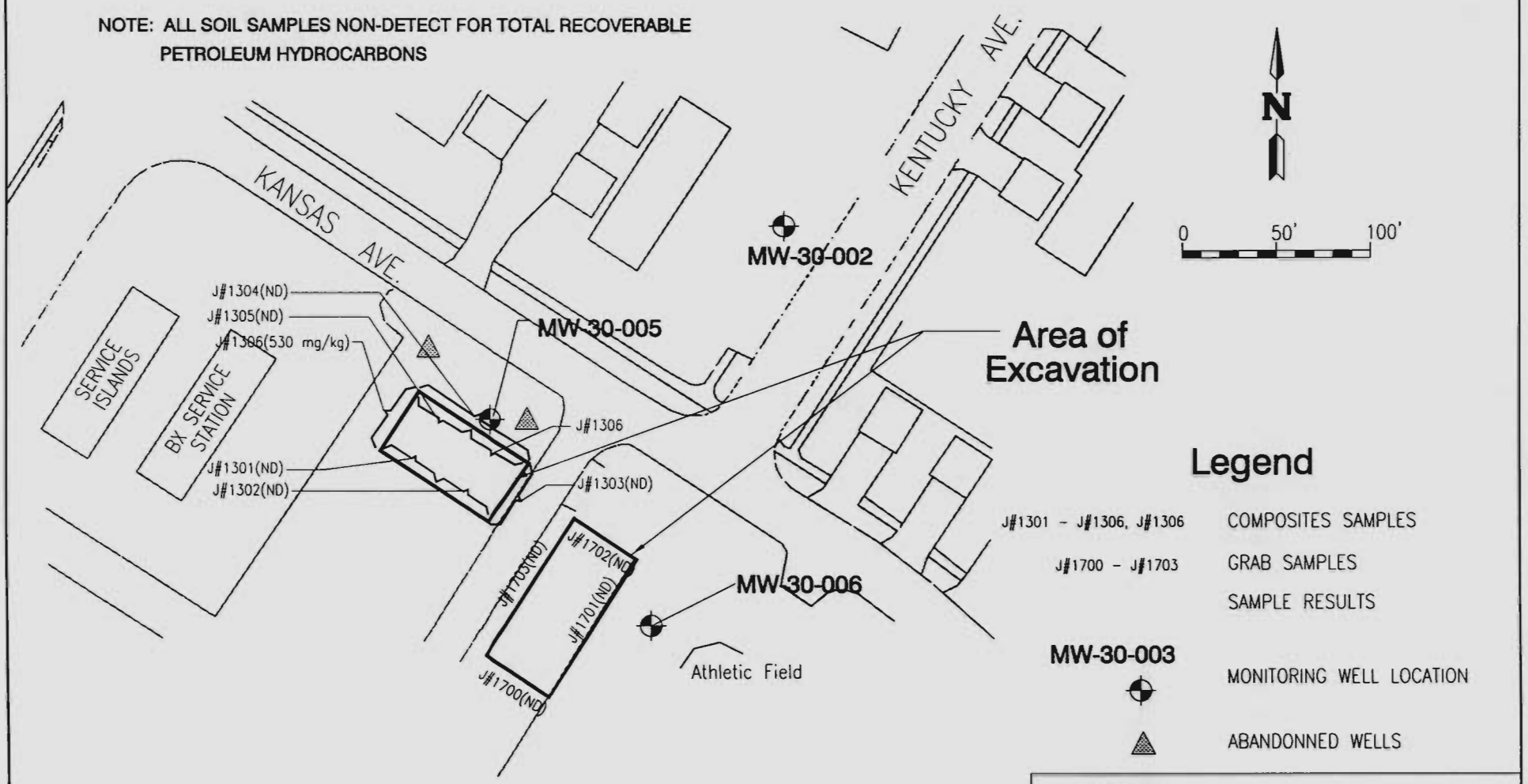
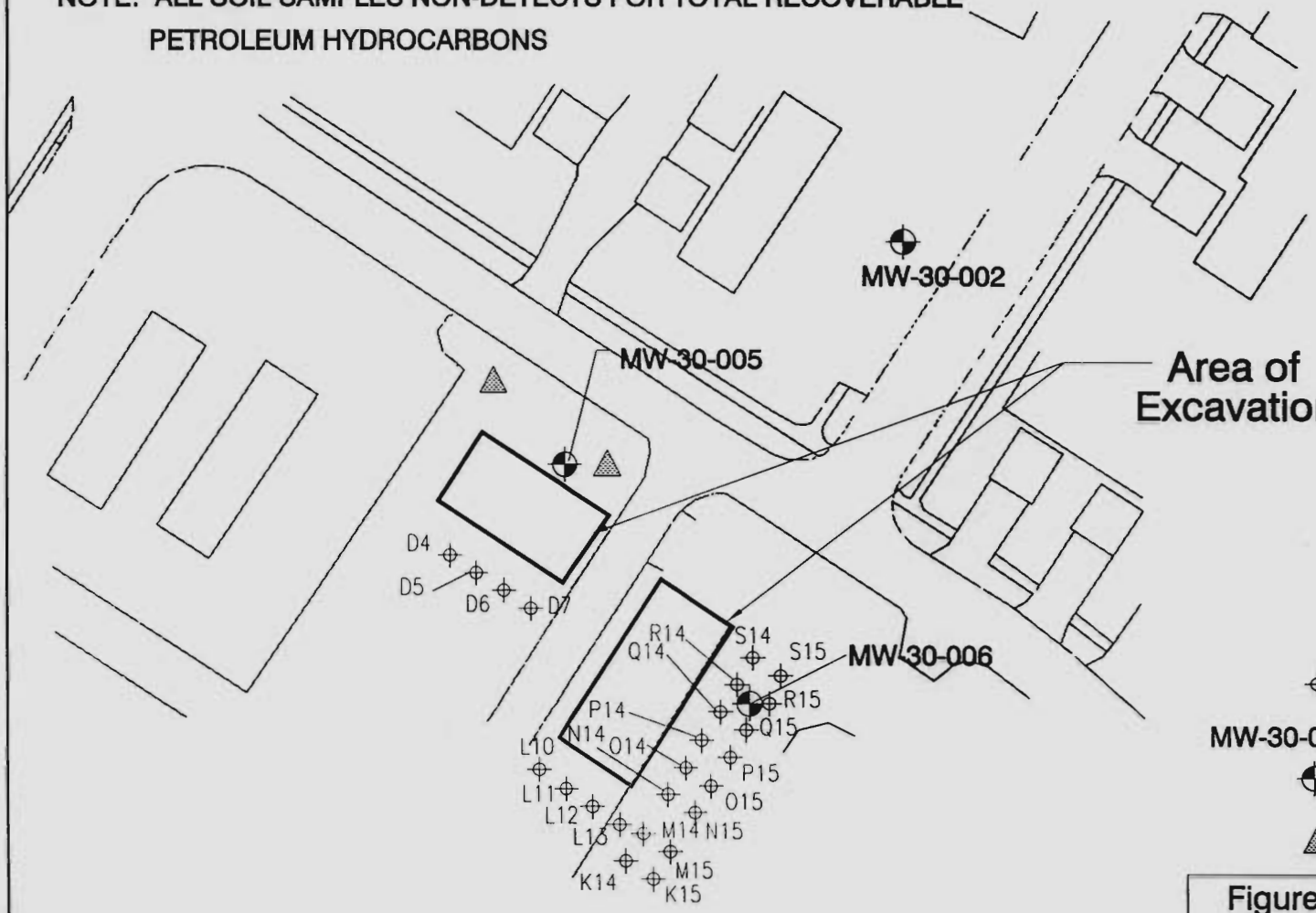


Figure 3-1
Plattsburgh AFB
BX Service Station Area
Excavation Sampling Locations/ Results

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 03/05/98	Drawing File Name: BXTOPO3.DWG

JACOBS ENGINEERING GROUP INC.
1300 North 17th Street, Suite 602, Arlington, Virginia 22209

NOTE: ALL SOIL SAMPLES NON-DETECTS FOR TOTAL RECOVERABLE PETROLEUM HYDROCARBONS



Legend

- SOIL SAMPLE LOCATION
- MW-30-003 — MONITORING WELL LOCATION
- ABANDONNED WELLS

Figure 3-2
Plattsburgh AFB
BX Service Station Area
Grid Sampling Locations/ Results

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 03/05/98	Drawing File Name: BXTOPOS.DWG

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1300 North 17th Street, Suite 602, Arlington, Virginia 22209

Table 3.1B
SUBSURFACE SOIL SAMPLES FROM 15 FOOT GRID PATTERN

GRID LOCATION IDENTIFIER	EXCAVATION ASSOCIATION	SAMPLE NUMBER	ANALYSIS CONDUCTED	ANALYTICAL RESULT	QUALIFIER
D-4	West side northern excavation	14/09/95/1635/2423/D4	EPA 418.1	ND	-
D-5	West side northern excavation	14/09/95/1630/2422/D5	EPA 418.1	ND	-
D-6	West side northern excavation	14/09/95/1620/2421/D6	EPA 418.1	ND	-
D-7	West side northern excavation	14/09/95/1620/2420/D7	EPA 418.1	ND	-
K-14	West side southern excavation	14/09/95/1505/30/2401/K14	EPA 418.1	ND	-
K-15	West side southern excavation	14/09/95/1536/2408/K15	EPA 418.1	ND	-
L-10	West side southern excavation	14/09/95/1554/2419/L10	EPA 418.1	ND	-
L-11	West side southern excavation	14/09/95/1555/2419/L11	EPA 418.1	ND	-
L-12	West side southern excavation	14/09/95/1553/2418/L12	EPA 418.1	ND	-
L-13	Southern side southern excavation	14/09/95/1551/2417/L13	EPA 418.1	ND	-
M-14	Southern side southern excavation	14/09/95/1510/30/2402/M14	EPA 418.1	ND	-
M-15	Southern side southern excavation	14/09/95/1538/2409/M15	EPA 418.1	33	-
OHM-M-15 *	Southern side southern excavation	OHM-M-15	EPA 418.1	ND	-
N-14	Southern side southern excavation	14/09/95/1515/30/2403/N14	EPA 418.1	ND	-
N-15	Southern side southern excavation	14/09/95/1534/2410/N15	EPA 418.1	ND	-
O-14	Southern side southern excavation	14/09/95/1525/30/2404/O14	EPA 418.1	ND	-
O-15	Southern side southern excavation	14/09/95/1541/2411/O15	EPA 418.1	ND	-
P-14	Southern side southern excavation	14/09/95/1530/30/2405/P14	EPA 418.1	ND	-
P-15	Southern side southern excavation	14/09/95/1542/2412/P15	EPA 418.1	ND	-
Q-14	Southern side southern excavation	14/09/95/1531/30/2406/Q14	EPA 418.1	ND	-
Q-15	Southern side southern excavation	14/09/95/1545/2413/Q15	EPA 418.1	ND	-
R-14	Southern side southern excavation	14/09/95/1532/30/2407/R14	EPA 418.1	ND	-
R-15	Southern side southern excavation	14/09/95/1545/2414/R15	EPA 418.1	ND	-
S-14	Southern side southern excavation	14/09/95/1549/2416/S14	EPA 418.1	ND	-
S-15	Southern side southern excavation	14/09/95/1547/2415/S15	EPA 418.1	ND	-

* Sample location reanalyzed by OHM, result was non-detect.
ND = Not Detected

3.2 IRP 31- CHP REMEDIAL SAMPLING RESULTS

One analytical laboratory sample was collected from the CHP swale excavation through collection of multiple aliquots for analysis of TRPH by Method 418.1. The results are listed in the Table 3.2.A and presented in Figure 3-3.

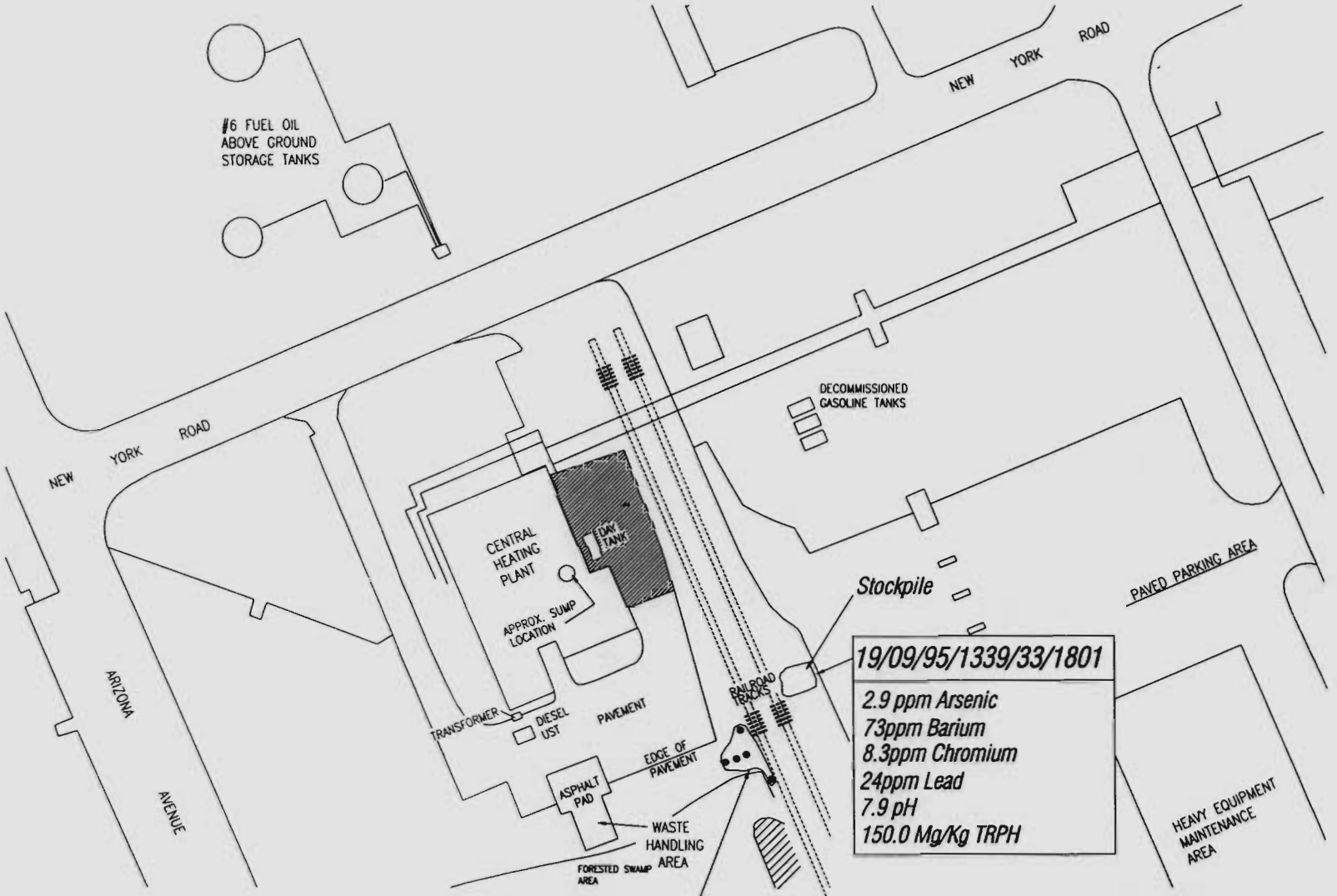

Figure 3-3
Plattsburgh AFB
Central Heating Plant
Excavation Sampling Locations/Results

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 16IC7002
Drawn By: L. Robertson Date: 03/06/96	Drawing File Name: CHPEX2.DWG

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Table 3.2.A
CHP EXCAVATION SAMPLING

TYPE	SAMPLE ID	RESULTS	QUALIFIER
soil	20/09/95/0906/33/1704	360 mg/kg	--

One composite analytical laboratory sample was collected from the stockpile of excavated soils from the CHP swale and analyzed for a profile analysis which consisted of the following parameters: PCBs, 8021 +MTBE, 8270, Reactivity, 418.1, and metals. The results are presented in Table 3.2.B and Figure 3-3.

Table 3.2.B
CHP STOCKPILE SOIL SAMPLING

TYPE	SAMPLE ID	METHOD	RESULTS	QUALIFIER
Soil	19/09/95/1139/33/1801	PCB	ND	--
Soil	19/09/95/1139/33/1801	pH	7.9	-
Soil	19/09/95/1139/33/1801	8021 + MTBE	ND	--
Soil	19/09/95/1139/33/1801	8270	ND	--
Soil	19/09/95/1139/33/1801	Reactivity	ND	--
Soil	19/09/95/1139/33/1801	Metals	2.9 mg/kg Arsenic	--
Soil	19/09/95/1139/33/1801		73 mg/kg Barium	--
Soil	19/09/95/1139/33/1801		8.3 mg/kg Chromium	--
Soil	19/09/95/1139/33/1801		24 mg/kg Lead	--
Soil	19/09/95/1139/33/1801	418.1	150 mg/kg	--

3.3 CONTAMINATION ASSESSMENT

Presented in the following sections are the analytical results associated with the contamination assessment for each IRP. Also, discussions are presented on background levels, detected contaminants, trend analysis, source, migration pathways, migration potential, and receptors

3.3.1 IRP 30 - BX Station Contamination Assessment

The analytical results associated with the BX Station are seperated by subsurface soil samples, groundwater samples, and storm drain samples. The results are spatialy located on the referenced figures and associated data qualifiers are reported in the analytical tables.

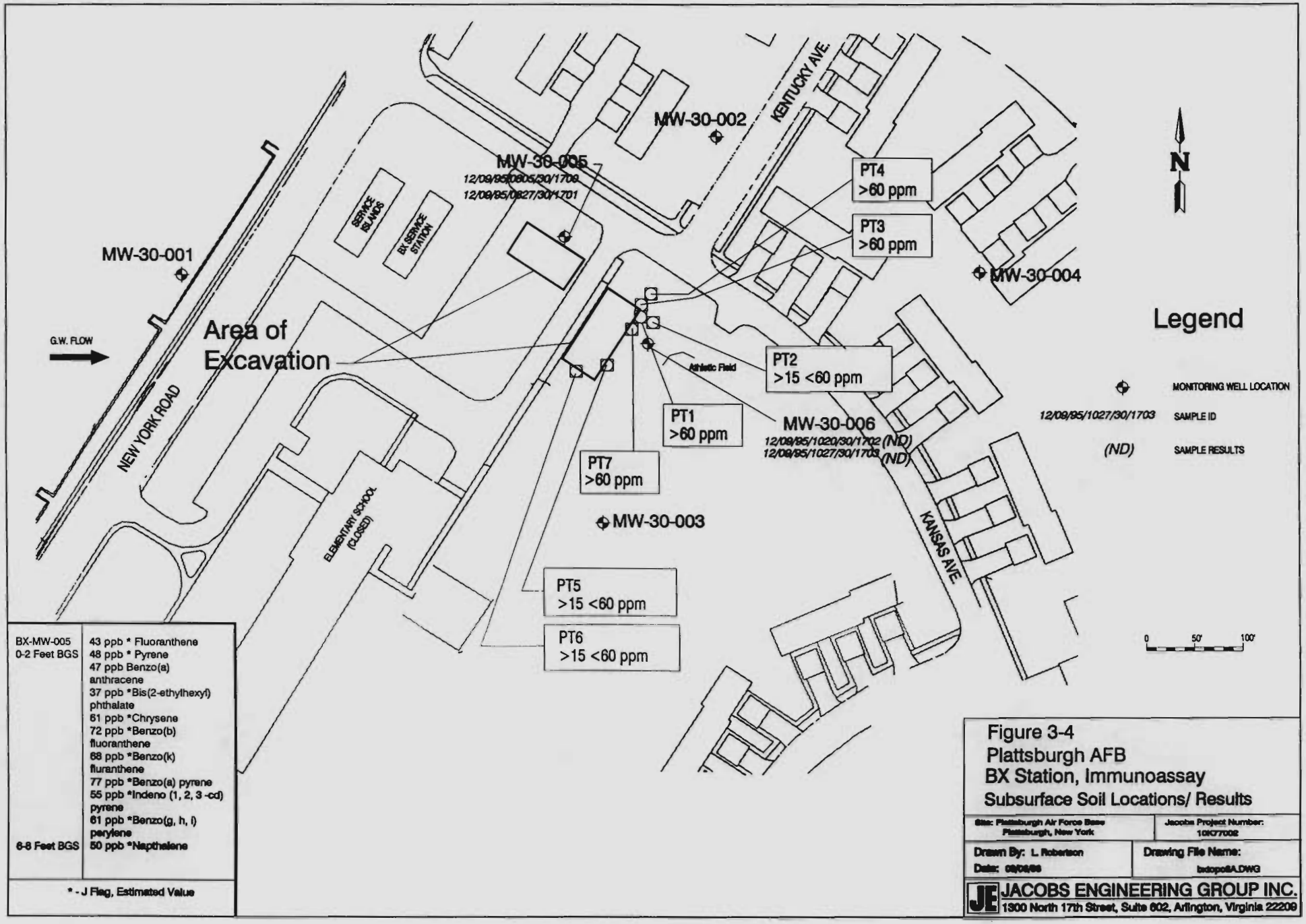
3.3.1.1 Subsurface Soil Samples

A total of four subsurface soil samples were collected during the installation of monitoring wells MW-030-005 and MW-030-006. These samples were analyzed for VOCs by method 8021 + MTBE and for Semi-VOCs by method 8270. The results are listed in Table 3.3.1.1.A and shown in Figure 3-4. Only samples 12/09/95/0805/30/1700 collected from the well boring for MW-030-005 at a depth of 0-2 feet and 12/09/95/0827/30/1701 collected at 6-8 feet showed appreciable levels of contamination. The compounds detected in the sample indicated contamination by semi-volatile organics. All other samples exhibited no detectable contamination by EPA Method EPA 8021 + MTBE and EPA Method 8270.

Table 3.3.1.1.A
BX SUBSURFACE SOIL SAMPLES FROM WELL BORINGS

WELL ID	SAMPLE ID	DEPTH	PARAMETER	CONCENTRATION (PPB)	QUALIFIER
MW-030-005	12/09/95/0805/30/1700	0 - 2	Fluoranthene	43	J
			Pyrene	48	J
			Benzo (a)anthracene	49	J
			Bis(2-ethylhexyl)phthalate	37	J
			Chrysene	61	J
			Benzo(b)fluoranthene	72	J
			Benzo(k)fluoranthene	68	J
			Benzo(a)pyrene	77	J
			Indeno(1,2,3-cd)pyrene	55	J
			Benzo (g,h,i)perylene	61	J
MW-030-005	12/09/95/0827/30/1701	6-8	Naphthalene	50	J
MW-030-006	12/09/95/1020/30/1702	0-2	8021 + MTBE/8270	ND	--
MW-030-006	12/09/95/1027/30/1703	4-6	8270 + MTBE/8270	ND	--

Also, subsurface soil assessment was completed at the BX-Station through field analysis of Total Petroleum Recoverable Hydrocarbons by immunoassay testing. The results are listed in the Table 3.3.1.1.A and shown in Figure 3-4. Sample PT1, PT3, PT4 and PT7 showed TPH concentrations to be above 60 ppm. Samples PT2 and PT6 exhibited TPH concentrations to be between 15 ppm and 60 ppm. Sample PT5 showed TPH concentration to be below 15 ppm.



BX-MW-005	43 ppb * Fluoranthene
0-2 Feet BGS	48 ppb * Pyrene
	47 ppb Benzo(a) anthracene
	37 ppb *Bis(2-ethylhexyl) phthalate
	61 ppb *Chrysene
	72 ppb *Benzo(b) fluoranthene
	68 ppb *Benzo(k) fluranthene
	77 ppb *Benzo(a) pyrene
	55 ppb *Indeno (1, 2, 3 -cd) pyrene
	61 ppb *Benzo(g, h, i) perylene
6-8 Feet BGS	50 ppb *Napthalene

* - J Flag, Estimated Value

Figure 3-4
Plattsburgh AFB
BX Station, Immunoassay
Subsurface Soil Locations/ Results

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10IC7002
Drawn By: L. Robertson Date: 09/06/96	Drawing File Name: bxlopo8A.DWG

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Table 3.3.1.1.B
BX SUBSURFACE SOIL FIELD IMMUNOASSAY RESULTS

SAMPLE IDENTIFIER	LOCATION	DEPTH BGS (FT)	RESULT
PT 1	2 Feet South of Southern Excavation	1.5	Above 60 ppm
PT 2	15 Feet South of Southern Excavation	1.5	Between 15 and 60 ppm
PT 3	2 Feet East of Southern Excavation	1.5	Above 60 ppm
PT 4	15 Feet East of Southern Excavation	1.5	Above 60 ppm
PT 5	2 Feet West of Southern Excavation	1.5	Under 15 ppm
PT 6	2 Feet South of Southern Excavation	1.5	Between 15 and 60 ppm
PT 7	2 Feet South of Southern Excavation	1.5	Above 60 ppm

3.3.1.2. Groundwater Sampling

The six monitoring wells at the BX Station were sampled for VOCs by EPA Method 8021 + MTBE and for Semi-VOCs by EPA Method 8270 by Jacobs and for VOCS by EPA Method 8021 and for Semi-VOCs by EPA Method 8270 by OHM. The sampling results are listed in Tables 3.3.1.2.C through 3.3.1.2.F and exhibited on Figure 3-5. The samples collected from MW-030-005 exhibited the highest level of contamination with MTBE at 7100 ppb during Jacobs sampling event. During OHM's sampling event, the sample collected from MW-030-005 exhibited the highest level of contamination with Benzene at 3900 ppb. Also, Total Xylenes, Ethylbenzene, 1,2,4-Trimethyl Benzene, Naphthalene and 2-Methyl-naphthalene were detected in this well during both sampling events. The sample collected from MW-030-004 exhibited the second highest levels of contamination with MTBE at 180 ppb. Benzene and Tri-chloroethylene were also detected in this well. MW-030-006 exhibited MTBE contamination at a concentration of 2.7 ppb during Jacobs sampling event. No contamination was detected in this well during OHM's sampling event. MW-030-002 exhibited low levels of contamination by MTBE, Benzene, and Bis(2-ethylhexyl)phthalate. MW-030-001 exhibits low levels of contamination of Tetrachlorethylene, Trichloroethylene, Xylenes, and Styrene during OHM's sampling. MW-030-003 didn't show any contamination during both sampling events.

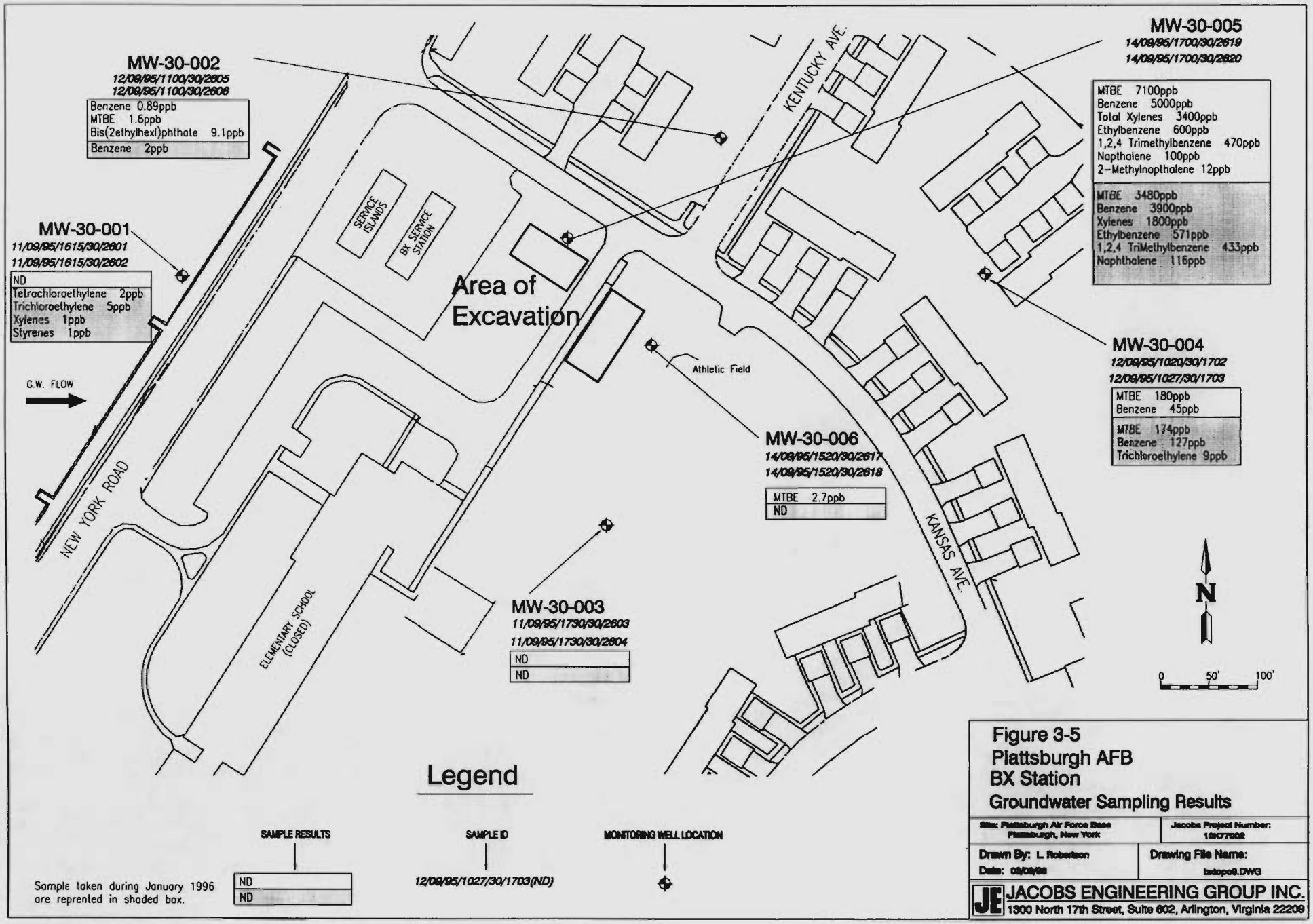

Figure 3-5
Plattsburgh AFB
BX Station
Groundwater Sampling Results

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 03/09/98	Drawing File Name: bxdpc9.DWG

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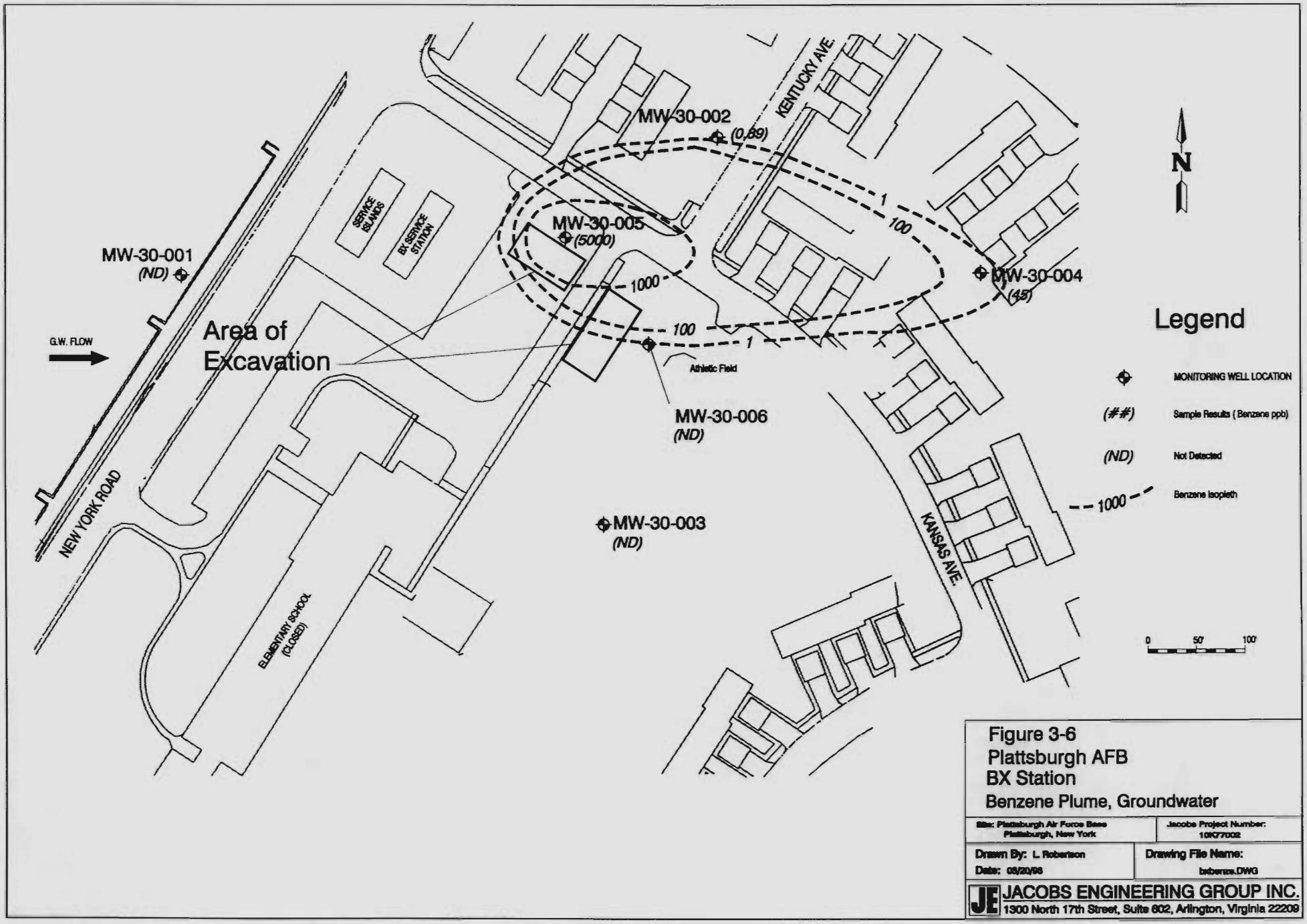
Analysis of the groundwater chemical results indicates the presence of a plume at the BX Station mainly consisting of MTBE and Benzene. MW-030-005 contains the highest level of contamination probably due to its close proximity to former sources of contamination. The plume appears to be migrating to the east following the groundwater flow direction determined at the BX Station . This is backed by the second highest levels of contamination were detected at MW-030-004 which is east of the MW-030-005. The boundaries of the plume appear to extend to the south to intersect MW-030-006 and to the northeast at MW-030-002 as shown in the low levels of MTBE and/or Benzene identified in these wells. Low levels of contamination were detected in MW-030-001, upgradient of the BX Station, and are potentially associated with a larger plume associated with the PAFB. The inferred benzene plume is shown in Figure 3-6 and the inferred MTBE plume is shown in Figure 3-7.

Table 3.3.1.2.C
RESULTS BY EPA METHOD 8021 + MTBE: JACOBS SAMPLING EVENT

PARAMETER (ppb)	MW-30-01	MW-30-02	MW-30-03	MW-30-04	MW-30-05	MW-30-06
MTBE	ND	1.6 J	ND	180	7100	2.7
Benzene	ND	0.89 J	ND	45	5000	ND
Toluene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	600	ND
Total xylenes	ND	ND	ND	ND	3400	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	470	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND


MW-30-002
(0.69)
KENTUCKY AVE.
MW-30-005
(5000)
MW-30-001
(ND)
SERVICE ISLANDS
BX SERVICE STATION
1000
100
1
MW-30-004
(45)
G.W. FLOW
Area of Excavation
Athletic Field
MW-30-006
(ND)
NEW YORK ROAD
MW-30-003
(ND)
KANSAS AVE.
ELEMENTARY SCHOOL (CLOSED)
N
Legend
MONITORING WELL LOCATION
(##) Sample Results (Benzene ppb)
(ND) Not Detected
1000 Benzene Isopleth
0 50' 100'
Figure 3-6
Plattsburgh AFB
BX Station
Benzene Plume, Groundwater
Site: Plattsburgh Air Force Base
Plattsburgh, New York
Jacobs Project Number:
10IG7002
Drawn By: L. Robertson
Date: 03/20/98
Drawing File Name:
bxbenzs.DWG
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1300 North 17th Street, Suite 602, Arlington, Virginia 22209

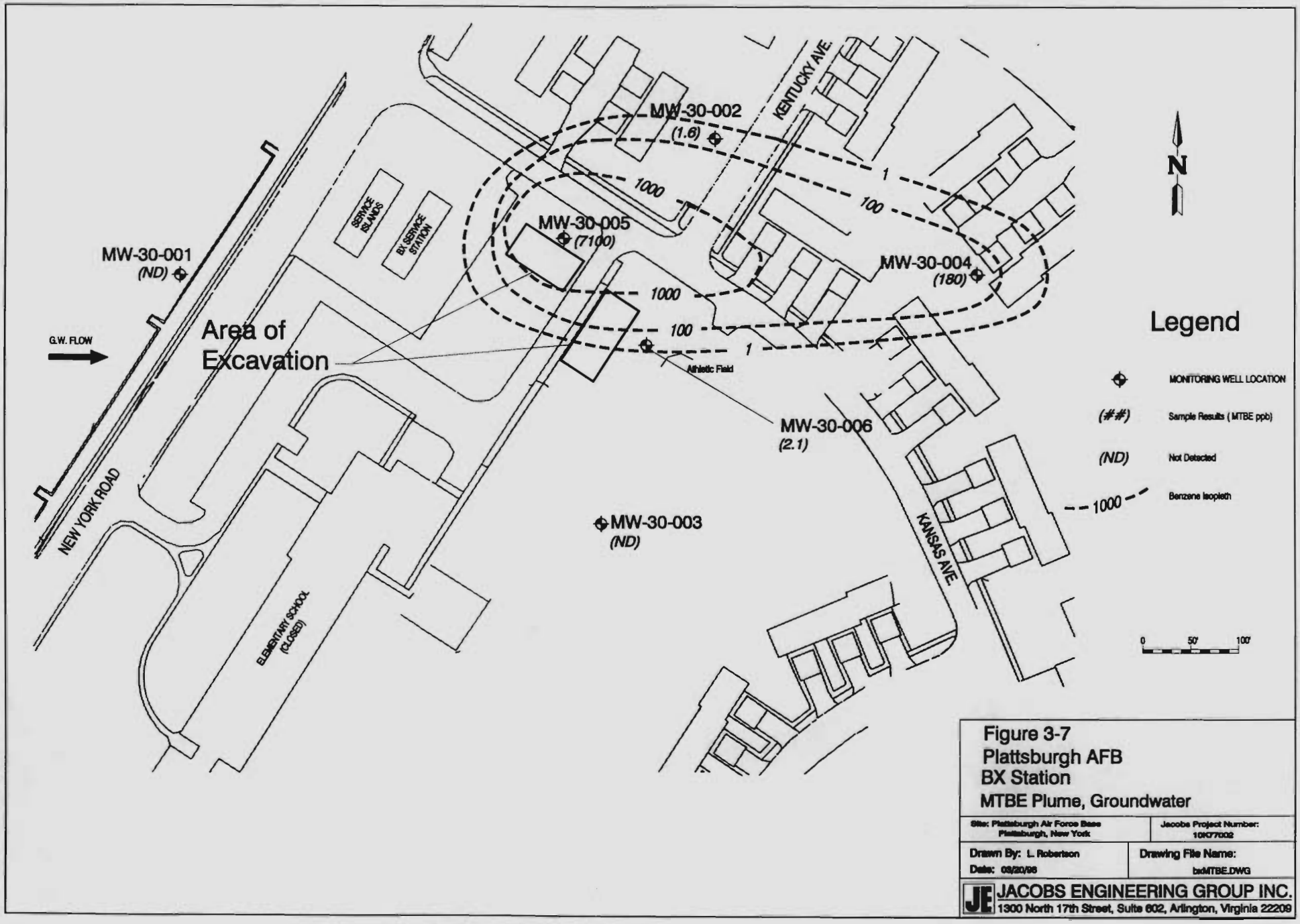
MW-30-002
(1.6)
KENTUCKY AVE.
1000
1
100
MW-30-005
(7100)
SERVICE ISLANDS
BX SERVICE STATION
MW-30-001
(ND)
MW-30-004
(180)
1000
100
1
G.W. FLOW
Area of Excavation
Athletic Field
MW-30-006
(2.1)
NEW YORK ROAD
MW-30-003
(ND)
KANSAS AVE
ELEMENTARY SCHOOL (CLOSED)
N
Legend
MONITORING WELL LOCATION
(##) Sample Results (MTBE ppb)
(ND) Not Detected
1000 Benzene Isopleth
0 50' 100'
Figure 3-7
Plattsburgh AFB
BX Station
MTBE Plume, Groundwater
Site: Plattsburgh Air Force Base
Plattsburgh, New York
Jacobs Project Number:
10IC7002
Drawn By: L. Robertson
Date: 03/20/06
Drawing File Name:
bxMTBE.DWG
JACOBS ENGINEERING GROUP INC.
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Table 3.3.1.2D
RESULTS BY EPA METHOD 8270: JACOBS SAMPLING EVENT

WELL ID	SAMPLE ID	PARAMETER	CONCENTRATION (ppb)	QUALIFIER
MW-030-001	11/09/95/1615/30/2602	8270	ND	--
MW-030-002	12/09/95/1100/30/2606	Bis(2ethylhexyl)phthalate	9.1	J
MW-030-003	11/09/95/1730/30/2604	8270	ND	--
MW-030-004	12/09/95/1345/30/2608	8270	ND	--
MW-030-005	14/09/95/1700/30/2620	Naphthalene	100	--
MW-030-005	14/09/95/1700/30/2620	2-methylnaphthalene	12	--
MW-030-006	14/09/95/1520/30/2618	8270	ND	--

Table 3.3.1.2 E
RESULTS BY EPA METHOD 8021: OHM SAMPLING EVENT

WELL ID	SAMPLE ID	PARAMETER	CONCENTRATION (PPB)	QUALIFIER
MW-030-001	MW2335-1	Tetrachlorethylene	2	--
MW-030-001	MW2335-1	Trichloroethylene	5	--
MW-030-001	MW2335-1	Xylenes	1	--
MW-030-001	MW2335-1	Styrene	1	--
MW-030-002	MW2335-2	Benzene	2	--
MW-030-003	MW2335-3	8021	ND	--
MW-030-004	MW2335-4	Trichloroethylene	9	--
MW-030-004	MW2335-4	Benzene	127	--
MW-030-004	MW2335-4	Tert-Butyl Methyl Ether	174	--
MW-030-005	MW2335-5	Benzene	3900	--
MW-030-005	MW2335-5	Ethylbenzene	571	--
MW-030-005	MW2335-5	Xylenes	1810	--
MW-030-005	MW2335-5	1,2,4-Trimethylbenzene	433	--
MW-030-005	MW2335-5	Naphthalene	116	--
MW-030-005	MW2335-5	Tert-Butyl methyl Ether	3480	--
MW-030-006	MW2335-6	ND		--

Table 3.3.1.2 F
RESULTS BY EPA METHOD 8270: OHM SAMPLING EVENT

WELL ID	SAMPLE ID	PARAMETER	CONCENTRATION (PPB)	QUALIFIER
MW-030-001	MW2335-1	8270	ND	--
MW-030-002	MW2335-2	8270	ND	--
MW-030-003	MW2335-3	8270	ND	--
MW-030-004	MW2335-4	8270	ND	--
MW-030-005	MW2335-5	Naphthalene	51	J
MW-030-005	MW2335-6	8270	ND	--

3.3.1.3 Storm Drain Sampling

A total of 10 samples were collected from the storm drain network of the BX Station. Jacobs collected 6 aqueous samples for analysis of TRPH by EPA Method 418.1, but two of these samples were broken during shipment. OHM collected 4 samples (2 aqueous and 2 solid) from this neetwork during January, 1996. The aqueous samples were analyzed for VOCs by EPA Method 8260 and the sediment samples were analyzed for TRPH by EPA Method 418.1. The results are listed in Table 3.3.1.3.A and Table 3.3.1.3.B and are exhibited on Figure 3-8.

Samples 19/09/95/1015/32/6102, 19/09/95/1030/32/6103, and 19/09/95/1045/32/6104 collected upgradient of the water flow in the network from the BX Station exhibited no contamination from Total Petroleum Hydrocarbons. Samples 14/09/95/1800/1307/SS, OHM32/6100S, and OHM32/6101S collected downgradient of the water flow from the BX Station exhibited petroleum hydrocarbon contamination of 1,110 mg/kg, 70.3 mg/kg, and 827 mg/kg, respectively. Aqueous sample OHM 32/6101 exhibits the highest contamination of this sampling event with Benzene at 49 ppb. Also detected in this sample was MTBE, Xylenes, Ethylbenzene, 1,2,4-Trimethylbenzene and Xylenes. Aqueous sample OHM32/6100 showed contamination by Benzene, MTBE and Xylenes. Analysis of the storm drain sampling indicates contamination is present in the drain system downgradient of the site potentially associated with sources at the BX Station and vehicular activity.

Table 3.3.1.3.A
BX STORM DRAIN RESULTS BY EPA METHOD 418.1

LOCATION FROM BX STATION	SAMPLE ID	MATRIX	PARAMETER	CONCENTRATION (MG/KG)	QUALIFIER
Downgradient	OHM32/6100S	solid	TRPH	70.3	--
Downgradient	OHM32/6101S	solid	TRPH	827	--
Downgradient	14/09/95/1800/1307/SS	aqueous	TRPH	1100	--
Upgradient	19/09/95/1015/32/6102	aqueous	TRPH	ND	--
Upgradient	19/09/95/1030/32/6103	aquious	TRPH	ND	--
Upgradient	19/09/95/1045/32/6104	aqueous	TRPH	ND	--

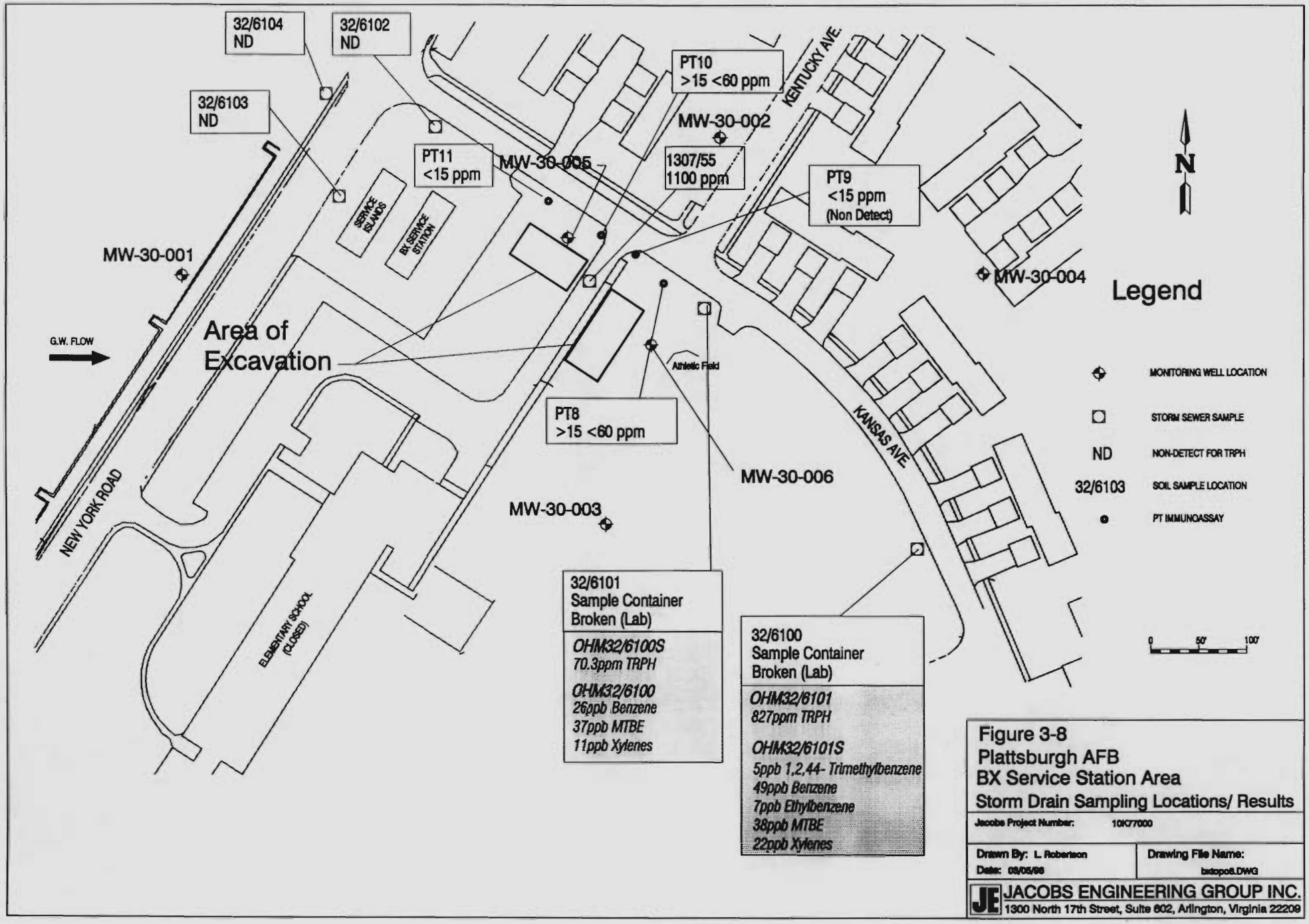

Figure 3-8
Plattsburgh AFB
BX Service Station Area
Storm Drain Sampling Locations/ Results

Jacobs Project Number: 10K77000

Drawn By: L. Robertson
Date: 03/05/98

Drawing File Name: bxdpo8.DWG

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Table 3.3.1.3.B
BX STORM DRAIN RESULTS BY EPA METHOD 8260

LOCATION FROM BX STATION	SAMPLE ID	MATRIX	PARAMETER	CONCENTRATION (PPB)	QUALIFIER
Downgradient	OHM32/6100	aqueous	Benzene	26	--
Downgradient	OHM32/6100	aqueous	MTBE	37	--
Downgradient	OHM32/6100	aqueous	Xylenes	11	--
Downgradient	OHM32/6101	aqueous	1,2,4-Trimethylbenzene	5	--
Downgradient	OHM32/6101	aqueous	Benzene	49	--
Downgradient	OHM32/6101	aqueous	Ethylbenzene	7	--
Downgradient	OHM32/6101	aqueous	MTBE	38	--
Downgradient	OHM32/6101	aqueous	Xylenes	22	--

Also, four soil samples were collected for immunoassay testing related to the assessment of the storm drain. The results are listed in Table 3.3.1.3.C and shown in Figure 3-8. The results indicate that TPH levels are between 15 and 60 ppm between Kansas Avenue and Southern excavation.

Table 3.3.1.3.C
STORM DRAIN RELATED SUBSURFACE SOIL SAMPLE IMMUNOASSAY INFORMATION

SAMPLE IDENTIFIER	COLLECTION LOCATION	DEPTH BGS (ft)	RESULT
PT 8	Storm drain area, 15 feet west of Kansas Ave., most southern collection, equal to south boundary southern excavation	1.5	> 15 ppm < 60 ppm
PT 9	Storm drain area, 5 feet west of Kansas Ave. even with southern excavation northern limit	1.5	> 15 ppm < 60 ppm
PT 10	Storm drain area, 6 feet west of Kansas Ave., even with southern excavation southern boundary	1.5	> 15 ppm < 60 ppm
PT 11	Storm drain area, 6 feet west of Kansas Ave., even with northern excavation northern boundary	1.5	> 15 ppm

3.4.1 Background Levels

Only one sample was identified as a background sample for the study area. MW-030-001 is located up-gradient of the BX Station contained contaminants listed in Table 3.1E through 3.1H. The contaminants detected include tetrachloroethylene, trichloroethylene, xylenes and styrene. All

concentrations were below equal or below 5 ppb and appear to be related to the base wide solvent plume, presently being investigating by URS.

3.4.2 Contaminants

The contaminants detected in the different media at the BX Station are listed below by specific media.

Groundwater

MTBE	1,2,4 TrimethylBenzene	Tetrachlorethylene
Benzene	Bis (2-ethylhexyl)phthalate	Styrene
Xylenes	Naphthalene	Trichloroethylene
Ethylbenzene		

Subsurface Soils

Fluoranthene	Chrysene	Benzo(g,h,i)perylene
Pyrene	Benzo(b)fluoranthene	Naphthalene
Benzo(a)anthracene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene
Bis 2-ethylhexyl)phthalate	Benzo(a)pyrene	Total Petroleum Hydrocarbons
2-Methlynaphthalene		

Storm Drain Sampling (Aqueous and solid)

Total Petroleum Hydrocarbons	Xylenes
Benzene	1,2,4-Trimethylbenzene
MTBE	

3.4.3 Trend Analysis

From analysis between Jacobs and OHM sampling events, the concentration of MTBE and Benzene decreased between events and no contamination was detected in MW-030-006 during OHM's sampling event.

3.4.4 Source

The BX Station was employed for vehicular fueling and repair. Potential sources of contamination associated with these activities include:

- 550 gallon steel UST for waste oil which was relocated to its present position along the south side of Bldg. 2335 during a renovation in the early mid-1960's.
- 550 gallon steel UST for waste oil located west of Bldg. 2335.
- A third steel UST, size unknown, used for No. 2 fuel oil was placed south of BX Station building during renovation in the early mid-1960's.
- Seven steel 3,000 gallon UST (six for gasoline and one for diesel fuel).
- Three 10,000 gallon fiberglass UST, storage unknown.
- Double-walled fiber reinforced plastic tanks, dispenser piping, and leak detection, size, number and contents unknown.
- Hydraulic lifts, daily operations, wash downs and floor drains.

3.4.5 Potential Pathways

Migration pathways are determined by the (1) physical characteristics of the site, (2) types and physicocharacteristics of contamination and their distribution, and (3) feasibility of contaminant transportation via identified release mechanisms to media that receptors might contact. Potential contact media at the BX Service Station are air, soil, groundwater, and surface water/sediment.

3.4.5.1 Soil Migration Pathway

The soils present at the BX Station consist of fine to medium grained sands with appreciable amounts of silt and fill material. Surface cover consists of asphalt paved and concrete covered areas associated with the parking lot and refueling areas, roadways, and landscaped areas south of the BX Station including the athletic field. Possible points of entry of contamination into the soil pathway consist of the raising and falling of contaminated groundwater into the vadose zone and contaminated runoff from activities at the BX Station. Migration pathways include the landscape

areas and the athletic field south of the BX Station from surface run-off and contaminated groundwater and soils underneath the roadways south and east of the BX Station from exposure to contaminated groundwater.

3.4.5.2 Groundwater Migration Pathway

Groundwater elevations at the BX Station range from 4.89 feet at MW-030-001 below ground to 1.29 feet below ground surface at the athletic field. Ground water flow is toward the southeast. Possible points of entry for contamination into this pathway include releases from storage vessels below the ground surface and infiltration of contaminated runoff from activities associated with the BX Station. Migration pathways include the dispersion of contaminants to the southeast following the hydraulic gradient, infiltration into the storm drain system south east of the BX Station, and discharge to the ground surface at the athletic field.

3.4.5.3 Surface Water Pathway

The preferential pathway of the surface water migration pathway at the BX Station consists of the storm water drain network. This system consists of underground pipes, collection areas, and manholes. The system employs gravity controlled flow for the movement of runoff and infiltration water. The flow is directed to the south and east in the network to the discharge point at Lake Champlain. Possible points of entry into this system consists of surficial runoff and groundwater infiltration. Migration pathways include; travel with the gravity flow of water, deposit of contamination in the network through absorption onto sediment, and leakage from the system during low flow periods along the network.

3.4.5.4 Air Migration Pathway

The average air speed is 5 knots. The predominant wind directions are north and southeast. Possible points of entry consist of volatilization of contaminants and wind blown contaminated material. Migration pathways consist of the areas above soil and groundwater contamination, including subterrian units of the residential housing.

3.4.6 Migration Potential

The ability of contamination to migrate through a pathway and affect receptors is dependent upon the fate and transport properties of the contaminant and pathway. The mechanisms for these properties affecting migration at the BX Station are listed as follows for respective pathways: groundwater, advection and dispersion; soil, groundwater infiltration, volatilization and erosion; surface water, bulk water gravity flow, dispersion, and volatilization; air volatilization and fugitive particle transport. The discussion on contamination migration at the BX Station shall focus on the major mechanism controlling migration in each pathway and the presence of contaminants present in each pathway.

3.4.6.1 Groundwater Potential

The major mechanisms controlling contamination migration consist of advection, in which contaminants follow groundwater flow lines dictated by hydraulic heads and dispersion, in which contaminants are spread laterally along flow lines but still follow the hydraulic gradient. The mechanism of advection is exhibited by the elevated concentrations of MTBE and benzene in ME-030-005 and MW-030-004 following the hydraulic gradient to the east. The process of dispersion is expressed by the low levels of contaminants detected in MW-030-006 and MW-030-002 which are cross-gradient of the main hydraulic gradient. Dispersion in the vertical gradient may occur to a small extent from analysis of naphthalene detected in MW-030-005 and the storage of diesel fuel at the BX Station. This compound and other dense non-aqueous phase liquids present as components of diesel fuel are expected to sink through the water column and reside on top of a clay layer. This migration pathway was not examined due to the absence of chemical results from deep wells at the BX Station.

3.4.6.2 Soil Potential

Absorption of contaminants from the raising water table is the major mechanism of contamination migration in this pathway. Low levels of semi-volatile compounds were detected in soil samples

from the well boring of MW-030-005 which is the closest well to the potential source and immunoassay testing indicated elevated levels of total petroleum hydrocarbons adjacent to the southern excavation. Infiltration of contaminants is not considered a major mechanism of migration due to location of sources under the ground surface, the impermeable nature of surface cover at the site, and the low organic carbon content of the soil which would allow contamination to not be absorbed into the soil matrix, but would flow directly to the groundwater. Volatilization is not considered a major mechanism of migration due to the low vapor pressure of contaminants in the groundwater and low organic content of the soil which would limit absorption into the soil matrix. Erosion is not considered a major mechanism of migration due to the impervious nature of the surface cover, parking lot, roadways, and grass.

3.4.6.3 Surface Water Potential

The major mechanism of contamination is the bulk gravity flow through the sewer network towards its discharge point of Lake Champlain. Dispersion may be a mechanism for removal of contaminants from this network where water is released to surrounding soils by leakage. Volatilization is not considered a major mechanism due to the low vapor pressure of contaminant present in this pathway. Contaminants detected in this pathway are similar to contaminants present in groundwater at the BX Station. Up-gradient samples need to be collected to verify the source of contamination.

3.4.6.4 Air Potential

Volatilization is the major mechanism of migration in this pathway, but would be limited by the low vapor pressure of contaminants present and lack of surficial contamination. The most viable routes for volatilization to occur would be the open excavation areas and where the water intersects the ground surface in the athletic field in which MTBE was found at low levels in the well and potential groundwater seepage into the subterranean compartments of residential housing. Emission of fugitive particles is not a major mechanism due to the lack of surficial contamination but can potentially occur in the open excavation areas.

3.4.7 Migration Receptors

The ability of a contaminant to effect a receptor is dictated by the presence of a contaminant at an exposure route of a receptor. Exposure routes for humans consist of dermal contact, consumption, and inhalation. Environment factors are effected by direct contact in these systems.

3.4.7.1 Groundwater Receptors

- Consumption is not a major exposure route because groundwater is not employed for potable purposes.
- Dermal contact through exposure to exposed groundwater at the ground surface near the ballfield, during earth-moving activities, and groundwater seepage into residential housing.

3.4.7.2 Soil Receptors

- Consumption during earth-moving activities.
- Dermal contact during earth-moving activities.

3.4.7.3 Surface Water Receptors

- Consumption not considered a major exposure route but potentially could occur at discharge point of Lake Champlain.
- Dermal contact through individual working on the sewer network or earth-moving activities affecting the sewer network.

3.4.7.4 Air Receptors

- Inhalation at the athletic field and basements of residential housing.

3.5.1 IRP 31- CHP Contamination Assessment

The analytical results associated with the CHP are seperated by subsurface soil samples and groundwater samples. Sampling of the storm drain network in the CHP area was not completed

during this investigation. The results are spatially located on the referenced figures and associated data qualifiers are reported in the analytical tables.

3.5.1.1 CHP Subsurface Soil Samples

A total of three subsurface soil samples were collected at the CHP site during the installation of MW-031-005. The results are listed in Table 3.5.1.1.A and exhibited in Figure 3-9. All samples exhibited non-detection for the analysis completed.

Table 3.5.1.1.A
CHP WELL BORING SAMPLING RESULTS

SPECIFIC LOCATION	DEPTH SAMPLE COLLECTED	SAMPLE ID #:	RESULTS	ANALYSIS
MW-031-005	0-2	12/09/95/1327/31/1704	ND	8021 + MTBE & 8270
MW-031-005	9-11	12/09/95/1342/31/1705	ND	8021 + MTBE & 8270
MW-031-005	9-11 duplicate	12/09/95/1342/31/1000	ND	8021 + MTBE & 8270

3.5.1.2 CHP Groundwater Sampling Results

A total of six monitoring wells were sampled at the CHP for VOCs by EPA Method 8021 + MTBE and for Semi-VOCs by EPA Method 8270. Table 3.5.1.2.A presents the results and they are exhibited on Figure 3-10.

Table 3.5.1.2.A
CHP GROUNDWATER SAMPLING RESULTS

TYPE	SAMPLE ID	LOCATION	METHOD	RESULTS	QUALIFIER
water	12/09/95/1655/31/2609	MW-031-01	8021 +MTBE	2.1 ppb phenol	J
water	12/09/95/1655/31/2610	MW-031-01	8270	ND	--
water	13/09/95/1030/31/2611	MW-031-02	8021 +MTBE	ND	--
water	13/09/95/1030/31/2612	MW-031-02	8270	ND	--
water	13/09/95/1030/31/2613	MW-031-03	8021 +MTBE	ND	--
water	13/09/95/1030/31/2614	MW-031-03	8270	ND	--
water	14/09/95/1030/31/2615	MW-031-04	8021 +MTBE	ND	--
water	14/09/95/1030/31/2616	MW-031-04	8270	ND	--
water	15/09/95/0930/31/2621	MW-031-05	8021 +MTBE	ND	--
water	15/09/95/0930/31/2622	MW-031-05	8270	ND	--
water	15/09/95/1030/31/2623	MW-031-06	8021 +MTBE	ND	--
water	15/09/95/1030/31/2624	MW-031-06	8270	ND	--

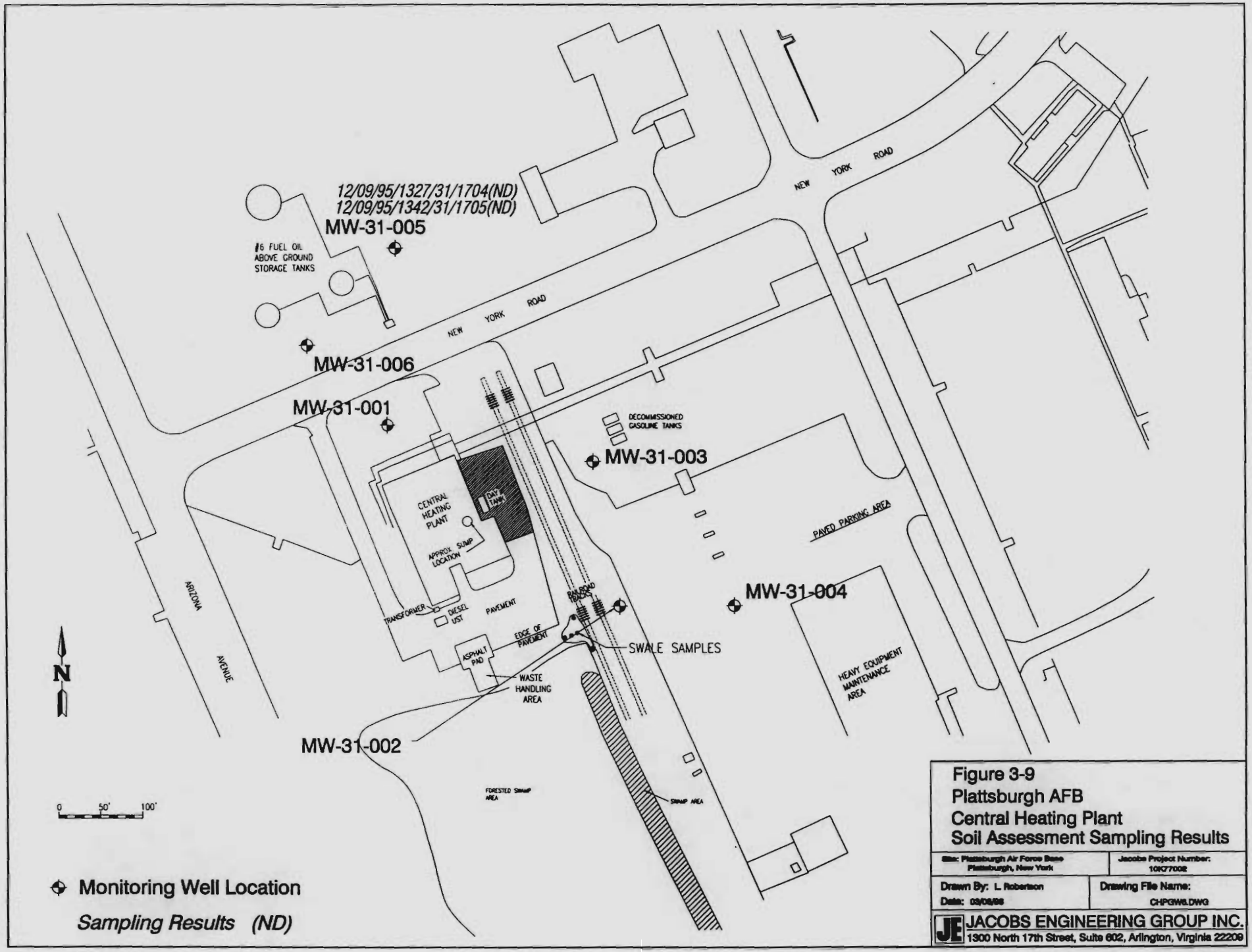

Figure 3-9
Plattsburgh AFB
Central Heating Plant
Soil Assessment Sampling Results

Site: Plattsburgh Air Force Base, Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson	Drawing File Name: CHPGW6.DWG
Date: 03/08/96	

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1300 North 17th Street, Suite 602, Arlington, Virginia 22209

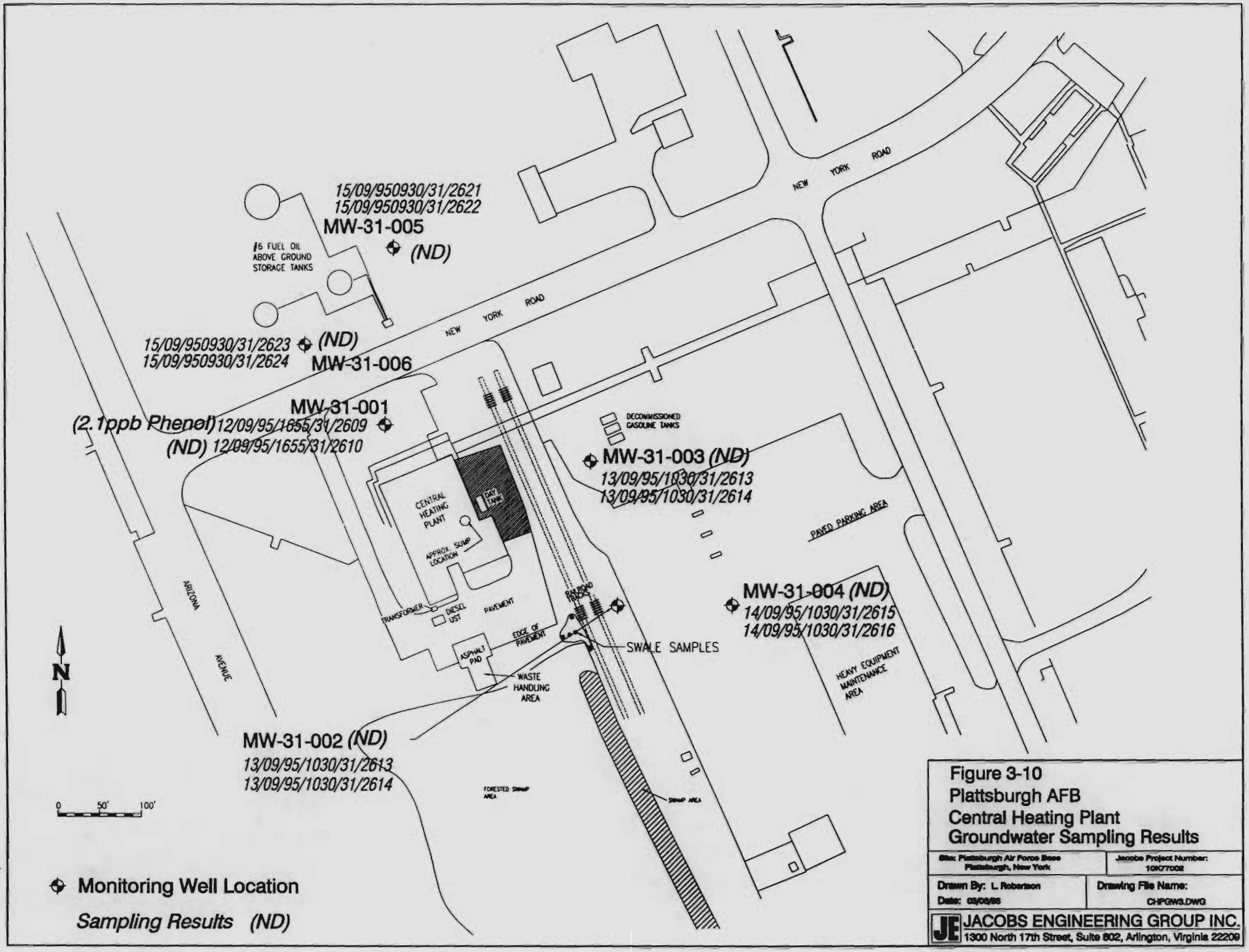

Figure 3-10
Plattsburgh AFB
Central Heating Plant
Groundwater Sampling Results

Site: Plattsburgh Air Force Base Plattsburgh, New York	Jacobs Project Number: 10K77002
Drawn By: L. Robertson Date: 03/06/96	Drawing File Name: CHPGW3.DWG

JACOBS ENGINEERING GROUP INC.
1300 North 17th Street, Suite 602, Arlington, Virginia 22209

3.6.1 Background Levels

A background soil sample, SS10-09, was utilized for comparison and is located in the mixed hardwoods southwest of the CHP swale excavation and collected at a depth of 2.5 to 3.0 feet. The sample was collected during a Remedial Investigation of the Heavy Equipment Maintenance Facility by URS Consultants, Inc. The results are listed in the Table 3.6.1A below and compared to the Jacobs analytical sample collected from the stockpiled soil from the CHP excavation.. The comparison indicates that elevated metal concentrations are present in the CHP swale.

Table 3.6.1A
CHP BACKGROUND COMPARISON

PARAMETER (mg/kg)	SS10-09 Background	JACOBS 19/09/95/1139/33/1801
Arsenic	0.23	2.9
Barium	7.5	73.0
Chromium	2.0	8.3
Lead	6.0	24.0

In comparison to metal analysis completed on the stockpiled excavation soil from the CHP swale excavation, the stockpiled soil samples exhibited elevated concentrations of contaminants than to the parameters detected in the background samples.

3.6.2 Contaminants

Soil

Total Petroleum Hydrocarbons

Arsenic, Barium, Chromium, Lead

Groundwater

Phenol

3.6.3 Trend Analysis

No trend analysis was completed due to a lack of sampling events.

3.6.4 Source

- Two 130,000 gallon AST for No. 6 fuel oil
- One 420,000 gallon AST for No. 6 fuel oil
- One 20,000 gallon UST for No. 6 fuel oil
- One 1,000 (KV) electrical substation, non PCB oils
- Day tank, Refueling Operations, and rail cars.

3.6.5 Migration Pathways

Migration pathways are determined by the (1) physical characteristics of the site, (2) types and physiocharacteristics of contamination and their distribution, and (3) feasibility of contaminant transportation via identified release mechanisms to media that receptors might contact. Potential contact media at the IRP 31 is soil.

3.6.5.1 Soil Migration Pathway

Soils present at the CHP consist mainly of fine to medium grained sand with appreciable amounts of silt and fill material. Surficial cover consists of paved parking lot, roadways, grass, and forested wetlands. Possible points of entry include infiltration of contaminated runoff.

3.6.6 Migration Potential

The ability of a contaminant to migrate through a pathway and affect receptors is dependent upon the fate and transport properties of the contaminant and pathway. The mechanisms for these properties affecting migration at the CHP are listed as follows for respective pathways: soil, infiltration and erosion, and surface water/sediment, bulk water flow, dispersion and volatilization. The discussion on contamination migration at the IRP 31 shall focus on the major mechanisms controlling migration in each pathway and the presence of contaminants in each pathway.

3.6.6.1 Soil Potential

Absorption of contaminants is the major mechanism for migration in this pathway and consist of metals bonded to the soil matrix. Low levels of Total Petroleum Hydrocarbons were detected in samples collected in the swale excavation. PCBs, volatile organic compounds, and semi-volatile organic compounds were not detected in a composite sample collected from excavated soils.

3.6.7 Migration Receptors

3.6.7.1 Soil

- Individuals near the swale excavated area during earth moving activities.
- Wetlands located downgradient of the CHP swale excavations

4.0 CONCLUSIONS

4.1 BX STATION EXCAVATIONS

The one sample which exhibited TRPH contamination of .530 mg/kg was collected from the northern wall of the northern excavation closest to the asphalt paved parking lot. Due to the removal actions currently being completed on the BX Station and the non-detection of TRPH in other associated BX Station excavation samples, it is recommended that excavation be completed at the BX Station and the open excavations be backfilled with clean approved soil and surface cover returned to it's nature state.

4.2 BX STATION SUBSURFACE SOILS

The majority of contamination was detected in subsurface soil samples collected at a depth of 0-2 feet BGS from MW-030-005. Minor contamination was detected in a sample collected at a depth of 6-8 feet BGS from MW-030-005, and in a few field immunoassay samples. Due to the low levels of contamination present and removal of the source at the BX Station, no further action should be required on the BX Station subsurface soils.

4.3 BX STATION GROUNDWATER

A plume of benzene and MTBE has been identified in the groundwater at this site along with other petroleum compounds that were detected in MW-030-005. Due to the removal of the source at the BX Station and the natural attenuation of the detected compounds, it is recommended that quarterly sampling be completed to verify the effectiveness of the source removal action and the practicability of natural degradation.

4.4 BX STORM DRAIN

Elevated concentrations of benzene, MTBE, and other petroleum related compounds were detected from the storm drain network downgradient of the BX Station. Due to its presence as a preferential flow path for contaminated groundwater, it is recommended that sampling be completed upgradient of the BX Station to verify it as the source of contamination and quarterly in

conjunction with the groundwater sampling to verify the effectiveness of the source removal action and the practicability of natural degradation.

4.5 CHP

No further action is recommended at the CHP due to the low levels of contaminant detected.

REFERENCES

1. Heavy Equipment Maintenance Facility (SS-010), Draft Remedial Investigation Report, Plattsburgh Air Force Base Installation Restoration Program, URS Consultants, Inc., July, 1994.

2. Interim Analytical Data, United States Air Force Center for Environmental Excellence, Jacobs Engineering Group Inc., October, 1995.

3. Final Informal Technical Information Report, United States Air Force Center for Environmental Excellence, Jacobs Engineering Group Inc., January, 1995.

4. STARS Memo No. 1, Petrolrum-Contaminated Soil Guidance Policy, New York State Department of Environmental Conservation, Division of Construction Management, Bureau of Spill Prevention and Response, August, 1992.