US Army, Engineering & Support Center
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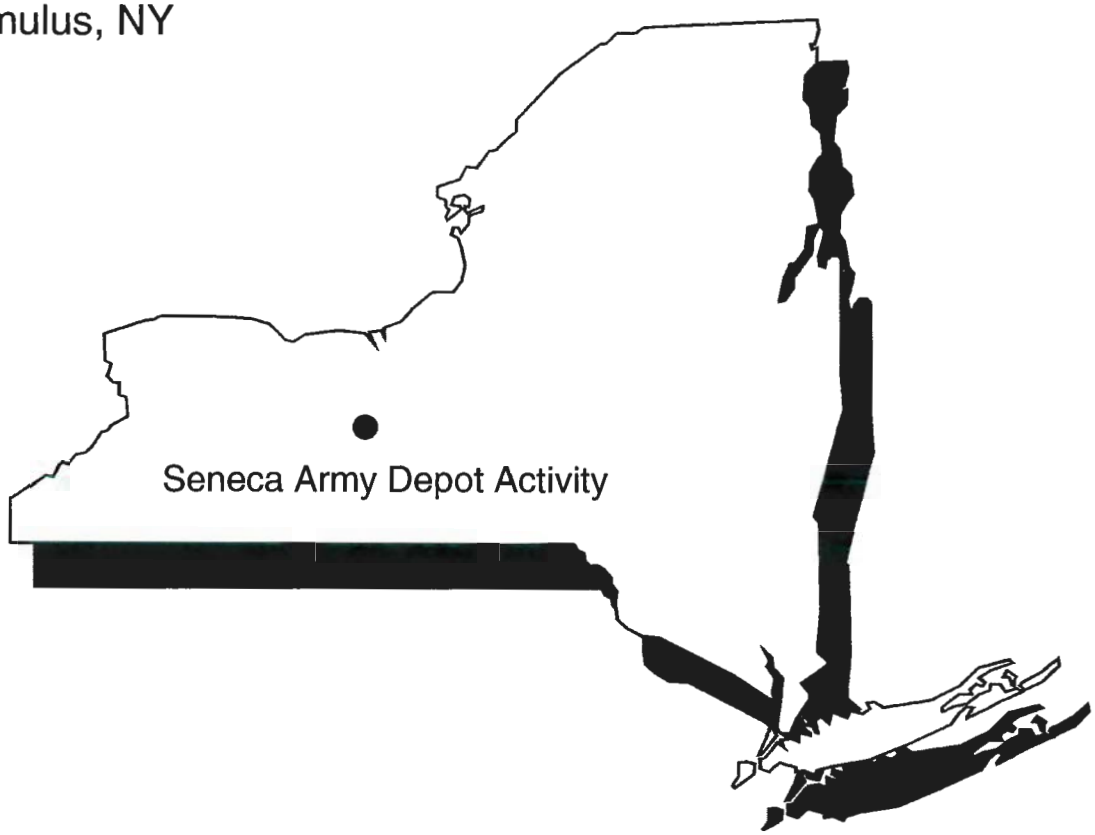
Seneca Army Depot Activity
Romulus, NY



DRAFT

TREATABILITY STUDY REPORT FOR THE AIRFIELD SMALL ARMS RANGE (SEAD-122B)

EPA Site ID# NY0213820830
NY Site ID# 8-50-006
CONTRACT NO. DACA87-95-D-0031
DELIVERY ORDER NO. 0032

Prepared by
PARSONS

APRIL 2004

US Army, Engineering & Support Center
Huntsville, AL

Seneca Army Depot Activity
Romulus, NY

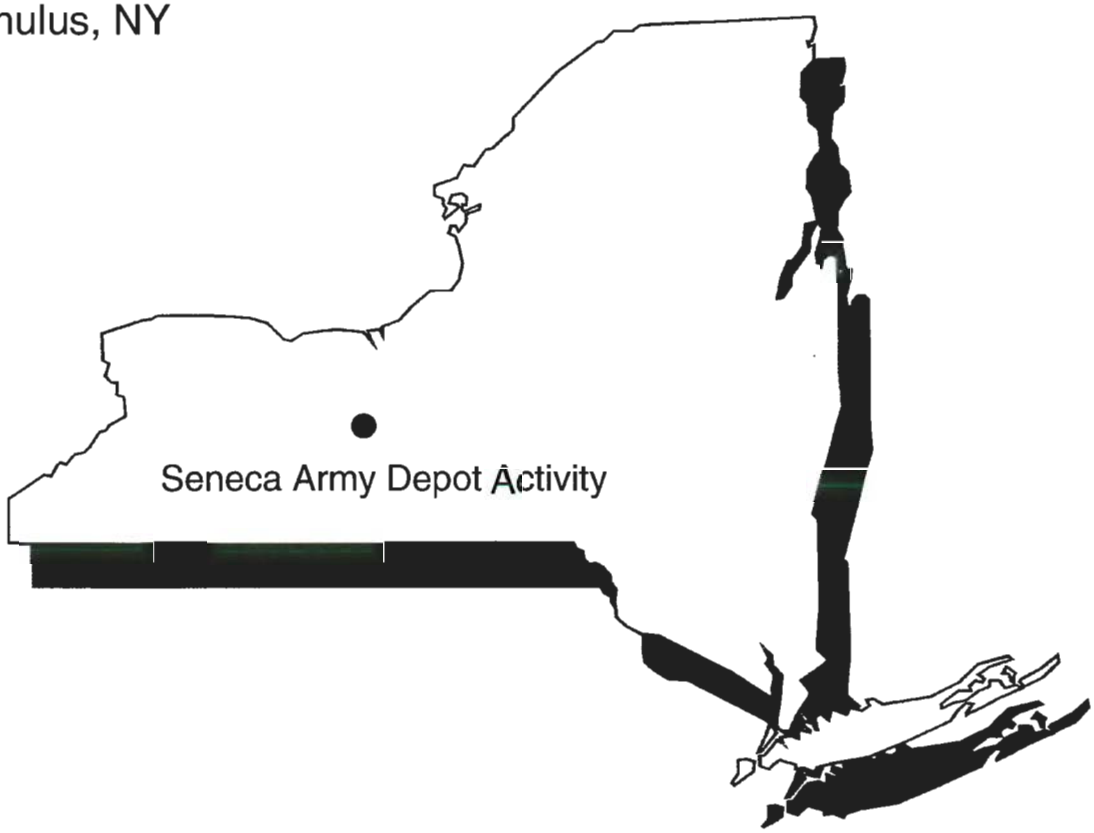


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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Goals 1
1.2 Description of Site 1
1.3 Summary of Previous Investigations 2

2.0 FIELD ACTIVITIES 2
2.1 Demolition of Baffles 2
2.2 Excavation 2
2.3 Mechanical Screening 3
2.4 Environmental Monitoring 3
2.4.1 Dust Monitoring 3
2.4.2 Lead-in-Air Monitoring 3
2.5 Disposal of Excavated Soils 3
2.6 Surveying 4

3.0 SAMPLING AND ANALYSIS 4
3.1 Pre-Screened Soils 4
3.2 Post-Screened Soils 4
3.3 Confirmation Sampling 4
3.4 Waste Characterization 4
3.5 Physical Testing 5

4.0 ANALYSIS OF RESULTS 5
4.1 Mechanical Screening – Physical Properties 5
4.2 Equipment Performance 6
4.3 Effect of Mechanical Screening on Lead Concentrations 6
4.4 Cost Performance 6

5.0 RECOMMENDATIONS 6

6.0 REFERENCES 7

LIST OF FIGURES

Figure 1 Site Location Plan 8

Figure 2 Site Configuration 9

Figure 3 Excavation Areas & Sample Locations 10

LIST OF TABLES

Table 1 Comparison of Pre-Screened/Post-Screened Soil Samples 11

Table 2 Waste Characterization Results 11

Table 3 Final Confirmation Samples 12

Table 4 Cost Performance 13

APPENDICES

(Appendices A, B, & C are on the attached CD)

APPENDIX A DAILY FIELD REPORTS

APPENDIX B DISPOSAL DOCUMENTATION
- **B.1 CONSTRUCTION & DEMOLITION DEBRIS**
- **B.2 CONTAMINATED SOIL**

APPENDIX C ANALYTICAL RESULTS
- **C.1 SOIL RESULTS & WASTE CHARACTERIZATION**
- **C.2 LEAD IN AIR RESULTS**
- **C.3 PHYSICAL PROPERTIES**

APPENDIX D AS-BUILT DRAWING

1.0 INTRODUCTION

The purpose of this report is to describe the details of, and present the findings and conclusions of, a Treatability Study that was conducted at the Small Arms Range (SAR) within the Airfield Parcel (SEAD-122B) at the Seneca Army Depot Activity in Romulus, New York between January 2004 and March 2004. This Treatability Study was performed to assess and evaluate the effectiveness of mechanical "dry" screening as a means of reducing the total lead concentration in soils contaminated by lead bullets. Mechanical screening was conducted with full size construction equipment, as opposed to bench-scale testing.

The soil chosen for the study was excavated from isolated areas within the SAR where concentrations of lead found during the site investigation conducted in 2002 (Parsons 2002) were greater than 400 parts per million (ppm).

The overall findings and conclusions of this study were that while mechanical screening worked to a limited degree, the screening did not reduce the total lead concentrations in the screened fractions, nor were any bullets recovered.

1.1 Goals

The following goals for the effectiveness of treatment were established for the Study in the Final Treatability Study Work Plan (Parsons 2003):

- Comparing the total lead concentration of treated soils (post-screening) with untreated soils (pre-screening);
- Determining the weight of recovered bullets and bullet fragments in pounds; and;
- Assessment of the costs of operations.

Additionally, sampling and analyses were to be completed to assess the soil quality in the excavation areas.

The Army submits that all of the goals for the study were achieved and the results and conclusions of this effort are presented and summarized within this report.

1.2 Description of Site

The Airfield SAR is located within the Seneca Army Depot Activity (SEDA), a 10,587 acre facility that is located in Seneca County, Town of Romulus, New York (Figure 1). SEDA was owned by the United States Government and operated by the Department of the Army between 1941 and 2000; the Depot's mission was terminated on September 30, 1999, and the installation closure date was September 30, 2000. Since early 2000, portions of the former Depot have been transferred or leased to other parties including the Federal Government, the State of New York Department of Corrections and the Seneca County Industrial Development Authority. Beginning with the construction of the Depot in 1941, SEDA's primary mission was the receipt, storage, maintenance and supply of military items.

The area encompassing the Airfield SAR has been owned by the US Government since 1941 and operated by the Navy (1942 – 1946), the Air Force (1950 – 1956) and the Army (1958 – 2000). The Airfield SAR was used since the 1950s for small arms range qualification of base and security personnel.

The Seneca Airfield SAR consists of two bermed small arms ranges, one used for small arms and the second for machine gun targeting (Figure 2). The small arms range and machine gun firing range berms are approximately 28 feet in height and comprised of brown to dark brown to gray, silt with clay with interbedded shale, and traces of fine sand and fine to medium gravel. The soil description is based on the drilling of seven soil borings through the top of the berms in June 2002 (Parsons, October 2002).

1.3 Summary of Previous Investigations

The Army conducted a Site Characterization Study of the SAR between June and July 2002. The results of the Site Characterization Study indicated no impacted groundwater at or adjacent to the site, but some elevated lead concentrations were detected in soil along portions of the berm perimeter and in isolated areas on the range floor and drainage swale (Figure 3). Lead was identified as the major constituent of concern.

2.0 FIELD ACTIVITIES

The following paragraphs describe the field activities conducted during the Treatability Study. Daily Field Reports describe the field activities in detail, and are included in Appendix A.

2.1 Demolition of Baffles

The wooden baffles on the range floor between the shooter platform and the impact berm were demolished. Approximately 331 tons (18 loads) of debris was disposed of off-site, as non-hazardous construction and demolition (C&D) debris at the Ontario County Landfill in Stanley, NY. The disposal documentation for the C&D debris is presented in Appendix B (B.1).

2.2 Excavation

A hydraulic excavator was used to mechanically excavate soils from several locations at the SAR. Approximately two feet of soil (approximately 200 cubic yards) was excavated from the impact face (western) of the backstop berm areas. Approximately twelve inches of soil (approximately 11 cubic yards) was excavated from the bottom of the south drainage swale. Approximately twelve inches of soil (approximately 5 cubic yards) was excavated from the bottom of the north drainage swale. Approximately three inches of soil (approximately 540 cubic yards) was excavated from the range floor. See Figure 3 for the extent of the excavation areas. Excavated soils from the impact berms and swales were placed into three separate stockpiles and sampled prior to mechanical screening.

2.3 Mechanical Screening

A commercially available Nordberg SW348 power screen was used to screen the three stockpiles of excavated soils (approximately 200 cubic yards). The soil was placed onto the screens by the excavator and was mechanically shaken. Two screen sizes (1-inch and 0.5-inch openings) were tested during the process. The screening would separate the untreated soil into two sized processed piles.

In the first test, there was a pile passed through the 1-inch screen and a second pile that contained soil that failed to pass through the 1-inch screen.

In the second test, the 1-inch screen test was repeated but the number of screening passes was increased. This test also resulted in a pile that passed the 1-inch screen and a pile that failed to pass through the 1-inch screen.

In the third test, there was a pile that passed through the 0.5-inch screen and a second pile that failed to pass through the 0.5-inch screen.

2.4 Environmental Monitoring

2.4.1 Dust Monitoring

Dust monitoring was conducted with real-time aerosol monitors during field activities. Dust was periodically monitored, downwind of the work area at temporary particulate monitoring locations.

No dust levels were recorded in excess of the 5mg/m3 action level set in the Treatablility Study Work Plan.

2.4.2 Lead-in-Air Monitoring

Breathing zone air samples were collected during the initial intrusive (excavation and screening) work at the SAR. Each sample was collected using a sampling system that consisted of a personnel sampling pump and a filter cassette. Recovered samples were sent to Galson Laboratories in East Syracuse, NY for lead in air analysis.

Lead exposure was shown to be below action levels. Lead monitoring data is included in Appendix C (C.2).

2.5 Disposal of Excavated Soils

All soils excavated and used in the Treatability Study were transported off-site and disposed of as non-hazardous waste. A total of 35 truckloads, 1,197 tons were disposed of at News of New York Landfill in Stanley, NY. Copies of the waste manifests and weigh tickets are included in Appendix B (B.2).

2.6 Surveying

Locations where confirmation samples were collected were surveyed by Deborah A. Naybor, PLS, P.C. of Alden, N.Y. In addition, final contours of the site following

excavation were developed. A copy of the as-built map for the site is included in Appendix D.

3.0 SAMPLING AND ANALYSIS

3.1 Pre-Screened Soils

Three (3) composite samples of excavated soil were collected as they were stockpiled, prior to screening. Each composite sample was comprised of five (5) subsamples collected at approximately 30-35 cy intervals during the excavation and stockpiling. The samples were sent to General Engineering Laboratories for total lead analysis by EPA Method 6010B.

Table 1 shows the pre-screened concentrations of lead prior to screening. Complete data packages are included on CD in Appendix C.

3.2 Post-Screened Soils

Two (2) composite samples were collected from the screened soils that passed the 1-inch and ½-inch screen sizes. Each composite sample was comprised of five (5) subsamples collected at approximately 30-35 cy intervals during the screening and stockpiling. Soil from stockpile 2 that passed the 1-inch screen was combined into stockpile 3. The samples were sent to General Engineering Laboratories for total lead analysis by EPA Method 6010B.

Table 1 shows the pre-screened concentrations of lead versus the post-screened concentrations of lead. Complete data packages are included on CD in Appendix C.

3.3 Confirmation Sampling

Ten (10) discrete samples were collected within the surface to 6-inch depth interval at locations as shown on Figure 3. The samples were collected after the excavations were complete using a stainless steel scoop to manually collect the samples. The locations were consistent with the approved Work Plan (Parsons 2003). The samples were sent to General Engineering Laboratories for total lead analysis by EPA Method 6010B.

Table 3 shows the results of the confirmation samples after all excavations were complete. Complete data packages are included on CD in Appendix C.

3.4 Waste Characterization

Three (3) composite samples were collected. One sample was collected from each stockpile. The samples were sent to General Engineering Laboratories for hazardous waste disposal characterization analysis.

The initial results of the analyses (Table 2) showed that two of the three stockpiles were characteristically non-hazardous. The third stockpile was characteristically hazardous for lead (TCLP 5.71 mg/L).

The characteristically hazardous stockpile was stabilized with Portland cement to stabilize the leachable lead and retested. The retesting confirmed that the leachable lead concentration in the stabilized stockpile (0.13 mg/L) was characteristically non-hazardous (Table 2).

3.5 Physical Testing

One (1) five-gallon pail of impact berm soil was collected and sent to PW Laboratories, Inc. of East Syracuse, NY for physical properties testing.

Physical testing showed that the soils used for the study consisted of the following properties:

- Natural Moisture Content – 13.7% of dry weight
- Grain Size Analysis – 100% passing ¾"; 98.1% passing 1/4"; 53.2% passing #200
- Atterberg Limits – Non-Plastic
- Specific Gravity – 2.70
- Bulk (Natural) Soil Density – 114.2 pounds per cubic foot (pcf), dry density; 130.0 pcf, moist density

The complete test report is enclosed in Appendix C (C.3).

4.0 ANALYSIS OF RESULTS

4.1 Mechanical Screening – Physical Properties

SOIL PILE #3

Soil pile #3 contained approximately 90 cubic yards. This pile was processed using the 1-inch screen size. Approximately 67% (60cy of 90cy) of the soil passed through the 1-inch screen. Bullets were visually observed in the screened fraction. No bullets were recovered from either fraction. The 1-inch screen opening was too large to capture the bullets, as evidenced by their presence in the soil passing through the 1-inch screen opening.

SOIL PILE #2

Soil pile #2 contained approximately 33 cubic yards. Pile #2 was processed using the 1-inch screen size. The 1-inch screen passed approximately 55% (18cy of 33cy) of the soil. Bullets were visually observed in the screened fraction. No bullets were recovered from either fraction. The 1-inch screen opening was too large to capture the bullets, as evidenced by their presence in the soil passing through the 1-inch screen opening.

SOIL PILE #1

Soil pile #1 contained approximately 75 cubic yards. The 0.5-inch screen size was used for processing this pile and approximately 49% (37cy of 75cy) of the soil passed through the screen. Bullets were visually observed in both the screened and un-screened fractions. No bullets were recovered from either fraction. The 0.5-inch screen opening was too large to capture the bullets, as evidenced by their presence in the soil passing through the 0.5-inch screen opening.

Laboratory bench-scale testing, by PW Laboratories, Inc., showed that 98% of the excavated would pass through a 0.25-inch screen (see grain size analysis in Appendix C); however, field results documented above indicated that only 49% was passed through a 0.5-inch screen. Therefore, no screen sizes smaller than 0.5 inches were used during the Treatability Study.

4.2 Equipment Performance

The screening process production rates were as follows:

- 1-inch screen – 11 cubic yards per hour (128cy in 11.5hrs, actual screen-only time)
- ½-inch screen – 7 cubic yards per hour (75cy in 10hrs, actual screen-only time)

The screening rates were affected by the cold temperatures (10°F - 25°F) which froze the moist soil and resulted in a "clumpy" consistency. Due to the presence of the soil clumps, multiple screening passes were needed to achieve the throughput volumes obtained during this study. It is expected that higher production rates and smaller screen sizes would be able to be used during more temperate seasons.

4.3 Effect of Mechanical Screening on Lead Concentrations

The screening operation resulted in an increased concentration of lead in the screened portions of the treated soils versus the lead content found for the unscreened soil. This finding probably results due to the lead being entrained in the finer soils and the finer soils were able to pass through the screen.

4.4 Cost Performance

The cost of the screening was approximately $33/cubic yard for the 1-inch screening and $49/cubic yard for the 0.5-inch screening. The cost breakdown is shown on Table 4. These costs are based on a small volume of material. In addition, because of the "clumpy" soil conditions, multiple passes were required to get the desired screening. In better weather, multiple passes would not be required.

With larger volumes and better weather conditions, significant improvements to these unit costs could be expected.

5.0 RECOMMENDATIONS

The following are the recommendations drawn from this exercise:

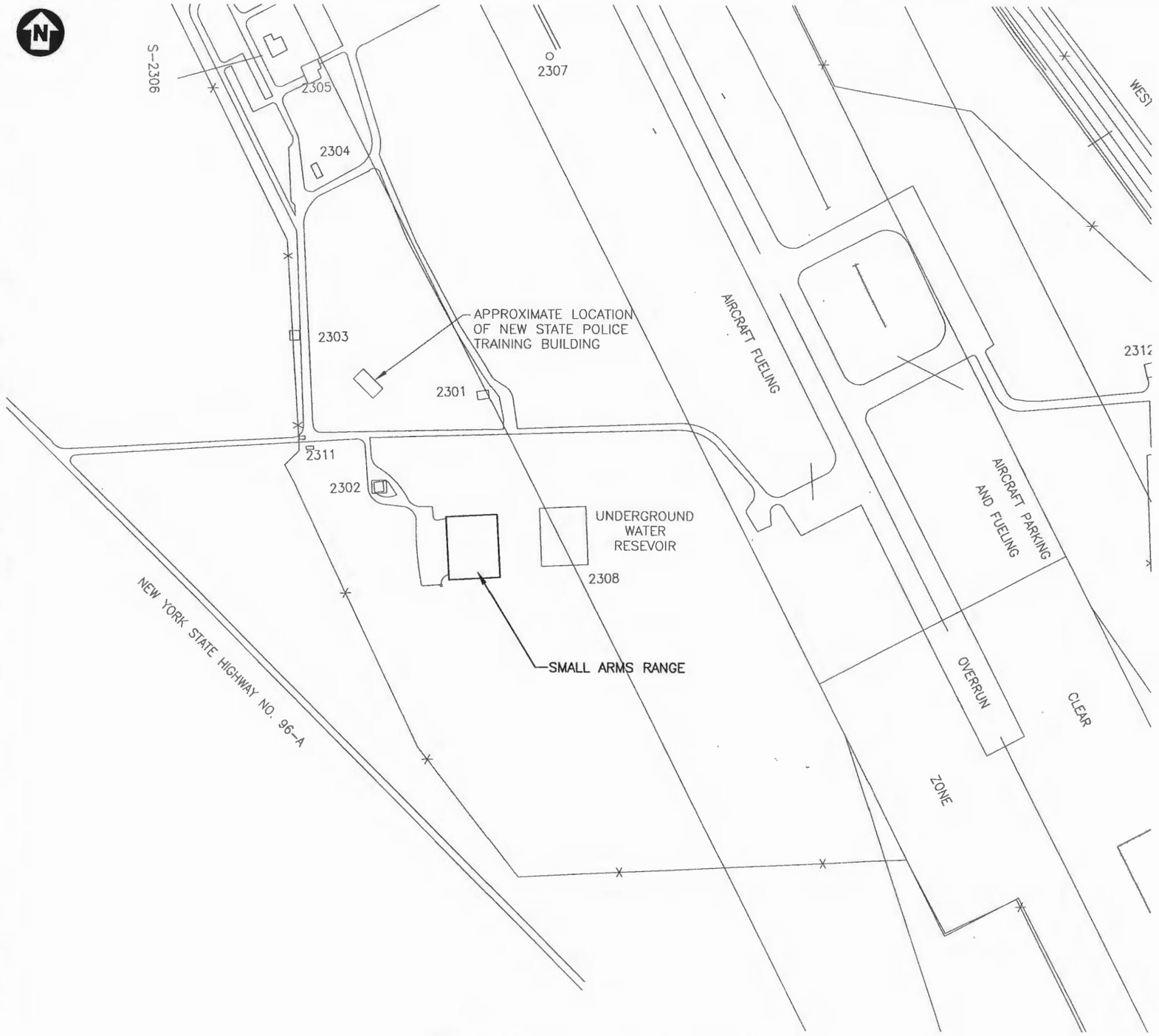
- Screening should be not be conducted in winter weather.
- Screen sizes smaller than 0.5-inch should be tested because the 0.5-inch screen did not trap the bullets.

Mechanical screening was shown to be ineffective for the removal of bullets and lead from soil. Several factors including weather conditions, time of year, soil moisture content and soil type probably contributed to the poor study results obtained.

6.0 REFERENCES

DRAFT Characterization Report and Treatability Work Scope for the Airfield Parcel (SEAD-122B) Small Arms Range, Seneca Army Depot, (Parsons October 2002).

FINAL Treatability Study Work Plan for the Airfield Small Arms Range (SEAD-122B), (Parsons November 2003).



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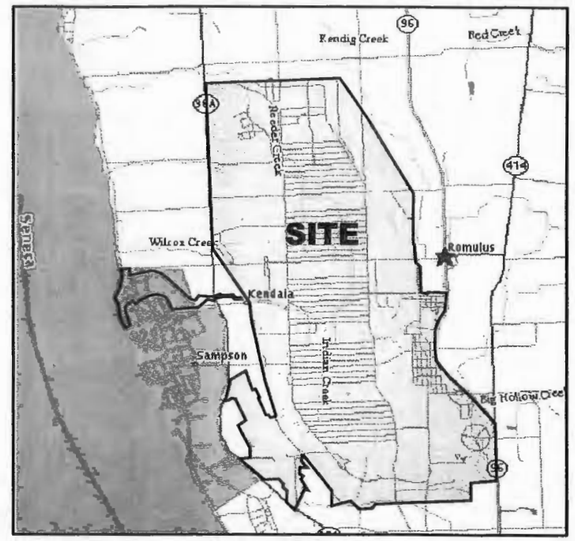
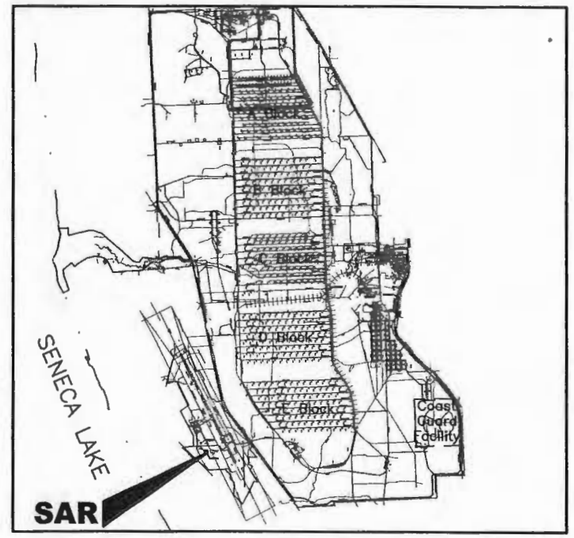


REGIONAL MAP
SCALE: 1 INCH=2.5 MILES
SOURCE: Mapquest.com



SITE MAP
SCALE: 1 INCH=10,000 FEET

FIGURE 1

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

AIRFIELD SMALL ARMS RANGE
SITE LOCATION PLAN

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

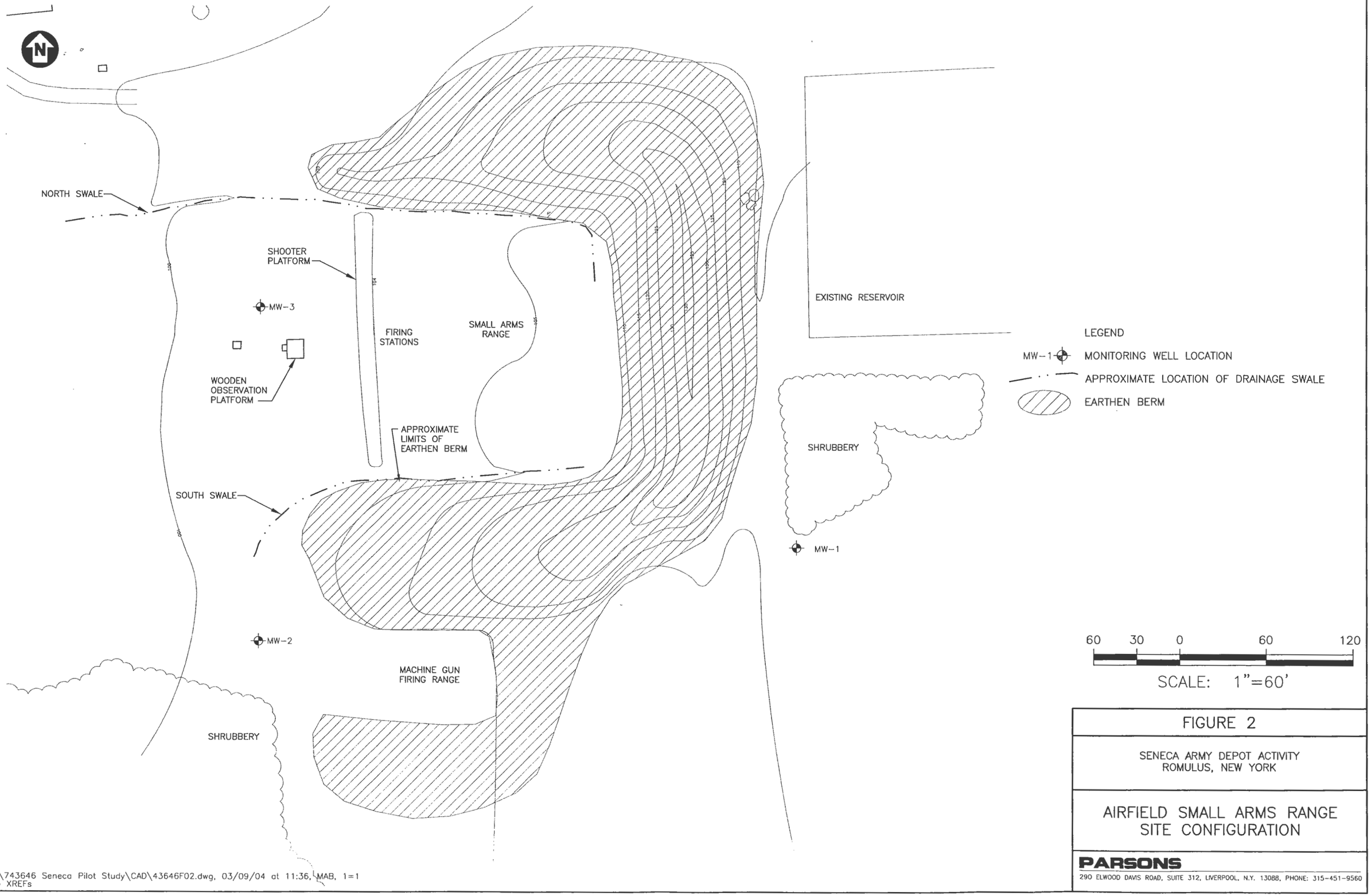


FIGURE 2

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

AIRFIELD SMALL ARMS RANGE
SITE CONFIGURATION

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

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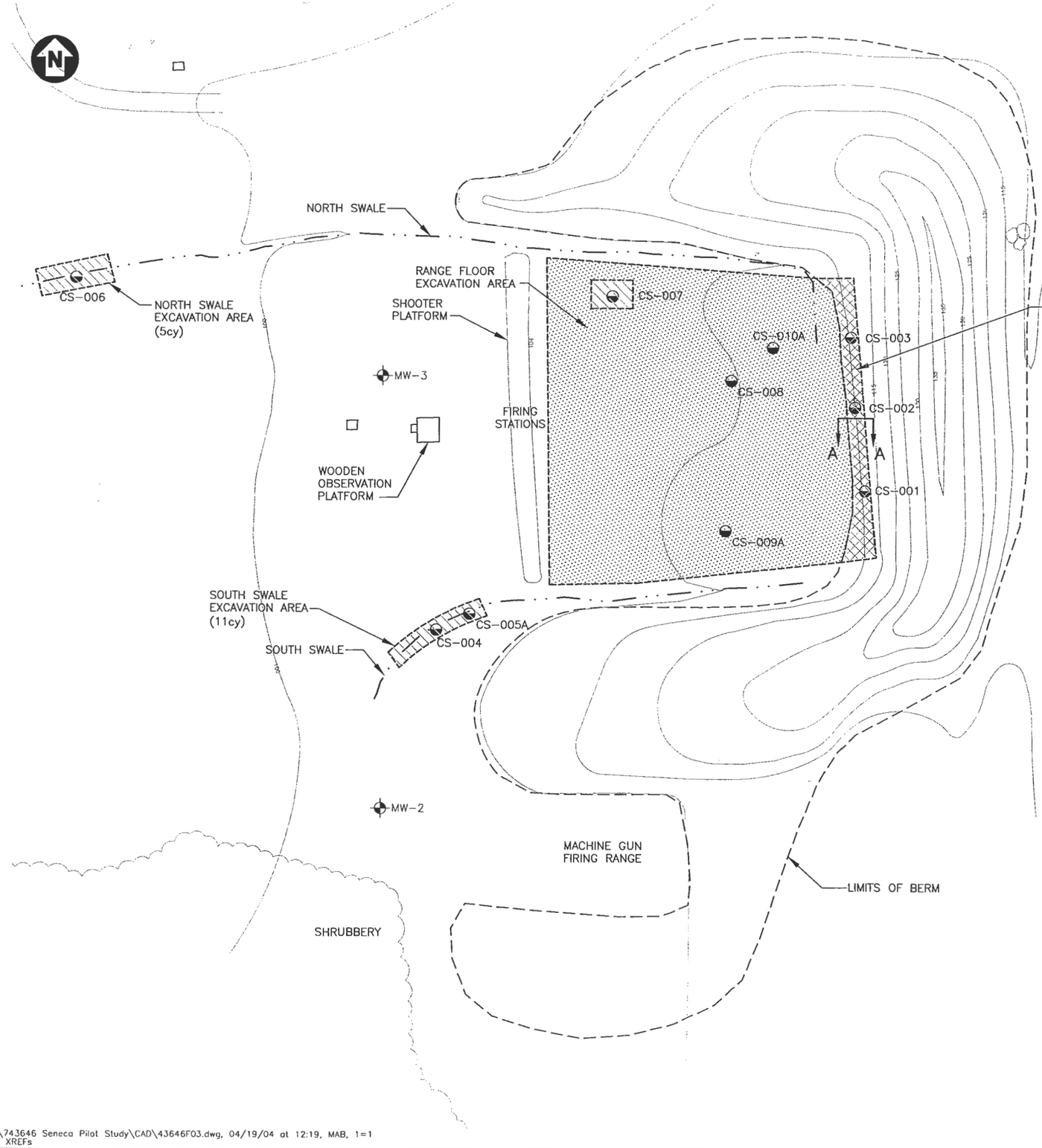

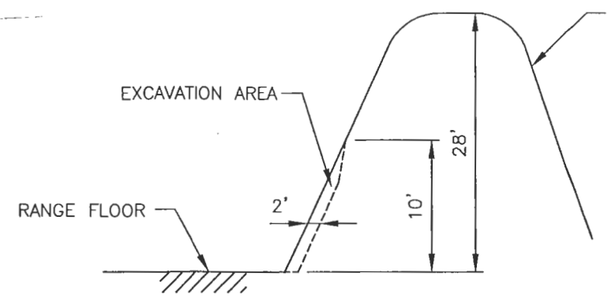

SECTION A–A
NOT TO SCALE

LEGEND

- MW–1 ⊕ MONITORING WELL LOCATION
- ◒ SURFACE SAMPLE LOCATION 0–6" BGS
- APPROXIMATE LOCATION OF DRAINAGE SWALE
- EXCAVATION AREA 2–3' BELOW GRADE SURFACE
- EXCAVATION AREA 6" BELOW GRADE SURFACE
- EXCAVATION AREA 3" BELOW GRADE SURFACE
- LIMIT OF IMPACT BERM

POST EXCAVATION SAMPLE RESULTS

SAMPLE #	TOTAL LEAD (ppm)
CS–001A	11.4
CS–002	209
CS–003	338
CS–004	195
CS–005A	213
CS–006	42
CS–007	45.2
CS–008	41.1
CS–009A	16.1
CS–010A	24.9

60 30 0 60 120

SCALE: 1"=60'

FIGURE 3

SENECA army DEPOT ACTIVITY
ROMULUS, NEW YORK

AIRFIELD SMALL ARMS RANGE
EXCAVATION AREAS & SAMPLE LOCATIONS

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315--451-9560

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TABLE 1

COMPARISON OF PRE-SCREENED/POST-SCREENED SOIL SAMPLES TOTAL LEAD

Location	Description	Pre-Screen Results (ppm)	Post-Screen Results (ppm)
Soil Pile 1	Screened with 1/2" screen	405	810
Soil Pile 2	Screened with 1" screen	2050	n/s*
Soil Pile 3	Screened with 1" screen	105	10200
Oversize Pile from Piles 1,2,&3	Did not pass screen	n/s	n/s

NOTES:
All soil pile samples collected were composite samples.
n/s = no sample
n/s* = Soil from pile 2 was mixed with soil from pile 3

TABLE 2

WASTE CHARACTERIZATION RESULTS LEACHABLE LEAD

Location	Description	Pre-Screen Waste Characterization Results (mg/L)	Post Stabilization Waste Characterization Results (mg/L)
Soil Pile 1	Composite	1.57	n/a
Soil Pile 2	Composite	11.2	0.13*
Soil Pile 3	Composite	0.343	n/a
Oversize Pile from Piles 1,2,&3	Composite	5.71	0.13*

NOTES:
* - Soil pile 2 and the oversize from soil piles 1,2 & 3 were mixed together and stabilized.
n/a = not applicable

TABLE 3

FINAL CONFIRMATION SAMPLES
TOTAL LEAD

Date	ID	Location	Results (ppm)
1/13/2004	SEADSARCS001A	Over Dig South Berm	**11.4**
1/8/2004	SEADSARCS002	Middle Berm	**209**
1/8/2003	SEADSARCS003	North Face	**338***
1/13/2004	SAEDSARCS004	Swale #1	**195**
1/21/2004	SEADSARCS005A	Over Dig, East Swale #1	**213**
1/13/2004	SEADSARCS006	Swale #2	**42**
1/21/2004	SEADSARCS007	1013 Resample location	**45.2**
1/21/2004	SEADSARCS008	Range Floor, center, 60' from fire line	**41.1**
1/28/2004	SEADSARCS009A	100' from firing line	**16.1**
2/18/2004	SEADSARCS010A	30' west of CS003	**24.9**

NOTES:
All confirmation samples were discrete surface samples collected in the 0-6" depth interval.
* - 338 ppm is the average of the sample and its duplicate

TABLE 4
COST PERFORMANCE

SCREENING COST: 1.0-INCH

ITEM	LABOR	No.	Hours	Rate	Total
1	Supervisor	1	11.5	$75.00	$863
2	Operators	2	11.5	$60.00	$1,380
3	Labor	1	11.5	$75.00	$863
	Subtotal Labor				$3,105
	EQUIPMENT	**No.**	**Hours**	**Rate**	**Total**
4	Kobelco Excavator	1	11.5	$45.00	$518
5	JCB Loader Backhoe	1	11.5	$20.00	$230
6	Screen	1	11.5	$15.00	$173
7	Trailer	1	11.5	$2.00	$23
8	Generator	1	11.5	$4.00	$46
9	F250 Pickup Truck	1	11.5	$7.00	$81
10	F350 Pickup Truck	1	11.5	$7.00	$81
	Subtotal Equipment				$1,150
	TOTAL COST				$4,255
	Volume of Soil Processed				128
	Unit Cost per cy				$33.24 per cy

SCREENING COST: 0.5-INCH

ITEM	LABOR	No.	Hours	Rate	Total
1	Supervisor	1	10	$75.00	$750
2	Operators	2	10	$60.00	$1,200
3	Labor	1	10	$75.00	$750
	Subtotal Labor				$2,700
	EQUIPMENT	**No.**	**Hours**	**Rate**	**Total**
4	Kobelco Excavator	1	10	$45.00	$450
5	JCB Loader Backhoe	1	10	$20.00	$200
6	Screen	1	10	$15.00	$150
7	Trailer	1	10	$2.00	$20
8	Generator	1	10	$4.00	$40
9	F250 Pickup Truck	1	10	$7.00	$70
10	F350 Pickup Truck	1	10	$7.00	$70
	Subtotal Equipment				$1,000
	TOTAL COST				$3,700
	Volume of Soil Processed				75
	Unit Cost				$49.33 per cy

APPENDIX A, B, C
(On Attached CD)

APPENDIX D
As-Built Drawing