

**EXPLANATION OF SIGNIFICANT DIFFERENCES #2
FOR
OPERABLE UNIT 2 (OU2)
CHANGES FOR SOIL SITES**

**NEW BRIGHTON/ARDEN HILLS SUPERFUND SITE
ARDEN HILLS, MINNESOTA**

May 2009

TABLE OF CONTENTS

Page

1.0	INTRODUCTION	1
2.0	BACKGROUND.....	3
2.1	SITE HISTORY	3
2.1.1	Site A.....	3
2.1.2	Site B.....	4
2.1.3	Site C-1	5
2.1.4	Site 129-3	5
2.1.5	Site 129-5	6
3.0	BASIS FOR THE EXPLANATION OF SIGNIFICANT DIFFERENCES	6
4.0	DESCRIPTION OF SIGNIFICANT DIFFERENCES AND CHANGES IN EXPECTED OUTCOME	7
5.0	SUPPORT AGENCY COMMENTS	7
6.0	STATUTORY DETERMINATIONS	8
7.0	PUBLIC PARTICIPATION COMPLIANCE.....	8

TABLE OF CONTENTS (continued)

FIGURES

Figure 1 Site Location Map

Figure 2 TCAAP Site Layout

Figure 3 Site A Plan View Construction and Sampling Grid Layout

Figure 4 Site B Dump Sampling and Trench Locations

Figure 5 Site C-1 Plan View Construction and Sampling Grid Layout

Figure 6 Site 129-3 Plan View Construction and Sampling Grid Layout

Figure 7 Site 129-5 Sampling Grid Layout

APPENDICES

APPENDIX A

References

**EXPLANATION OF SIGNIFICANT DIFFERENCES #2
FOR
SITES A, B, C-1, 129-3, AND 129-5 AT OPERABLE UNIT 2 OF THE
NEW BRIGHTON/ARDEN HILLS SUPERFUND SITE
ARDEN HILLS, MINNESOTA**

1.0 INTRODUCTION

Soil Sites A, C-1, 129-3, and 129-5 and a dump at Site B are located within Operable Unit 2 (OU2) at the New Brighton/Arden Hills (NB/AH) Superfund Site, also known as the Twin Cities Army Ammunition Plant (TCAAP), located in Arden Hills, Minnesota. The Superfund site includes TCAAP (a former small arms ammunition plant) as well as portions of several surrounding residential communities. The NB/AH site was placed on the National Priorities List (NPL) in September 1983. Figure 1 shows the Site Location Map. Figure 2 shows the TCAAP Site Layout.

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601, et seq., and Executive Order 12580, the United States Army (Army) is the lead federal agency for remedial actions at the site. All remedial actions are subject to the provisions of the Federal Facilities Agreement among the Army, U.S. Environmental Protection Agency (USEPA) and the Minnesota Pollution Control Agency (MPCA).

In 1997, the Army, USEPA, and MPCA signed a Record of Decision (ROD) that selected remedies for various sites within OU2. Based on the completion of the removal/remedial actions and/or the outcome of additional characterization/investigations, the Army has determined, and USEPA and MPCA have concurred, that a modification to the selected remedies is necessary. Section 117(c) of CERCLA and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establish procedures for explaining, documenting, and informing the public of significant changes to the remedy that occur after the ROD is signed.

An Explanation of Significant Differences (ESD) is required when the remedial action to be taken differs from the selected remedy stated in the ROD, but does not fundamentally alter that remedy with respect to scope, performance, or cost, which is the situation in this case. There is a separate ESD being issued concurrently regarding OU2 groundwater sites, so this ESD is considered #2.

The selected remedy specified in the OU2 ROD for Sites A, C-1, 129-3, and 129-5 included the following activities:

- Identification/characterization of contaminated soil boundaries, surface and subsurface debris.
- Excavation and sorting of hazardous and non-hazardous materials, debris and ordnance.
- Removal and disposal of ordnance, debris and oversized material.
- On-site stabilization of hazardous soils.
- Off-site disposal of contaminated soils above site-specific cleanup goals.
- Backfill and regrade.

- Restrict site access and use during remedy implementation.
- Five year period of groundwater monitoring.

The ROD prescribed cleanup levels based on an industrial land use. While the ROD addressed Land Use Controls (LUCs) that were to be in place during the time while field remediation activities were being conducted, this ESD is intended to clarify the need for long-term LUCs to restrict the areas to industrial use.

The selected remedy specified in the OU2 ROD for Site B included the following activities:

- Characterization of the dump site to determine its contents. If the contents are found to be toxic, hazardous, or contaminated, then a remedy for the landfill will be utilized and documented through a post-ROD amendment. If the contents are not toxic, hazardous, or contaminated, a no further action remedy would be employed.

Results of a subsequent investigation indicated that no remedial action was required. The dump is considered to be cleared for unrestricted use. The intent of this ESD is to document No Further Action as the final remedy for Site B.

This ESD and all supporting documents will become part of the NB/AH Administrative Record file in accordance with Section 300.825(a)(2) of the NCP. The Administrative Record is available during business hours and is located at:

Twin Cities Army Ammunition Plant Office
470 West Highway 96, Suite 100
Shoreview, MN 55126

2.0 BACKGROUND

The following subsections summarize the site history and the completed removal action and/or investigation and characterization.

2.1 SITE HISTORY

The NB/AH site consists of a 25-square-mile area located in Ramsey County, Minnesota. This includes the 4-square-mile area of the original TCAAP facility and portions of seven nearby communities: New Brighton, Arden Hills, St. Anthony, Shoreview, Mounds View, Columbia Heights, and Minneapolis. The NB/AH site has been divided into three operable units. OU2 of the NB/AH site consists of affected environmental media on the original TCAAP facility, a former small arms ammunition plant surrounded by residential communities.

TCAAP was constructed in 1941 to produce small-caliber ammunition for the United States military. Production activities included manufacturing small arms ammunition and related materials, proof-testing small arms ammunition and items as required, and handling and storing strategic and critical materials for other government agencies. Ammunition production and related activities have occurred periodically, commensurate with operations in wars, conflicts, and other national emergencies. Information from past studies indicates that between 1941 and 1981, waste materials such as Volatile Organic Constituents (VOCs), heavy metals, corrosive materials, and explosives were used and disposed of at a number of locations within TCAAP. The use and disposal of these materials at TCAAP resulted in soil and groundwater contamination at the facility.

The NB/AH site was listed on the NPL in September 1983 based on the results of samples collected from wells in the TCAAP area. The analytical results from these samples indicated that municipal wells, drinking water wells, and wells at TCAAP were contaminated with VOCs. In March 1997, an FS was completed for OU2 that identified the environmental contamination associated with OU2 and provided remedial alternatives for addressing that contamination. In October 1997, the ROD for OU2 was issued that documented the selected remedies and cleanup standards for this operable unit. OU2 consists of shallow soil sites (Sites A, C, E, H, 129-3, and 129-5), dumps (Sites B and 129-15), deep soil sites (Sites D and G), shallow groundwater sites (Sites A, I, and K), and deep groundwater. This ESD is specific to Shallow Soil Sites A, C-1, 129-3, 129-5, and the Site B dump only.

2.1.1 Site A

Site A is located on the northern boundary of the original TCAAP and is approximately 12.3 acres. Since the signing of the OU2 ROD, the property encompassing Site A was transferred to the Army National Guard. Site A was used between the early 1940s and 1966 for burial and/or burning of various wastes, such as sewage sludge, solvents, explosive-containing wastes, and mercury crack cases. These activities resulted in the contamination of the shallow soil and shallow groundwater with VOCs and metals. Site A was divided into five areas (A1 through A5) to delineate locations of past disposal and burning activities. The media of concern at Site A include shallow soils and shallow groundwater, but this ESD only addresses the soil.

The 1997 OU2 ROD also selected stabilization, excavation, and off-site disposal of the shallow, contaminated soil. The contaminants of concern (COCs) identified for Site A are antimony, barium, copper, lead, tetrachloroethene (PCE), and trichloroethene (TCE) with cleanup levels established at 33.6 milligram per Kilogram (mg/Kg), 21,745 mg/Kg, 19,593 mg/Kg, 1,200 mg/Kg, 0.5 mg/Kg, and 1.44 mg/Kg, respectively. The cleanup levels are health-risk based for a site-specific industrial land use scenario.

In 1998 and 1999, approximately 16,300 cy of contaminated soil were removed and disposed as part of the remedial action for shallow soils. Contaminated soil was removed to varying depths (approximately 0.5 to 18 feet below ground surface [bgs]) at Areas A1, A2, A3, and A5. As part of the remedial action, the dump at Site A, which was included in Area A5, was characterized and the contaminated soil and debris was included in excavation activities. The close out report was prepared in 2001 (Stone & Webster, 2001). MPCA and USEPA provided conditional approval of the close out report in 2001. Once LUCS have been incorporated into the close out report, MPCA and USEPA will make a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement. Figure 3 shows the Site A Layout.

As required by the OU2 ROD, additional site characterization was performed in 1997 that identified a disposal trench in Area A1 (Site A 1945 Trench) as the source of VOC contamination in the shallow soils. An Engineering Evaluation/Cost Analysis (EE/CA) recommended soil vapor extraction (SVE)/air sparging as the removal action. Additional soil samples were collected from the source area in 2002. The results suggested that the SVE system would not be able to remediate soils to meet the cleanup levels. With MPCA and USEPA's approval, the SVE/air sparging system was dismantled and the VOC-contaminated soil (approximately 688 cy) was excavated and disposed off-site in November 2002. The Site A 1945 Trench soils were cleaned up for unrestricted use. The close out report for the Site A 1945 Trench removal action was approved by USEPA and MPCA (Shaw, 2004a).

2.1.2 Site B

Site B is located along the northern boundary of the original TCAAP, just east of Site A. Like Site A, Site B is now on property controlled by the Army National Guard. The operational history of Site B is uncertain and limited information on historical disposal practices exist for the Site B dump. Prior to 1966, the site may have been used as a disposal area for sewage sludge, although the exact disposal location(s) and sewage sludge sources are unknown. Aerial photographs from 1940 through 1962 show no access roads or debris in or around the site. There is no photographic evidence suggesting the Site B was used for disposal after 1966. Any disposal activities at Site B area considered to have occurred between 1962 and 1966. Site B was divided into areas B-1, B-2, and B-3. These discrete sub-areas within Site B were identified in the RI (ANL, 1991) as areas where disposal activities could have occurred based on aerial photographs and surface sampling results.

Prior to investigation, the dump was expected to extend into the southwestern corner of area B-3. The dump was not expected to extend into area B-1 or B-2. A small low-lying wetland is located in the southeast section of Site B. The dump is located along the southern end of Site B, southwest of area B-3, and just south of the wetland. The dump was estimated at 12,500 bulk cubic yards in the OU2 FS (MW, 1997). Based on evaluations of the analytical data from areas B-1, B-2 and B-3 taken during the OU2FS (MW, 1997), no COCs were associated with Site B.

The RI (ANL, 1991) identified no health risk based use restrictions at Site B. The OU-2 ROD noted, "No contamination was found to exist at Site B, therefore, no remedial action is necessary for this site." The OU2 ROD did recommend characterization of a dump adjacent to Site B called the "Site B Dump," to determine if the contents of the dump were toxic, hazardous, or contaminated. The characterization/investigation performed in October 1998 found no material to be toxic, hazardous or contaminated. The final Site B Dump Investigation, Characterization, and Close Out Report. was approved by USEPA and MPCA (Stone & Webster, 2001). Figure 4 shows the Site B Layout.

2.1.3 Site C-1

Site C is located immediately east of Mounds View Road within the central portion of TCAAP. Site C was used to burn various wastes from 1947 through 1957. During the initial investigation, Site C was divided into two areas, C-1 and C-2. Area C-1 is the subject of this ESD and is referred to as Site C-1.

Site C was identified in the 1997 OU2 ROD as a shallow soil site, impacted primarily by metals. The remedy selected for Site C was to excavate stabilize, and dispose of shallow soil with contaminant levels in excess of the cleanup levels, which are based on a site-specific industrial land use scenario. The COCs for Site C shallow soil include antimony, arsenic, beryllium, lead, manganese, and thallium with cleanup levels at 67.2 milligrams per kilogram (mg/Kg), 10 mg/Kg, 0.7 mg/Kg, 1,200 mg/Kg, 2,503 mg/Kg, and 11.8 mg/Kg, respectively. Remedial activities for the shallow soil at Site C-1 occurred during the year 2000 when approximately 50 cy of contaminated soils were excavated and disposed at an off-site landfill. In 2007, during the construction of a replacement wetland at Site C, VOC and metals contamination was identified in a small burn area near the original Site C-1 Area of Concern (AOC). Approximately 360 cy of contaminated soils were excavated, stabilized and disposed at an off-site landfill. Figure 5 shows the Site C-1 Layout.

The close out report for Site C-1 will be included in the overall close out report for the entirety of Site C. This report is currently being finalized. It will include documentation that the cleanup goals for site C-1 were achieved.

2.1.4 Site 129-3

Site 129-3 is located west of Snelling Avenue and south of the intersection with Upper Range Road in the central portion of the original TCAAP. The site is now on property controlled by the Army National Guard. Site 129-3, approximately 2 acres, had three leaching pits that were used for disposal and flashing of contaminated wastewater, primarily from the lead styphnate primer mix facility that began operation in 1971 and ended about 1972. Disposal activity at the site may also have included the burning of scrap powder and lead styphnate wastes.

Site 129-3 was identified in the 1997 OU2 ROD as a shallow soil site. The selected remedy required excavation, stabilization, and off-site disposal of the contaminated soil. The COCs identified for Site 129-3 included antimony, lead, manganese, nitroglycerine and TCE with cleanup levels at 22.4 mg/Kg, 1,200 mg/Kg, 834 mg/Kg, 61,200 mg/Kg/ and 4.43 mg/Kg, respectively. The cleanup levels are based on a site-specific industrial land use scenario.

Site 129-3 was divided into three AOCs, Areas 129-3-1, 129-3-2, and 129-3-3, to better define past disposal activities. The three AOCs were excavated during the 2000 remedial action activities. During the excavation and exploration of investigation trenches, two lead styphnate pits were identified. The two lead styphnate pits were excavated during the 2001 remedial action activities. Approximately 1,090 cy of contaminated soil from the three Site 129-3 AOCs and 2,370 cy of contaminated soil from the two lead styphnate pits were stabilized and disposed off-site. In addition, a small amount of debris (about 10 cy) with suspect ACM was identified and removed from Site 129-3. Nonhazardous and stabilized soils were disposed off-site.

A close out report was prepared for the 2000 and 2001 remedial actions at Site 129-3 (Stone & Webster, 2002d). MPCA and USEPA provided conditional approval of the close out report in 2002. Once LUCS have been incorporated into the close out report, MPCA and USEPA will make a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement. Figure 6 shows the Site 129-3 Layout.

2.1.5 Site 129-5

Site 129-5 is located in the east central portion of the original TCAAP (now on Army National Guard property) and covers approximately 7.2 acres. Site 129-5 was used for open burning in pits of scrap explosives, bullets, spent solvents and disposal of primer/tracer sludge from about 1945/46 through the late 1950s. The area was mined by Arsenal Sand and Gravel Company in the early 1970s. A silt-settling pond for the former gravel operations now overlies much of the suspected burn areas north of and within the northeast corner of Site 129-5. Areas of Site 129-5 with observed surface debris were fenced in 1995.

Site 129-5 was identified in the 1997 OU2 ROD as a shallow soil site. The selected remedy required excavation, stabilization, and off-site disposal of the contaminated soil. The COCs identified at Site 129-5 include antimony, barium, and lead with the cleanup levels at 67.2 mg/Kg, 21,725 mg/Kg, and 1,200 mg/Kg. The cleanup levels are based on a site-specific industrial land use scenario.

Approximately 100 cy of contaminated soil were excavated, stabilized and disposed off-site during the during the 1999 remedial action and the fence was removed. The close out report was prepared in 2001 (Stone & Webster, 2001). MPCA and USEPA provided conditional approval of the close out report in 2001. Once LUCS have been incorporated into the close out report, MPCA and USEPA will make a determination that the report is a final document and passes the Consistency Test in accordance with Chapter XIV of the Federal Facility Agreement. Figure 7 shows the Site 129-5 Layout.

3.0 BASIS FOR THE EXPLANATION OF SIGNIFICANT DIFFERENCES

The selected remedies at Shallow Soil Sites A, C-1, 129-3, 129-5 have been completed and the remedial action objectives (RAOs) and cleanup levels have been attained. The ROD prescribed LUCs during remedy implementation, but was not clear on the need for long-term LUCs. Therefore, this ESD is intended to add LUCs for these sites to restrict land use as site-specific industrial.

For the dump at Site B, the ROD required further investigation into the contents of the dump. The investigation/characterization work has been completed, and it was found that remedial action was not required. Therefore, this ESD is intended to document No Further Action as the final remedy for Site B.

4.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES AND CHANGES IN EXPECTED OUTCOME

This ESD clarifies that the final remedy for Sites A, C-1, 129-3, and 129-5 includes the implementation of LUCs to maintain the land use as industrial. General LUCs would include actions to be taken by the Army and/or Army National Guard while the property is under Federal control, and if transferred from Federal control, then deed restrictions and State Environmental Covenants. The Army and/or Army National Guard have already been restricting the use of these sites to activities consistent with the industrial use cleanup levels. Therefore, the formal adoption of the LUCs in this ESD will not cause any change in the outcome of the remedy, other than to add greater assurance. Also, this ESD is intended to clarify that Five-year reviews will be conducted for each of these sites because hazardous substances, pollutants, or contaminants remain on site above levels that allow for unlimited use and unrestricted exposure.

For the dump at Site B, investigation/characterization work indicated there is no need for remedial action and the site is cleared for unrestricted use. Therefore, the formal adoption of No Further Action as the final remedy does not cause any change in the outcome.

5.0 SUPPORT AGENCY COMMENTS

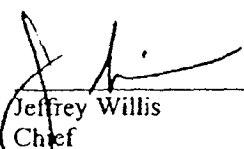
The USEPA and the MPCA have reviewed this ESD and concur with the clarifications and determinations with respect to the remedies for Shallow Soil Sites A, C-1, 129-3, and 129-5, and the dump at Site B.

6.0 STATUTORY DETERMINATIONS

The permanent remedy as clarified by this ESD for the Sites A, C-1, 129-3, 129-5, the Site B dump at the NB/AH site is protective of human health and the environment, complies with state and federal requirements, including CERCLA Section 121, that are applicable or relevant and appropriate to the remedial action, and is cost effective.

7.0 PUBLIC PARTICIPATION COMPLIANCE

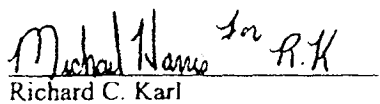
A notice of availability and a brief description of this ESD will be printed in the local newspaper in accordance with Section 300.435(c)(2)(i) of the NCP.



Jeffrey Willis
Chief

9/22/2008
Date

Operational Army and Medical Branch
Base Realignment & Closure Division



Richard C. Karl

5/01/2009
Date

Superfund Division
Region 5
U.S. Environmental Protection Agency, Region V

Kathryn Sather, Director
Remediation Division
Minnesota Pollution Control Agency

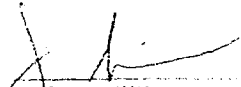
Date

6.0 STATUTORY DETERMINATIONS

The permanent remedy as clarified by this ESD for the Sites A, C-1, 129-3, 129-5, the Site B dump at the NB:AH site is protective of human health and the environment, complies with state and federal requirements, including CERCLA Section 121, that are applicable or relevant and appropriate to the remedial action, and is cost effective.

7.0 PUBLIC PARTICIPATION COMPLIANCE

A notice of availability and a brief description of this ESD will be printed in the local newspaper in accordance with Section 300.435(c)(2)(i) of the NCP.



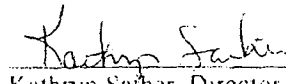
Jeffrey Willis
Chief

Operational Army and Medical Branch
Base Realignment & Closure Division

9/22/2008
Date

Richard C. Karl
Superfund Division
Region 5
U.S. Environmental Protection Agency, Region V

Date



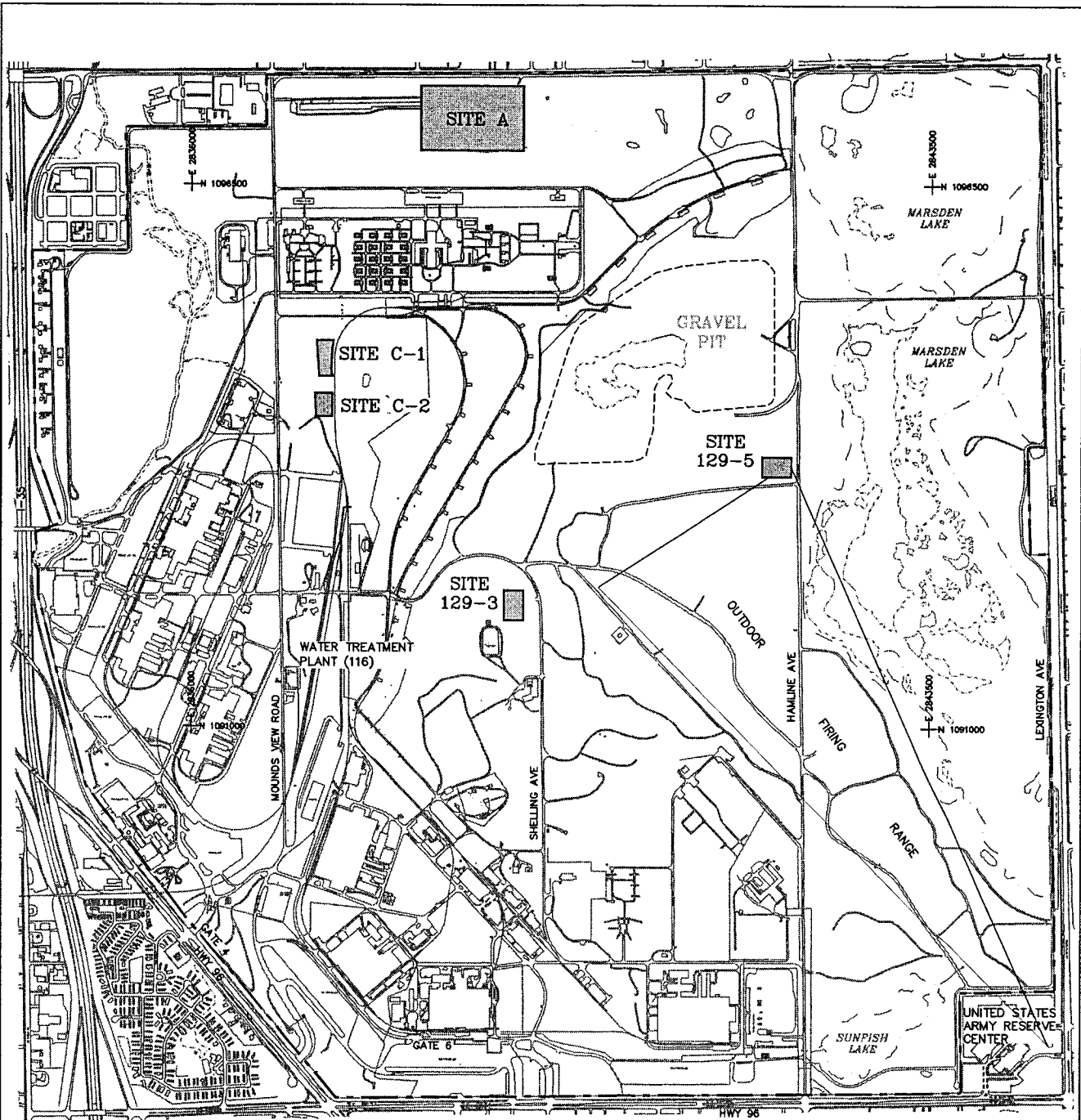
Kathryn Sather, Director
Remediation Division
Minnesota Pollution Control Agency

3/20/09
Date

FIGURES

FIGURES

WED, JAN 23, 2008 09:45 A MEC O:\TCAAP\Y10100.1504\REV-C\10100Y09C.DWG



LEGEND

--- FORMER TCAAP BOUNDARY

REMEDATION SITES

0 1500 3000

SCALE: 1" = 1500'

**U.S. ARMY
CORPS OF ENGINEERS
OMAHA DISTRICT**

TWIN CITIES ARMY AMMUNITION PLANT

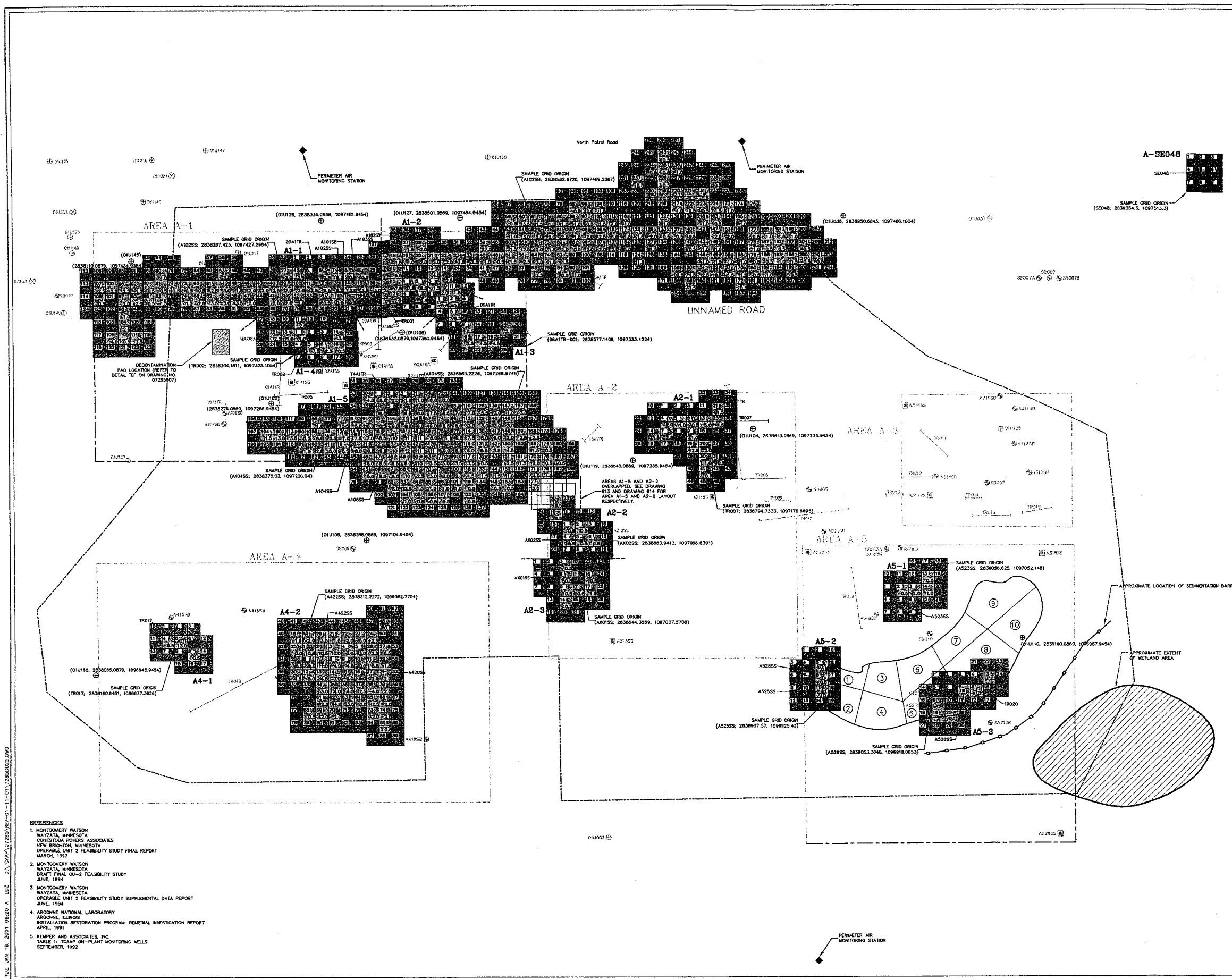
FIGURE NUMBER
2

TCAAP SITE LAYOUT

C	ISSUE TO ARMY	DPM	KR	01/23/08	
B	ISSUE TO ARMY	DPM	KR	12/03/07	
A	ISSUE TO ARMY	ERC	PSM	01/20/06	
REVISION	DESCRIPTION	CHKD	APPR	DATE	
BY	DATE	BY	DATE	BY	DATE
DSGN	ERC 01/20/06	DRAWN	MEC 01/20/06	CHKD	ERC 01/20/06
				APPR	PSM 01/20/06

Shaw Environmental, Inc.

PROJECT NO.	REV.	FILE NAME
10100.1504	C	10100Y09C

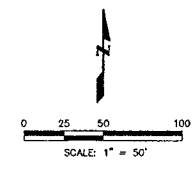


LEGEND

- SITE BOUNDARY
- AREA BOUNDARY
- DUMP BOUNDARY
- SEDIMENTATION BARRIER
- ⊠ SEDIMENT SAMPLE
- ⊙ SOIL BORING
- ⊡ SURFACE SOIL SAMPLE
- ◆ PERIMETER AIR MONITORING STATION
- ⊔ FORMER TRENCH LOCATION
- ⊕ MONITORING WELL
- ⊗ RECOVERY WELL
- AREA OF CONCERN ESTABLISHED IN OUI 2 FS
- ⊠ SAMPLE GRID LOCATION
- ⊠ PERIMETER GRID CONFIRMED CLEAN BY IIS AND VERIFICATION SAMPLING
- ⊠ EXCAVATED, CONFIRMED CLEAN BY VERIFICATION SAMPLING AND BACKFILLED.
- GRID NUMBER
- DEPTH OF EXCAVATION

GENERAL NOTES

- AREA A-3 IS INCLUDED ON THIS DRAWING FOR REFERENCE ONLY. AREA A-3 DOES NOT CONTAIN ANY AOC.
- EMERGENCY RESPONSE IS HANDLED THROUGH THE BUILDING 502 GUARD DESK (639-7177). THE GUARD DESK WILL CONTACT THE PROPER AUTHORITIES IN THE CASE OF EMERGENCY.



6	RESPONSE TO COMMENTS FROM USEPA, MPCA	01/15/01
5	COMPLETION OF 1999 CONSTRUCTION SEASON	03/16/00
4	WIDOW SHALLOW SOIL CLOSE-OUT REPORT	01/22/98
3	RESPONSE TO COMMENT RESOLUTION MEETING	04/14/99
2	RESPONSE TO COMMENTS FROM USEPA, ITC&AW INC., RAB TECHNICAL COMMITTEE, MPCA	03/26/99
1	RESPONSE TO USACE COMMENTS	11/10/97
0	ORIGINAL ISSUE	

**U.S. ARMY
CORPS OF ENGINEERS
OMAHA DISTRICT**

TWIN CITIES ARMY AMMUNITION PLANT

3

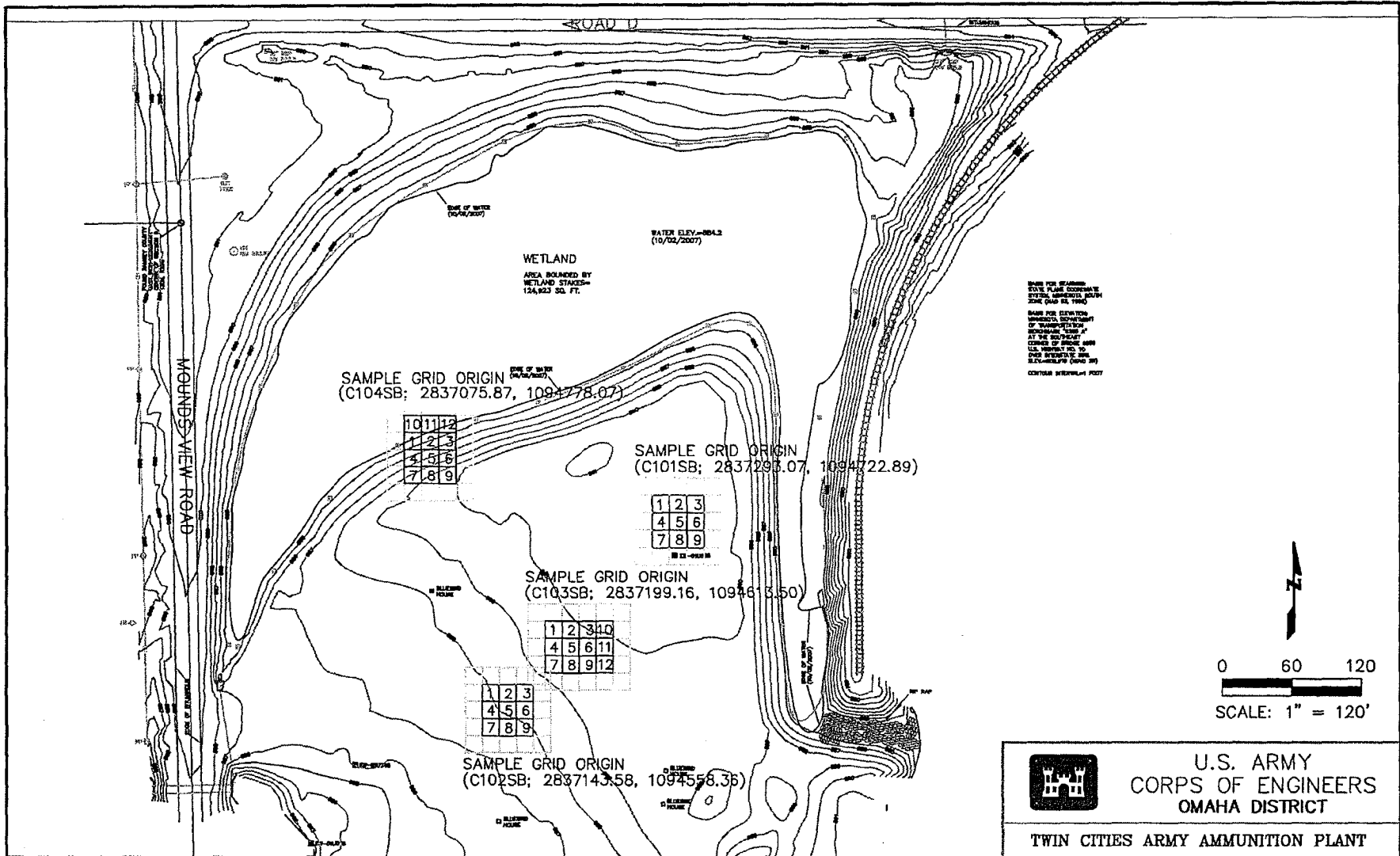
**SITE A - PLAN VIEW
CONSTRUCTION AND
SAMPLING GRID LAYOUT**

STONE & WEBSTER, INC.

DESIGNED	BY	DATE	CHECKED	BY	DATE	PROJECT NO.	REV.	FILE NAME
DRAWN	LDZ	01/11/01	APPROVED			07285.1140	6	72850025

TWE: JAN 16, 2001 08:20 A: L02: D:\TCAP\07285\REV-01-11-01\2850025.DWG

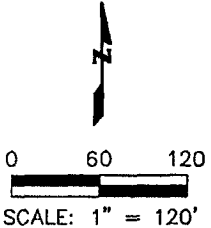
- REFERENCES**
- MONTGOMERY WATSON
WAYZATA, MINNESOTA
CONESTOGA POWERS ASSOCIATES
NEW BRIGHTON, MINNESOTA
OPERABLE UNIT 2 FEASIBILITY STUDY FINAL REPORT
MARCH, 1997
 - MONTGOMERY WATSON
WAYZATA, MINNESOTA
DRAFT FINAL OU-2 FEASIBILITY STUDY
JUNE, 1994
 - MONTGOMERY WATSON
WAYZATA, MINNESOTA
OPERABLE UNIT 2 FEASIBILITY STUDY SUPPLEMENTAL DATA REPORT
JUNE, 1994
 - ARGONNE NATIONAL LABORATORY
ARGONNE, ILLINOIS
INSTALLATION RESTORATION PROGRAM: REMEDIAL INVESTIGATION REPORT
APRIL, 1991
 - KIMPER AND ASSOCIATES, INC.
TABLE 1: TCAIP OU-1 PLANT MONITORING WELLS
SEPTEMBER, 1992



BASE FOR ELEVATION
STATE PLANS COORDINATE
SYSTEM, AMERICAN MOUNTAIN
ZONE (GAS 83, 1984)


BASE FOR ELEVATION
NATIONAL DEPARTMENT
OF TRANSPORTATION
MONTGOMERY, TENN. AT
AT THE INTERSECTION
CORNER OF BRIDGE 200
U.S. HIGHWAY 50 TO
R.D. 1000 (GAS 83)
N.T.C. (GAS 83) (GAS 83)

CONTINUE INTERIM PLAN




LEGEND

SITE C-1 AREA OF
CONCERN GRID LAYOUT

 U.S. ARMY CORPS OF ENGINEERS OMAHA DISTRICT	
TWIN CITIES ARMY AMMUNITION PLANT	
FIGURE NUMBER 5	SITE C-1 CONSTRUCTION AND SAMPLING GRID LAYOUT

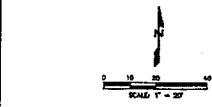
REVISION		DESCRIPTION				CHKD	APPR	DATE
BY	DATE	BY	DATE	CHKD	BY	DATE	BY	DATE
A		ISSUE TO ARMY				DPM	KR	12/06/07
DSGN	DPM	12/06/07	DRAWN	DPM	12/06/07	CHKD	KR	12/06/07

 Shaw Environmental, Inc.		
PROJECT NO.	REV.	FILE NAME
10100.1116	A	10100N43A

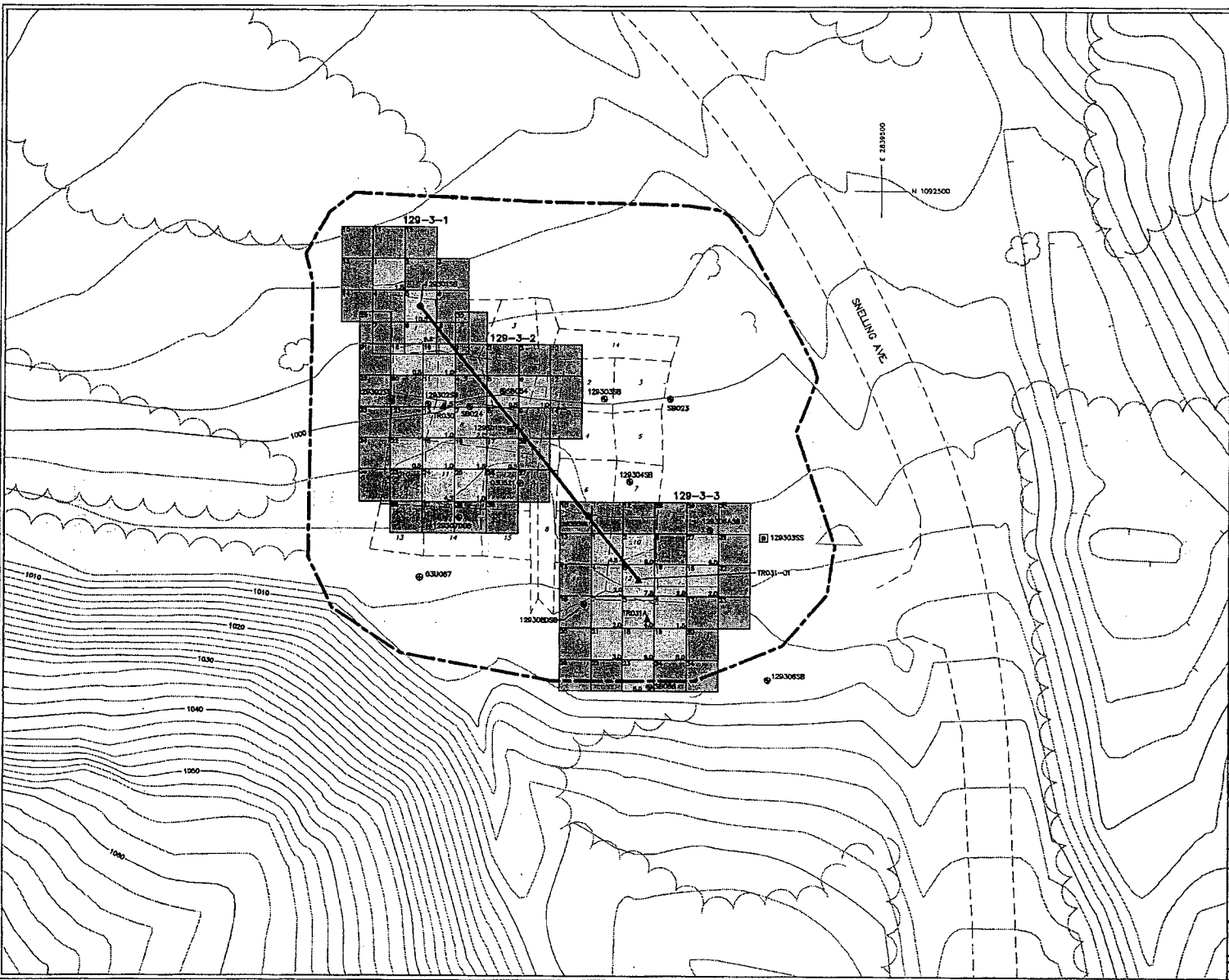
NOTE
 1. GRID 23 IN AOC 129-3-3 WAS AN EXCAVATED BURN LENS.
 2. AREA OF CONCERN GRIDS ARE 15 FEET BY 15 FEET.

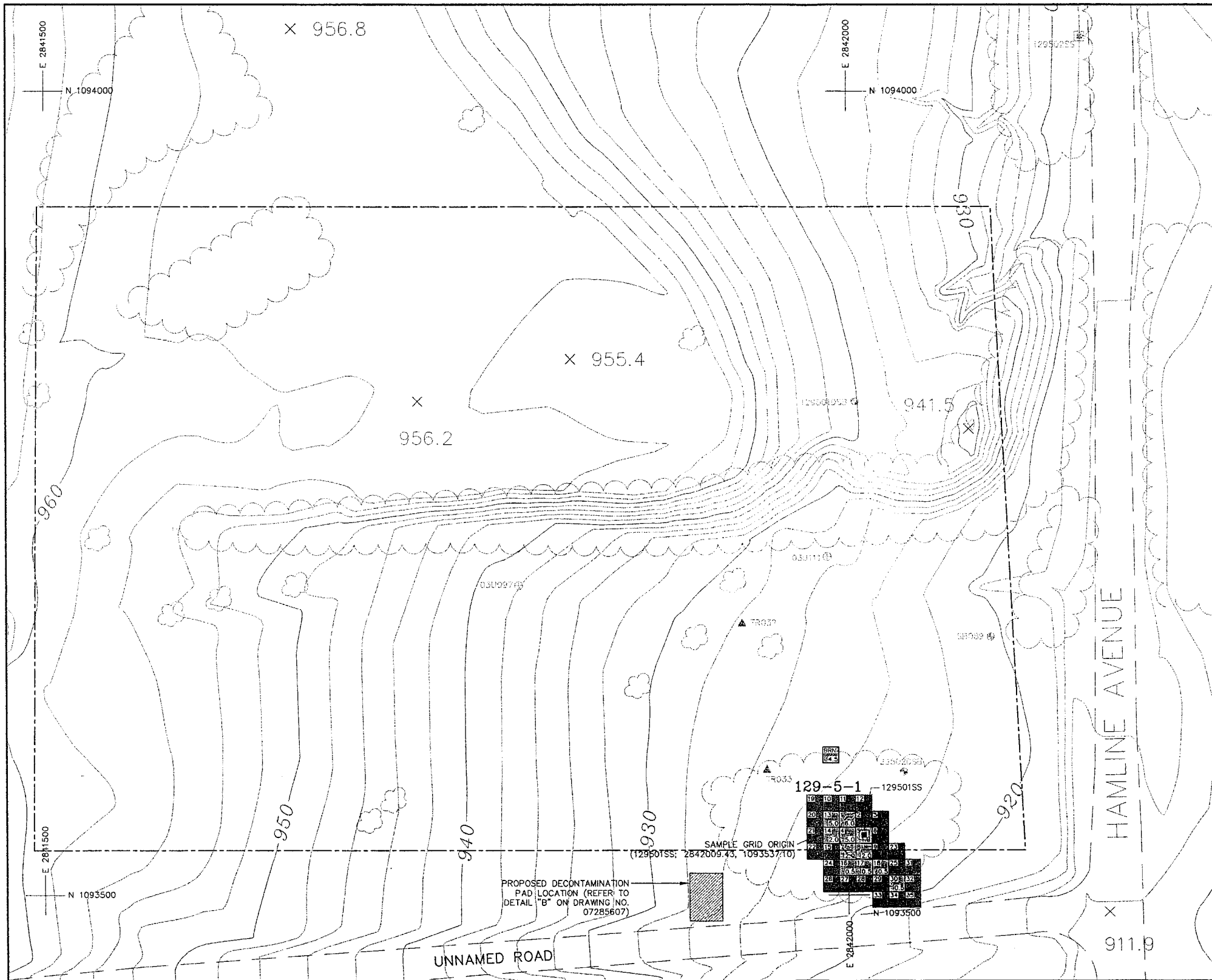
LEGEND

- SITE BOUNDARY
- - - - EXISTING CONTOUR
- - - - MERCURIUS NITRATE TRENCH
- GRID NUMBER
- DEPTH OF EXCAVATION
- EXCAVATED GRID CONFIRMED CLEAN BY VERIFICATION SAMPLING AND BACKFILLED.
- PERIMETER GRID CONFIRMED CLEAN BY XRF AND VERIFICATION SAMPLING.
- LEAD STYPHATE PIT GRID
- SOIL BORING
- ▲ TRENCH SAMPLE
- SURFACE SOIL SAMPLE
- ⊕ MONITORING WELL



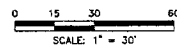
DATE TO PRINT AND ADDRESS	BY	CHK	DATE
DATE TO FILE AND ADDRESS	BY	CHK	DATE
DESCRIPTION	PROJECT	PROJECT	DATE
 U.S. ARMY CORPS OF ENGINEERS OMAHA DISTRICT			
TWIN CITIES ARMY AMMUNITION PLANT			
SITE 129-3 PLAN VIEW CONSTRUCTION AND SAMPLING GRID LAYOUT			
 STONE & WEBSTER, INC.			
DESIGNED BY	CHECKED BY	DATE	SCALE
DRAWN BY	APPROVED BY	DATE	PROJECT NO.





VERTICAL DATUM = NAVD (1929)
 HORIZONTAL DATUM = STATE PLANE COORDINATES (NAD-1983)
 CONTOUR INTERVAL = 2'-FOOT

SITE 129-5 PLAN VIEW

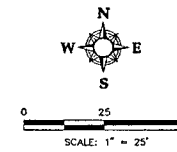


LEGEND

- SITE BOUNDARY
- SEDIMENT SAMPLE
- ⊕ SOIL BORING
- ⊗ SURFACE SOIL SAMPLE
- - - AREA OF CONCERN ESTABLISHED IN OUI-2 FS
- SAMPLE GRID LOCATION
- PERIMETER GRID CONFIRMED
CLEAN BY XRF AND
VERIFICATION SAMPLING
- EXCAVATED, CONFIRMED
CLEAN BY VERIFICATION
SAMPLING AND BACKFILLED.
- GRID NUMBER
- DEPTH OF
EXCAVATION

REFERENCES

1. MONTGOMERY WATSON
WAYZATA, MINNESOTA
CONESTOGA RIVERS ASSOCIATES
NEW BRITTON, MINNESOTA
OPERABLE UNIT 2 FEASIBILITY STUDY FINAL REPORT
MARCH, 1997
2. MONTGOMERY WATSON
WAYZATA, MINNESOTA
DRAFT FINAL OUI-2 FEASIBILITY STUDY
JUNE, 1994
3. MONTGOMERY WATSON
WAYZATA, MINNESOTA
OPERABLE UNIT 2 FEASIBILITY STUDY SUPPLEMENTAL DATA REPORT
JUNE, 1994
4. ARGONNE NATIONAL LABORATORY
ARGONNE, ILLINOIS
INSTALLATION RESTORATION PROGRAM: REMEDIAL INVESTIGATION REPORT
APRIL, 1991
5. KEMPER AND ASSOCIATES, INC.
TABLE 1: TCAAP ON-PLANT MONITORING WELLS
SEPTEMBER, 1992
6. TOPOGRAPHY PROVIDED BY
MARCHFORD
MAY, 1983



3	COMPLETION OF 1999 CONSTRUCTION SEASON		
2	RESPONSE TO COMMENTS FROM USEPA, TECHAM, INC., RAB TECHNICAL COMMITTEE, MPCA		03/26/98
1	RESPONSE TO USACE COMMENTS		11/10/97
REVISION	DESCRIPTION	CHECKED	APPROVED

**U.S. ARMY
CORPS OF ENGINEERS
OMAHA DISTRICT**

TWIN CITIES ARMY AMMUNITION PLANT

FIGURE
7
SITE 129-5
SAMPLING GRID LAYOUT

**STONE & WEBSTER ENVIRONMENTAL
TECHNOLOGY & SERVICES**

DESIGNED	KM	02/25/99	CHECKED		PROJECT NO.	07285.1140	REV.	3	FILE NAME	7285D093
DRAWN	JPS	02/25/99	APPROVED							

APPENDIX A

APPENDIX A

REFERENCES

Montgomery Watson (MW). 1996. Twin Cities Army Ammunition Plant Operable Unit 2 Feasibility Study Supplemental Data Report. Prepared for U.S. Army Environmental Center. June 1996.

Montgomery Watson and Conestoga Rovers Associates (MW). 1997. *Operable Unit 2 Feasibility Study, Final Report, Twin Cities Army Ammunition Plant, Arden Hills, Minnesota*. Prepared for U.S. Army Environmental Center and Alliant Techsystems, Inc. March 1997.

Shaw Environmental, Inc. (Shaw). 2004a. *Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Twin Cities Army Ammunition Plant, Arden Hills, Minnesota, Volume VIII Site A Former 1945 Trench Activities, Revision 3*. Prepared for the U.S. Army Corps of Engineers, Omaha District. January 30, 2004.

Stone & Webster Environmental Technology & Services (Stone & Webster). 1999. *Final Field Investigation Report, Site B Dump, Twin Cities Army Ammunition Plant, Arden Hills, Minnesota, Revision 2*. Prepared for the U.S. Army Corps of Engineers, Omaha District. January 2001.

Stone & Webster, Inc. (Stone & Webster). 2001. *Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Twin Cities Army Ammunition Plant, Arden Hills, Minnesota, Volume I Site A Activities, Volume II Site 129-5 Activities, Revision 2*. Prepared for the U.S. Army Corps of Engineers, Omaha District. December 10, 2001.

Stone & Webster, Inc. (Stone & Webster). 2002d. *Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Twin Cities Army Ammunition Plant, Arden Hills, Minnesota, Volume V Site 129-3 Activities, Revision 2*. Prepared for the U.S. Army Corps of Engineers, Omaha District. November 21, 2002.

U.S. Army Environmental Center, Environmental Restoration Division (USAEC). 1997. Twin Cities Army Ammunition Plant, New Brighton/Arden Hills, Superfund Site, Operable Unit 2 Record of Decision. December 1997.