MALCOLM PIRNIE

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REMEDIAL DESIGN ENGINEERING REPORT

ROCHESTER FIRE TRAINING ACADEMY ROCHESTER, NEW YORK

JANUARY 1994

MALCOLM PIRNIE, INC.

S-3515 Abbott Road
P. O. Box 1938
Buffalo, New York 14219

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Engineering Report

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ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

LIST OF TABLES

TABLE OF CONTENTS (continued)

LIST OF TABLES (Continued)

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 PURPOSE AND ORGANIZATION OF THE REPORT

The purpose of this Engineering Design Report is to provide greater detail to the conceptual remedial design presented in the Feasibility Study and Record of Decision (ROD) in conjunction with the design plans and specifications. Specifically, this report has been prepared to describe the means for executing and coordinating the various phases of remediation at the Rochester Fire Academy site; provide minimum performance and operating requirements of the various remedial treatment technologies to be utilized at the site; and present the verification sampling plan for each environmental medium of concern. This report consists of ten (10) sections. Section 1 presents a summary of the site background and defines the goals of the report. A brief discussion of the remaining Sections is as follows:

- Section 2 presents the results of pre-design soil sampling undertaken during May and July 1993 to further define the physical and chemical characteristics of the South Disposal Area and Training Grounds Area soils, respectively.
- Section 3 presents a summary of the existing utilities and training facilities at the site and the related modifications which will be undertaken in support of the remediation.
- Section 4 presents a description of the site preparations which will be conducted prior to remediation.
- Section 5 presents the excavation and remediation plans for soils in the South Disposal Area, Genesee Valley Park Area and Training Grounds Areas.
- Section 6 describes closure and restoration of the remediated areas. Verification sampling plans are also presented for each of these areas.
- Section 7 presents the conceptual design and operation of the South Disposal Area groundwater collection and treatment system.
- Section 8 presents the responsibilities of the City of Rochester and the contractor for obtaining the permits necessary for the remedial construction.

- Section 9 identifies the format of the contract documents and describes the bid/award process.
- Section 10 presents the remedial design construction schedule for the site.

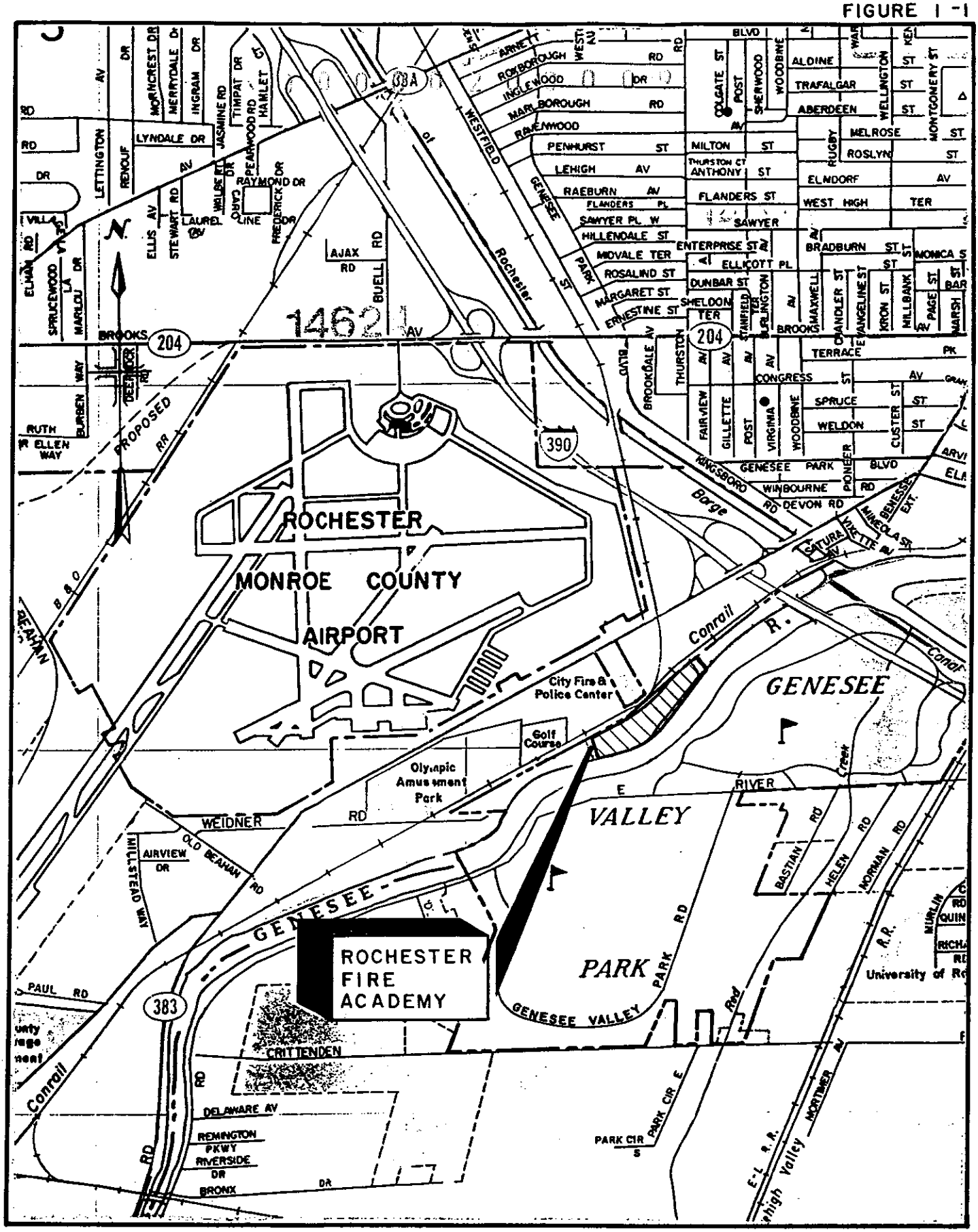
1.2 SITE HISTORY

The Rochester Fire Training Academy (the Fire Academy), illustrated on Figures 1-1 and 1-2, has been owned and operated by the City of Rochester as a training facility used by the City's Fire and Police Departments since its inception in 1954. Prior to 1954, the area was undeveloped park land. During the period from approximately 1954 through 1980, the Fire Academy accepted flammable liquids from local industries and other sources for training activities. No records were kept on materials accepted by the Fire Department for burning practices. On-site personnel indicated that solvents, paint thinners and other organic chemicals in addition to metallic residue sludge-like materials were burned and/or disposed of at the Training Grounds and North and South Disposal Areas.

The history and results of investigative activities at the site can be found in the following reports:

- Empire Soils Investigations, 1981.
- Engineering Investigations at Inactive Hazardous Waste Site in the State of New York, Phase I Investigation, Rochester Fire Academy, Recra Research, Inc., 1983.
- Engineering Investigations at Inactive Hazardous Waste Sites in the State of New York, Phase II Investigation, Rochester Fire Academy, Recra Research, Inc., 1985.
- Remedial Investigation for the Rochester Fire Academy Site - Results of Preliminary Surveys, Malcolm Pirnie, Inc., February 1990.
- Remedial Investigation Report for the Rochester Fire Academy Site, Malcolm Pirnie, Inc., May 1991.
- Interim Remedial Measures (IRM) Phase II Design Concept Report, Malcolm Pirnie, Inc., February 1992.
- Supplemental Remedial Investigation Report for the Rochester Fire Academy Site, Malcolm Pirnie, Inc., May 1992.

FIGURE 1-1



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ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT
SITE LOCATION MAP

CITY OF ROCHESTER, NEW YORK

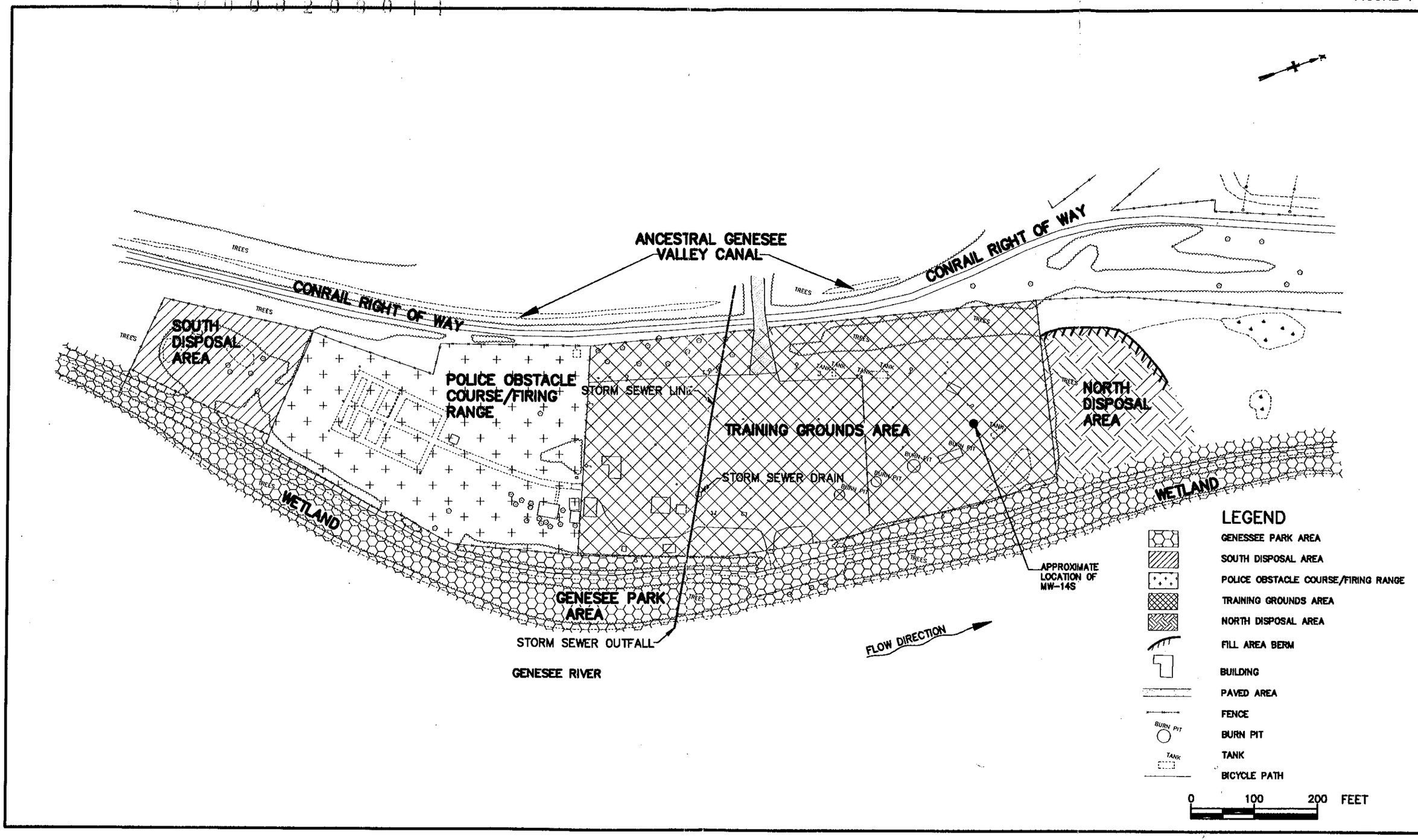
MAY 1993

- Feasibility Study for the Rochester Fire Academy Site, Malcolm Pirnie, Inc., February 1993.
- Record of Decision, Rochester Fire Academy, Monroe County, New York, Site Number 828015, New York State Department of Environmental Conservation, March 1993.
- Draft Technical Report for Adjacent Property Owners, Malcolm Pirnie, Inc., April 1993.
- Closure Report, Interim Remedial Measures, Rochester Fire Academy Site, Malcolm Pirnie, Inc., July 1993.

1.3 SITE LOCATION AND DESCRIPTION

The Fire Academy Site is a 21-acre tract of land used as a training facility by the City of Rochester Fire and Police Departments. The site is located on the west bank of the Genesee River at 1190 Scottsville Road in the City of Rochester, Monroe County, New York (Figure 1-1). The Fire Academy site is bordered to the northwest by the former Genesee Valley Canal and the former Consolidated Railroad (ConRail) right-of-way (Figure 1-2). A 75- to 125-foot wide portion of the City of Rochester's Genesee Valley Park is located between the river bank and the eastern edge of the Fire Academy site and includes a paved bicycle path which extends along the entire eastern edge of the site. The park is heavily wooded with marshy areas. The associated bicycle path terminates approximately 300 feet Southeast of the site. The park encompasses a narrow New York State Department of Environmental Conservation (NYSDEC) designated wetland between the bicycle path and the west bank of the Genesee River as illustrated on Figure 1-2. The City of Rochester has erected a 7-foot high chain-link fence around the perimeter of the Fire Academy site, including a portion of the Genesee Valley Park adjacent to the site, so that the site is not presently accessible to the public. The nearest residence is located approximately 1/4 mile Southeast of the site. Descriptions of the nature and extent of contamination at the site can be found in the Remedial Investigation and Supplemental Remedial Investigation Reports (Malcolm Pirnie, Inc., 1991 and 1992).

FIGURE 1-2



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ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT
SPECIFIC AREAS AT ACADEMY SITE

CITY OF ROCHESTER, NEW YORK MAY 1993

1.3.1 Subareas of the Site

The Fire Academy Site consists of four distinct areas, the North Disposal Area (NDA), the South Disposal Area (SDA), the Training Grounds Area (TGA) and the Police Obstacle Course and Firing Range (PFR). Three of these areas have been involved with chemical use and disposal, the NDA, TGA, and SDA, which are 3.0, 5.4 and 0.8 acres in size, respectively. The remaining area, the PFR, and two adjacent off-site areas included in the Remedial Investigation study area, the Genesee Valley Park (GVP) and the Genesee Valley Canal, are not believed to have been associated with historical dumping of potentially hazardous wastes.

1.3.1.1 North Disposal Area

The NDA is generally flat and overgrown with small trees and underbrush. Although the NDA is approximately 3.0 acres in size, only approximately 1.0 acre (adjacent to the TGA) is associated with past disposal of construction and demolition (C&D) debris. This portion of the NDA is delineated on Figure 1-2 with cross-hatching. Drums placed in this area were apparently crushed and buried using heavy construction equipment. A discontinuous layer of coarse-textured soil, foundry sand, refractory bricks, and miscellaneous debris covers the C&D materials. Drum fragments are visible at the face of the existing berm along the north-northwest edge of the fill area. The remainder of the NDA is heavily wooded, with localized areas of seasonally ponded water.

1.3.1.2 Training Grounds Area

The TGA encompasses approximately 5.4 acres. A large portion of the TGA has been and continues to be used for fire fighting training exercises involving the controlled burning of a variety of fuels. The north end of the TGA is occupied by burn pits, which in the past were supplied with fuel from storage tanks via an underground fuel transmission line. This practice has been abandoned, and the fuel storage tanks have been decommissioned with the underground pipe remaining. The central portion of the TGA is open and unoccupied. The southern portion of the TGA is occupied by structures used for burning during fire training exercises. Approximately three inches of coarse, angular gravel overlies a 0.3-foot to 2-foot thick layer of very dense, silty gravel-fill in the TGA. Underlying the silty gravel-fill is native clayey silt or native silty sand.

1.3.1.3 South Disposal Area

The SDA is located in the southwest corner of the site. Drummed and uncontained wastes were disposed of in this area. Approximately 0.6 acres of the SDA were formerly used for the open air incineration of waste materials, which generated waste incineration residue (cinders, ash, and non-combustible waste such as glass, nails, springs, and wire). The incineration residue is approximately 1 to 3 feet in depth and covers an irregular area approximately 120 feet in length by 120 feet in width. Reworked soil material, which was previously excavated from within the SDA, has been placed in piles around the incineration residue. The extent of the incineration residue and reworked soil are discussed in greater detail in Section 5.2.1. A number of drums were previously removed from this area resulting in several depressions which seasonally pond with water.

1.4 REMEDIAL ACTION PLAN

1.4.1 Objective

The overall objective of the remediation of the Rochester Fire Academy site is to reduce the concentrations of contaminants and the routes of exposure to levels which are protective of human health and the environment. The site-specific goals for remediating the site can be summarized in general as follows:

- Reduce, control, or eliminate the contamination present within the soils on-site.
- Eliminate the threat to surface waters by eliminating any future contaminated surface runoff from the contaminated soils on-site.
- Eliminate the potential for direct human or animal contact with the contaminated soils on-site.
- Mitigate the impacts of contaminated groundwater to the environment.

1.4.2 Clean-Up Goals

The clean-up goals for the soil contaminants of concern are presented in Table 1-1. Groundwater cleanup goals are NYSDEC groundwater standards (see Appendix A).

TABLE 1-1

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

SOIL CLEAN-UP GOALS

Parameter	Clean-Up Goal (mg/kg)
PCBs	1[1] (surficial) / 10 (subsurface)
Lead	250
Cadmium	10
Total Volatile Organic Compounds	10
Total Semi-Volatile Compounds	500[2]
2-methylnaphthalene	50[3]
Phenanthrene	50[3]
Anthracene	50[3]
Di-n-butylphthalate	19.4
Fluoranthene	50[3]
Pyrene	50[3]
Butylbenzyl phthalate	50[3]
Chrysene	1
Bis(2-ethylhexyl)phthalate	50[3]
Benzo(b)fluoranthene	2.6
Benzo(k)fluoranthene	2.6
Benzo(a)pyrene	26.4
Naphthalene	31.2
Diethylphthalate	17.0
Fluorene	50[3]
3,3'-Dichlorobenzidene	N/A[4]
Benzo(a)anthracene	7.2
Ideno(1,2,3-cd)pyrene	7.7
Benzo(g,h,i)perylene	50[3]
Phenol	0.07
Acenaphthylene	50[3]
3-nitroaniline	1.2
4-chlorophenyl-phenylether	N/A

NOTES:
(1) "Surficial" is defined by the New York State Department of Health as the upper one foot of soil.
(2) SVOC clean-up goals are calculated for individual compounds based on NYSDEC TAGM HWR-92-4046 dated November 11, 1992. Total SVOC cleanup goal is 500 mg/kg.
(3) The calculated goal is higher than shown. 50 mg/kg is the maximum allowable cleanup goal for any individual SVOC compound.
(4) N/A = No cleanup goal published in TAGM HWR-92-4046.

1.4.3 Remedial Action Plan Summary

The selected remedial action plan as stated in the NYSDEC's Administrative Record of Decision (ROD) for the Rochester Fire Academy site is presented below. The remedial measures to be implemented include:

South Disposal Area Soils:
Soils containing total volatile organic compounds (VOCs), PCBs or cadmium equal to or above 10 mg/kg will be excavated, as will soils containing lead contamination equal to or above 250 mg/kg. Excavated soils will be conditioned (i.e., tilled or worked) within the confines of a containment shelter until leachable VOC concentrations meet the toxicity characteristic limits for VOCs specified in 40 CFR Part 261, total VOCs are less than 10 mg/kg and until moisture content and particle size requirements for solidification/stabilization (if necessary) are achieved. The volatile organic-contaminated emissions generated from the soil conditioning will be contained within the shelter and the emissions will undergo thermal or catalytic oxidation to achieve the New York State 6NYCRR Part 212 requirements as well as New York State air Action Limits presented in the Division of Air Resources "Air Cleanup Criteria" (NYSDEC, May 1991) (see Appendix B) at the site perimeter. Excavated soils having PCB contamination less than 10 mg/kg and lead contamination less than 250 mg/kg will be placed in the NDA following conditioning to the VOC limits specified above. Excavated soils having PCB concentrations greater than or equal to 10 but less than 50 mg/kg and/or lead contamination greater than or equal to 250 mg/kg will undergo solidification/stabilization (following conditioning) such that leachable lead and leachable cadmium in the solidified mass will meet the toxicity characteristic limit specified in 40 CFR Part 261. The solidified mass will be relocated to the NDA. Excavated soils having PCB concentrations equal to or above 50 mg/kg will be disposed off-site in a secure landfill. Excavated materials with PCB concentrations greater than or equal to 50 mg/kg may also contain other constituents which may, under federal or state regulations, necessitate treatment prior to disposal. The solidified material will be analyzed as required by the off-site disposal facility.

Genesee Valley Park Soils
Soils in the GVP immediately adjacent to the SDA will be handled in the same manner as SDA soils. Remaining soils containing surficial PCB contamination equal to or above 1 mg/kg, or subsurface PCB contamination greater than 10 mg/kg will be excavated, as will soils containing cadmium equal to or above 10 mg/kg. These soils will be hauled to the NDA, where they will be placed beneath the synthetic/soil cover system.

North Disposal Area Soils
The NDA will be cleared and grubbed, and fill (including excavated GVP, SDA and TGA soils) will be placed and compacted in the NDA to achieve at least a 4% grade. A composite synthetic/soil cover system will be placed over the NDA consisting of a 6-inch layer of sand, followed by a 40 mil HDPE synthetic membrane,

a geocomposite drainage layer, 24 inches of barrier soil and 6 inches of seeded topsoil. Institutional controls including deed restrictions and security fencing will also be implemented.

Training Grounds Area Soils

Soils containing total VOCs, PCBs or cadmium equal to or above 10 mg/kg will be excavated, as will soils containing lead contamination equal to or above 250 mg/kg. VOC-contaminated soils (primarily in the vicinity of monitoring well MW-14S) will be hauled to the SDA and conditioned within the confines of the containment shelter until leachable VOC concentrations meet the toxicity characteristic limits specified in 40 CFR Part 261 and total VOCs are less than 10 mg/kg. Excavated soils having PCB concentrations greater than or equal to 10 but less than 50 mg/kg and/or lead contamination greater than or equal to 250 mg/kg will undergo solidification/stabilization such that leachable lead and leachable cadmium in the solidified mass will meet the toxicity characteristic limits for lead and cadmium specified in 40 CFR Part 261 and total VOCs are less than 10 mg/kg. The solidified mass will be placed in the NDA. Excavated soils having PCB concentrations equal to or above 50 mg/kg will be disposed off-site in a secure landfill, and will be analyzed as required by the off-site disposal facility. Excavated materials with PCB concentrations greater than or equal to 50 mg/kg may also contain other constituents which may, under federal or state regulations, necessitate treatment prior to disposal. The TGA will be filled, graded and covered with asphalt to facilitate future use of the area for training purposes.

South Disposal Area Groundwater

Overburden groundwater in the SDA will be collected and treated by air stripping. Prior to SDA soils remediation, a 200-foot long groundwater collection trench will be installed in the SDA to a depth of 22 feet below grade. The groundwater will enter a treatment train which will include filtration and iron/hardness treatment with a sequestering agent (to prevent fouling) followed by air stripping and post-treatment with activated carbon.

2.0 PRE-DESIGN SOIL SAMPLING

2.1 PURPOSE AND SCOPE

As identified in Section 1.4, the NYSDEC's Record of Decision (ROD) for the Rochester Fire Academy site specifies excavation with treatment and/or disposal of contaminated soils in the TGA and the SDA and groundwater collection and treatment in the SDA. Although sufficient data on the nature and extent of contamination and physical properties of the soils were collected during the various phases of the Remedial Investigation (RI) to develop a conceptual remedial design, additional characterization of TGA and SDA soils was recommended to increase the accuracy of soil excavation quantity and cost estimates and to provide detailed subsurface data in the vicinity of the SDA groundwater collection trench. Thus, a pre-design soil sampling program was undertaken in May 1993 to develop this additional information.

Detailed descriptions of the sampling programs, including sample locations, collection methods, sample handling procedures, and analytical methodology, are presented in the **Scope of Work for Pre-Design Soil Sampling at the Rochester Fire Academy Site** dated April 1993 and the **Scope of Work for Additional Soil Sampling at the Rochester Fire Academy Site** dated July 1993 (see Appendix C-1).

2.2 DELINEATION OF SOILS FOR EXCAVATION

The delineation of soil excavation at the TGA and SDA required a soil sampling program to identify the extent of PCB and lead contamination, and a VOC soil headspace survey to establish the qualitative extent of VOC contamination in the SDA. The basis for excavation is established by the clean-up goals set forth in Section 1.4. The sample results and delineation of excavation limits for the TGA and SDA are presented separately in the following sections.

2.2.1 Training Grounds Area Results

The soil sampling results, including PCB, lead, and VOC soil headspace concentrations, detected at the TGA are summarized in Appendix C-2. Sample locations are

identified on Plate 1. Elevated concentrations of PCBs, lead, and VOCs were detected at the TGA during sampling, particularly in soils at or near the four burn pits, fuel storage tanks, pump house and underground fuel transmission line, northern access area to the NDA, and the swale along the TGA fence line bordering the GVP. Stained soil resulting from the spillage of fuel oil, was observed on the ground surface in the vicinity of the fuel storage tanks and pump house. For ease of presentation, a separate discussion of the soil characteristics and levels of contamination, namely PCBs, lead, and VOCs at the TGA are presented in the following sections.

2.2.1.1 Characteristics

Soil collection logs from TGA soil sampling are presented in Appendix C-7. The soil matrix of the TGA consists of approximately one to two feet of gravely fill material underlain by native fine grain soil material. Undisturbed native soil was found at the outer perimeter of the area and immediately below the fill material. The fill material consists primarily of silt and gravel with trace amounts of clay and sand. The undisturbed native soil is silty with trace amounts of clay, sand, and gravel.

2.2.1.2 PCBs

Laboratory results from the PCB analyses are included in Appendices C-3 and C-4 and sample locations are presented on Plate No. 1. PCB concentrations in excess of 10 mg/kg were present in 32 samples of the soil/fill material in the TGA, specifically in areas where fuel oil was transported, stored, or burned. Elevated PCB concentrations (>50 mg/kg) were detected in the upper 12 inches of soil/fill material in an area south of burn pit No. 1 (Sample No. 14A), monitoring well MW-14S, fuel storage tanks (Sample Nos. 102A, T1S102S), underground fuel transmission line (Sample Nos. 45A, T1S45S), access area to the NDA (Sample Nos. 57A, T1S57W), and in the swale along the TGA fence line bordering the GVP (Sample Nos. S48A, 24A). Elevated PCB concentrations were also detected approximately 100 feet northwest of monitoring well MW14S (Sample No. S52A) and in the area of abandoned fuel storage tanks (Sample No. S29B). Soil samples with elevated PCB concentrations were generally surrounded or adjacent to soils with lower PCB concentrations (>10 and <50 mg/kg). There were 21 samples within this range.

2.2.1.3 Lead

Laboratory results from the lead analyses are included in Appendix C-5 and sample locations are presented on Plate No. 1. Lead contamination was limited to the upper 12 inches of the soil/fill material with the exception of sample S56B which was taken between 12 and 24 inches below grade. Elevated lead concentrations (>250 mg/kg) were detected in 14 samples taken south of and at burn pit No. 1 (Sample Nos. 14A, T1S14N, T2S14N, T1S23S), in and around the swale along the TGA line bordering the GVP (Sample Nos. S24A, T1S24N, 37A, 48A, T1S48S), and in the area along the NDA fence line (Sample Nos. 56B, T1S56W, 57A). Soil samples (Sample Nos. 35A, T1S25S) at burn pit Nos. 2 and 4 also had elevated lead concentrations. The maximum lead concentration (8910 mg/kg) was detected along the swale approximately 120 feet from the northeast corner of the TGA (Sample No. T1S48S).

2.2.1.4 Delineation of Soil Excavation

In accordance with the Remedial Action Plan (see Section 1.4), soils contaminated with PCBs, lead, or VOCs at or above 10, 250, and 10 mg/kg, respectively, will require excavation. Three levels of soil contamination were established based on the specified method of treatment, namely soils contaminated with: a) PCBs greater than 50 mg/kg and lead greater than 250 mg/kg, b) only PCBs greater than 50 mg/kg, and c) PCBs between 10 and 50 mg/kg and/or lead greater than 250 mg/kg. The TGA was delineated into excavation areas based on these three levels of contamination. In addition, VOC contaminated soil identified during RI investigations (see **Remedial Investigation Report for the Rochester Fire Academy Site** dated May 1993), primarily in the vicinity of monitoring well MW-14S, will be excavated for treatment.

An excavation plan presented on Sheet G8 was developed based on the areal extent and depth of the contamination. In general, the limits of excavation were delineated by identifying mid-points between uncontaminated and contaminated samples. The mid-points were considered to be the extent of contamination and therefore the limit of excavation required.

2.2.2 South Disposal Area Results

Soil characteristics and VOC contamination are presented in the following sections. Sample locations are identified in Figure 2-1.

2.2.2.1 Soil Characteristics

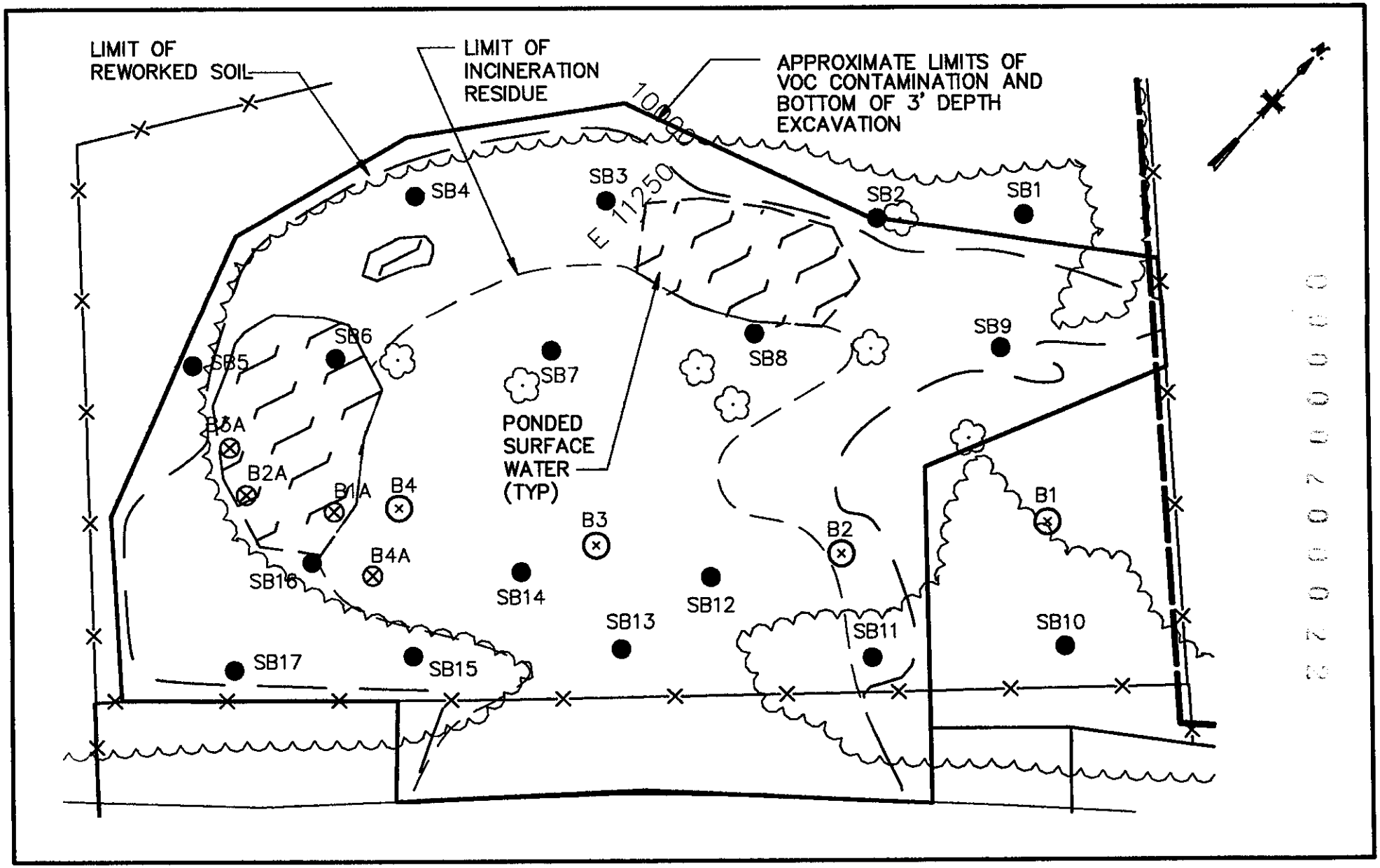
Soil description and percent by weight passing the No. 200 sieve at each sample location are summarized in Appendix C-2. Soil sample collection logs and laboratory testing data are included in Appendices C-8 and C-9, respectively.

The soils in the SDA consist primarily of three different types of material, namely incineration residue, reworked soils, and native soils. Incineration residue consists of an approximately 786 cy layer that extends approximately 2 feet below the surface consisting of ash and residue from past burning activities at the site. The reworked soils are primarily a mix of fill and native soils with little incineration residue, and are present adjacent to and up to 2 feet deep beneath the incineration residue. The areal limits of the incineration residue and reworked soil are indicated on Figure 2-1. Native soils in the SDA are found at the outer perimeter of the area and below the reworked soils.

The SDA native soils are predominantly silty clay or silt and clay mixtures. Small amounts of very fine and fine sand and trace amounts of gravel were detected in some samples. The percent by weight passing the No. 200 sieve of 51 soil samples taken at two, four, and six feet below grade ranged from 60 to 100 percent. Of the 51 samples analyzed, 26 had equal to or greater than 95 percent by weight passing the No. 200 sieve.

2.2.2.2 VOCs

The qualitative extent of VOC contamination, as indicated by HNu headspace (ppm), at each sample location is summarized in Appendix C-2 in two foot depth intervals to six feet below grade. VOC soil headspace concentrations, as measured with an HNu ionization detector, were detected at or above 10 ppm in 12 of the 17 sample locations in the SDA. At these locations, 31 samples had VOC soil headspace concentrations greater than 10 ppm up to a depth of six feet below grade in native soils, reworked soils, and incineration residue. The maximum VOC soil headspace concentration detected was 660 ppm (SB-8) at a depth between 4 to 6 feet below the limits of the incineration residue.



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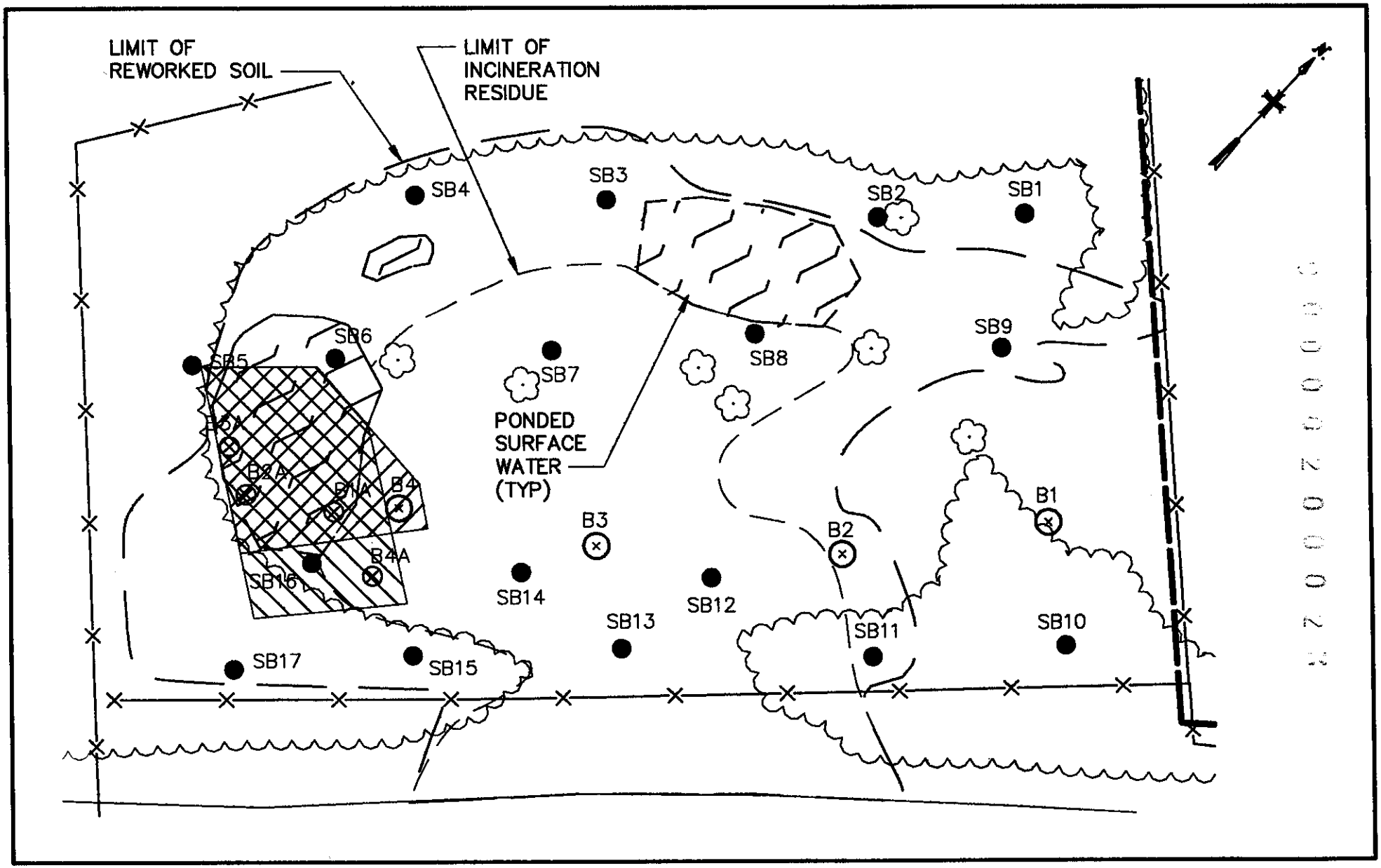
ROCHESTER FIRE TRAINING ACADEMY
DESIGN REPORT
SOUTH DISPOSAL AREA
EXTENT OF VOC CONTAMINATION

CITY OF ROCHESTER NOVEMBER 1993

FIGURE 2-1



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RESIDUAL NAPL CONTAMINATED SOIL TO 12' BGS (SATURATED ZONE)

RESIDUAL NAPL CONTAMINATED SOIL IN UPPER 6' BGS (UNSATURATED ZONE)

ROCHESTER FIRE TRAINING ACADEMY
DESIGN REPORT
SOUTH DISPOSAL AREA
DELINEATION OF NAPL CONTAMINATED SOIL
CITY OF ROCHESTER NOVEMBER 1993

FIGURE 2-2

Five samples with VOC soil headspace concentrations below 10 ppm (SB-1, SB-2, SB-4, SB-10, SB-11) were located on the perimeter of the known disposal area.

2.2.2.3 Delineation of Soil Excavation for VOC conditioning

In accordance with the Remedial Action Plan in Section 1.4, soils with total VOC soil concentrations at or above 10 mg/kg will require excavation. The delineation of soil excavation for VOC conditioning was based on the areal extent of VOC contamination in the SDA and GVP adjacent of the SDA (see Figure 2-1). Soil contamination and excavation was delineated in areas of reworked soil and where HNu headspace concentrations were at or above 10 ppm. The extent of contamination in the northeast corner of the SDA adjacent to the Police Firing Range (PFR) is delineated through SB11 (with a VOC headspace concentration <10 ppm) and at a midpoint between SB9 (200 ppm) and B1 (<10 ppm). From the midpoint, the delineation extends directly to and along the PFR fence line and continues between SB1 (<10 ppm) and the limits of reworked soil to SB2 (<10 ppm). From SB2, the delineation parallels the outside of the limits of reworked soil by a minimum of two feet until SB11.

2.3 SUBSURFACE SOIL CONDITIONS IN PROXIMITY TO GROUNDWATER COLLECTION TRENCH

The methodology and results from the subsurface investigation in the proximity of the groundwater collection trench are presented in the following sections.

2.3.1 Investigative Methodology

A total of four (4) exploratory borings (B-1 through B-4) drilled to a depth of 26 to 28 feet with hollow stem augers were used to characterize the subsurface soils along the alignment of the groundwater collection trench within the South Disposal Area (see Figure 2-2). A fifth boring specified in the scope of work was to be completed south of the pond, however, the boring was not completed due to limited access caused by the high water level in the pond. Continuous split spoon samples were collected during borehole advancement and each soil sample was examined and described in the borehole logs presented in Appendix C-2. All soil samples were screened with an HNu photoionization

detector. Soil samples collected from coincident depths in each of the four borings were composited and submitted for grain size sieve analysis and Atterberg Limits.

Subsequent to the four exploratory borings, an additional four (4) borings were completed in this area to delineate the extent of non-aqueous phase liquid (NAPL) contaminated soil observed during the drilling of boring B-4 (see Section 2.3.2 Results). Borings were sampled from ground surface to a depth of 16 feet below grade. As identified on Figure 2-2, the locations of these borings are located in the immediate vicinity of the pond located in the southern portion of the disposal area. An ATV drill rig was utilized to complete these additional borings due to limited access of some locations. The eastern-most end of the pond required crossing with the ATV rig in order to drill borings B-2A and B-3A. After traversing the pond with the drill rig, the disturbed sediment in the pond produced HNu readings in the breathing zone that exceeded 50 ppm and required evacuation of the South Disposal Area. At the downwind site perimeter, HNu concentrations ranged from background levels (0.2 ppm) to 2 ppm. After approximately two hours, breathing zone levels in the vicinity of the pond returned to background concentrations. Drilling and sample collection procedures were performed with Level C personal protective equipment due to sustained HNu readings of 3 to 10 ppm in the breathing zone during drilling. Each split spoon sample retrieved was logged and described on the field borehole logs (Appendix C-10) and placed in a soil jar for headspace analysis and for potential further evaluation. samples suspected of NAPL contamination were placed in glass jars with a small amount of distilled water. The distilled water was used to wash any potentially mobile NAPL from the soil pores for NAPL qualitative testing. Potentially NAPL-contaminated soil samples were examined in a dark room under ultraviolet light for evidence of fluorescence to indicate that a non-aqueous phase liquid is present. Sudan IV solvent dye was added to the liquid in the bottom of the soil jars for additional evidence of NAPL. The dye will color non-aqueous phase liquids immiscible with water a bright red. A composite of NAPL-contaminated soil was submitted for laboratory analysis for Target Compound List (TCL) VOCs, PCBs, Arsenic, Cadmium, Lead and Total Petroleum Hydrocarbons with a GC finger print.

2.3.2 Results

The four exploratory borings identified cohesive clayey silt deposits to an average depth of 5.3 feet below grade. Below the fine-grained sediments, poorly-sorted loose to

dense silty sand and gravel deposits were encountered to borehole termination. Stratified layers of well-sorted sand and gravel occur at various depths within the subsurface. A zone of cobbles and boulders was encountered in several of the borings ranging from a depth of 10 to 16 feet below grade. Complete descriptions of the soils are presented in the borehole logs for each boring (see Appendix C-10). Excluding gravel-size material greater than 1.5 inches in diameter which cannot be sampled with the split spoon sampler, the grain size distribution from sieve analysis for the composite soil sample ranging in depth from 6 to 26 feet below grade is 23% gravel, 41% sand and 36% fines (silt and clay). Atterberg Limits testings indicates that the soil is non-plastic. All physical test results are presented in Appendix C-11. Based on visual evidence and Atterberg Limits testing, it appears that only a small percentage of fines represent clay size particles. Data collected during the RI identified the depth to rock in this area at approximately 30 feet below grade.

Substantially elevated readings on the HNu photoionization detector were measured in the breathing zone (1 to 10 ppm) and in the soil headspace (200 to 500 ppm) in the two southern-most borings, B-3 and B-4, to a depth of 16 feet below grade (see Figure 2-2). Additionally, stained soil and an oil-like sheen was observed from 8 to 8.3 feet below grade and a very small quantity of brown oil-like non-aqueous phase liquid (NAPL) was observed within the pore spaces of soil collected from the from 10 to 12 feet below grade in boring B-4. NAPL was also identified in the upper portion of the 2 to 4 foot split spoon soil sample interval collected from shallow boring B-16 completed as part of the physical characterization study of the South Disposal Area soils for excavation.

The locations of the four borings (B-1A, B-2A, B-3A and B-4A) used to delineate and characterize NAPL in this area are shown in Figure 2-2. These locations are in the immediate vicinity of the pond where several crushed drums and numerous broken amber reagent bottles are present from past disposal practices and most likely represents the most contaminated portion of the South Disposal Area. Similar geologic material encountered during the exploratory boring program were observed in these borings. Black to brown staining and occasionally small droplets of NAPL within soil pores across a small fraction of the soil samples was observed. Occasionally, a slight sheen was observed on the wash water in the bucket used to rinse the soiled split spoon samplers following sample collection. Detailed soil descriptions as logged in the field are summarized in Appendix C-2. Soil samples showing evidence of NAPL contamination were examined under an ultraviolet

light and were washed with water and mixed with solvent dye. None of the samples tested indicated a positive response to these test methods (no florescence or dying of liquid was observed). The lack of response to these qualitative methods may be due to insufficient quantities of the residual NAPL present in the soil to provide a positive response. Contaminated soil depths, quantitative test results and visual descriptions are summarized in Table 2-1. NAPL-contaminated soil was not observed at depths greater than 12 feet below grade or below the saturated zone at a distance greater than 20 feet from the perimeter of the pond. Areas of residual NAPL-contaminated soil within the saturated and unsaturated zone are delineated in Figure 2-2. Portions of each NAPL-contaminated zone were composited into a single sample and submitted for chemical analysis. The composite sample included portions of B-1A 0-2', B-2A 8-10', B-3A 4-8', and B-4A 2-4'. Analytical test results are summarized in Table 2-2 and detailed in Appendix C-6. Test results indicate that the NAPL-contaminated soil contains chlorinated volatile organic compounds, petroleum derived hydrocarbons, styrene and PCBs. Metals concentrations were not elevated with respect to background concentrations. Since sediment from the disposal pond was incorporated into the soil sample through the compositing of sample B-1A 0-2', one or more of the compounds detected may only occur within the upper two feet of soil (e.g. PCBs).

2.3.3 Summary

Borings advanced along the alignment of the groundwater collection trench identified cohesive clayey soils to a depth of 5 to 6 feet below grade. Non-cohesive soils comprised of gravel, sand and silt was observed to a depth of 26 feet below grade. A zone of cobbles and boulders was identified in borings from depths of 10 to 16 feet below grade. NAPL-contaminated soils were observed at the south end of the groundwater collection trench in the vicinity of the pond. The extent of the NAPL-contaminated soil is restricted in proximity to the pond which was once used for disposal purposes. The NAPL-contaminated soil represents a largely immobile phase of residuals that are sorbed onto soil particles within the shallow water-bearing zone. Incomplete saturation of the pore spaces will not permit the residual NAPL to mobilize as a free-phase liquid. However, the residual NAPL is a continuing source of groundwater contamination through solubilization of the residual within the water-bearing zone. Based on the chemical analysis of the NAPL-contaminated

TABLE 2-1

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

SUMMARY OF SUSPECTED NAPL-CONTAMINATED SOILS AT THE SOUTH DISPOSAL AREA

		Frequency of Positive Testing			
Boring	**Depth**	**UV Light**	**Sudan IV Dye**	**HNu**	**Visual**
B-1A	0 - 10 ft	0	0	200+ ppm	Residual black-brown staining
B-2A	8 - 10 ft	0	0	200+ ppm	Occl. droplet of black residuals
B-3A	4 - 10 ft	0	0	200+ ppm	Sheen on gravel surface; Black staining
B-4A	2 - 2.5 ft	0	0	200+ ppm	Residual black-brown staining

soil, residual present in the soil will provide a continuing source for chlorinated volatile organic and petroleum hydrocarbon groundwater contamination.

TABLE 2-2

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT
SOUTH DISPOSAL AREA

NAPL CONTAMINATED SOIL
ANALYTICAL RESULTS

Analyte	Concentration (ppm)
Volatile Organics:	
1,1,1-Trichloroethane	180
Trichloroethene	210
Tetrachloroethene	45
Toluene	87
Styrene	82
Xylene (total)	45
PCBs	21
Petroleum Hydrocarbon Fingerprint Results	3000 (lube oil) 450 (diesel fuel)
Heavy Metals:	
Arsenic	2(1)
Cadmium	4(1)
Lead	84

Note:
(1) Concentration within five times the detection limit.

3.0 UTILITY SURVEY

3.1 SUMMARY OF EXISTING UTILITIES

The existing utilities at the Rochester Fire Academy site include potable water, gas and electricity and are illustrated on Sheet G-1. These utilities currently service only the TGA.

3.2 UTILITY MODIFICATION

The remediation of the TGA will impact the existing utilities which service this area. The existing water main will be abandoned in place. The existing hydrants will be removed and replaced. Gas and electrical service in the TGA will also be modified to allow continued use of the TGA as a fire training facility. The existing gas piping in the TGA will be abandoned in place. The existing gas meter will be relocated to the lawn area to the northwest of its present location in the TGA. A gas main will extend from the metering point to the SDA along the SDA access road. A secondary gas feeder will extend from this main to the location of the proposed burn building to provide gas service for future simulator training at the burn building as well as supplying the proposed classroom, storage and training building and the proposed auto fire simulator. The existing incoming TGA power service to the existing pump house will remain. Existing power panels and service transformer at the pump house will be upgraded to provide power for the treatment facility as well as any future requirements in the TGA. Service for the SDA will be provided from the existing pump house via underground conduit to the groundwater treatment system. New site lighting will be provided in the TGA to replace the existing lighting stanchions which will be removed prior to remedial activities.

Operation and maintenance of the SDA groundwater treatment system will require potable water, gas, electric, sewer and telephone service. Soils remediation in the SDA may also require water, gas and electric service, depending on the contractor's needs. The potable water main which provides service to the TGA will be extended to the SDA. A buried telephone service conduit and cable will be installed from the groundwater treatment system building in the SDA to the existing training and classroom facility. The telephone

service will function as the remote notification system output for plant alarms via a dialer device as well as providing voice communications. A sewer force main which will serve as a conduit for discharge of treated groundwater to the sanitary sewer will be installed from the SDA groundwater treatment system to the effluent manhole to the south of the existing classroom building.

4.0 SITE PREPARATION

The first steps in the remediation process will include site preparation activities, including installation of an access road, clearing and grubbing, demolition and utility modification. These activities are described in the following sections.

4.1 ACCESS ROAD INSTALLATION

Prior to commencing site soils remediation, improvements to the site will be required to provide access for heavy machinery to the SDA and to facilitate hauling of excavated soils from the SDA to the TGA. A new access road is proposed from the existing TGA access road, south along the Genesee Valley Canal west of the site, and entering the SDA from the south, as illustrated on Sheet G-2. The new access road will be constructed atop the existing abandoned railroad bed. An asphalt-surfaced road is proposed, as shown on Sheet G-15.

4.2 CLEARING AND GRUBBING

Clearing and grubbing of areas which are presently vegetated with shrubs and trees (viz., the SDA, GVP and NDA) will be conducted prior to commencement of soils remediation in each area. The limits of clearing for the SDA, GVP and NDA are illustrated on Sheets G-7, and G-10, respectively. Clearing and grubbing in the GVP will be conducted with scaled down equipment to preserve the natural aesthetics of the GVP to the extent possible. Attempts will be made to save all trees of diameter greater than six inches.

4.3 UTILITIES MODIFICATION

Soils remediation in the SDA may require water, gas and electric, depending on the contractor's needs. Extension of necessary utilities from the existing services in the TGA will be conducted prior to remediation of the SDA soils as discussed in Section 3.7.

4.4 DEMOLITION

Demolition of various existing structures in the TGA will be accomplished to facilitate the remediation of the TGA and its use as a soils staging and solidification/stabilization processing area. Sheet G-3 denotes the structures proposed for demolition, including the burn pits, site lighting, smoke house, and various structures located throughout the TGA. Brick and steel debris, snow fencing and drums will be removed for burial in the NDA. Fire training props, including 4 propane tanks, a railroad tank car and a tanker truck will be removed prior to remediation of the TGA. The railroad tank car, the auto fire training simulator and the gas fired oil spill pit will be replaced in the TGA following remediation.

Existing site perimeter fencing will be removed and replaced during the site remediation process as shown on Sheet G-1.

5.0 SITE SOILS REMEDIATION PLAN

5.1 OVERVIEW OF SOIL REMEDIATION ACTIVITIES

The remediation of soils in the various areas at the Rochester Fire Academy will be interdependent processes, due to access, treatment and staging constraints. These interdependencies are illustrated schematically on a soils flow chart presented as Figure 5-1.

Clean-up of SDA soils will require the longest amount of time to complete and will impact other areas of the site through equipment and/or materials staging. Following the installation of the access road, clearing and grubbing of the SDA and utilities improvements, a temporary containment shelter and air emissions control equipment will be installed in the SDA. The SDA soils will be excavated and conditioned within the shelter, with on-going transport of conditioned soils to the TGA for staging. Soil contaminated with VOCs in the vicinity of MW-14S of the TGA will be excavated and transported to the SDA for treatment during the SDA soils conditioning process.

The GVP soils will be excavated and hauled to the NDA for disposal. Excavation of the GVP soils will be undertaken near the completion of the SDA remediation to allow for additional treatment flexibility in the unlikely event that VOCs or other unknown contaminants are encountered while excavating (i.e., such contamination might be treated in the same manner as the SDA soils). In addition, remediation of the SDA may require some limited use of the GVP for access.

Upon completion of soil conditioning activities in the SDA, the containment shelter and emission control equipment will be decommissioned, the SDA and GVP areas will be restored, and solidification/stabilization of SDA soils will commence in the TGA. Treated soils may be staged in the area of the TGA shown on Sheet G-1 prior to disposal in the NDA or off-site disposal, depending on the initial PCB concentration of the soils. SDA soils having PCB concentrations less than 10 mg/kg and lead concentrations less than 250 mg/kg will not undergo solidification/stabilization and will be placed in the NDA.

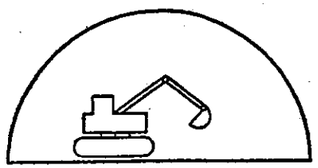
Designated TGA soils will be excavated and treated by solidification/stabilization. Treated TGA soils may be staged in the TGA prior to disposal in the NDA or off-site disposal, depending on the initial PCB concentration of the soils.

NOTE:
SEE FIGURE AF-1
IN APPENDIX F
FOR SOIL VOLATILIZATION/CONDITIONING
CONCEPT PLAN

HAUL TO NDA FOR CONTAINMENT

HAUL FOR OFF-SITE
DISPOSAL IN TSCA/RCRA
PERMITTED TSDF

EXCAVATE AND CONDITION
SDA SOILS WITHIN
TEMPORARY ENCLOSURE



SOUTH DISPOSAL AREA

HAUL CONDITIONED SOIL
TO TGA FOR STAGING
AND/OR TREATMENT

SOILS W/
PCBs<10
AND Pb<250

SOILS W/
PCBs≥50

SOILS W/
10≤PCB<50
AND/OR Pb ≥250

YES

PASSES
TSDF
REQUIREMENTS?

NO

SOLIDIFICATION/
STABILIZATION
TREATMENT
AREA

TREATED
SOILS W/
INITIAL
PCBs≥50

TREATED
SOILS W/
INITIAL PCBs
<50

TREATED SOILS
STAGING AREA

HAUL TO NDA
FOR DISPOSAL

CONTAINMENT OF GVP SOILS
AND SOLIDIFIED SOILS
FROM SDA AND TGA
UNDER COVER SYSTEM

NORTH DISPOSAL AREA

HAUL MW-14S SOILS W/ VOCs ≥ 10 TO
SDA FOR CONDITIONING
PRIOR TO S/S TREATMENT

UNTREATED SOILS
STAGING AREA

TRAINING GROUNDS AREA

EXCAVATE AND HAUL SOILS WITH VOCs ≥ 10 TO SDA FOR CONDITIONING

EXCAVATE AND HAUL SOIL W/ VOCs < 10
TO NDA FOR CONTAINMENT

GENESEE VALLEY PARK AREA

NOTE: ALL CONCENTRATIONS IN MG/KG.

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ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT
SOILS EXCAVATION, STAGING AND DISPOSAL
FLOW DIAGRAM

CITY OF ROCHESTER, NEW YORK NOVEMBER 1993

The NDA will be capped with a soil/synthetic cover after all excavated GVP, SDA, and TGA soils have been transported to the area. Clean fill from an off-site source will be placed and graded as necessary to achieve a minimum 4 percent slope. An earthen berm will be installed along the northern and eastern border of the site to prevent the intrusion of flood waters during a 100-year storm event. Asphalt will be placed in the TGA to facilitate future use of the site and prevent direct contact with the underlying soils and infiltration of rain water. The asphalt bicycle path will be replaced in the GVP while paving equipment is available in the TGA.

The remainder of Section 5.0 will discuss the soils remediation plans for the SDA, GVP, TGA and NDA on an area by area basis. Performance requirements for control equipment and the solidification/stabilization treatment process will be discussed as well.

5.2 SOUTH DISPOSAL AREA SOILS REMEDIATION

The Record of Decision for the Rochester Fire Academy site specifies excavation of contaminated SDA soils followed by: soil conditioning (i.e., tilling or other methods to effect removal of volatile organics); treatment using solidification/stabilization depending on lead and PCB concentrations; and disposal in the NDA or a secure landfill depending on PCB concentrations. The excavation activities will take place within the confines of a containment shelter, which will be fitted with emission control equipment to prevent loss of volatile gasses to the atmosphere so that atmospheric VOC concentrations at the site perimeter will remain below New York State Action Limits. The TGA (see Section 5.4) will be used as a staging area for conditioned soils and for solidification/stabilization activities.

The following sections describe the SDA soils remediation, including soil characteristics, excavation activities and performance requirements for each of the various aspects of the work.

5.2.1 Soil Characteristics

The soils in the SDA consist primarily of three (3) different types of material: incineration residue; reworked soils; and native soils. Incineration residue is mainly comprised of ash and residue from past burning activities at the site, and is highly contaminated with volatile organics. In addition, the incineration residue also contains

elevated levels of PCBs, cadmium and lead. The areas in which PCB contamination has been found in the SDA are associated primarily with the incineration residue. The incineration residue exists in an approximately 786 cy layer from 0 to 2 feet below ground surface, which extends across the SDA into the GVP as indicated on Figure 2-1. Unknown quantities of debris such as drum fragments, broken laboratory reagent bottles, mattress springs, and other rubble are also present within or beneath the incineration residue.

The reworked soils are primarily a mix of fill material and incineration residue, and are present adjacent to and beneath the incineration residue. The approximate areal limits of the reworked soil are indicated on Figure 2-1. The reworked soil varies from 0-2 feet in thickness. The physical characteristics of the reworked soils are described in Section 2.0.

Native soils in the SDA are found at the outer perimeter of the area and below the reworked soils. Native soils beneath the incineration residue and reworked soils are contaminated with elevated levels of volatile organics. Native soils at the SDA perimeter have not been designated for remediation. The physical characteristics of the native soils are described in Section 2.0. Sheet G-6 illustrates the proposed limits of excavation based on all data collected to date.

5.2.2 Remediation Plan

Based on the results of sampling undertaken during investigation activities at the site and the cleanup goals for the SDA established by NYSDEC, an excavation plan (see Sheet G-6) has been prepared for this area. The excavation plan provides for excavation to 3 feet below ground surface and incorporates the portion of the GVP immediately adjacent to the SDA. These soils are the same general type and have the same contaminants as SDA soils, indicating that some overland erosion to the GVP from the SDA may have occurred. The contractor will be required to provide means for dewatering excavated soil should groundwater be encountered during excavation. This will involve collection and disposal of the water associated with excavated soil. The water may be treated by the contractor using the South Disposal Area groundwater treatment system (see Section 7.0) and discharged to the sanitary sewer (upon approval of the Monroe County Division of Pure Waters and procurement of applicable permits) or hauled off-site to a treatment and disposal facility. The groundwater treatment system will be installed outside of the confines of the SDA to the south prior to initiation of soils remediation activities in the SDA.

The estimated volumes of soils to be excavated are presented in Table 5-1. The actions to be applied to the excavated soils will be as follows:

- All excavated soils having initial total VOC concentrations of 10 mg/kg or greater will be conditioned (i.e., tilled or worked) within the confines of a containment shelter fitted with air emission controls until leachable VOC concentrations meet the toxicity characteristic limits for VOCs specified in 40 CFR Part 261 and total VOCs are less than 10 mg/kg, and until moisture content and particle size requirements for solidification/stabilization (if necessary) are achieved.

- Excavated soils having PCB contamination less than 10 mg/kg and lead contamination less than 250 mg/kg will be placed in the NDA following conditioning to the VOC limits specified above.

- Excavated soils having PCB concentrations greater than or equal to 10 but less than 50 mg/kg and/or lead contamination greater than or equal to 250 mg/kg will undergo solidification/stabilization (following conditioning) such that leachable lead and leachable cadmium in the solidified mass will meet the toxicity characteristic limit specified in 40 CFR Part 261. The solidified mass will be placed in the NDA under the soil/synthetic cap.

- Excavated soils having PCB concentrations equal to or above 50 mg/kg will be disposed off-site in a secure landfill. Excavated materials with PCB concentrations greater than or equal to 50 mg/kg may also contain other constituents which may, under federal or state regulations, necessitate treatment prior to disposal. The material will be analyzed as required by the off-site disposal facility.

- Following excavation and remedial activities, the SDA will be graded with clean off-site soils, covered with a minimum of 6 inches of topsoil, and vegetated to mitigate erosion.

The majority of the remedial work in the SDA will require the use of heavy construction equipment, which will be driven to the SDA over the access road installed in the Genesee Valley Canal area. Clean-up of SDA soils will require the longest amount of time to complete and will impact other areas of the site through equipment and/or materials staging. Since it will be necessary to control VOC emissions during the excavation and conditioning of the VOC-contaminated materials, the excavation area and soil conditioning area will be enclosed within a temporary containment shelter. The type and design of the enclosure will be the remediation contractor's option. The enclosure could be an inflatable structure, an aluminum frame fabric structure, or pre-engineered metal

TABLE 5-1

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

ESTIMATED SOIL VOLUMES TO BE EXCAVATED

Location	Clean-Up Goal (mg/kg)				Max. Depth (ft)	Volume[2] (cy)	Governing Parameter
	Lead	Cadmium	PCBs	VOCs			
South Disposal Area:	250	10	10	10			
Incineration Residue/Reworked Soil					0-2	1,604	All
Reworked Soil					2-3	802	VOCs
Native Soil					0-2	549	All
Native Soil					2-3	345	VOCs
Subtotal						**3,300**	
Training Grounds Area:	250	10	10	10			
PCBs 10-50 mg/kg & Pb >250 mg/kg					1	1,170	Pb/PCBs
PCBs 10-50 mg/kg & Pb >250 mg/kg					2	320	Pb/PCBs
PCBs >50 mg/kg					1	52	PCBs
PCBs >50 mg/kg					2	30	PCBs
PCBs >50 mg/kg & >250 mg/kg					1	72	Pb/PCBs
VOCs (MW-14S)					5	176	VOCs
Subtotal						**1,820**	
Genesee Park Area:	250	10	1/10[1]	10			
Adjacent to South Disposal Area					1	370	Pb/Cd/PCB
To be moved to North Disposal Area					0.5	810	Cd/PCBs
Subtotal						**1,180**	
TOTAL						**6,300**	

NOTES:
(1) PCB clean-up goal based on NYSDOH-recommended goal of 1 mg/kg PCBs in surficial soils, and USEPA spill clean-up policy of 10 mg/kg at depth.
(2) Volume calculated assuming 1:1 sideslopes for excavations between 0-2 ft. depth and 1.5:1 side slopes for excavations between 2-5 ft. depth.

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building. Air emissions from the structure (or structures) will be routed through a destructive oxidation unit (i.e., a catalytic or thermal oxidation unit), followed by a counter-current scrubber to neutralize any hydrochloric acid vapors formed as a result of destruction of the chlorinated VOCs. A backhoe or other heavy equipment will be operated within the enclosure for excavation of the contaminated soils. At the contractor's option, heavy equipment may be vented to outside the temporary containment shelter to minimize accumulation of noxious gases within the enclosure. Soils will be excavated within the shelter on a batch basis and spread into lifts for conditioning. Conditioning will consist of screening to remove debris and tilling to effect volatilization. The lifts will be segregated according to soil type (e.g., incineration residue, native soils, reworked soils), and will not be combined during any of the conditioning or solidification/stabilization steps to avoid cross-contamination of materials. The lifts will be sampled for VOCs, lead and PCBs by the contractor according to sample collection and analytical protocols presented in the specifications to determine the appropriate treatment requirements. Following conditioning, lifts will be transported to the TGA via the access road where they will be solidified/ stabilized (if necessary). Soils to be disposed off-site will be removed from the site as they become available following solidification/stabilization treatment. Soils to be placed in the NDA may be staged temporarily in the TGA.

The process specified above will be repeated for the remaining SDA soils until the cleanup criteria have been met for all contaminated soils. At this time staged treated materials will be transported to the NDA for placement beneath the NDA soil/synthetic cover system. SDA soils which did not require treatment by solidification/stabilization will be placed in the NDA as well. Upon completion of remedial activities in the SDA, the area will be compacted and graded with off-site borrow soils, covered with an additional six inches of topsoil, and vegetated to mitigate erosion.

5.2.3 Performance Requirements

5.2.3.1 Containment Shelter and Air Emission Controls

A containment shelter fitted with air emission controls will be required for all excavation and conditioning work in the SDA. The selection of a suitable containment shelter will be the responsibility of the contractor, and will be subject to review by the

Engineer. The shelter must meet the minimum requirements outlined in the performance specification.

The shelter will be fitted with emission controls to prevent the release of volatile organics and/or contaminated airborne particulates during excavation and soil conditioning per the specification. The air emission controls will operate on the principle of destructive oxidation, consisting of either thermal oxidation or catalytic oxidation. The selection and design of the emission control equipment will be the responsibility of the contractor. The emission control equipment will meet the minimum requirements outlined in the Soil Volatilization and Conditioning performance specification (Section 13700). A full-scale demonstration of the effectiveness of the emission control equipment in meeting the performance requirements will be required at start-up in order to obtain the equivalent of a permit to construct and a certificate to operate an air emissions source from the NYSDEC.

A community health and safety plan will be prepared for the site remediation which will provide for ambient air monitoring at the site perimeter in addition to the exhaust monitoring at the emission control stack. If perimeter VOC concentrations exceed New York State Action Limits (see Appendix B), the contractor will be required to immediately shut-down the soil conditioning operation until corrective action is taken.

5.2.3.2 Soil Conditioning

Soil excavation and conditioning to effect removal of VOCs shall be performed within the confines of the containment shelter. The conditioning methodology will be determined by the contractor, but it is anticipated that some form of tilling, windrows or other type of mechanical working of the soils will be used. The soil conditioning procedure must meet the minimum requirements outlined in the performance specification document, and the Engineer must approve the intended conditioning method prior to initiation of the excavation work.

5.2.3.3 Solidification/Stabilization

Solidification/Stabilization of soils meeting the criteria for stabilization identified in Section 5.2.2 will be performed in the unremediated TGA. The solidification/stabilization process will be performed after the SDA soils have been subjected to sufficient conditioning

to lower the VOC concentration to meet the leachable toxicity characteristic limits for VOCs specified in the 40 CFR Part 261 and total VOCs are less than 10 mg/kg. Bench-scale solidification/stabilization results generated during the Feasibility Study are referenced in the Soil Solidification/Stabilization performance specification (Section 13800). The selection of a solidification/stabilization procedure shall be the responsibility of the remedial contractor. The contractor shall be permitted to conduct bench-scale S/S tests with site soils to choose an admixture formula or formulas during the Work Plan preparation period. The contractor will be required to demonstrate that soils treated with the chosen admixture formula(s) will pass the TCLP and Multiple Extraction Procedure (MEP) (EPA Method 1320) using TCLP limits for cadmium and lead. Soils contaminated with greater than 4,500 mg/kg lead and 10 to 50 mg/kg PCBs must be used for the bench scale tests. The contractor will be required to document performance with on-site soils prior to commencing full-scale treatment. The testing will consist of a full-scale field demonstration at the TGA on representative soil from the SDA or TGA having initial lead concentrations in excess of 4,500 mg/kg and a PCB concentration between 10 and 50 mg/kg. The quantity of soil for the field demonstration shall be equal to the proposed maximum batch size. The contractor shall conduct the field demonstration as soon as the minimum required quantity of soils is obtained. The solidification/stabilization treatment process must meet all additional minimum requirements outlined in the Soil Solidification/Stabilization performance specification.

5.3 GENESEE VALLEY PARK AREA SOILS REMEDIATION

The Record of Decision for the Rochester Fire Academy site specifies excavation of contaminated GVP soils followed by placement of these soils under the NDA cap. Upon completion of the excavation activities, the excavated portions of the GVP will be graded with clean, off-site fill and covered with a minimum of 6 inches of topsoil, with replacement of the bike path and restoration of adjacent areas.

The following section describes the GVP soils remediation, including specific remedial activities.

5.3.1 Remediation Plan

Based on the results of sampling undertaken during investigation activities at the site and the cleanup goals presented in Table 1-1 established by NYSDEC, an excavation plan (see Sheet G-6) has been prepared for this area.

As discussed in Section 5.2.2, soils in the GVP adjacent to the SDA will be handled in the same manner as SDA soils. Therefore, this Section applies only to those GVP soils not adjacent to the SDA (see Sheet G-6). The estimated volume of soils requiring excavation is presented in Table 5-1.

Excavation of the GVP soils will be undertaken during or immediately following completion of the SDA soils remediation. Excavated soils will undergo HNu headspace screening to qualitatively determine if the soils are contaminated with VOCs. Any samples with HNu headspace readings above background will be analyzed for VOCs at an off-site approved laboratory to determine if conditioning is required. In the unlikely event that VOCs in excess of the cleanup goal are encountered, the contaminated soils will be treated in the same manner as the SDA soils. In addition, remediation of the SDA may require some limited use of the GVP for access.

Excavation of the GVP is anticipated to be a fairly rapid process but will require extensive clearing of brush and trees, particularly in the vicinity of the drainage swale prior to excavation. Clear and grub waste will be disposed off-site by the contractor. Excavated soil will be hauled to the NDA as they are excavated, where they will be compacted and graded with other fill to achieve the design criteria for the NDA cover. Clean backfill from an off-site source followed by 6 inches of topsoil will replace the excavated GVP soils, and the entire GVP will be seeded and replanted to restore vegetation.

5.4 TRAINING GROUNDS AREA SOILS REMEDIATION

The Record of Decision for the Rochester Fire Academy site specifies excavation of contaminated TGA soils followed by treatment using solidification/stabilization (if necessary depending on metal and PCB concentrations) and disposal on-site or off-site in a secure landfill (depending on PCB concentrations). In addition, approximately 175 cubic yards of soils contaminated with non-chlorinated volatile organics will be excavated and moved to the SDA for conditioning within the containment shelter. The TGA will also be

used as a staging and treatment area for SDA soils undergoing solidification/stabilization. Upon completion of the excavation and solidification/stabilization activities, an asphalt cover will be placed over the TGA.

The following sections describe the TGA soils remediation, including specific remedial activities and facilities modifications.

5.4.1 Remediation Plan

Based on the results of sampling undertaken during investigation activities at the site and the cleanup goals for the TGA established by NYSDEC, an excavation plan (see Sheet G-8) has been prepared for this area. The excavation plan incorporates excavation to 1 foot below ground surface in most areas, and to 2 feet below ground surface where shown to be warranted by predesign soil sampling.

The estimated volumes of soils requiring excavation and remediation are presented in Table 5-1. The actions to be applied to the TGA soils will be as follows:

- VOC-contaminated soils (as indicated on Sheet G-8 in the vicinity of monitoring well MW-14S) will be hauled to the SDA and conditioned within the confines of the containment shelter until leachable VOC concentrations meet the toxicity characteristic limits specified in 40 CFR Part 261 and total VOCs are less than 10 mg/kg.

- Excavated soils having PCB concentrations between 10 and 50 mg/kg and/or lead contamination in excess of 250 mg/kg will undergo solidification/stabilization such that leachable lead and leachable cadmium in the solidified mass will meet the toxicity characteristic limits for lead and cadmium specified in 40 CFR Part 261. The solidified mass will be placed in the NDA.

- Excavated soils having PCB concentrations equal to or above 50 mg/kg will be disposed off-site in a secure landfill, and will be analyzed as required by the off-site disposal facility. Excavated materials with PCB concentrations greater than or equal to 50 mg/kg may also contain other constituents which may, under federal or state regulations, necessitate treatment prior to disposal.

During on-site volatilization activities within the SDA, the PCB and organic-contaminated soils surrounding MW-14S in the TGA will be excavated using a backhoe and hauled to the SDA containment shelter to achieve reduction of VOCs. This material will

then be treated and disposed according to the criteria for SDA soils. The total volume of TGA soils to be conditioned in the SDA is estimated to be approximately 175 cubic yards.

The remaining soils in the TGA will be excavated using a backhoe or other construction equipment according to the excavation plan. Excavated TGA soils which are not contaminated with VOCs will undergo screening or other sizing processes in the TGA to reduce particle size to the maximum diameter which can be processed by the solidification/stabilization equipment. Excavated soil will be segregated by initial PCB and/or lead concentration and will be staged in a portion of the TGA for solidification/stabilization, if required. All soils having initial PCB concentrations greater than or equal to 50 mg/kg PCBs, regardless of the degree of treatment, will be transported off-site for disposal in a secure landfill. These materials will be removed from the site as they become available.

Soils remaining in place (viz., underlying soils), following excavation in accordance with Sheet G-8 and the specifications, will be subject to verification sampling by the engineer to determine if the cleanup criteria have been met. Verification sampling is discussed in Section 6.1 of this report. If the soil remaining in-place in a particular area does not meet the cleanup criteria, an additional 6 inches of soil shall be excavated from that area and verification sampling shall be repeated. Following demobilization of solidification/stabilization equipment, the entire TGA will be graded and covered with asphalt. To achieve an adequate slope for drainage, approximately 3,250 cubic yards of off-site fill will be required in the Training Grounds Area prior to construction of the cover. The asphalt cover will be constructed in accordance with applicable specifications for paved areas to facilitate fire and police training exercises.

5.4.2 Performance Requirements

The performance requirements for the soils conditioning to effect VOC removal from soil excavated from the vicinity of MW-14S will be identical to those specified for SDA soils in Sections 5.2.3.1 and 5.2.3.2. Solidification/stabilization performance requirements will be identical to those for SDA soils presented in Section 5.2.3.3.

5.4.3 Facilities Modifications

Sheet G-9 indicates the revised site plan for the TGA. As previously discussed in Section 4.4 (Demolition), a number of the existing structures in the TGA with the exception

of the pump house, training tower, and smoke house will be demolished and removed. At the conclusion of the excavation and remediation of the soils to be processed, the utilities discussed in Section 3.2 will be installed as discussed in Section 6.4, and the asphalt cover will be placed. The facility improvements to be constructed include below grade concrete foundations for a future burn building, a future classroom training and storage building, concrete slabs for the relocated rail tank car, gas-fired spill pit in the northwest area of the TGA, and a concrete slab for auto fire simulation in the southwest corner. Concrete slabs will also be placed for each of the fire hydrant training areas and for a distance of 15 feet from the base of the tower and proposed burn building.

New fences will be installed on the north and east sides of the TGA and new access gates will be installed on the north, east, and west sides of the TGA. The new fence will be an eight-foot high black PVC-coated fence with barbed wire to discourage intruders. The fence will be installed on the outside of the existing berm. The asphalt cover will include an access ramp with a crest elevation of 520.00 FMSL at the location of the existing access to the river. The ramp will provide flood protection for the site for the 100-year flood elevation of 519.00 FMSL while allowing access to the river for drafting purposes and river rescue training.

5.5 NORTH DISPOSAL AREA SOILS REMEDIATION

The Record of Decision for the Rochester Fire Academy site specifies placement of a synthetic/soil cover system over the NDA, including soils excavated from the GVP. The NDA subgrade will be prepared using GVP soils, treated SDA and TGA soils, as well as clean, off-site fill. The area will then be covered with synthetic layers followed by fill and topsoil seeded to promote vegetation.

The following section describes the NDA closure.

5.5.1 Remediation Plan

The fill in the NDA will be moved to within the limits of the proposed cap and will then be covered with a synthetic/soil cover system as depicted on Sheet G-10 and G-11. The area will be cleared of all brush and trees, and a storm water runoff ditch will be installed at the perimeter of the NDA cover, which will lead to a drainage ditch along the

eastern perimeter of the TGA which will also serve to collect storm water runoff from the TGA asphalt cover. The proposed berm between the Fire Academy and the GVP will extend to the west side of the NDA to prevent upgradient storm runoff from contributing to site runoff. Excavated GVP soils will be transported to the NDA for placement beneath the cover system as will solidified/stabilized soils from the SDA and TGA. The GVP soils, solidified/stabilized soils, and additional off-site fill will be graded and compacted to achieve at least a 4% slope on all sides of the finished cover. The cover layers illustrated on Sheet G-11 will then be placed over the soils. A minimum of 6-inch layer of sand, followed by a 40 mil HDPE synthetic membrane, a geocomposite drainage layer, 24 inches of barrier soil and 6 inches of topsoil will be placed over the fill material. A sand-filled gas collection trench will be installed as shown on Sheets G-10 and G-11. A single gas vent will be placed in the collection trench at the high point of the fill. The topsoil will be seeded to promote vegetation and mitigate erosion.

Institutional controls to prevent access/use of the NDA will be implemented following closure activities. These activities will include deed restrictions and replacement/repair of the security fence around the cover.

6.0 CLOSURE AND RESTORATION

After soils remediation has been completed in an area of the site, the completeness of remediation will be verified by sampling and the area will be closed and restored. In addition, a flood production berm will be installed along the eastern and northern perimeter of the site. These closure activities are discussed in the following section.

6.1 VERIFICATION SAMPLING

Verification sampling will be conducted to accomplish three objectives: (i) to ensure that soils which exceed cleanup goals do not remain on-site, (ii) to segregate excavated soils with respect to PCB concentration to ensure proper disposal (viz., either on-site or off-site), and (iii) to confirm that adequate soils treatment has been accomplished. All soils samples will be collected manually using precleaned stainless steel collection tools which will be decontaminated between sample locations using non-phosphate soap and deionized water. Verification sampling of soils remaining after excavation, excavated soils, conditioned and solidified/stabilized soils, and associated laboratory analytical methodologies are discussed below. Verification sampling requirements are summarized in Table 6-1.

6.1.1 Soils Remaining After Excavation

The excavation plans for the SDA, GVP and TGA were developed taking into account all available data. With the exception of the SDA, following excavation of an area, the engineer will sample the soils remaining in place to verify that contaminant concentrations meet the cleanup goals. Verification sample results will be compared to the appropriate cleanup goal for each parameter. If the cleanup goals are met for a particular grid, the excavation will be considered complete for that area. If the goals are not met, however, an additional 6 inches of soil will be excavated from the grid following the contour of the initial excavation and the grid will be retested. Conditions specific to the verification sampling of soils remaining after excavation in the SDA, GVP and TGA are discussed below.

TABLE 6-1

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

VERIFICATION SAMPLING REQUIREMENTS

Matrix	Parameter						
	PCBs	Lead (total)	Cadmium (total)	VOCs	TCLP Lead	TCLP Cadmium	TCLP VOCs
Soils Remaining After Excavation:							
South Disposal Area[1]							
Training Grounds Area	✓	✓	✓	✓ (2)			
Genesee Valley Park Area	✓	✓	✓	✓ (2)			
Excavated Soils:							
South Disposal Area	✓	✓		✓			
Training Ground Area	✓	✓		✓ (3)			
Genesee Valley Park Area (adj. to SDA)	✓	✓	✓	✓			
Genesee Valley Park (all other areas)	✓	✓	✓	✓ (2)			
Conditioned Soils				✓			✓
Solidified/Stabilized Soils					✓ (4)	✓ (4)	

Notes:

(1) SDA soils will be excavated to 3 feet below ground surface. VOC-contaminated soils beneath 3 feet are in the saturated zone and will be remediated over time by the groundwater treatment system. Therefore no verification sampling will be undertaken for remaining soils.

(2) VOCs will be analyzed only in soils suspected to contain total VOCs greater than 10 ppm as indicated by field HNu headspace VOC screening. HNu headspace VOC readings above background will indicate off-site laboratory analysis for VOCs.

(3) TGA soils in the vicinity of MW-14S will be analyzed for VOCs. VOCs will be analyzed in other TGA soils suspected to contain VOCs in excess of 10 ppm as indicated by field HNu headspace VOC screening. See Note (2).

(4) QA sampling only by engineer.

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6.1.1.1 South Disposal Area

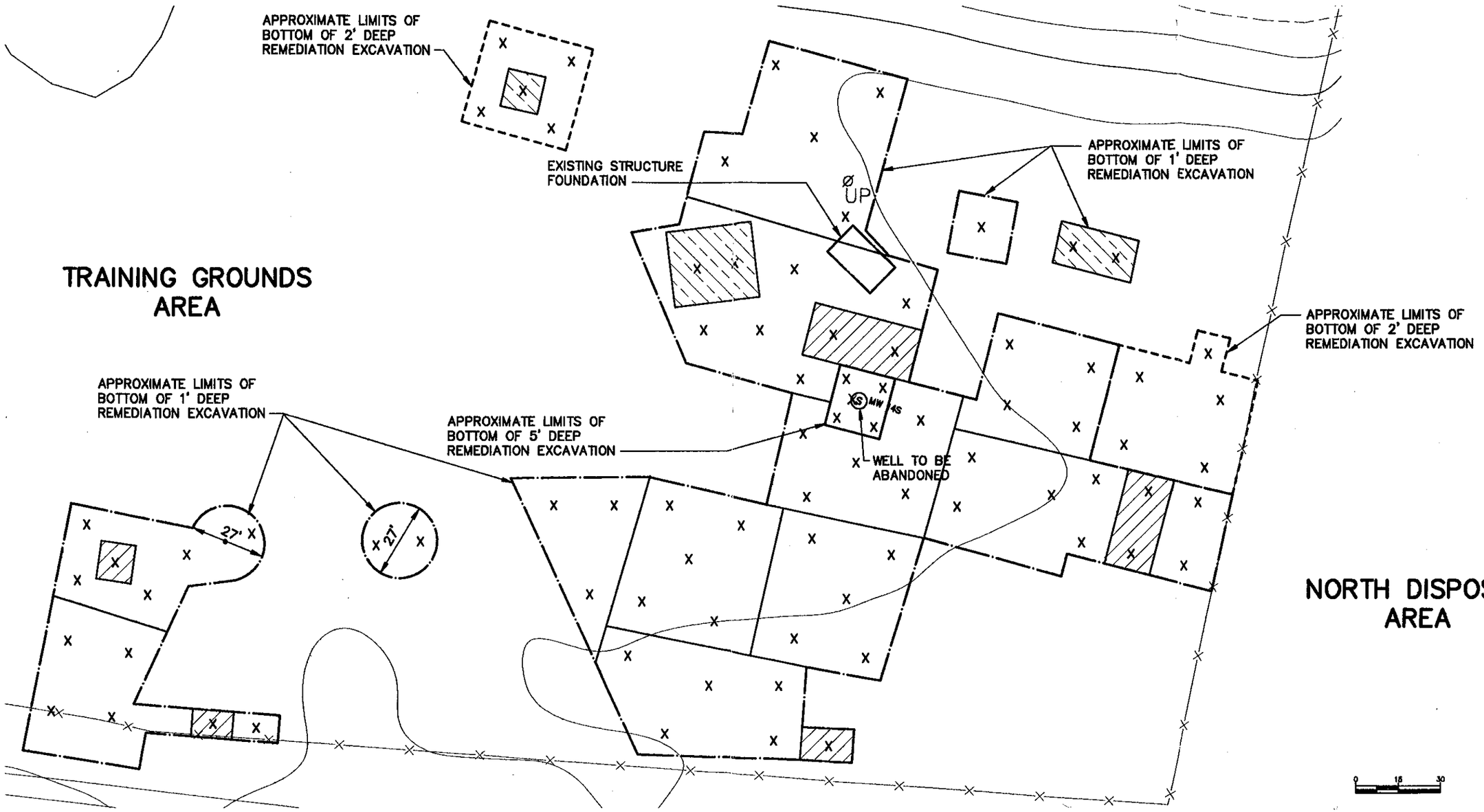
As indicated in the excavation plan for the SDA presented on Sheet G-6, all SDA soils with the exception of the perimeter soils along the south, west and north limits of the area will be excavated to 3 feet below ground surface to remove contamination associated with incineration residue and reworked soils. Soils beneath 3 feet are in the saturated zone and are contaminated with VOCs only, and will be remediated over time by the groundwater treatment system; therefore, no verification sampling will be undertaken for soils remaining below 3 feet. The soils remaining along the perimeter of the South Disposal Area have been adequately characterized during past investigations at the site, therefore, no additional verification sampling will be performed in these areas.

6.1.1.2 Genesee Valley Park

The GVP has been segregated into approximate 50-foot by 50-foot grids for verification sampling. Grab samples will be collected from zero to 6 inches below ground surface from within each grid as shown on Figure 6-1 and composited into one sample for the grid according to the procedures outlined in Appendix D. Portions of each grab sample will be containerized and stored under controlled conditions for confirmatory analysis, if necessary. The composited sample will be containerized and transported to an independent, NYSDOH-approved laboratory for analysis of PCBs, lead and cadmium.

6.1.1.3 Training Grounds Area

The TGA has been divided into approximate 50-foot by 50-foot grids for verification sampling. Grab samples will be collected from zero to 6 inches below ground surface from within each grid as shown on Figure 6-2 and composited into one sample for the grid according to the procedures outlined in Appendix D. Portions of each grab sample will be containerized and stored under controlled conditions for confirmatory analysis, if necessary. The composited sample will be containerized and transported to an independent, NYSDOH-approved laboratory for analysis of PCBs, lead and cadmium.The composited sample will be containerized and transported to an independent, NYSDOH-approved laboratory for analysis of PCBs, lead and cadmium. VOCs will be analyzed only in the vicinity of MW-14S. Five grab samples for VOC analysis will be collected from the grid surrounding MW-14S and transported to the laboratory for compositing under controlled conditions and analysis



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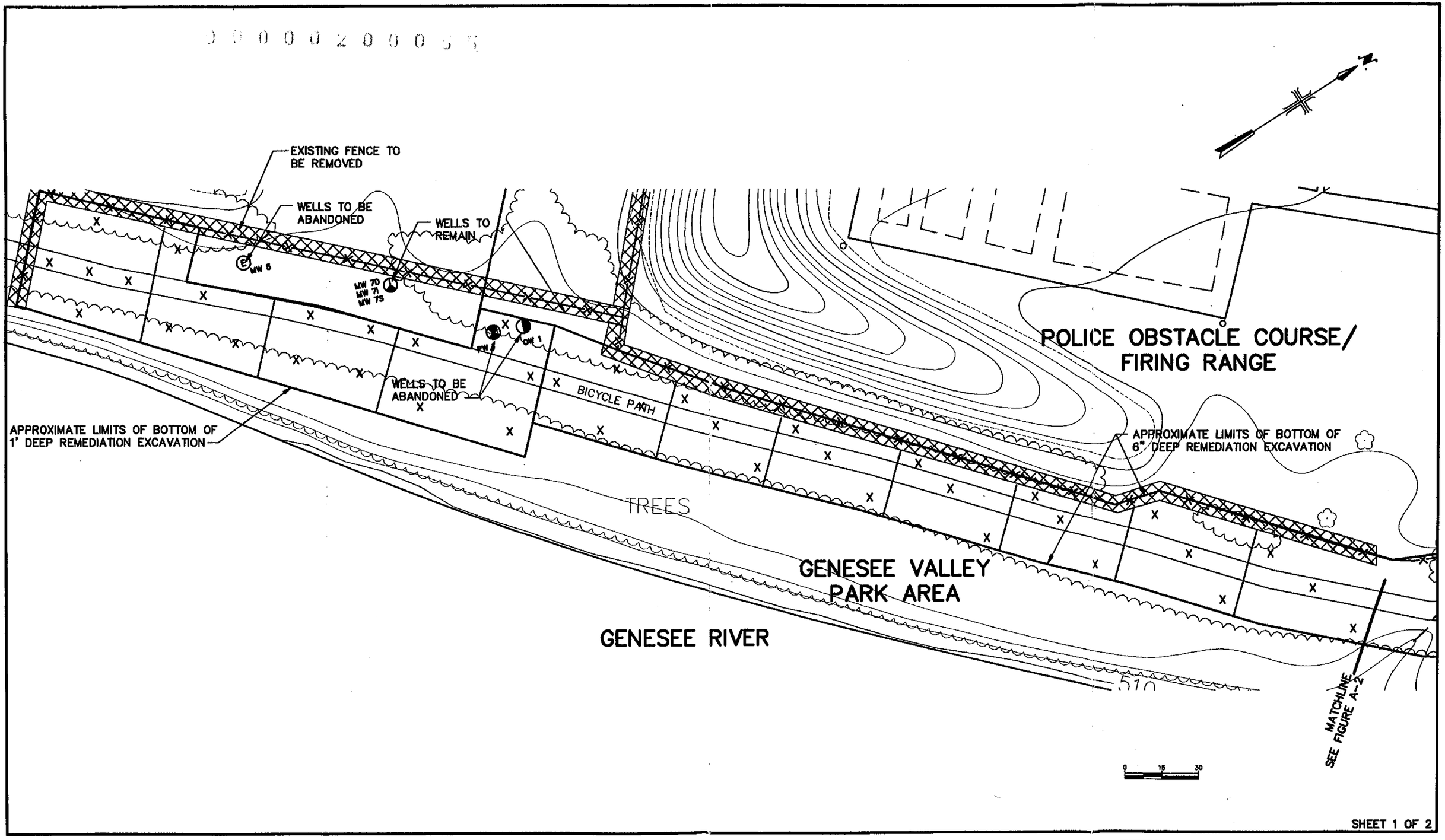
ROCFIGA3

FIRE TRAINING ACADEMY
VERIFICATION SAMPLING LOCATIONS
TRAINING GROUNDS AREA

CITY OF ROCHESTER
DEPARTMENT OF ENVIRONMENTAL SERVICES

JANUARY 1994



SHEET 1 OF 2

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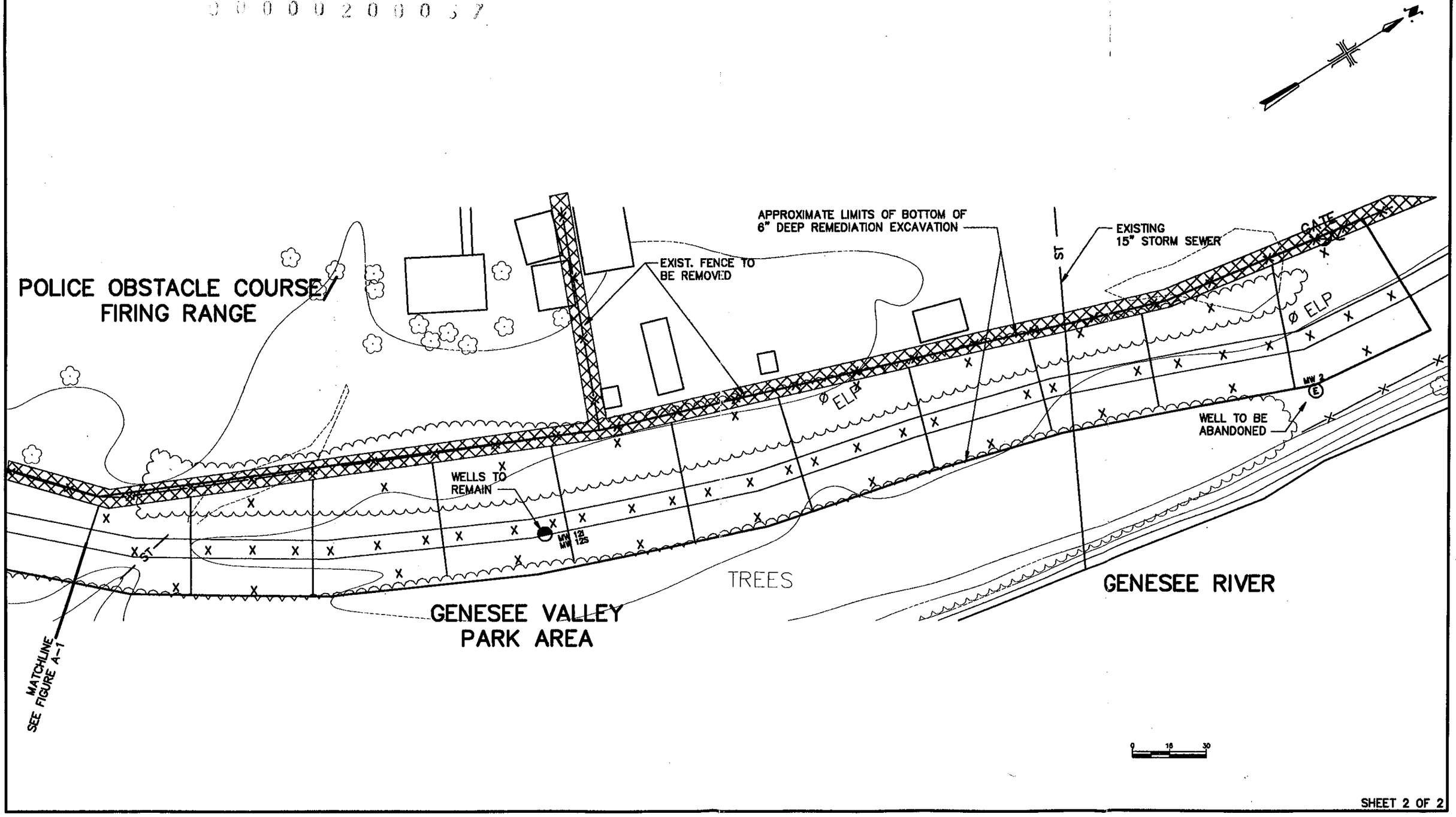
ROCFIGA1

FIRE TRAINING ACADEMY
VERIFICATION SAMPLING LOCATIONS
GENESEE VALLEY PARK AREA

CITY OF ROCHESTER
DEPARTMENT OF ENVIRONMENTAL SERVICES

JANUARY 1994



SHEET 2 OF 2

MALCOLM PIRNIE

ROCFIGA1

FIRE TRAINING ACADEMY
VERIFICATION SAMPLING LOCATIONS
GENESEE VALLEY PARK AREA

CITY OF ROCHESTER
DEPARTMENT OF ENVIRONMENTAL SERVICES

JANUARY 1994

of target compound list volatiles. It is anticipated that only the grid surrounding MW-14S will require sampling for VOCs.

6.1.2 Excavated Soils

6.1.2.1 South Disposal Area

Soils will be formed into lifts for the purpose of conditioning following the excavation step. The lifts will be segregated according to soil type (e.g., incineration residue, native soils, reworked soils), and will not be combined during any of the conditioning or solidification/stabilization steps to avoid cross-contamination of materials. The lifts will be sampled by the contractor to determine the appropriate treatment requirements. A minimum of five (5) representative grab samples will be collected from across the lift to characterize the materials immediately following formation of the lift and submitted to a NYSDOH-approved analytical laboratory for compositing (under controlled conditions) and analysis for target compound list (TCL) volatile organics. In addition, a field composite will also be prepared from aliquots of the grab samples (in accordance with the Standard Operating Procedure in Appendix D) and sent to the analytical laboratory for analysis of PCBs and lead. The results of the VOC analysis will be summed to determine the total VOC concentration in the lift. A total concentration of 10 mg/kg or greater will necessitate soil conditioning. The PCB and lead results will be evaluated against the criteria presented in Table 1-1 to determine if solidification/stabilization is needed after conditioning and to determine the proper disposal location (i.e., on-site or off-site in a secure landfill).

6.1.2.2 Training Grounds Area

With the exception of a small quantity (viz., 175 cubic yards) of TGA soils known to contain VOCs, the excavation plan for the TGA is based on exceedance of PCB and/or lead cleanup goals of 10 and 250 mg/kg, respectively. All other soils excavated from the TGA will be staged prior to solidification/stabilization in batches. Soil batches will be formed from the same general area of excavation and anticipated contaminant concentration, and will not be mixed with soils from other portions of the TGA. Each batch will be sampled by the contractor to determine initial PCB and lead concentrations. Five representative grab samples will be collected from the batch and composited into one sample according to the procedures outlined in Appendix D. The composited sample will

be containerized and transported to an independent, NYSDOH-approved laboratory for analysis of PCBs and lead. Soil batches having an initial PCB concentration equal to or greater than 50 mg/kg will be designated for off-site disposal and will be subject to further analysis as required by the disposal facility. Soil batches having an initial PCB concentration less than 50 mg/kg will be designated for on-site disposal in the NDA following solidification/stabilization. Soil batches will remain segregated and intact throughout the characterization, staging and treatment process. Soils designated for off-site disposal will remain separate from soils designated for on-site disposal throughout the staging, treatment and disposal steps.

6.1.3 Conditioned Soils

Following soil conditioning, five (5) representative grab samples will be collected by the contractor from across the lift and sent to the analytical laboratory for compositing and analysis of total VOCs and TCLP VOCs. In addition, soils having initial PCB concentrations above 50 ppm will be sampled and analyzed in accordance with the requirements of the off-site disposal facility. If the leachable toxicity limits are met for all the volatile organic parameters regulated under 40 CFR Part 261 and total VOCs are less than 10 mg/kg, then conditioning of the lift may be discontinued. On-site measurements such as headspace analyses or portable GC testing may be used at the discretion of the contractor during the conditioning step to provide an indication of the progress of the conditioning, however analytical testing for toxicity characteristic volatiles by an independent, NYSDOH-approved laboratory will be required to demonstrate successful treatment of each lift.

6.1.4 Solidified/Stabilized Soils

During the performance demonstration testing, the contractor will establish values for real-time process control indicator parameters which result in a solidified/stabilized soil product which meets TCLP limits for lead and cadmium. These real-time process control parameters will be monitored during full scale operation in lieu of conducting TCLP analyses on each batch of soil. The engineer will collect a minimum of three samples of the treated soil over the course of the remediation for TCLP lead and cadmium analysis as a QA measure. A composite consisting of five (5) grabs of the solidified soil will be collected,

crushed (if necessary), and sent to a NYSDOH-approved analytical laboratory for TCLP analysis.

6.1.5 Analytical Methodology

All laboratory analyses will be performed by a NYSDOH ELAP-certified laboratory. Table 6-2 identifies the method, method reference, holding time, preservative and container specifications for the required soil analyses.

6.2 PHYSICAL QA/QC TESTING

All soil geotechnical QA/QC testing will be performed by the engineer. Samples for these tests will be collected by the contractor and forwarded by the contractor to the engineer's designated laboratory. All concrete and bituminous paving QA/QC sampling and testing will be conducted by the contractor. Geomembrane field testing will be conducted by the contractor, with verification testing to be conducted by the engineer.

6.3 CLOSURE AND RESTORATION

After an area has been remediated and remediation has been verified by sampling, the area will be closed and restored. Closure and restoration of the SDA, GVP and TGA are discussed below. The closure and restoration of the NDA was discussed previously in Section 5.5.

6.3.1 South Disposal Area

Following excavation and conditioning of SDA soils, and verification of unexcavated soils in the GVP and MW-14S area of the TGA, the SDA will be closed. All containment and emission control equipment will be decontaminated, decommissioned and removed from the site by the contractor. Clean off-site fill will be imported, compacted and graded as necessary to meet the design requirements. To protect against intrusion of flood waters during a 100-year storm event, the elevation of portions of the SDA will be raised above the 100-year flood plain with imported fill. The soil will be seeded and planted to promote vegetation and prevent surface erosion.

TABLE 6-2
ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

ANALYTICAL METHODS & PROTOCOLS FOR SOILS VERIFICATION SAMPLING

Parameter	Method	Method Ref.	Holding Time	Preservation	Container
Target Compound List VOCs	8240	(1)	14 days	Cool to 4°C	2-40 ml. VOA vials w/ Teflon-lined septa
PCBs	8080	(1)	7 days to extraction; 40 days to analysis	Cool to 4°C	1-8 oz. glass jar w/ Teflon-lined lid
Lead Cadmium	6010 6010	(1) (1)	180 days	Cool to 4°C	1-8 oz. glass jar
TCLP VOCs	1311	(2)	14 days to extraction; 14 days to analysis	Cool to 4°C	1-4 oz. glass jar w/ Teflon-lined lids
TCLP Lead TCLP Cadmium	1311 1311	(2)	180 days to extraction; 180 days to analysis	Cool to 4°C	1-4 oz. glass jar

Notes:
(1) USEPA SW-846, "Test Methods for Examining Solid Waste, Physical/Chemical Methods," 3rd Edition, 1986.
(2) TCLP Methodology from SW-846, Revised November 1990.

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6.3.2 Genesee Valley Park

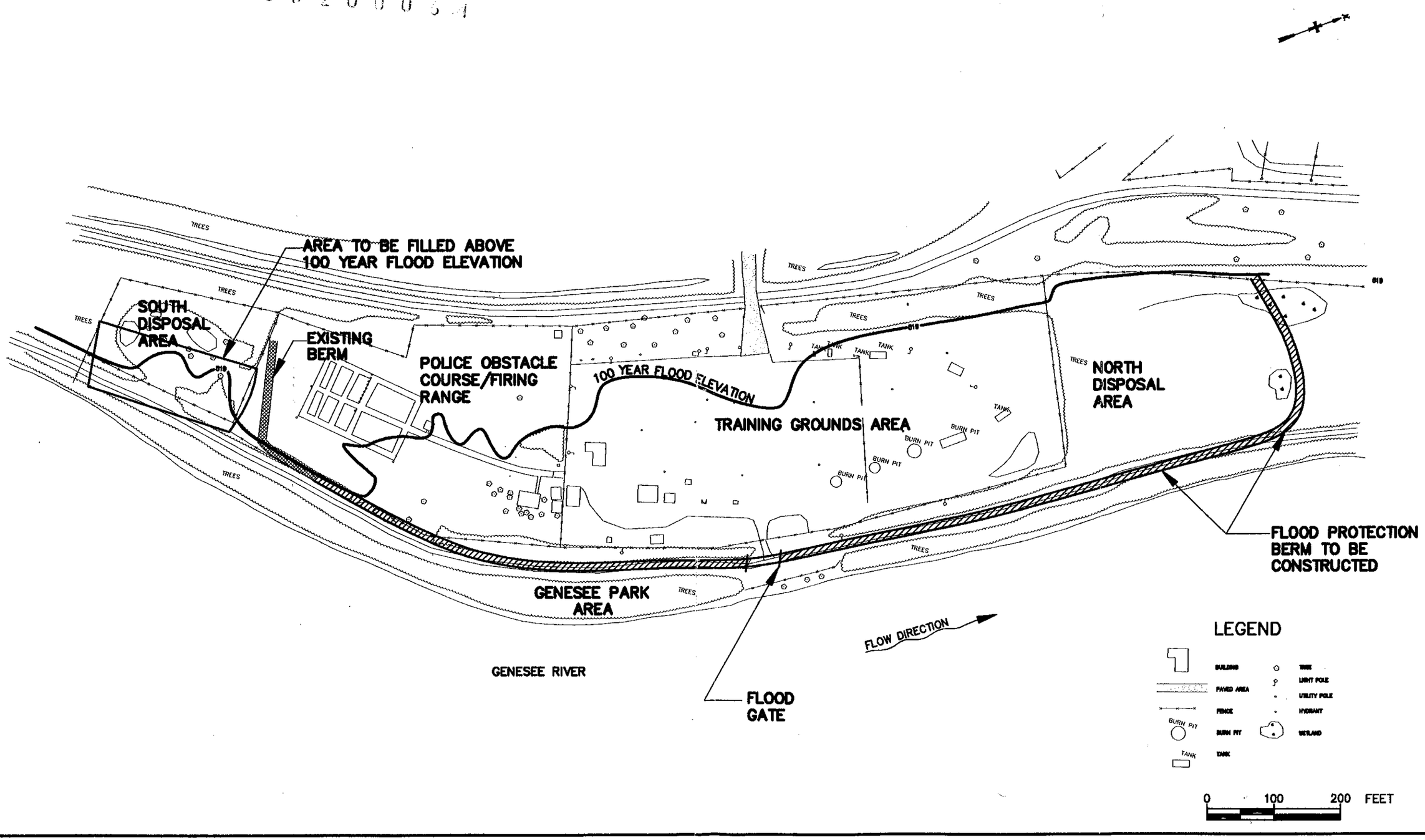
Following remediation of the GVP soils, clean off-site fill will be placed and compacted in the excavated depressions and covered with a minimum of six inches of topsoil. These areas, as well as all other portions of the GVP affected by the remedial work will be seeded and replanted with appropriate species of trees and shrubs to promote vegetation and mitigate erosion. The bicycle path will be restored to its original condition in anticipation of re-opening the GVP to the public following completion of the site remediation.

6.3.3 Training Grounds Area

Following treatment of the TGA and SDA soils, all solidification/stabilization equipment will be decontaminated as necessary, decommissioned and removed from the site by the contractor, and the facilities improvements discussed in Section 5.4.3 will be completed. Clean off-site fill will be imported, compacted and graded as necessary to meet the asphalt cover design requirements. The asphalt cover system as shown on Sheet G-9 will then be constructed across the TGA, which will serve to mitigate infiltration of precipitation and prevent direct human contact with underlying soils. The asphalt cover system will be constructed in accordance with applicable specifications for paved areas in order to facilitate future fire and police training exercises.

6.4 BERM

An analysis of the floodplain in the vicinity of the Rochester Fire Academy was conducted by the Army Corps of Engineers. According to this study, the limits of the 100-year floodplain in the vicinity of the site is at an elevation of 519 feet above sea level, illustrated in Figure 6-3 (Personal communication, U.S. Army Corps of Engineers, 1990). To prevent flooding of portions of the remediated site which will have elevations below the 100 year flood plain (el. 519 FMSL), an approximately 5-foot high earthen berm will be constructed along the eastern perimeter of the Fire Academy property as illustrated on Figure 6-3 and Sheet G-2. The berm will extend from the NDA to the Police Firing Range (PFR) where it will be graded into the existing PFR berm. The berm will also enclose the northern portion of the NDA and will be tied into the existing grade west of the NDA to



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ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT
100 YEAR FLOOD PROTECTION PLAN

CITY OF ROCHESTER, NEW YORK JUNE 1993

prevent upgradient storm water runoff from contributing to site runoff. In addition to providing flood protection, the berm will provide an aesthetic barrier between the GVP and the Fire Academy, thereby providing security during training exercises. The berm will be constructed in approximately the same location as the existing security fence, and the security fence will be moved to the toe of the berm on the Genesee Valley Park side (i.e., to the east of its present location). The berm will be approximately 6 feet wide at the top, and will have side walls on a 1:2 slope resulting in a 30-foot wide base. The slope of the berm will prevent trespassers from scaling the security fence. A drain pipe fitted with a backflow preventer will be installed through the berm to prevent ponding on Fire Academy property, as discussed in Section 6.4. In addition, an access ramp will be installed through the berm opposite the existing security fence gate between the TGA and the GVP, which will allow Fire Academy personnel continued access to the Genesee River for training exercises. The berm will be vegetated to prevent erosion and maintain the natural aesthetics of the GVP.

As discussed in Section 6.2.1, the elevation of portions of the SDA will be raised above the 100-year flood plain with imported fill to prevent the intrusion of flood waters during a 100-year flood event.

6.5 SITE STORM WATER MANAGEMENT

The proposed storm water collection system is shown on Sheets G-7, G-9, and G-10 for the Police Obstacle Course/Firing Range, TGA, and NDA, respectively. The existing storm water collection system in the Fire Academy Entrance Area, which includes training classrooms and offices, mechanic shop, fire station, parking lot, and paved road, is shown on Sheet G-4.

The capacity of the existing Rochester Fire Academy storm water collection system will be upgraded to handle increased storm water runoff resulting from the construction of the TGA and NDA caps. The new system is designed for storm water flows during the 25-year storm event in the Fire Academy Entrance Area, TGA, Police Obstacle Course/Firing Range, and NDA. Storm water flow during the 25-year storm event (18.6 cfs) was calculated using the Rational Method with Rainfall Intensity Curves for Monroe County, NY prepared

by the Monroe County Planning Council. The proposed storm water collection system and modifications to the existing system are presented in the following subsections.

6.5.1 Existing Storm Water Collection System

The proposed storm water collection system will connect to the existing system at the proposed drainage structure No. 1. All existing pipes, catch basins, and manholes at and downstream (south) of the drainage structure No. 1 will be removed. The existing 15-inch and 30-inch RCP storm sewer pipes located near the TGA entrance will be connected to the proposed system at drainage structure No. 1 (see Sheet G-13). Drainage structure No. 1 will be a 10-foot deep, 5-foot diameter precast concrete manhole and will replace the existing masonry manhole.

The new 15-inch RCP storm sewer pipe, which will replace the existing 15-inch PCP pipe, will extend approximately 250 feet east from drainage structure No. 1 and connect to drainage structure No. 2. located near the center of the TGA. All new sewer pipe will be installed to invert elevations shown on the Sheets G-13 and G-14 and buried with a minimum of 4½ feet of cover to prevent upheaval from frost action.

6.5.2 Training Grounds Area

Sheet flow across the western half of the TGA cap will be intercepted by a 2-foot wide rectangular reinforced concrete channel connected to drainage structure No. 2. The channel will extend approximately 440 feet to the north and 135 feet to south of the drainage structure No. 2. Heavy duty cast iron inlet grating will be provided to allow vehicular travel over the length of the channel.

Drainage structure No. 2 will be a 7½-foot deep, 5-foot diameter precast concrete manhole that will receive storm water flow from the channels and the 15-inch storm sewer pipe from drainage structure No. 1 (see Sheet G-13). Storm water collected in drainage structure No. 2 will discharge into a new 21-inch RCP pipe. The new 21-inch pipe, which will replace the existing 15-inch pipe, will extend approximately 140 feet to the east and connect to the proposed drainage structure No. 3.

Drainage structure No. 3 will collect storm water from the new 21-inch pipe and from 2-foot wide reinforced concrete channels along the entire length of the eastern edge of the TGA cap. The channels will intercept sheet flow across the eastern half of the TGA.

The channels will be installed to the invert elevations shown on the Sheet G-9. Heavy duty cast iron inlet grating will be provided to allow vehicular travel over the length of the channel. Storm water runoff from the NDA will flow through the northeastern channel into drainage structure No. 3. All flow collected in drainage structure No. 3 will discharge into the Genesee River through a new 135 foot long, 27-inch diameter RCP pipe which will replace the existing 15-inch pipe. The new pipe will terminate at a reinforced concrete headwall and discharge into the river (See Sheet S-3). A 27-inch diameter check valve will be installed on the end of the pipe to prevent backflow from the river.

Drainage structure No. 3 will be a rectangular reinforced concrete structure with two compartments separated by a reinforced concrete wall and a sliding gate (see Sheet G-14). The top of the drainage structure No. 1 (elev. 522.0 FMSL) will be 3 feet above the 100-year flood elevation (elev. 519.0 FMSL) and 4 feet above finished grade (elev. 518.0 FMSL). Storm water from the 21-inch diameter pipe and the two rectangular concrete channels will flow into the upstream compartment, through the open sliding gate, and into the downstream compartment. The downstream compartment will be equipped with a weir that will act as an oil/water separator, intercepting any petroleum product spills that may occur in the TGA and the Fire Academy Entrance Area. In the event of high water level in the River (e.g. 100-year flood elevation), the 27-inch diameter pipe may require surcharge to create adequate head through the pipe to allow storm water to discharge through the pipe. To accomplish this, the slide gate would be closed, preventing flow into the downstream compartment, and the storm water pumped from the upstream compartment over the concrete separation wall into the downstream compartment. The downstream compartment would be filled with storm water to a level to create sufficient head to discharge the storm water through the 27-inch diameter pipe.

6.5.3 North Disposal Area

Storm water runoff from the NDA will be collected by an earthen channel around the perimeter of the NDA cap. The trapezoidal channel along the northern, eastern, and western limit of the cap will have a 2-foot base width and be constructed between the outermost limit of the cap and the inside toe of the earthen berm to the invert elevations as shown on Sheet G-10. The side slopes of the channel will be 3:1 and 2:1 on the cap-side and berm-side of the channel, respectively. The V-shaped channel along the southern limit

of the cap will have 2:1 side slopes and one-foot minimum depth. The channels will carry flow to the southeastern corner of the NDA where the channel transitions into the 2-foot wide rectangular concrete channel. Riprap will be limited to the transition area since flow velocities in the channel during the 25-year storm event are not anticipated to cause significant erosion.

6.5.4 Police Obstacle Course/Firing Range

The existing 12-inch diameter corrugated metal pipe that drains the Police Obstacle Course/Firing Range to the Genesee River will be replaced with a 12-inch diameter reinforced concrete pipe. The new pipe will extend from a low point on the inside toe of the proposed berm and extend 140 feet to the Genesee River. The pipe will terminate at a reinforced concrete headwall discharge into the River. A 12-inch diameter check valve will be installed on the end of the pipe to prevent any back flow from the River.

6.5.5 South Disposal Area, Genesee Valley Park Area, and Access Road

The topography of the existing SDA and GVPA drains surface runoff into the Genesee River. Proposed contours in the SDA and GVPA will either follow existing topography or will be graded to drain surface runoff into the river. The proposed access road will be sloped to drain surface runoff into the Ancestral Genesee Valley Canal.

7.0 GROUNDWATER COLLECTION AND TREATMENT SYSTEMS

7.1 GENERAL

The remediation of contaminated groundwater in the South Disposal Area will be accomplished using a permanent groundwater collection and treatment system. A groundwater collection trench will interrupt off-site migration of contaminants in the overburden waterbearing zone. Contaminated groundwater will be pumped for on-site treatment. The primary contaminants requiring removal are VOCs. Because PCBs have been detected sporadically in the South Disposal Area groundwater, the treatment system has been designed to incorporate PCB removal as well. Treated groundwater will be discharged to the sanitary sewer. The City of Rochester has obtained a Sewer Use Discharge Permit from the Monroe County Pure Water Division through submittal of a permit application prepared by Malcolm Pirnie.

The site remediation contractor will be responsible for the construction of the groundwater collection and treatment system. Construction will commence prior to the remediation of the SDA discussed in Section 5.2. The collection and treatment system will be available for use by the contractor during SDA dewatering to reduce overall project cost. If the contractor chooses to utilize the treatment system to treat groundwater produced by dewatering, the contractor shall be required to obtain a modification of the existing groundwater treatment system permit. Operation and maintenance of the system following completion of construction will be the responsibility of the City of Rochester.

7.2 COLLECTION TRENCH

A groundwater collection trench will be installed within the South Disposal Area to collect overburden groundwater. The objective of the collection trench is to maintain an inward hydraulic gradient in the overburden water-bearing zone within the South Disposal Area to mitigate off-site contaminant migration (overburden groundwater currently discharges to the Genesee River). As presented on Sheet G-7, the collection trench will be 200 feet in length and extend to a depth of 22 feet below ground surface. The collection trench is comprised of a six-inch diameter slotted drain pipe enveloped in permeable backfill

material. The drain pipe is connected to a 24-foot deep collection sump located mid-way across the length of the drain. Groundwater will be collected in the sump and pumped via force main for on-site treatment. The void space between the connection with the drain and the bottom of the sump will collect any mobile dense non-aqueous phase liquid that may enter the collection sump via the drain pipe. Groundwater levels within the trench will be monitored in piezometers installed within the trench backfill material between the collection sump and the end of the trench. Maintenance of the drain pipe may be conducted through cleanouts located on the ends of the collection trench. During operation of the collection trench, the head level in the sump will be maintained at a level that will permit the drain pipe to be operated in a flooded condition to minimize fouling of the collection pipe.

To provide contaminant capture in the overburden water-bearing zone, computer model simulations indicate that steady-state flow rates for the trench will be approximately 7 gpm with the hydraulic head level maintained at an elevation of 500 feet above mean sea level (approximately 14 feet of drawdown). Transient flow rates at initial start-up and during wet weather events may be several times greater than the steady-state flow rate. These flow estimates are based on hydraulic data collected from wells in the vicinity of the groundwater collection trench. Actual flow rates may be higher or lower based on the hydraulic conductivity of the soils in the immediate vicinity of the trench.

7.3 CONCEPTUAL TREATMENT PROCESS DESIGN

The groundwater treatment process is illustrated schematically on Sheet M-1. The basis for design of the system is presented in Table 7-1.

Collected groundwater will be conveyed to the treatment system via a buried PVC pipeline. The first step in the treatment process will be an addition of a linear poly-phosphate sequestering agent. The sequestering agent complexes with iron, manganese and hardness (calcium and magnesium) ions, thus minimizing scale build-up in process equipment. The groundwater will then pass though a bag filter to remove particulates (such as silts) which could accumulate in the feed tank or foul the activated carbon beds. During dewatering of the collection trench soils, one of the two bag filter vessels may be fitted with oil adsorbing bags to remove non-aqueous phase liquid (NAPL) which may enter the

treatment system. Use of the oil adsorbing bags may be continued during normal groundwater treatment operations should NAPL be present on an on-going basis.

The filtered groundwater will be discharged into a 1500 gallon feed tank, which will provide hold-up volume should the City desire to operate the treatment process in a batch mode at a future date. In addition, process or floor washdown water collected in the building sump will be pumped to the feed tank for subsequent treatment. The contents of the feed tank will be pumped to a low-profile air stripper using one of two centrifugal feed pumps.

The low-profile air stripper will effect the removal of volatile organic compounds from the groundwater via countercurrent contact of the groundwater with a 900 cubic foot per minute (cfm) air stream. Air will be drawn from outside the treatment system enclosure and discharged to the atmosphere through a 24-foot high (above-ground level) stack. After flowing across the air stripper trays, the groundwater is collected in the air stripper sump and pumped to the activated carbon system, which will be required to remove PCBs which may be found in the groundwater. Effluent from the activated carbon units will be collected in a 1500-gallon discharge tank prior to being pumped to the sanitary sewer located near the Fire Training Academy buildings. The discharge pumps will operate in a batch mode, controlled by high and low level indicators in the discharge tank. A flowmeter and totalizer will be installed in the discharge line to monitor the flow from the discharge pumps.

7.4 EQUIPMENT SIZING AND PIPING LAYOUT

The process equipment and piping have been sized to handle a maximum groundwater flow of 40 gpm. Process equipment sizes and materials of construction are summarized in Table 7-2. The treatment system layout is illustrated on Sheets M-2 and M-3.

7.5 TREATMENT SYSTEM ENCLOSURE

The purpose of the building is to provide an environmentally controlled enclosure for process equipment and to provide office facilities for one operator. A clear span rigid frame premanufactured metal building will be utilized. The interior concrete floor will be

TABLE 7-1
ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

GROUNDWATER TREATMENT SYSTEM - BASIS FOR DESIGN

Parameter	Quantity
Maximum Flow Rate	40 gpm
Average Flow Rate	10 gpm
Effluent Quality	<2 mg/L Total Organics, non-detectable PCBs
Operating Mode	Continuous Flow

TABLE 7-2
ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

GROUNDWATER TREATMENT SYSTEM - PROCESS EQUIPMENT SIZING

Component	Size and/or Capacity	Pipe Connection		Material of Construction
		Inlet	Outlet	
Metering Pump	0.004 to 1.7 gal./hr.	¼" ϕ NPT	¼" ϕ NPT	316 SS(1)
Bag Filter	30" ϕ vessel, 8 bags/vessel	2" flange	2" flange	Carbon Steel
Feed Tank	64" ϕ x 127", 1550 gal.	2" bulkhead	2" bulkhead	HDPE(2)
Feed Pump	1 x 1.5 x 7, ¾ hp	1½" FNPT	1" MNPT	316 SS
Air Stripper	4 tray, 75 gpm	2" ϕ female slip joint	2" ϕ female slip joint	304L SS
Activated Carbon	55 gal. drum	2" FNPT	2" FNPT	Steel, epoxy phenolic coated
Discharge Tank	64" ϕ x 127", 1550 gal.	2" bulkhead	2" bulkhead	HDPE
Discharge Pump	1.5 x 2 x 7.5, 2 hp	2" MNPT	1½" MNPT	PVDF (3)(4)
Process Piping	2" ϕ or as required by equipment connections	–	–	Sch. 80 PVC

Notes:
(1) SS = Stainless Steel
(2) HDPE = High Density Polyethylene
(3) PVDF = Polyvinylidene Fluoride Resin
(4) PVDF or other plastic.
(5) Discharge piping will be 3" ϕ

sloped to a centrally-located drain and treated with a chemical floor hardener. A sump with a 1500 gallon capacity will also be provided.

Potable water will be supplied by a new water main. This water service will provide hot and cold water for sanitary fixtures, and equipment wash down throughout the building. Sanitary waste shall be collected within the building and discharged to the nearest sanitary sewer. Phone service will be provided with a phone jack outlet box in the office area and a phone bill outlet box in the process area.

7.6 TREATMENT SYSTEM OPERATION AND MAINTENANCE

The groundwater treatment system has been designed for continuous flow operation with minimal operator attention. To maintain continuous flow operation, minor adjustments to the air stripper pump discharge valve position will need to be made to match the flow rate entering the stripper from the feed tank. The flow rate from the feed pump will be controlled by automatically throttling the discharge line control valve based on the level of groundwater in the feed tank; however, manual adjustment of the control valve in the recirculation line may be required occasionally. Operator attention will be more intensive during system start-up and draw down of the aquifer, and following periods of heavy rainfall, when flow from the groundwater collection trench may fluctuate. A log book of flow rates, air stripper air pressures, upstream and downstream pressures in the filter vessels and activated carbon drums, and general observations should be maintained on a regular basis.

The treatment system components will require periodic maintenance. The supply of sequestering agent will be replaced as necessary, based on usage. Filter bags will be replaced when pressure drop through the filter vessel reaches a predetermined value. Periodic pressure washing air stripper trays will be required based upon air flow pressure drop through the air stripper unit. Based on the iron content of the groundwater during supplemental RI pumping tests, approximately bimonthly cleaning of air stripper trays can be anticipated. Activated carbon drums will be replaced yearly. Pumps and blowers will receive routine maintenance on a yearly basis.

7.7 PROCESS EFFLUENT SAMPLING AND VERIFICATION

Monitoring of the treatment system effluent will be conducted in accordance with the terms of the sewer discharge permit obtained for the treatment system (see Appendix E). Performance testing of the treatment system effluent will be conducted during system start-up. Additional effluent and in-plant monitoring during start-up will be conducted at the contractor's discretion. This section outlines the effluent sampling locations, sampling methodology, analytical methodology and detection limits, and data interpretation for process effluent monitoring.

7.7.1 Sample Locations

The discharge tank will serve as the sampling location for the collection of effluent composite samples. The discharge tank provides a convenient location for collection of composite samples using automatic sampler collection methods. Grab samples can be collected from the tank using a bailer.

Numerous sampling ports have been installed in the treatment train to allow for performance testing of individual unit process components. The sample port at the head of the treatment works will provide a sample of raw groundwater. A sample of filtered groundwater can be collected either from the feed tank or from the air stripper influent sample port. The VOC removal efficiency of the air stripper can be measured by comparing VOC concentrations in samples collected at the air stripper inlet and outlet sampling ports. Sample ports are provided at each activated carbon drum discharge to determine organic removal efficiency and to monitor for potential PCB breakthrough.

7.7.2 Sample Methodology

Sample collection for monitoring of the treatment system effluent in compliance with the industrial discharge permit obtained for the treatment system will be conducted using time-proportional automatic composite sampling techniques. One 24-hour composite sample will be collected for analysis from the discharge tank. Samples for pH, PCBs, acetone, methyl ethyl ketone, methyl isobutyl ketone, 4-methylphenol, and total toxic organic analysis will be collected as grab samples from the discharge tank. Per the Sewer Use Permit, one grab sample will be collected for analysis of the previously mentioned parameters. Sampling

will be conducted in a manner such that the collected samples will be representative of normal treatment process operation and expected pollutant discharges to the sanitary sewer.

7.7.3 Analytical Methodology/Detection Limits

All samples collected for discharge permit monitoring will be analyzed by a New York State Department of Health ELAP-certified laboratory. Table 7-3 identifies the parameters, methods, method references, detection limits, holding times, preservatives and container specifications for analysis of the treatment system effluent in accordance with the Monroe County Pure Waters Districts discharge permit requirements.

7.7.4 Data Interpretation

The daily maximum limits for the discharge permit parameters are presented in Table 7-4. Detection of concentrations above the discharge limits will require shut down of the groundwater treatment process, identification of the malfunctioning unit process, and immediate correction of the malfunction.

MALCOM PIRNIE

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TABLE 7-3
ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT
ANALYTICAL METHODS AND PROTOCOLS FOR GROUNDWATER TREATMENT SYSTEM DISCHARGE MONITORING

Parameter	Method	Method Reference	Holding Time	Preservation	Container
pH	Field		(2)	None	1-500 ml polyethylene bottle
Phosphorus (Total, as P)	365.4	(1)	28 days	H_2SO_4 to pH <2; Cool to 4C	100 ml polyethylene bottle
Total Metals:					1-1 liter polyethylene bottle (Volume satisfies requirement for all metals listed)
Arsenic	206.2	(1)	180 days	HNO_3 to pH <2	
Cadmium	200.7	(1)	180 days	HNO_3 to pH <2	
Chromium	200.7	(1)	180 days	HNO_3 to pH <2	
Copper	200.7	(1)	180 days	HNO_3 to pH <2	
Lead	200.7	(1)	180 days	HNO_3 to pH <2	
Manganese	200.7	(1)	180 days	HNO_3 to pH <2	
Nickel	200.7	(1)	180 days	HNO_3 to pH <2	
Selenium	270.2	(1)	180 days	HNO_3 to pH <2	
Zinc	200.7	(1)	180 days	HNO_3 to pH <2	
Total Toxic Organics:					
Purgeable Halocarbons	601	(1)	14 days	Cool to 4C	2-40 ml glass vials
Purgeable Aromatics	602	(1)	14 days	Cool to 4C	2-40 ml glass vials
Xylene	602	(1)	14 days	Cool to 4C	2-40 ml glass vials
Acid Extractables	625	(1)	7 days to extraction; 40 days to analysis	Cool to 4C	1-1 liter amber glass jug
Base/Neutral Extractables	625	(1)		Cool to 4C	1-1 liter amber glass jug
Pesticides	608	(1)		Cool to 4C	1-1 liter amber glass jug
PCBs	608	(1)		Cool to 4C	1-1 liter amber glass jug
Other Organics:					
Acetone	8015	(3)	14 days	Cool to 4C	2-40 ml glass vials
Methyl Ethyl Ketone	8015	(3)	14 days	Cool to 4C	2-40 ml glass vials
Methyl Isobutyl Ketone	8015	(3)	14 days	Cool to 4C	2-40 ml glass vials
2-Methylphenol	604	(1)	7 days to extraction; 40 days to analysis	Cool to 4C	1-1 liter amber glass jug

Notes:
1. 40 CFR Part 136; Chemical Analysis of Water and Wastewater, EPA 600/4-49-020, Revised March 1983.
2. Conduct test immediately following collection of samples.
3. USEPA SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, September 1986, 3rd Edition.

TABLE 7-4

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

GROUNDWATER TREATMENT SYSTEM
DISCHARGE LIMITS

Parameter	Discharge Limit[1] ppm
Total Metals:	
Arsenic	0.5
Cadmium	1.0
Chromium	3.0
Copper	3.0
Lead	1.0
Manganese	5.0
Nickel	3.0
Selenium	2.0
Zinc	5.0
Phosphorous (Total, as P)	10.0
Total Toxic Organics	2.13
PCBs	BDL [2]
pH (standard units)	5.5 to 10.0
Other Organics:	
Acetone	Monitoring only
Methyl Ethyl Ketone	Monitoring only
Methyl Isobutyl Ketone	Monitoring only
4-Methyl Phenol	Monitoring only

Notes:
(1) Monroe County Pure Waters Districts discharge limits, stated in Rochester Fire Academy Sewer Use Permit (see Appendix E).
(2) BDL = Below Detection Limit.

8.0 PERMITS

The remedial work at the Rochester Fire Academy site will require securing certain permits and approvals prior to construction. Although the remedial work will be performed under a New York State issued Order on Consent and, hence, will be exempt from formal State permits, activities at the site will be subject to equivalent permit conditions. The following permit requirements will apply to the remedial construction at the Rochester Fire Academy site:

- The City of Rochester has obtained an initial Industrial Sewer Use Permit from the Monroe County Division of Pure Waters for discharge of groundwater treatment system effluent to the sanitary sewer (see Appendix E). The Contractor will be required to obtain a modification of the existing discharge permit for any other temporary discharge which may result during remediation activities.

- The contractor must make application for a Permit to Construct/Certificate to Operate for the soil conditioning emission controls, and any air contamination sources associated with solidification/stabilization, from the NYSDEC Division of Air resources. The information and procedures necessary to submit an application are described in detail in the performance specification for the soils volatilization and conditioning. A formal permit, however, will not be issued.

- The City of Rochester must submit applications for a Permit to Construct/Certificate to Operate for the groundwater treatment system air stripper exhaust from the NYSDEC Division of Air resources. A formal permit, however, will not be issued. The applications for the Permit to Construct and Certificate to Operate will be prepared by the engineer for the City of Rochester for subsequent submittal to the NYSDEC.

- The remedial construction activities will disturb more than 5 acres of land, and thus will require a permit for storm water discharge associated with construction activities, subject to confirmation by NYSDEC. The remedial construction activities can be covered under the NYSDEC SPDES General Permit for Storm Water Discharges from Construction Activities. Coverage under the General Permit is obtained by submitting a Notice of Intent (NOI). Preparation of a Storm Water Pollution Prevention Plan (SWPPP) is required also. At the conclusion of construction activities, a Notice of Termination (NOT) must be submitted. The engineer will prepare the NOI, SWPPP, and NOT for subsequent submittal by the City of Rochester to NYSDEC.

- The remedial construction activities at the Rochester Fire Academy site may impact wetlands situated between the Genesee Valley Park bicycle path and the Genesee River. The Army Corps of Engineers (ACOE) and the NYSDEC have joint jurisdiction over wetlands in New York State and require separate permit applications. Obtaining a NYSDEC wetlands permit will entail preparation of a permit application, and possibly, a SEQR long form, as determined by NYSDEC. In addition to a permit application, a field delineation will be required by the ACOE. The engineer will prepare the NYSDEC and ACOE permit applications and SEQR long form, and conduct the wetland delineation, for the City of Rochester's submittal to NYSDEC and ACOE.

- Installation of a stormwater outfall east of the Police Firing Range and modification of the existing stormwater outfall east of the Training Grounds Area will require work in the Genesee River, which is considered to be a navigable waterway. An ACOE permit will be required to perform this work. The permit application package will be prepared by the engineer for submittal to the ACOE by the City of Rochester.

- A building construction permit will be required by the City of Rochester for construction of the groundwater treatment system enclosure. The City of Rochester will obtain the building permit. The contractor will be required to meet with the City of Rochester to review the conditions of the building permit.

- A building demolition permit will be required by the City of Rochester for the demolition of structures in the Training Grounds Area. The City of Rochester will obtain the demolition permit. The contractor will be required to meet with the City of Rochester to review the conditions of the demolition permit.

- An excavation and fill permit will be required by the City of Rochester for excavation and fill activities associated with remedial construction. The City of Rochester will obtain the excavation and fill permit. The contractor will be required to meet with the City of Rochester to review the conditions of the excavation and fill permit.

- A fence construction permit will be required by the City of Rochester for the replacement of the site perimeter fence. The City of Rochester will obtain the fence construction permit. The contractor will be required to meet with the City of Rochester to review the conditions of the fence construction permit.

- A hauling permit may be required by the City of Rochester or Monroe County for the movement of clean fill during remediation activities. Determining the requirement for such a permit, and the application therefor will be conducted by the contractor.

- Electrical and plumbing inspections of the groundwater treatment system will be required by the City of Rochester. The City of Rochester will coordinate these inspections.

- Soils containing PCBs in concentrations greater than or equal to 50 mg/kg will require disposal at an off-site facility. In New York State, wastes contaminated with greater than or equal to 50 mg/kg PCBs are considered hazardous wastes. Each shipment of such soils thus will require a hazardous waste manifest. The contractor will be responsible for preparing manifests and keeping records of all off-site shipments of hazardous waste.

The contractor will be required to submit the necessary information for the soil conditioning emission controls to the NYSDEC immediately following award of the remedial construction contract so as to avoid start-up delays.

9.0 CONTRACT DOCUMENTS

9.1 CONTRACTOR PROCUREMENT

The complex nature of this project combined with the special qualifications required of the Contractor indicate the need for an alternative to the conventional open competitive bidding process for procurement of a Contractor. Research by legal counsel has established that an exception to the General Municipal Law 103 public bidding requirements exists. Specifically, "if the success of the project is substantially dependent on the diligent exercise of prudent judgment in the application of specialized technical or scientific knowledge, experience or management skills by a Contractor in a limited field qualified practitioners" then an exception to the public bidding obligation of General Municipal Law 103 exists. The City of Rochester has determined that the contract for this project will be bid as a Professional Services Agreement. Additionally, based on this "special skills' exception, the City has established that Wick's Law Requirements do not apply to this project. Thus, contract documents prepared for the remedial construction at the Rochester Fire Academy will be structured so that the construction is managed through a General Contractor who will be responsible for coordinating all aspects of the remedial cleanup. In order to ensure a "field of qualified practitioners" the City proposes to prequalify Contractors. The City will publicly advertise a Request for Qualifications in the Dodge Reports and Engineering News Record. Interested Contractors must demonstrate the specified minimum experience, bondability and management skills in order to be allowed to submit a proposal. Once a "short list" of qualified contractors has been established, each contractor will be invited to visit the site and review the 90% complete design drawings and specifications. Contractors' comments or suggestions may then be incorporated into the design documents before the Contractors are invited to submit a proposal. The RFP will specify submittal of separate technical and cost proposals. The City will review the technical portion of the low bid proposal when selecting the Contractor to confirm that the proposal is responsive before awarding the Contract.

All plans and specifications will be signed and sealed by a licensed professional engineer registered in the State of New York and will be prepared in conformance with applicable State and Federal laws, rules and regulations and in conformance with the City

of Rochester's Order on Consent with the NYSDEC. General terms and conditions of the contracts will observe the requirements of the City of Rochester Department of Environmental Services document entitled "Instructions to Design Professionals Regarding Preparation of Construction Contract Documents". The plans will be plotted on 24-inch by 36-inch "bid ready" sheets utilizing Autocadd, Version 12.0. Specifications will be prepared in standard CSI format.

The complete package of contract documents consists of this report as well as:

- 35 sheets of drawings as listed in Table 9-1.
- General and detailed technical specifications as listed in Table 9-2.
- Quality Assurance Plan.
- Health and Safety/Contingency Plan.
- Operation and Maintenance Plan.

TABLE 9-1

ROCHESTER FIRE ACADEMY - REMEDIAL DESIGN ENGINEERING REPORT

INDEX TO SHEETS

Sheet No.	Description	Sheet No.	Description
G-1	Existing Site Plan	A-1	Groundwater Treatment Building - Plans, Sections, and Details
G-2	Proposed Site Plan	A-2	Groundwater Treatment Building - Elevations and Details
G-3	Proposed Demolition Plan - Training Grounds & North Disposal Areas	S-1	Groundwater Treatment Building - Plans, Sections and Details
G-4	Proposed Access Road & Utilities Piping Plan	S-2	Training Grounds Foundations - Plans Sections & Details
G-5	Utilities Piping - Profile, Plan and Details	S-3	Typical Details
G-6	Excavation Plan - South Disposal and Genesee Valley Park Areas	I-1	Instrumentation - Legend
G-7	Proposed Site Plan - South Disposal and Genesee Valley Park Areas	I-2	Groundwater Treatment System - Process Diagram
G-8	Excavation Plan - Training Grounds Area	E-1	Legend, Plans, Details
G-9	Proposed Site Plan - Training Grounds Area	E-2	One Line Diagram and Panel Schedules
G-10	Proposed Plan & Details - North Disposal Area	E-3	Treatment Buildings Power Plan
G-11	Sections and Details - North Disposal Area	E-4	Treatment Buildings Lighting Plan
G-12	Groundwater Collection system - South Disposal Area	E-5	Schematics
G-13	Drainage Structures #1 & #2 - Plans & Sections	E-6	Training Grounds Area - Lighting/Power
G-14	Drainage Structure #3 - Plan, Sections & Details	H-1	Groundwater Treatment Building - HVAC
G-15	Typical Fence & Site Details	P-1	Groundwater Treatment Building - Plumbing
G-16	Typical Piping Details		
G-17	Miscellaneous Site Details		
M-1	Groundwater Treatment System - Process Diagram		
M-2	Groundwater Treatment System - Plan		
M-3	Groundwater Treatment System - Sections and Details		

TABLE 9-2

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

PROJECT SPECIFICATIONS TABLE OF CONTENTS

TABLE 9-2 (Continued)

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

PROJECT SPECIFICATIONS TABLE OF CONTENTS

DETAILED SPECIFICATIONS (Continued)

Division 1 - GENERAL REQUIREMENTS (Continued)

Division 2 - SITE WORK

Division 3 - CONCRETE

TABLE 9-2 (Continued)

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

PROJECT SPECIFICATIONS TABLE OF CONTENTS

TABLE 9-2 (Continued)

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

PROJECT SPECIFICATIONS TABLE OF CONTENTS

TABLE 9-2 (Continued)

ROCHESTER FIRE ACADEMY
REMEDIAL DESIGN ENGINEERING REPORT

PROJECT SPECIFICATIONS TABLE OF CONTENTS

APPENDIXES

10.0 REMEDIAL CONSTRUCTION SCHEDULE

The remediation of the Rochester Fire Training Academy is required to be complete by the end of 1995. It is anticipated that the contract will be awarded in April 1994. The detailed remediation schedule will be determined by the contractor and subject to the City of Rochester's approval as part of the Work Plan approval process.