Draft
Operable Unit (OU-4)
After Action Report for Boundary Fence Installation
at the
Inert Disposal
Area
Iowa Army Ammunition Plant
Middletown, Iowa

November 2016

Prepared for:
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Omaha District
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Omaha, Nebraska 68102

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under
Contract No. W9128F-10-D-0099
Task Order No. 0004

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List of Appendices

Acronyms and Abbreviations

ASL	Aerostar SES LLC
IAAAP	Iowa Army Ammunition Plant
IDA	inert disposal area
LUC	land use control
LUCIP	land use controls implementation plan
OU	operable unit

1.0 INTRODUCTION

The purpose of this report is to document the boundary fence installation activities for the inert disposal area (IDA) at the Iowa Army Ammunition Plant (IAAAP). The objective of the IDA fence installation is to provide a physical land use control (LUC) to comply with the existing land use controls implementation plan (LUCIP) (Tetra Tech, 2014). The fence installation was conducted following the guidance provided in *Final Revision 1, Operable Unit (OU-4) Remedial Action Work Plan, Inert Disposal Area (IDA) Boundary Fence Installation at the Iowa Army Ammunition Plant, Middletown, Iowa* (Aerostar SES LLC [ASL], 2016).

2.0 PRE-INSTALLATION ACTIVITIES

2.1 ARCHAEOLOGICAL SURVEYS

A Phase I archaeological survey of the proposed fence installation path was conducted on 13–14 May 2015. A supplemental Phase I archaeological survey was conducted on 1–2 March 2016 because the fence position moved to the outside of the IDA access road (ASL, 2016). No archeological finds were identified in either survey, as provided in Appendix A.

2.2 SURVEYING

Prior to fence installation, preliminary flagging of the proposed fence line was conducted by a licensed surveyor to provide visual guidance to the fence installation field team.

2.3 UTILITY LOCATION

A call was placed to the "Iowa One Call" by the contractor conducting the intrusive site work. In addition, American Ordnance LLC conducted a site-specific utility location on 25 April 2016. Utility location documentation is provided as Appendix B.

2.4 NEW PROJECTS REVIEW DOCUMENTATION

In accordance with the LUCIP (Tetra Tech, 2014), a new project review was conducted prior to fence installation. This review is documented on the ENV-0014 "Land Use Approval" form that is provided in Appendix C.

2.5 VEGETATION REMOVAL

Brush, branches, and small trees were removed from the path of the proposed fence line in coordination with the IAAAP natural resources manager. Vegetation removal was conducted in February and March 2016, outside the breeding season of the endangered Indiana Bat and Northern Long-Eared Bat summer maternity dates (April –September). Vegetation was removed using hand-held, brush-cutting equipment

and chainsaws to provide clearance for equipment and personnel. Removed vegetation was left onsite, outside of the immediate work area.

3.0 BOUNDARY FENCE INSTALLATION

The IDA boundary fence is a physical LUC that is used to restrict intrusive activities by personnel and equipment onto or near the IDA cap/closure systems. The installed 42-inch chain link fence abutting the active test firing range provides the required access restriction. The fence was installed to allow site access for maintenance and repair activities as presented in the remedial action completion report (Tetra Tech, 2012).

Fence installation began on 2 May and was completed 13 May 2016. The fence was installed using the specifications provided in the work plan (ASL, 2016). A photographic log of the fence installation is provided as Appendix D.

3.1 GATE LOCKS

Locks were placed on fence gate by IAAAP Security conforming to IAAAP specifications. The Army reviews and authorizes gate key requests for entry to the IDA.

3.2 WARNING SIGNS

Warning signs were attached to the fence in 100-foot intervals, as specified in the LUCIP (Tetra Tech, 2014). The warning signs comply with Occupational Safety and Health Administration standard danger design specified by 29 CFR 1926.200b, as shown in Figure 1. Additional signs at entry points were mounted to list the points of contact for entry.

Figure 1 Warning signs

3.3 AS-BUILT SURVEY

A formal as-built survey was conducted on 31 May 2016 by a licensed surveyor. Coordinates obtained during the survey were incorporated into the as-built drawing provided as Appendix E.

4.0 REFERENCES

Aerostar SES LLC, January 2016. *Final Revision 1, Operable Unit (OU-4) Remedial Action Work Plan, Inert Disposal Area (IDA) Boundary Fence Installation at the Iowa Army Ammunition Plant, Middletown, Iowa.*

Tetra Tech, July 2012. *Operable Unit 4 (OU-4) Remedial Action Completion Report, Volume 4. Iowa Army Ammunition Plant, Middletown, Iowa.*

Tetra Tech, April 2014. *Land Use Controls Implementation Plan for the Inert Disposal Area. Iowa Army Ammunition Plant, Middletown, Iowa.*

Appendix A

Archaeological Survey

Introduction

The Inert Disposal Area Boundary Fence Installation (Project) is located within the Iowa Army Ammunition Plant in Des Moines County, Iowa. The Project involves construction of a 42-inch chain-link boundary fence which will restrict intrusive activities by personnel and equipment onto or near the cap/closure systems. GAI Consultants (GAI) conducted an initial Phase I archaeological investigation for the proposed Project on May 13 and 14, 2015 resulting in the submission and acceptance of an Archaeological Survey Short Report (ASSR) by the Iowa State Historic Preservation Office. Due to Project design changes, three areas were added to the proposed boundary fence. This revised Area of Potential Effect (APE) for the Project is defined as the limits of ground disturbance for the three un-surveyed portions of the proposed fence line, the combined length of which measures 583 meters (1,916 feet) long by 0.3 meter (1 foot wide) (Figure 1).

Background Research

Archival background research initially conducted for the proposed Project in April 2015 included a site file check with the Iowa State Historic Preservation Office and the Iowa Office of the State Archaeologist. This study indicated that no previously recorded archaeological sites or architectural/historical resources are mapped within the original or supplemental Project APE. Two previously recorded archaeological sites – 13DM354 and 13DM1175 – are mapped approximately 148 meters (486 feet) southeast and 126 (414 feet) southwest of the Project area, respectively. A total of 53 archaeological sites are mapped within 1.6 kilometers (1 mile) of the proposed Project.

Supplemental Phase I Archaeological Survey Results

GAI conducted a supplemental Phase I archaeological survey within the revised APE on March 1 and 2, 2016. Ground cover within the revised APE consisted of mowed grasses, shrubs, mixed hardwoods, and pines. Surface visibility within the expanded Project area was 0 percent due to the existing ground cover. Phase I field investigations within the expanded Project APE involved systematic visual inspection followed by subsurface testing, where appropriate. Moderate to high archaeological potential portions of the supplemental APE were investigated through placement of judgmental and regularly-spaced shovel test pits (STPs) excavated at 15-meter (49.2-foot) intervals (Figure 2). A total of 17 STPs were excavated during the course of the supplemental Phase I archaeological investigation (Figure 3). Areas considered to have low archaeological potential due to existing disturbance were photographed, marked on field mapping, and excluded from subsurface testing. The supplemental Project APE encompasses 0.01 hectares (0.04 acres); subsurface testing was undertaken within 0.008 hectares (0.02 acres) or 50 percent of the supplemental APE.

During pedestrian reconnaissance in the northeastern portion of the supplemental APE, GAI archaeologists noted existing disturbance from past grading activities and an artificially elevated area (Photographs 1 and 2). Five STPs (STPs B1-B5) were excavated within this northeastern portion of the revised APE to document ground

disturbance (Figure 3). STPs B1-B4 contained disturbed fill while STP B5 exhibited intact soils typical for an upland landscape. In STP B2, for example, a brown (10YR 4/3) silt loam CA1 horizon was found above a yellowish brown (10YR 5/4) mixed with gray (10YR 6/1) and very dark grayish brown (10YR 3/2) clay loam CA2 horizon. A grayish brown (10YR 5/2) and gray (10YR 6/1) clay loam CA3 horizon with iron oxide staining was found below the CA2 horizon (Figure 4; Photograph 3). The interface between CA1 and CA2 horizons was noted at 11 centimeters (4.3 inches) below ground surface (bgs), and the CA2/CA3 interface was reached at 33 centimeters (12.9 inches) bgs. Excavation of STP B2 was terminated at 50 centimeters (19.6 inches) bgs. The intact soil profile encountered in STP B5 consisted of a very dark grayish brown (2.5Y 3/2) silt loam Ap horizon overlying a brownish yellow (10YR 6/6) silty clay loam B horizon (Figure 4). The Ap/B interface was noted at 33 centimeters (12.9 inches) bgs, and STP B5 was terminated at 50 centimeters (19.6 inches) bgs. No cultural resources were identified in this northeastern portion of the supplemental APE.

The southernmost portion of the supplemental Project APE is situated within an area covered with grasses, shrubs, and trees (Photographs 4 and 5). While visually inspecting this area, GAI archaeologists noted disturbance from an earthen dam associated with an adjacent retention pond (Photograph 6). The remaining portions of this area maintained moderate to high archaeological potential, and 11 STPs (C1-C11) were excavated to assess the presence of cultural deposits (Figure 3). Both disturbed and intact soil profiles were encountered during shovel testing in the southern portion of the revised APE; seven STPs contained disturbed CA horizon fill, and four STPs exhibited intact soils characteristic of an upland setting. In STP C11, GAI archaeologists documented a disturbed soil profile, consisting of a yellowish brown (10YR 5/4) and light gray (10YR 7/1) course sand CA1 horizon overlying a grayish brown (10YR 5/4) mixed with gray (10YR 6/1) clay loam CA2 horizon with road gravels and redoximorphic features (Figure 4). The interface between the CA1 and CA2 horizons was noted at 17 centimeters (6.6 inches) bgs, and excavation of STP C11 was terminated at 60 centimeters (23.6 inches) bgs. The intact soil profile in STP C3 was comprised of a wet very dark grayish brown (10YR 3/2) silt loam A horizon overlying a wet gray (10YR 6/1) and yellow (10YR 7/8) clay loam B horizon with redoximorphic features (Figure 4; Photograph 7). The A/B interface was noted at 33 centimeters (12.9 inches) bgs, and excavation of STP C3 was terminated at 43 centimeters (16.9 inches) bgs. No cultural resources were identified in this southernmost portion of the supplemental APE.

The westernmost portion of the revised APE is situated alongside an existing access road, and the area is covered in low grasses, shrubs, and mixed hardwoods (Photograph 8). While conducting pedestrian reconnaissance, GAI archaeologists noted ground disturbance from past grading activities in the area. To document ground disturbance, one STP was excavated (STP D1) (Figure 3). The soil profile encountered in STP D1 consisted of a compact very dark grayish brown (10YR 3/2) mixed with brownish yellow (10YR 6/6) silty clay loam CA1 horizon overlying a compact dark grayish brown (10YR 4/2) mixed with gray (10YR 6/1) and brownish yellow (10YR 6/6)

silty clay loam CA2 horizon with iron and manganese staining (Figure 4; Photograph 9). The CA1/CA2 interface was noted at 24 centimeters (9.4 inches) bgs, and excavation of STP D1 was terminated at 55 centimeters (21.6 inches) bgs. No cultural resources were identified as a result of pedestrian reconnaissance and shovel testing efforts in the western portion of the supplemental APE.

Summary and Recommendations

Supplemental Phase I field investigations evaluated additional areas for a proposed fence line within the Inert Disposal Area at the Iowa Army Ammunition Plant. Pedestrian reconnaissance was conducted within the entire 0.01 hectare (0.04 acre) supplemental APE to identify areas with low and moderate to high archaeological potential. Seventeen STPs were excavated within areas maintaining moderate to high potential for containing archaeological resources and within low potential areas to confirm the presence of existing ground disturbance. Fifty percent, or 0.008 hectare (0.02 acre), of the total 0.01-hectare (0.04-acre) supplemental Project APE, were investigated with systematic subsurface testing. No cultural resources were encountered during pedestrian reconnaissance and shovel testing efforts. GAI recommends no further work in the supplemental Project APE due to the absence of cultural resources. Given the negative results of this fieldwork, GAI recommends that the Project will not affect resources eligible or listed in the National Register of Historic Places. GAI also recommends that the proposed Project proceed as planned and with no further cultural resource investigations. If Project plans change, or new facilities are added, additional work may be necessary, in accordance with Section 106 of the National Historic Preservation Act of 1966.

Please note that no archaeological technique is completely sufficient to locate all cultural resources or historic properties. If the proposed Project work uncovers an item(s) which might be of archaeological, historical, or architectural interest, or if important new archaeological, historical, or architectural data come to light in the Project area, reasonable efforts should be made to avoid or minimize harm to the property until the discovery’s significance can be determined.

Project Photographs

Photograph 1. Graded portion of supplemental APE northeast of STP B1. View east-northeast.

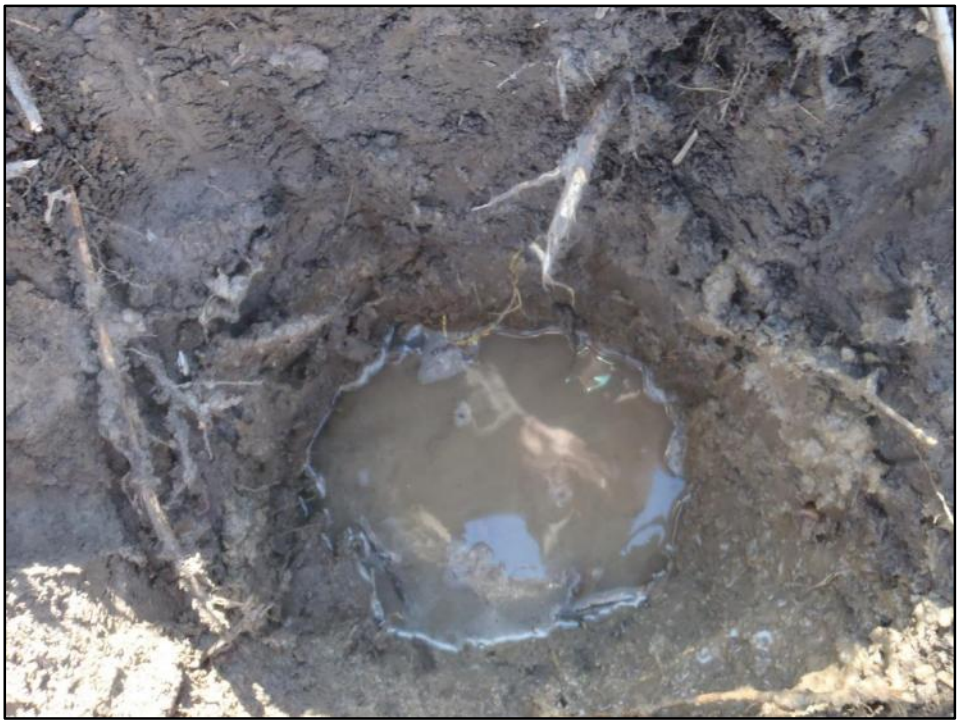
Photograph 2. Graded and artificially elevated portion of supplemental APE, toward STP B3. View south.

Photograph 3. Disturbed soils encountered in STP B2.

Photograph 4. Southernmost portion of revised APE, toward STP C2. View southwest.

Photograph 5. Southernmost portion of revised APE, toward STP C10. View west.

Photograph 6. Disturbance from an earthen dam within the southernmost portion of the supplemental APE. View southwest.

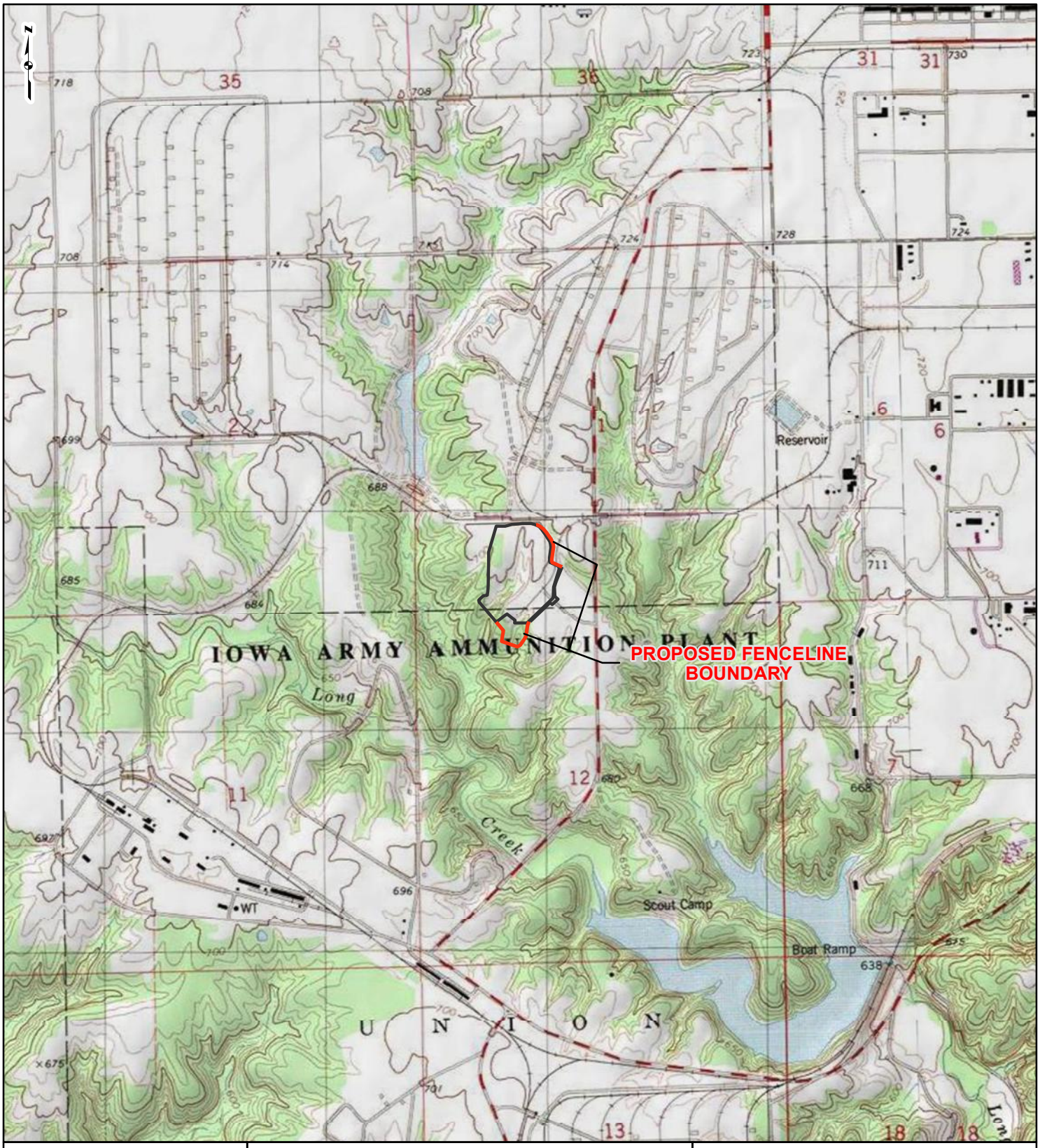


Photograph 7. Intact upland soils encountered in STP C3.

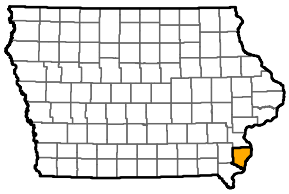
Photograph 8. Westernmost portion of supplemental APE, toward STP D1. View north.

Photograph 9. Disturbed soil profile encountered in STP D1.

Project Figures



PROJECT LOCATION



DES MOINES COUNTY, IOWA

LEGEND

PROPOSED FENCELINE

PREVIOUSLY SURVEYED

0 1,000 2,000 4,000 Feet

FIGURE 1
PROJECT LOCATION

INERT DISPOSAL AREA BOUNDARY
FENCE INSTALLATION
IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

DRAWN BY: AJW DATE: 3/11/2016
CHECKED: SWW APPROVED: BR

REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLE: DANVILLE (1981) AND WEST BURLINGTON (1978), IOWA, OBTAINED THROUGH ESRI USA TOPO MAPS, NATIONAL GEOGRAPHIC TOPO AND USGS, ACCESSED 03/2016.

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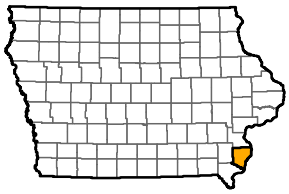
PROJECT LOCATION



DES MOINES COUNTY, IOWA

LEGEND

- PROPOSED FENCELINE
- PREVIOUSLY SURVEYED
- TESTED CORRIDOR
- DISTURBED CORRIDOR
- PREVIOUSLY SURVEYED

0 375 750 1,500 Feet

FIGURE 2
PROJECT OVERVIEW

INERT DISPOSAL AREA BOUNDARY
FENCE INSTALLATION
IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

DRAWN BY: AJW DATE: 3/11/2016
CHECKED: SWW APPROVED: BR

REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLE: DANVILLE (1981), IOWA, OBTAINED THROUGH ESRI USA TOPO MAPS, NATIONAL GEOGRAPHIC TOPO AND USGS, ACCESSED 03/2016.

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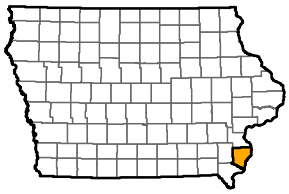
PROJECT LOCATION



DES MOINES COUNTY, IOWA

LEGEND

PROPOSED FENCELINE

PREVIOUSLY SURVEYED

SHEET INDEX

0 1,000 2,000 4,000 Feet

FIGURE 3
ARCHAEOLOGICAL TESTING LOCATIONS - SHEET INDEX

INERT DISPOSAL AREA BOUNDARY
FENCE INSTALLATION
IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

DRAWN BY: AJW DATE: 3/15/2016
CHECKED: SWW APPROVED: BR

REFERENCE: ESRI WORLD IMAGERY, PROVIDED BY NAIP, 2013, ACCESSED 03/2016.

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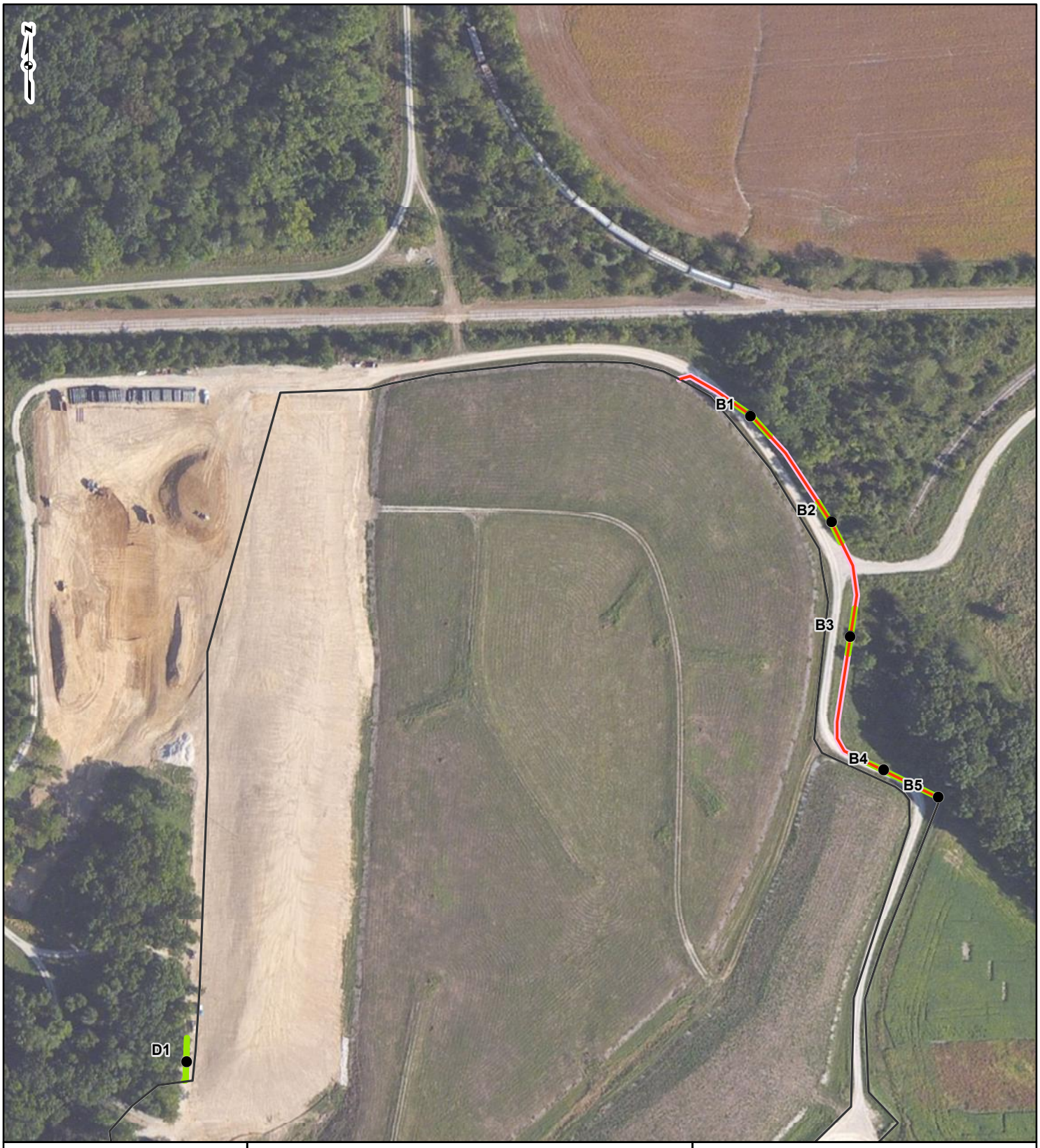
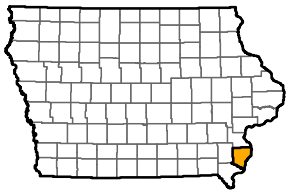


PROJECT LOCATION



DES MOINES COUNTY, IOWA

LEGEND

- NEGATIVE STP
- PROPOSED FENCELINE
- PREVIOUSLY SURVEYED
- TESTED CORRIDOR
- DISTURBED CORRIDOR
- PREVIOUSLY SURVEYED

0 100 200 400 Feet

FIGURE 3
ARCHAEOLOGICAL TESTING LOCATIONS - SHEET 1 OF 2

INERT DISPOSAL AREA BOUNDARY
FENCE INSTALLATION
IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

DRAWN BY: AJW DATE: 3/15/2016
CHECKED: SWW APPROVED: BR

REFERENCE: ESRI WORLD IMAGERY, PROVIDED BY MICROSOFT, UC-G, 2011, ACCESSED 03/2016.

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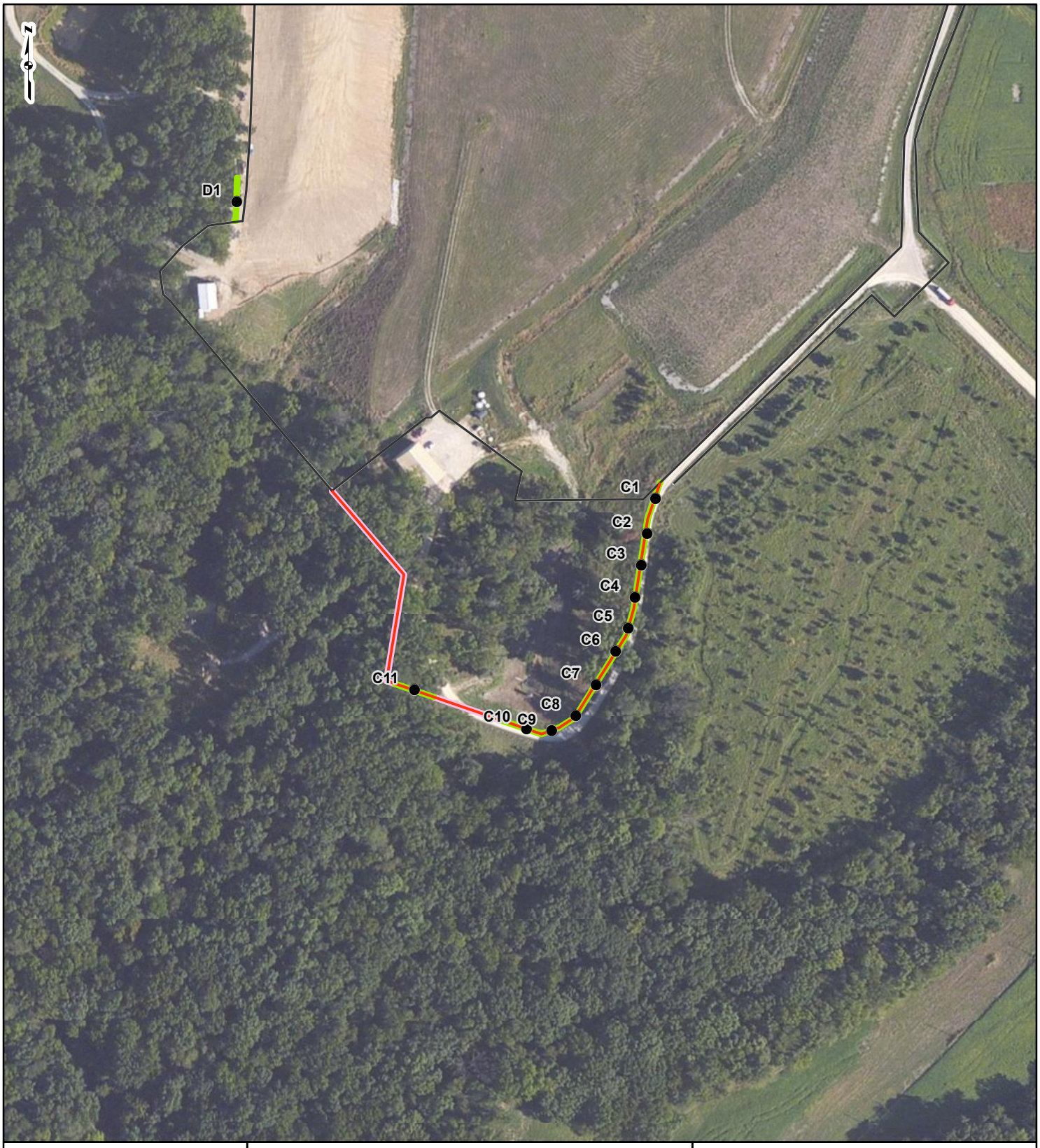
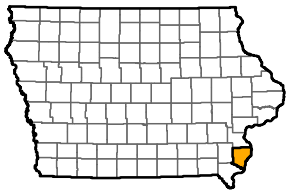


PROJECT LOCATION



DES MOINES COUNTY, IOWA

LEGEND

- NEGATIVE STP
- PROPOSED FENCELINE
- PREVIOUSLY SURVEYED
- TESTED CORRIDOR
- DISTURBED CORRIDOR
- PREVIOUSLY SURVEYED

0 100 200 400 Feet

FIGURE 3
ARCHAEOLOGICAL TESTING LOCATIONS - SHEET 2 OF 2

INERT DISPOSAL AREA BOUNDARY
FENCE INSTALLATION
IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

DRAWN BY: AJW DATE: 3/15/2016
CHECKED: SWW APPROVED: BR

REFERENCE: ESRI WORLD IMAGERY, PROVIDED BY MICROSOFT, UC-G, 2011, ACCESSED 03/2016.

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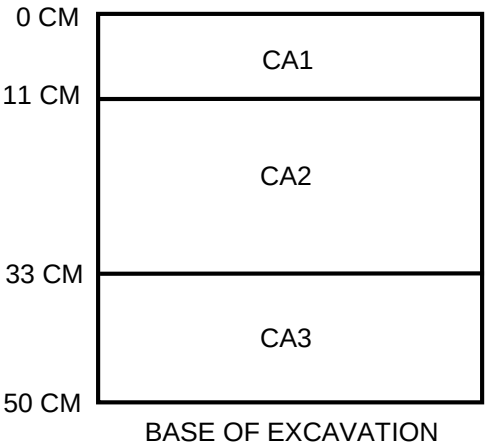
STP B2

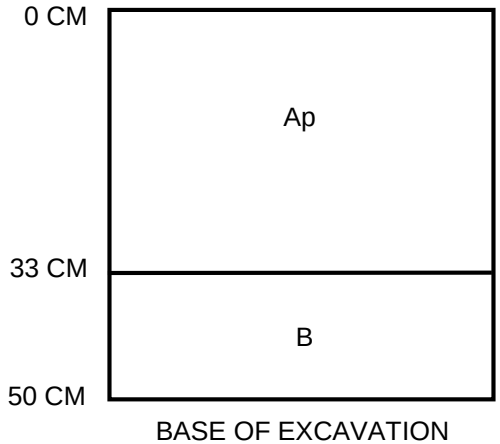


CA1 – BROWN (10YR 4/3) SILT LOAM

CA2 – YELLOWISH BROWN (10YR 5/4) MIXED WITH GRAY (10YR 6/1) AND VERY DARK GRAYISH BROWN (10YR 3/2) CLAY LOAM

CA3 – GRAYISH BROWN (10YR 5/2) AND GRAY (10YR 6/1) CLAY LOAM WITH IRON OXIDE STAINING

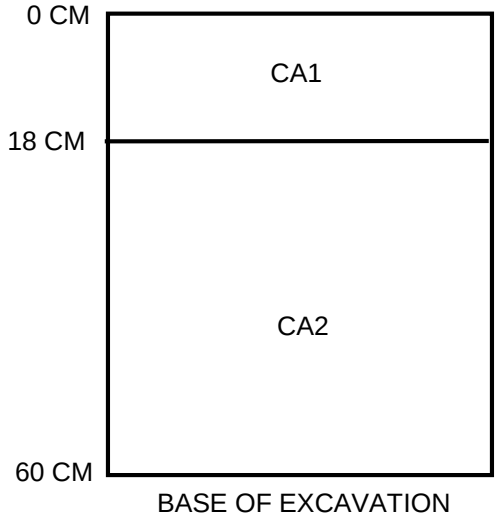
STP B5



Ap – VERY DARK GRAYISH BROWN (2.5Y 3/2) SILT LOAM

B – BROWNISH YELLOW (10YR 6/6) SILTY CLAY LOAM

STP C11



CA1 – YELLOWISH BROWN (10YR 5/4) AND LIGHT GRAY (10YR 7/1) COURSE SAND

CA2 – GRAYISH BROWN (10YR 5/4) MIXED WITH GRAY (10YR 6/1) CLAY LOAM WITH ROAD GRAVELS AND REDOXIMORPHIC FEATURES

FIGURE 4, SHEET 1 OF 2
REPRESENTATIVE STP PROFILES

SCALE

0 CM 25 CM 50 CM

gai consultants

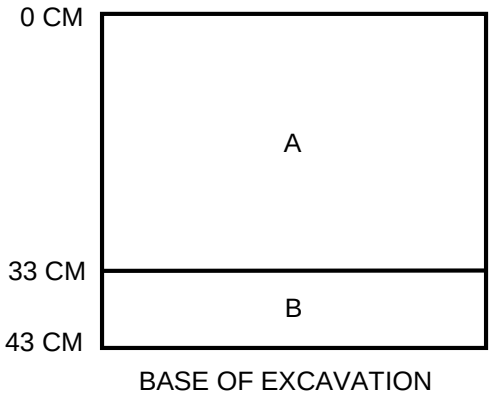
INERT DISPOSAL AREA BOUNDARY FENCE
INSTALLATION IOWA ARMY AMMUNITION
PLANT AEROSTAR SES LLC

AerostarSES LLC

DRWN: ANH
CHECKED: BR

DATE: 3/8/2016
APPROVED: BR

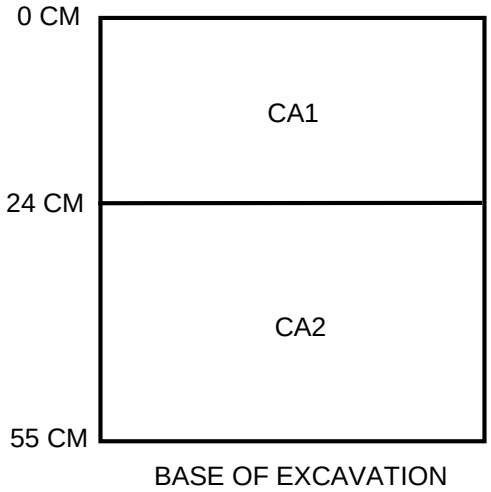
STP C3



A – WET VERY DARK GRAYISH BROWN (10YR 3/2) SILT LOAM

B – WET GRAY (10YR 6/1) AND YELLOW (10YR 7/8) CLAY LOAM WITH REDOXIMORPHIC FEATURES

STP D1



CA1 – COMPACT VERY DARK GRAYISH BROWN (10YR 3/2) MIXED WITH BROWNISH YELLOW (10YR 6/6) SILTY CLAY LOAM

CA2 – COMPACT DARK GRAYISH BROWN (10YR 4/2) MIXED WITH GRAY (10YR 6/1) AND BROWNISH YELLOW (10YR 6/6) SILTY CLAY LOAM WITH IRON AND MANGANESE STAINING

FIGURE 4, SHEET 2 OF 2
REPRESENTATIVE STP PROFILES

SCALE

0 CM 25 CM 50 CM

gai consultants

INERT DISPOSAL AREA BOUNDARY FENCE
INSTALLATION IOWA ARMY AMMUNITION
PLANT AEROSTAR SES LLC

AerostarSES LLC

DRWN: ANH
CHECKED: BR

DATE: 3/8/2016
APPROVED: BR

Initial ASSR Form

ARCHAEOLOGICAL SURVEY SHORT REPORT FORM

State Historical Society of Iowa
The Historical Division of the Department of Cultural Affairs
600 E. Locust
Des Moines, Iowa 50319-0290

R & C#: _____
Reviewer: _____
Date: _____
ASSR Accepted: Yes (__) No (__)

Locational Information and Survey Conditions

County(ies): Des Moines

Quadrangle(s): Danville Date(s): 1981

Project type/title: Inert Disposal Area Boundary Fence Installation Iowa Army Ammunition Plant

Responsible federal/state agencies: United States Army

Legal Location:	SW	1/4	SE	1/4	SW	1/4	Sec.	1	T.	69N	R.	4W
(if needed) :	NW	1/4	NE	1/4	NW	1/4	Sec.	12	T.	69N	R.	4W
(if needed) :		1/4		1/4		1/4	Sec.		T.		R.	

UTM coordinates: N 645773 to 646052, E 4518135 to 4517954
(if needed) : N 645762 to 645966, E 4517705 to 4517695

Project description: The project will involve construction of a 42-inch chain-link boundary fence for the Inert Disposal Area (IDA) at the Iowa Army Ammunition Plant (IAAP). The boundary fence will be a physical land use control to restrict intrusive activities by personnel and equipment onto or near the cap/closure systems. Photographs of the project area are included in the additional information sheets below (Photographs 1-8). The Area of Potential Effect (APE) for the project is defined as the limits of ground disturbance for the proposed fence line, which measures 1,729 meters (5,672 feet) long by 0.3 meter (1 foot wide) (Figure 1). The proposed fence line is situated along the perimeter of the existing IDA landfill; the majority of the APE has been previously disturbed by landfill construction and maintenance activities (Figure 2).

Topography

Soil associations: Keomah Series soils (1 to 3 percent slopes); Clinton Series soils (2 to 9 percent slopes); and Lindley Series soils (18 to 25 percent slopes)

Reference: Brown 1983

Landform: Southern Iowa Drift Plain

Reference: Prior 1991

Drainage Name: Skunk River

Land use/ground cover/percent visibility: Approximately 90 percent of the project area is situated within the existing IDA landfill at the IAAP (Photographs 1-8). Ground cover within this portion of the existing landfill consists of mowed grasses and small patches of gravel associated with access roads within the IDA. Surface visibility within the landfill portion of the project was 0 percent due to the grass and gravel ground cover. The remaining 10 percent of the project area is located outside of the landfill area; land use in this portion of the project area includes a sparsely forested area with mixed hardwoods, low understory vegetation, and grasses. A narrow riprap channel also extends roughly north-south through this forested area. Surface visibility within this portion of the project area is 0 percent.

Survey Limitations: None

ARCHAEOLOGICAL SURVEY SHORT REPORT FORM
State Historical Society of Iowa
The Historical Division of the Department of Cultural Affairs
600 E. Locust
Des Moines, Iowa 50319-0290

R & C#: _____
Reviewer: _____
Date: _____
ASSR Accepted: Yes (__) No (__)

Archaeological and Historical Information

Previously reported sites: No previously recorded archaeological sites are mapped within the project APE. Two previously recorded archaeological sites – 13DM354 and 13DM1175 – are mapped approximately 486 feet southeast and 414 feet southwest of the APE, respectively. A total of 53 sites are mapped within 1.6 kilometers (1 mile) of the project APE.

Previous surveys: Seven surveys were previously conducted within 1 mile of the project APE: 19970729066, 19881129084, 20000529128, 20000229086, 20100729029, 20001029034, and 20001029034. None of these seven surveys was conducted within the project APE.

Citation(s): Anderson 2000; Bienenfeld et al. 1997; Bond 2011; Brodnicki 2000; Harvey 2000; Harvey et al. 2000; Leininger and Bienenfeld 2001; Stafford et al. 1984; Winham et al. 1991

Regional archaeologist contacted: Benjamin Resnick, M.A., M.B.A., RPA Phone number: (412) 476-2000 extension 1200

Investigation Techniques: The project area was initially investigated through archival background research, including a site file check with the Iowa State Historic Preservation Office and the Iowa Office of the State Archaeologist. A Phase I archaeological survey was subsequently conducted within the entire project APE. GAI archaeologists visually inspected the project APE and found extensive ground disturbance from the existing IDA landfill. While the majority of the project APE contained existing ground disturbance that precluded subsurface testing, the southwestern portion of the APE was located along an undisturbed, relatively level sparsely forested area. GAI archaeologists excavated 14 shovel test pits (STPs) at 15-meter (50-foot) intervals along a single transect in the southwestern portion of the APE (Figure 3). A total of four judgmental STPs were also excavated in the northwestern, northeastern, southeastern, and southern portions of the APE, respectively, to confirm the presence of ground disturbance along the perimeter of the IDA landfill (see Figure 3). All STPs were hand-excavated by natural soil stratigraphy to at least 10 centimeters (3.93 inches) into culturally sterile subsoil (B horizon) or when the extent of disturbed fill was confirmed. Figure 4 provides historical maps of the project vicinity (see additional information sheet). All soils excavated were screened through 0.6-millimeter (0.25-inch) hardware cloth. STPs ranged in depth from 29 centimeters (11.41 inches) to 82 centimeters (32.28 inches) below ground surface (Figure 5).

Historical sources consulted: Andreas 1873, 1875; General Land Office Survey 1838; North West Publishing Company 1897; United States Department of Agriculture (USDA) 1930, 1950, 1960, 1970, 1980; United States Geological Survey 1990; W.W. Hixson and Company 1930

Time expended: 15.5 Person hours: 15.5
Area surveyed: 0.13 acres 526 square meters.

Contractor and Surveyor Information

Archaeological contractor: GAI Consultants, Inc.
Address: 385 East Waterfront Drive
Homestead, Pennsylvania 15120
Surveyor's Name(s): Sam Williams
Date(s) surveyed: May 13 and 14, 2015
ASSR completed by: Angela N. Hood, M.A., RPA
ASSR submitted by: Benjamin Resnick, M.A., M.B.A., RPA (title) Assistant Vice President/Senior Director

ARCHAEOLOGICAL SURVEY SHORT REPORT FORM
State Historical Society of Iowa
The Historical Division of the Department of Cultural Affairs
600 E. Locust
Des Moines, Iowa 50319-0290

R & C#: _____
Reviewer: _____
Date: _____
ASSR Accepted: Yes (__) No (__)

Signature:

Benjamin Resnick, M.A., M.B.A., RPA (sign here)

Address (if the address is not the same as the contractor address): _____

Attachments Checklist

__x__ 1. Project location map depicting general project location, scale, and north arrow
__x__ 2. U.S.G.S. topographic map depicting project limits, scale, north arrow, and date of map
__x__ 3. Sketch map(s) depicting project limits, scale, north arrow, date of map, all subsurface tests, shovel probes, soil cores, and soil profiles
__x__ 4. Copies of historical plat map(s) consulted
__x__ 5. Relevant depiction(s) of soil profiles and soil descriptions
__x__ 6. References cited section
__x__ 7. Additional information sheets as necessary

Contractor and ASSR Assurance Control

I (We), the (Co-) Principal Investigator(s):

Benjamin Resnick, M.A., M.B.A., RPA (sign here)

do hereby assure that the Phase I archaeological reconnaissance has located no archaeological materials or no historic properties (sites over 50 years of age from the date of this report); project clearance is recommended.

Address(es) of the agency or person to whom SHPO comments should be mailed:
Benjamin Resnick
385 East Waterfront Drive
Homestead, Pennsylvania 15120

Comments: Phase I field investigations evaluated a proposed fence line within the Inert Disposal Area at the Iowa Army Ammunition Plant. Pedestrian reconnaissance was conducted within the entire 0.05-hectare (0.13-acre) APE to identify areas with low and moderate to high archaeological potential. Fourteen STPs were excavated within areas maintaining moderate to high potential for archaeological resources, and an additional four judgmental STPs were excavated to confirm the presence of existing ground disturbance (Photographs 5-8). Fourteen percent, or 0.007 hectare (0.019 acre) of the total 0.05-hectare (0.13-acre) project APE, were investigated with systematic subsurface testing. No cultural resources were encountered during pedestrian reconnaissance and shovel testing efforts. GAI recommends no further work in the project APE due to the absence of cultural resources. Given the negative results of this fieldwork, GAI recommends that the project will not affect resources eligible or listed on the National Register of Historic Places. GAI also recommends that the proposed project proceed as planned and with no further cultural resource investigations.

ARCHAEOLOGICAL SURVEY SHORT REPORT FORM

State Historical Society of Iowa
The Historical Division of the Department of Cultural Affairs
600 E. Locust
Des Moines, Iowa 50319-0290

R & C#: _____
Reviewer: _____
Date: _____
ASSR Accepted:Yes (__) No (__)

If project plans change, or new facilities are added, additional work may be necessary, in accordance with Section 106 of the National Historic Preservation Act of 1966.

Please note that no archaeological technique is completely sufficient to locate all cultural resources or historic properties. If the proposed project work uncovers an item(s) which might be of archaeological, historical, or architectural interest, or if important new archaeological, historical, or architectural data come to light in the project area, reasonable efforts should be made to avoid or minimize harm to the property until the discovery's significance can be determined.

Reviewer's comments:

References Cited

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Additional Information Sheet

Historical Map Review

A review of historical atlases, plat maps, and aerial photographs indicate limited development in the project vicinity from 1838 through the early to mid-twentieth century (Andreas 1873, 1875; General Land Office Survey 1838; North West Publishing Company 1897; USDA 1930, 1950; W.W. Hixson and Company 1930). A structure is illustrated immediately east of the project vicinity on the Iowa land survey map from 1838 (General Land Office Survey 1838) (Figure 4, Sheet 1), but subsequent nineteenth century atlases and plat maps of the project area do not depict this structure (Andreas 1873, 1875; North West Publishing Company 1897) (Figure 4, Sheets 2 and 3). The project vicinity remained undeveloped until 1930, at which point aerial photographs of the project vicinity show a farmstead in the northern portion of the project vicinity (USDA 1930) (Figure 4, Sheet 4). Aerial imagery of the entire IAAP facility is redacted on the next available aerial photographs of Des Moines County (USDA 1950), perhaps due to security concerns. The 1960 aerial photographs of the project vicinity show the exposed soils and access roads associated with the IDA landfill for the first time, though the landfill's footprint in 1960 was smaller than its present extent (USDA1960) (see Figure 4, Sheet 4). The railroad immediately north of the IDA landfill also appears for the first time on the 1960 aerial photographs (USDA 1960) (see Figure 4, Sheet 4) The farmstead visible on aerial images of the project vicinity in 1930 is not present on the 1960 photographs (USDA 1930, 1960) (Figure 4, Sheet 4). Structures associated with this farmstead were likely demolished during development of this portion of the IAAP. Subsequent aerial photographs of the project vicinity exhibit the expansion of the IDA landfill (USDA 1970, 1980) (Figure 4, Sheet 5).

Background research focusing on historical atlases, plat maps, and aerial photographs indicates that development within the project area was limited before the IAAP was established in the mid-twentieth century. Although a structure is present on the 1838 Iowa land survey map immediately east of the project vicinity, no evidence of this structure was encountered during Phase I archaeological fieldwork within the project APE. Furthermore, no vestiges of the farmstead present on 1930 aerial photographs of the project area were identified within the APE.

Shovel Testing Results

Of the 18 total STPs excavated within the project APE, nine contained intact soils characteristic of an upland landform, while the remaining nine STPs exhibited disturbed soils. STP 1 consisted of intact soils, specifically a very dark gray (10YR 3/1) mixed with dark grayish brown (10YR 4/2) silty clay loam A horizon with iron oxide staining overlying a yellowish brown (10YR 5/4) clay loam B horizon (Figure 5). The A/B interface was reached at 19 centimeters (7.48 inches) below ground surface, and excavation of STP 1 was terminated at 29 centimeters (11.41 inches).

STP 7 contained a horizon of disturbed fill overlying intact upland soils. The soil profile of STP 7 consisted of a dark grayish brown (10YR 4/2) mixed with dark yellowish brown (10YR 4/6) and very dark gray (10YR 3/1) silty clay loam CA overlying a very dark gray (10YR 3/1) silt loam A horizon and a yellowish brown (10YR 5/6) silty clay loam B horizon (see Figure 5). The interface between the CA and A horizons was noted at 29 centimeters (11.41 inches) below ground surface, and the A/B interface at 60 centimeters (23.62 inches). STP 7 was terminated at 70 centimeters (27.55 inches) below ground surface.

In STP 16, GAI archaeologists encountered three strata of disturbed fill. The CA1 horizon consisted of a compact dark yellowish brown (10YR 4/4) mixed with very pale brown (10YR 7/3) clay loam, which was found above a compact yellowish brown (10YR 5/8) mixed with dark grayish brown (10YR 4/2) clay loam CA2 horizon. A compact dark grayish brown (10YR 4/2) mixed with light brownish gray (10YR 6/2) clay loam CA3 horizon with 25 percent gravels was found below the CA2 horizon (see Figure 5). The CA1/CA2 interface was reached at 18 centimeters (7 inches) below ground surface, and the CA2/CA3 interface at 35 centimeters (13.77 inches). Excavation of STP 16 was terminated at 47 centimeters (18.5 inches) below ground surface.

No cultural resources were identified during shovel testing and pedestrian reconnaissance efforts in the project APE.

Project Photographs

Photograph 1. Tested portion of project APE, between STPs 12 and 13. View southwest.

Photograph 2. Tested portion of project APE, from STP 10 to STP 9. View southeast.

Photograph 3. Tested portion of project APE, from STP 7 to STP 8. View northwest.

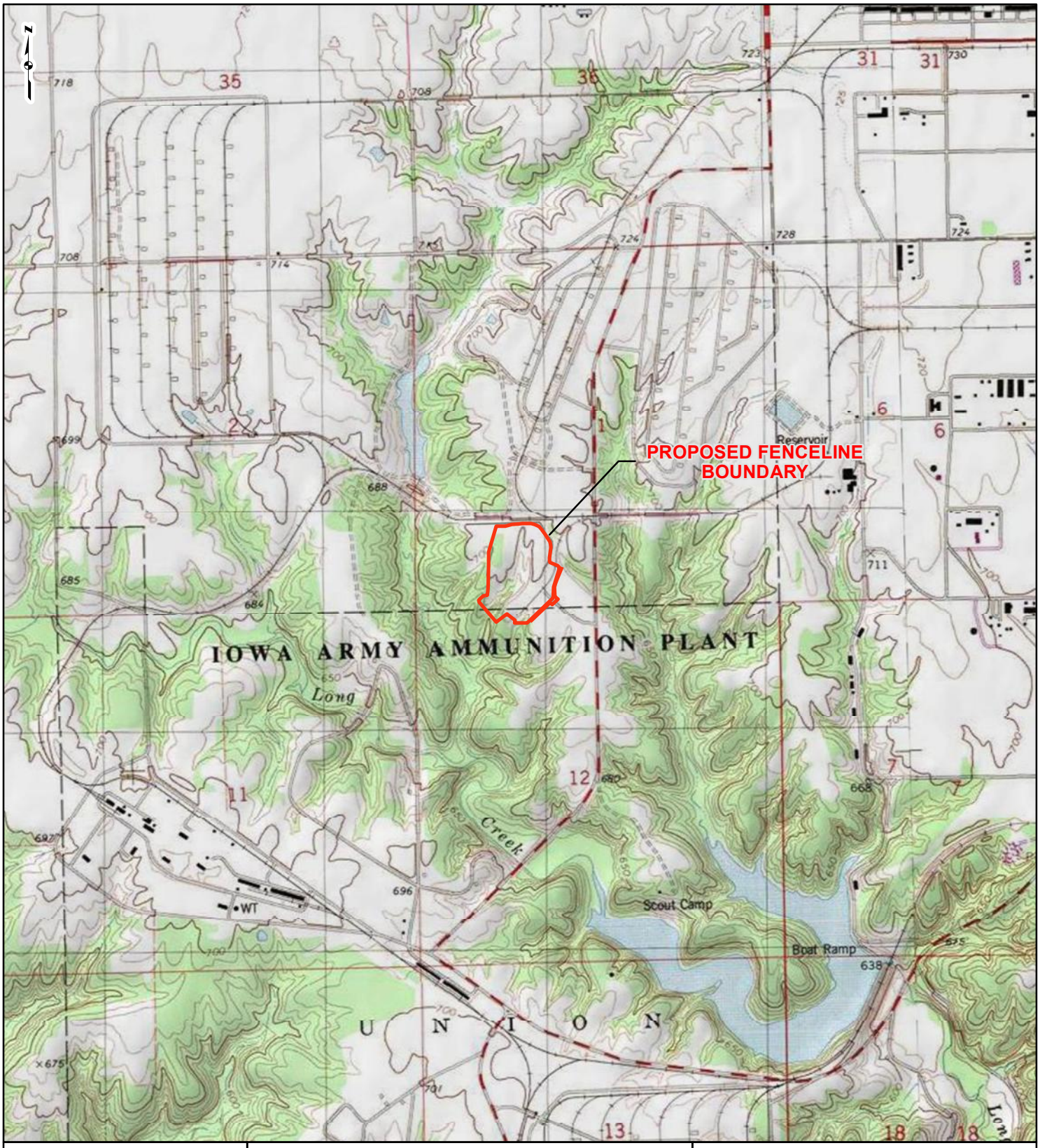
Photograph 4. Intact soils of STP 12. View northeast.

Photograph 5. Portion of project APE within existing IDA landfill, toward STP 15. View south-southwest.

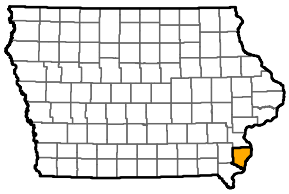
Photograph 6. Disturbed soil profile in STP 16. View northwest.

Photograph 7. Disturbance from existing IDA landfill in eastern portion of project APE, from STP 17. View north.

Photograph 8. Disturbance from existing IDA landfill in southern portion of project APE, from STP 18. View northwest.



PROJECT LOCATION



DES MOINES COUNTY, IOWA

LEGEND

PROPOSED FENCELINE

0 1,000 2,000 4,000 Feet

FIGURE 1
PROJECT LOCATION

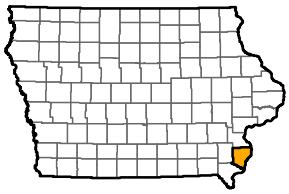
INERT DISPOSAL AREA BOUNDARY
FENCE INSTALLATION
IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

DRAWN BY: SJS DATE: 6/4/2015
CHECKED: AJW APPROVED: BR

REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLE: DANVILLE (1981) AND WEST BURLINGTON (1978), IOWA, OBTAINED THROUGH ESRI USA TOPO MAPS, NATIONAL GEOGRAPHIC TOPO AND USGS, ACCESSED 06/2015.

P:\PIT\2009\C091116.03 - Aerostar IAAP Phase I Arc\GIS\MXD\CULTURAL\REPORT MAPPING\FIG_1_PROJ_LOC_MAP_2015_06_01.mxd

PROJECT LOCATION



DES MOINES COUNTY, IOWA

LEGEND

- PROPOSED FENCELINE
- STUDY CORRIDOR
- TESTED
- DISTURBED
- SLOPE

0 375 750 1,500 Feet

FIGURE 2
PROJECT OVERVIEW

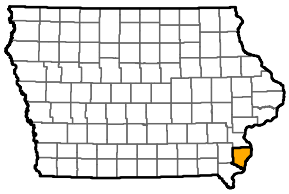
INERT DISPOSAL AREA BOUNDARY
FENCE INSTALLATION
IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

DRAWN BY: SJS DATE: 6/4/2015
CHECKED: AJW APPROVED: BR

REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLE: DANVILLE (1981), IOWA, OBTAINED THROUGH ESRI USA TOPO MAPS, NATIONAL GEOGRAPHIC TOPO AND USGS, ACCESSED 06/2015.

P:\PIT\2009\C091116.03 - Aerostar IAAP Phase I Arc\GIS\MXD\CULTURAL\REPORT MAPPING\FIG_2_PROJ_OVERVIEW_2015_06_01.mxd

PROJECT LOCATION



DES MOINES COUNTY, IOWA

LEGEND

- NEGATIVE STP
- PROPOSED FENCELINE
- STUDY CORRIDOR
- TESTED
- DISTURBED
- SLOPE

0 100 200 400 Feet

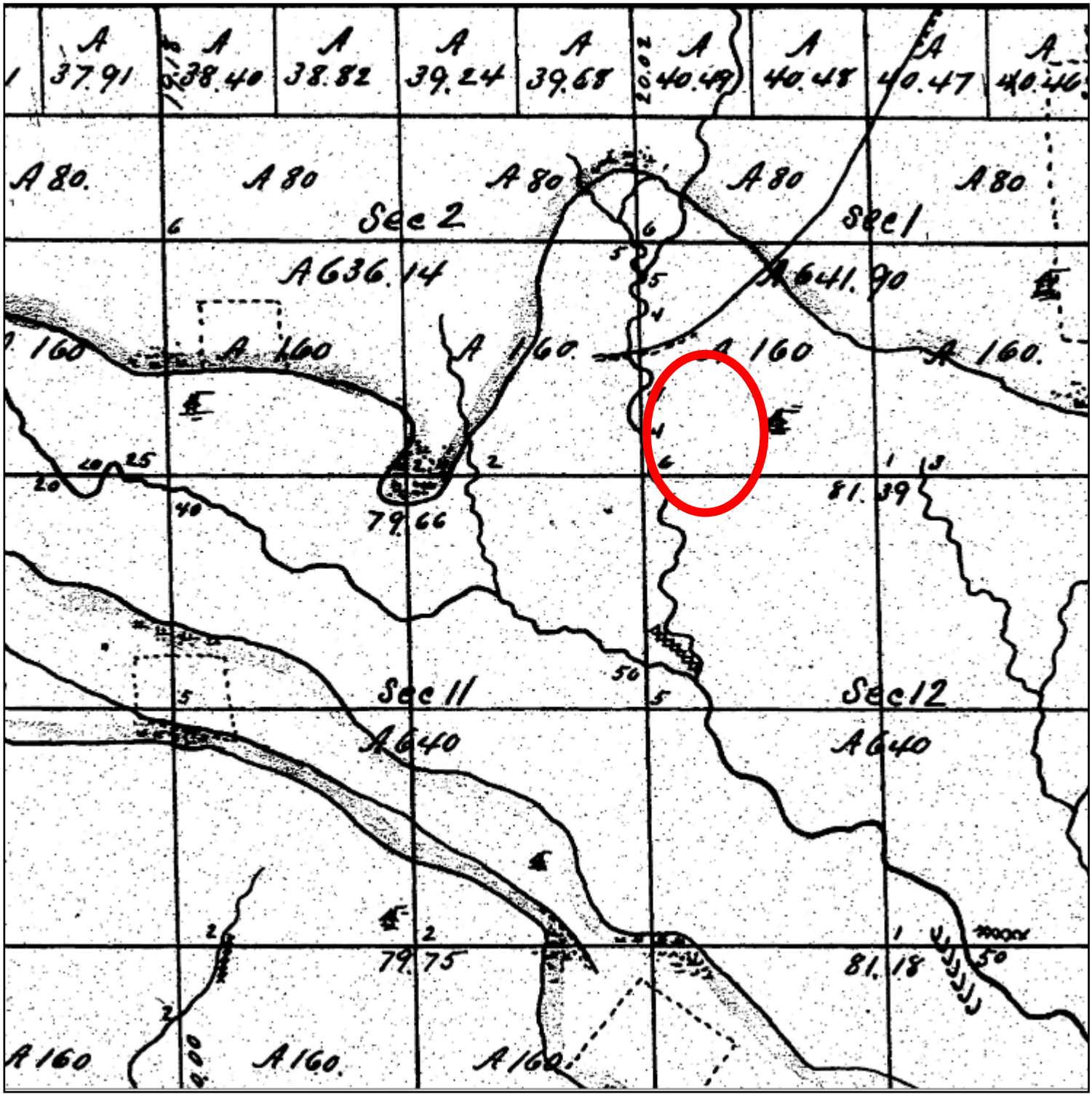
FIGURE 3
ARCHAEOLOGICAL TESTING LOCATIONS

INERT DISPOSAL AREA BOUNDARY FENCE INSTALLATION
IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

DRAWN BY: SJS DATE: 6/4/2015
CHECKED: AJW APPROVED: BR

REFERENCE: NAIP, 2013, OBTAINED THROUGH ESRI WORLD IMAGERY, USDA, FSA, ACCESSED 06/2015.

P:\PIT\2009\C091116.03 - Aerostar IAAP Phase I Arc\GIS\MXD\CULTURAL\REPORT MAPPING\FIG_3_ARCH_TESTING_MAP_2015_06_01.mxd



SCALE

0 MI 1 MI 2 MI

SOURCE: IOWA LAND SURVEY MAP, TOWNSHIP NO. 69N, RANGE NO. 4W (GENERAL LAND OFFICE SURVEY 1838)

N

PROJECT VICINITY

FIGURE 4, SHEET 1 OF 5
HISTORICAL MAPS OF PROJECT VICINITY

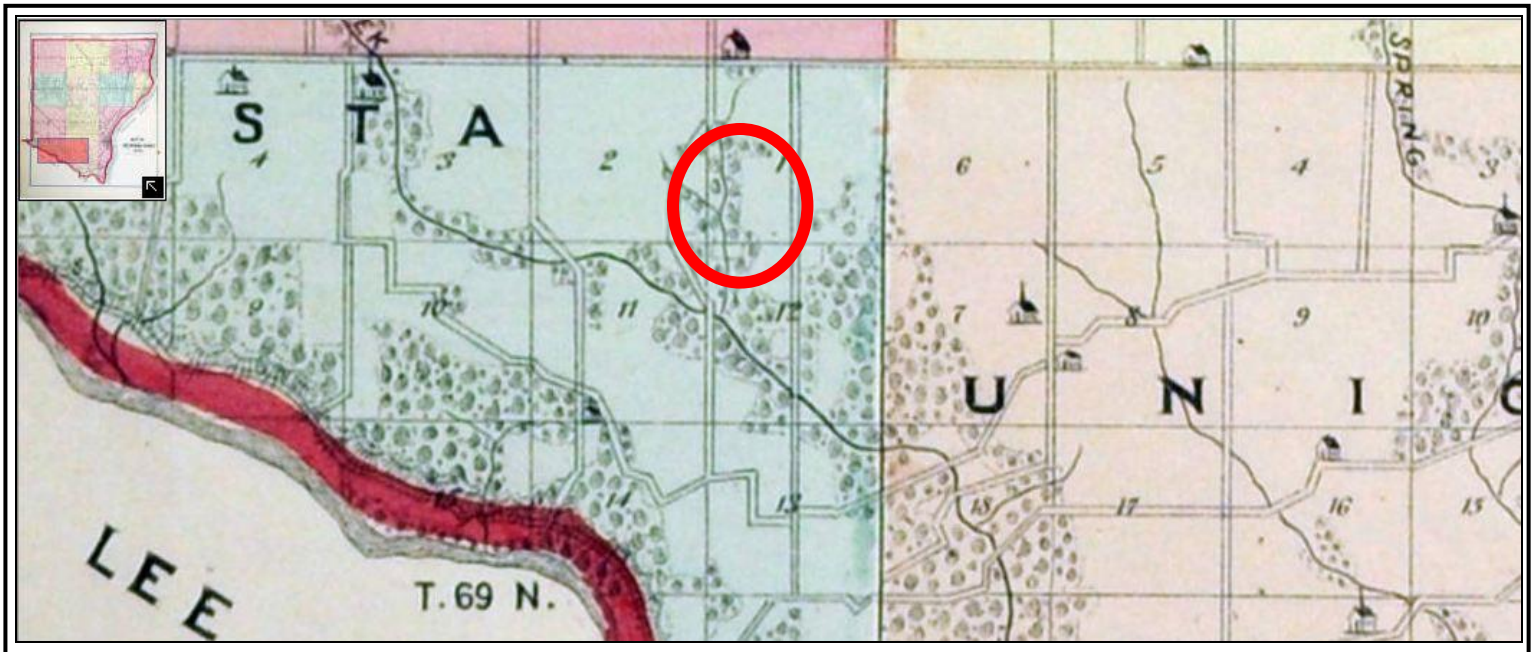
gai consultants

INERT DISPOSAL AREA BOUNDARY FENCE
INSTALLATION IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

AerostarSES LLC

DRWN: ANH
CHECKED: BR

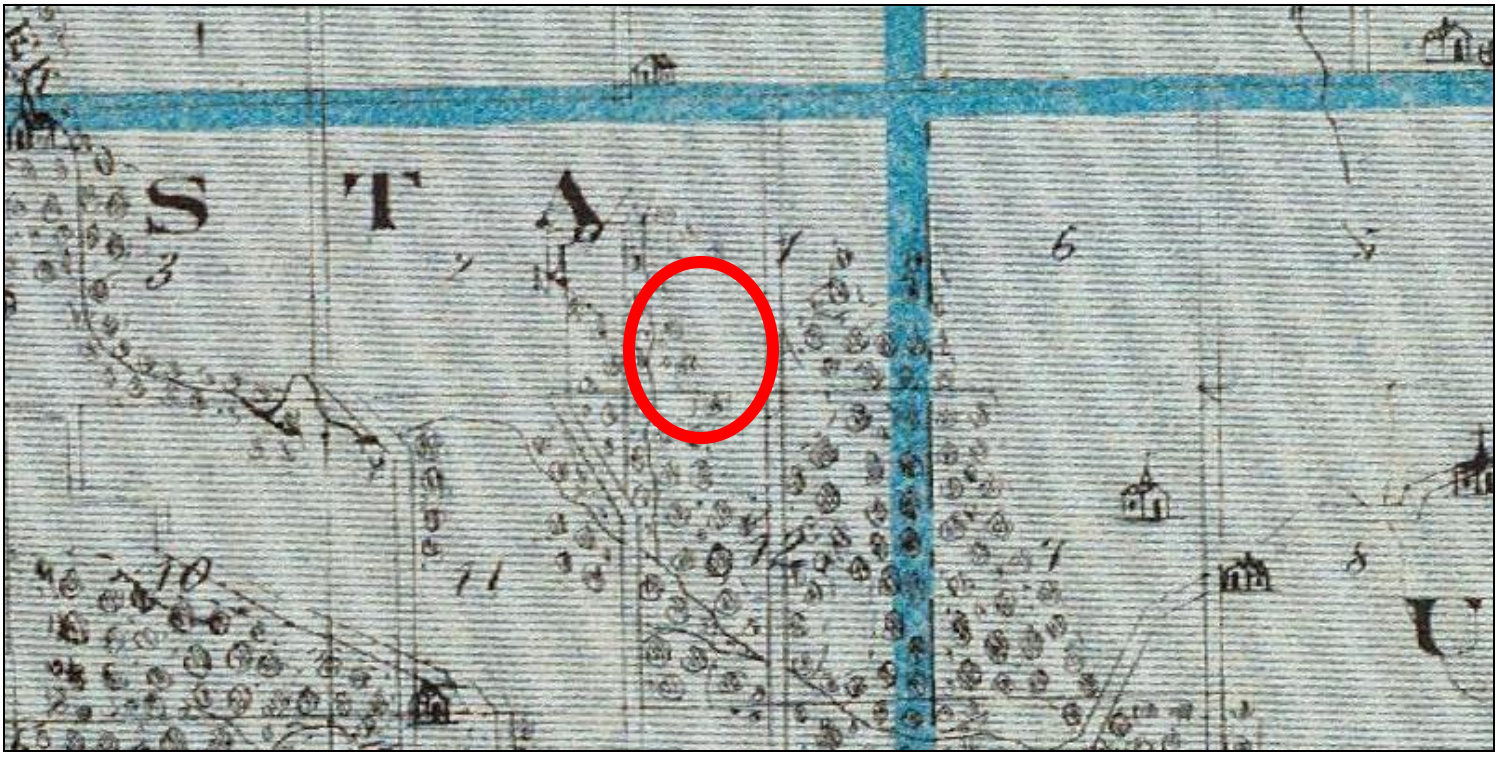
DATE: 05/29/2015
APPROVED: BR



SCALE

0 MI 1 MI 2 MI

SOURCE: AN ILLUSTRATED HISTORICAL ATLAS OF DES MOINES COUNTY, IOWA (ANDREAS 1873)



SCALE

0 MI 1 MI 2 MI

SOURCE: ILLUSTRATED HISTORICAL ATLAS OF THE STATE OF IOWA (ANDREAS 1875)

N

PROJECT VICINITY

FIGURE 4, SHEET 2 OF 5
HISTORICAL MAPS OF PROJECT VICINITY

gai consultants

INERT DISPOSAL AREA BOUNDARY FENCE
INSTALLATION IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

AerostarSES LLC

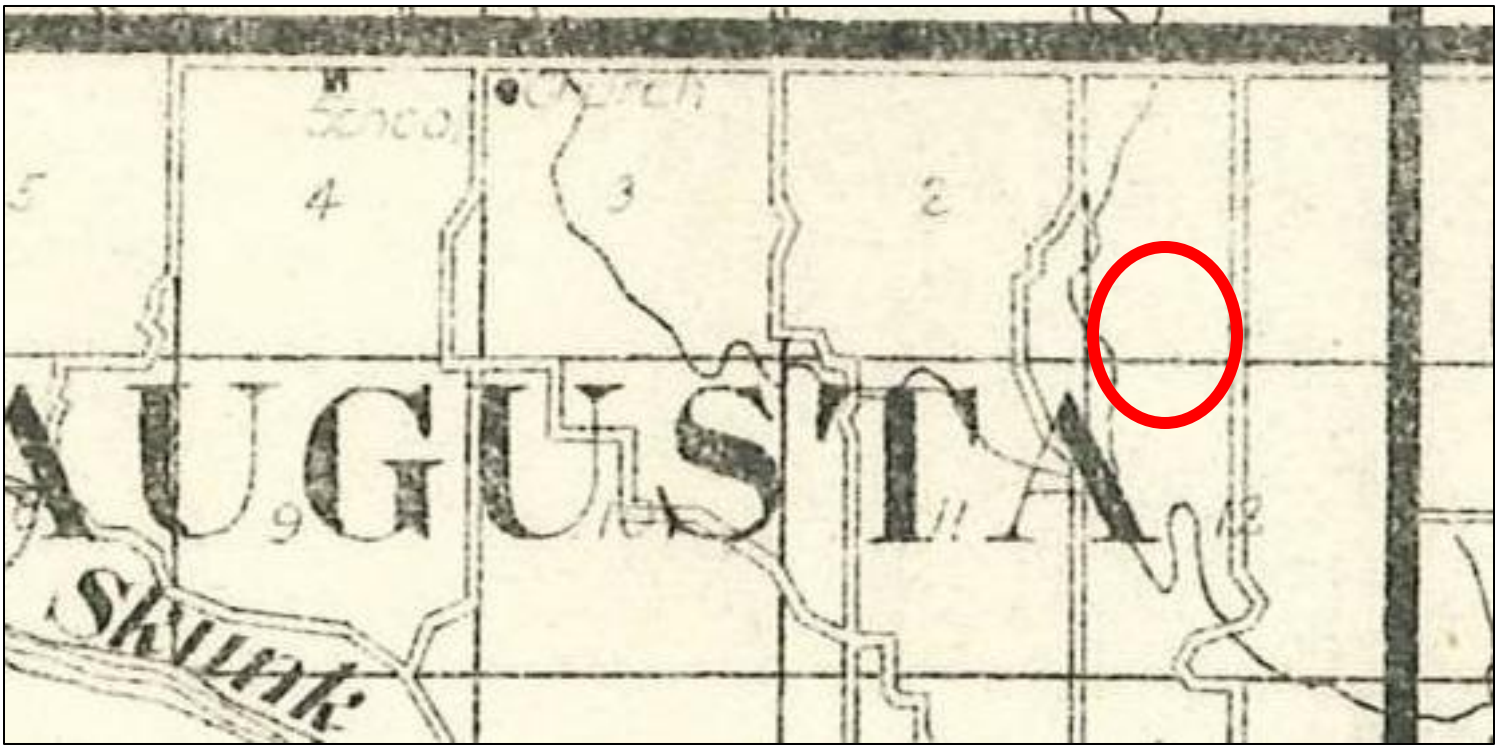
DRWN: ANH
CHECKED: BR

DATE: 05/29/2015
APPROVED: BR

SCALE

0 MI 1 MI 2 MI

SOURCE: PLAT BOOK OF DES MOINES COUNTY, IOWA (NORTH WEST PUBLISHING COMPANY 1897)



SCALE

0 MI 1 MI 2 MI

SOURCE: PLAT BOOK OF DES MOINES COUNTY, IOWA (W.W. HIXSON AND COMPANY1930)

N

PROJECT VICINITY

FIGURE 4, SHEET 3 OF 5
HISTORICAL MAPS OF PROJECT VICINITY

gai consultants

INERT DISPOSAL AREA BOUNDARY FENCE
INSTALLATION IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

AerostarSES LLC

DRWN: ANH
CHECKED: BR

DATE: 05/29/2015
APPROVED: BR

SCALE

0 1,000 FT 2,000FT

SOURCE: DES MOINES COUNTY, IOWA
AERIAL PHOTOGRAPH (USDA 1930)

SCALE

0 1,000 FT 2,000FT

SOURCE: DES MOINES COUNTY, IOWA
AERIAL PHOTOGRAPH (USDA 1960)

N

PROJECT VICINITY

FIGURE 4, SHEET 4 OF 5
HISTORICAL MAPS OF PROJECT VICINITY

gai consultants

INERT DISPOSAL AREA BOUNDARY FENCE
INSTALLATION IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

AerostarSES LLC

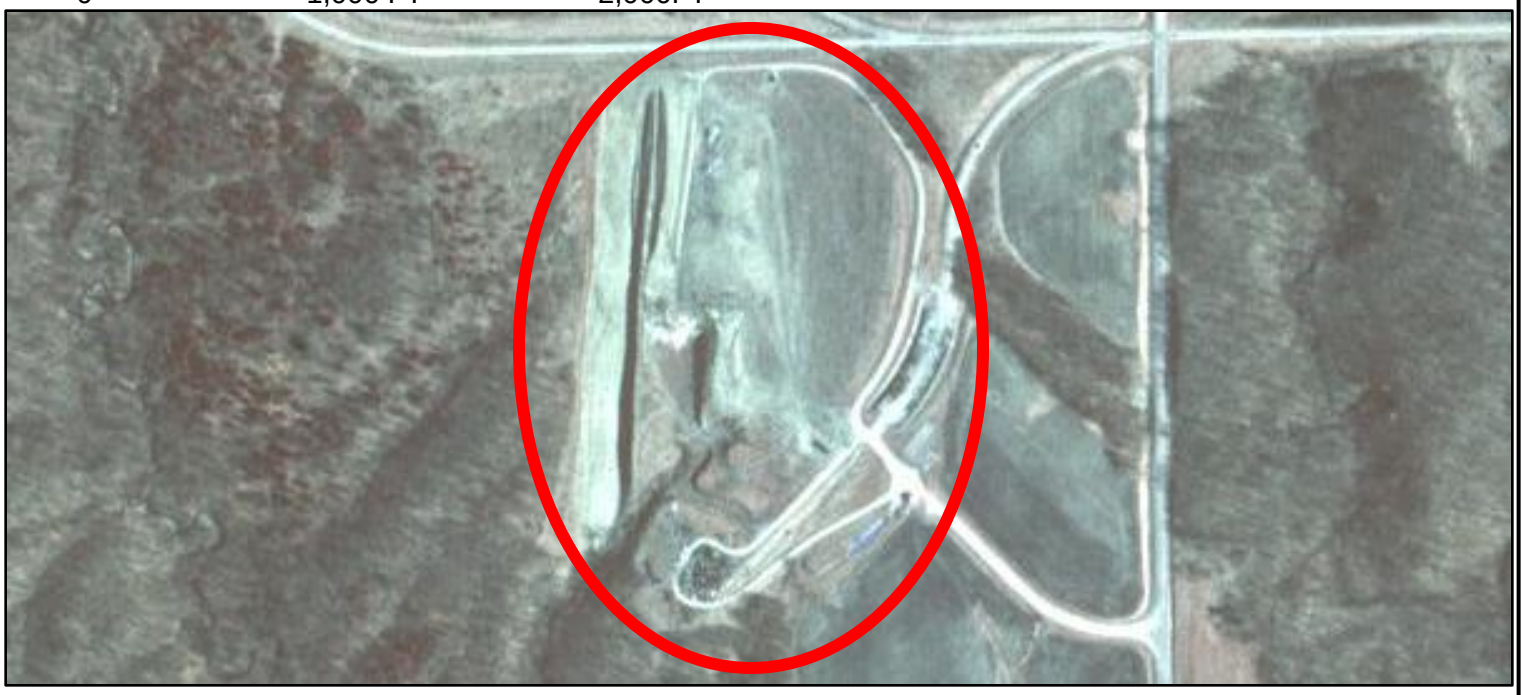
DRWN: ANH
CHECKED: BR

DATE: 05/29/2015
APPROVED: BR

SCALE

0 1,000 FT 2,000FT

SOURCE: DES MOINES COUNTY, IOWA
AERIAL PHOTOGRAPH (USDA 1970)



SCALE

0 1,000 FT 2,000FT

SOURCE: DES MOINES COUNTY, IOWA
AERIAL PHOTOGRAPH (USDA 1980)

N

PROJECT VICINITY

FIGURE 4, SHEET 5 OF 5
HISTORICAL MAPS OF PROJECT VICINITY

gai consultants

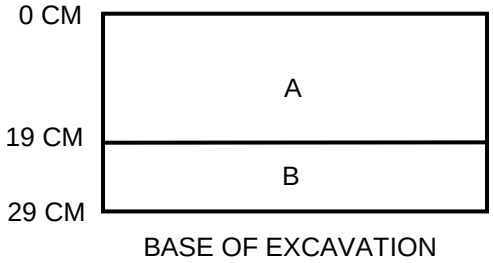
INERT DISPOSAL AREA BOUNDARY FENCE
INSTALLATION IOWA ARMY AMMUNITION PLANT
AEROSTAR SES LLC

AerostarSES LLC

DRWN: ANH
CHECKED: BR

DATE: 05/29/2015
APPROVED: BR

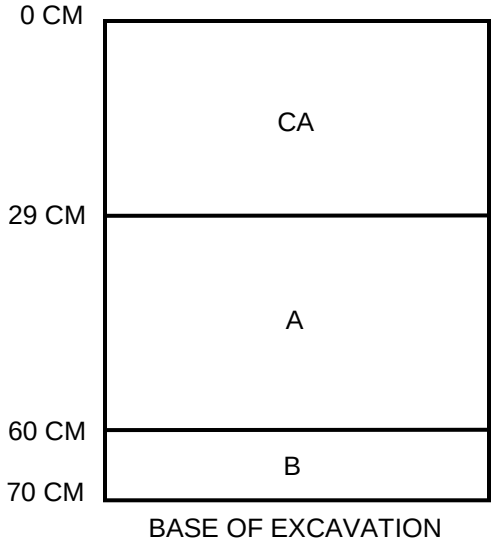
STP 1



A – VERY DARK GRAY (10YR 3/1) MIXED WITH DARK GRAYISH BROWN (10YR 4/2) SILTY CLAY LOAM WITH IRON OXIDE

B – YELLOWISH BROWN (10YR 5/4) CLAY LOAM

STP 7

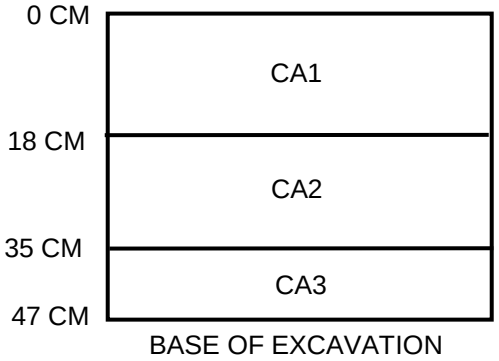


CA – DARK GRAYISH BROWN (10YR 4/2) MIXED WITH DARK YELLOWISH BROWN (10YR 4/6) AND VERY DARK GRAY (10YR 3/1) SILTY CLAY LOAM

A – VERY DARK GRAY (10YR 3/1) SILT LOAM

B – YELLOWISH BROWN (10YR 5/6) SILTY CLAY LOAM

STP 16



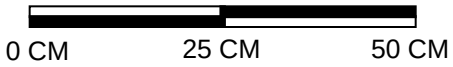
CA1 – COMPACT DARK YELLOWISH BROWN (10YR 4/4) MIXED WITH VERY PALE BROWN (10YR 7/3) CLAY LOAM

CA2 – COMPACT YELLOWISH BROWN (10YR 5/8) MIXED WITH DARK GRAYISH (10YR 4/2) CLAY LOAM

CA3 – COMPACT DARK GRAYISH BROWN (10YR 4/2) MIXED WITH LIGHT BROWNISH GRAY (10YR 6/2) CLAY LOAM WITH 25 PERCENT GRAVELS

FIGURE 5
REPRESENTATIVE STP PROFILES

SCALE



gai consultants

INERT DISPOSAL AREA BOUNDARY FENCE
INSTALLATION IOWA ARMY AMMUNITION
PLANT AEROSTAR SES LLC

AerostarSES LLC

DRWN: ANH
CHECKED: BR

DATE: 6/3/2015
APPROVED: BR

Appendix B

Utility Location Permits

Ticket Number: 161160214
Location: 17575 HWY 79 DANVILLE TWP, IA

As of 4/26/16 8:26 CDT, participating facility owners have responded to Ticket Check as follows:

District Code	Status
DANVILLE MUTUAL TELEPHONE	Clear

The following is the guide to the usage of the various statuses:
Not Yet Responded - the facility operator has not yet provided a status comment.
Clear - no conflict exists.
Marked - locating and marking is completed.
Marked Including Private - locating and marking is complete and includes the locating and marking of private facilities.
Agreed to Marking Schedule - locating and marking will be conducted as agreed by the operator and the excavator.
Standby Required/Marked - locating and marking was completed with an operator representative onsite -'standby'.
Standby Required/ Not Marked - locating and marking cannot be completed until the operator and the excavator can arrange a 'standby'.
Not Marked/Inadequate Information - locating and marking cannot be completed until the excavator can clearly and adequately define the proposed area of excavation.
Not Marked/No Access - locating and marking cannot be completed until the locator can gain effective and safe access to the property where the proposed excavation is scheduled to occur - please contact facility operator.

Please contact 563-884-7763 or ialead@occinc.com with any questions.

To review this ticket in its entirety, visit Search and Status on www.managetickets.com.

American Ordnance

We do what we say.

17575 Highway 79
Middletown, IA 52638

UTILITY LOCATE PERMIT

X Caller's Name: Doris Fuhs X Telephone No.: 641-682-4971

X Company Name: Gullett Fence Co. Company Address: 830 Hayne St

City: Ottumwa State/Zip: Iowa 52501

Contact Person: ~~Brad~~ Brad Hamilton Contact Phone: 319-753-7128

Start Date: 4-20-16 Start Time: 0700

Job Site: Inert Disposal Nearest Intersection: _____

Method of Excavation

Trenching: ___ Boring: ___ Plowing: ___ Backhoe: ___ Blasting: ___ Other: X

Reason for Excavation: New Fence

IMPORTANT INFORMATION WE WILL GIVE YOU

Ticket No: 14511505

Utilities we are checking: (check below if applicable)

Gas/Oil/Steam: ___ (yellow) ~~Electric:~~ ___ (red) ~~Phone:~~ ___ (orange) ~~Water:~~ ___ (blue) ~~Sewer:~~ ___ (green) ~~Fiber Optic:~~ ___ (orange)

Locators Signature: [signature] Date: 4-25-16

X Excavators Signature: [signature] Date: 4-27-16

ACO/Gov't Approval: yes ___ no ___

Notes: _____

White copy is retained by the locator (Mechanical Operations). The yellow copy shall be retained by the requestor.

Appendix C

New Projects Review Form

American Ordnance LLC

LAND USE APPROVAL

AO Project No.		**Army Project No.**	
Project Location	Inert Disposal Landfill (USACE Contract #W9128F-10-D-0099 TO #0004)		

Project Description (attach drawings and maps)

The installation of the boundary fence is an LUC of the inert disposal area to restrict intrusive activities by personnel and equipment onto or near the cap/closure systems. A 42-inch chain link fence abutting the active test firing range will provide the needed IDA access restriction.

While the initial final work plan was established by Tetra Tech (September 2014), please find attached the January 2016 *Final Revision 1, Operable Unit (OU-4) Remedial Action Work Plan, Inert Disposal Area (IDA) Boundary Fence Installation at the Iowa Army Ammunition Plant, Middletown, Iowa*. This document includes the approved specifications for fence installation.

Planned activities (check all that apply)

- ☑ New Construction
- ☐ Equipment Lay Down Area Soil
- ☐ Excavation; If Checked, Maximum Depth _____
- ☐ Water Management
- ☐ Demolition

Potential impacts to existing LUC and mitigation

The LUCIP is currently in draft final status, pending the finalization of the 2014 OU-4 RACR. The fence is to be installed along the outside of the IDA perimeter road to preserve the cap/components. No known soil contamination exists within proposed fence line. The cap will not be penetrated and fence installation crews will be supervised to enforce appropriate drive paths and preserve cap/components. Depths of posts and corner/gate/terminal posts are as follows.

1. Line post footing depth below finish grade: 24 inches
2. Corner, gate, and terminal post footing depth below finish grade: 36 inches

Army Review comments

Army has no comment.

American Ordnance LLC

LAND USE APPROVAL

Comment Resolution

AO Environmental Approval: _____ 4-25-2016

Signature Date

Army Approval: _____ 04/25/16

Signature Date

Appendix D

Photo Log

Appendix D

Photo 1. View southwest of the access road toward the Fixed Facility Water Treatment Plant. Skid steer using 12-inch auger to advance fence post holes.

Photo 2. Ground view of a completed 12-inch fence post hole.

Appendix D

Photo 3. View south along access road heading toward the IDA office. Concrete truck filling the fence post holes with concrete.

Photo 4. View southeast along access road heading toward the Fixed Facility Water Treatment Plant. Installed fence posts.

Appendix D

Photo 5. View north along the west side of Trench 6 Landfill. Showing fence posts secured in concrete.

Photo 6. View west along access road to the IDA office. Installation of the fence top bar.

Appendix D

Photo 7. Camera facing west from the west side of trench 6. Attaching the chain link to the frame.

Photo 8. Camera facing north from the east side of the IDA. Showing corner section of fencing with larger end/corner post, tie wire, truss rod, and brace band supplying necessary reinforcement.

Appendix D

Photo 9. Camera facing northwest from the west side of the IDA. Gate #5.

Photo 10. Latch mechanism at Gate #5. Mechanism is the same at all installed double gates.

Appendix D

Photo 11. Camera facing southeast from the west side of trench 6. Gate #4.

Photo 12. Camera facing west from the northeast corner of trench 6. Gate #3.

Photo 13. Walkthrough gate on the east side of the IDA perimeter fence.

Photo 14. Showing where the newly constructed fence meets with the existing barbed wire fence that is the border of the active range.

Appendix E

As-Built Drawing

PRODUCTS	
COMPONENT	SPECFICATION
Framing (Steel)	ASTM F1083 Schedule 40 galvanized steel pipe
Fabric Wire (Steel)	ASTM A392 zinc-coated wire fabric, 2-inch diamond mesh interwoven 11 gauge wire, top selvage twisted tight, bottom selvage twisted right
Line Posts	1 5/8-inch 16 gauge
Corner, terminal, and gate posts	2.5-inch
Top and Brace Rail	1.25-inch, plain end, sleeve coupled
Tension Wire	6 gauge steel, single strand
Tension Band	3/16-inch thick steel
Tension Strap	3/32-inch thick steel
Truss Rods	3/8-inch diameter steel
Tie Wire	Aluminum alloy steel

NOTES:

CONTROL POINTS UTILIZED FOR THIS SURVEY ARE THOSE AS SHOWN ON TETRA TECH INC. SITE FEATURES PLAN FOR INERT DISPOSAL AREA (FIGURE A 2) AND IS ON THE IOWA STATE PLANE COORDINATE SYSTEM, SOUTH-ZONE IN METERS BASED ON THE NAD83 ADJUSTMENT OF 1996. THE VERTICAL CONTROL REFERENCE DATUM IS NAVD88 IN METERS.

SURVEY CONDUCTED: MAY 31, 2016 BY KLINGER & ASSOCIATES.

LEGEND

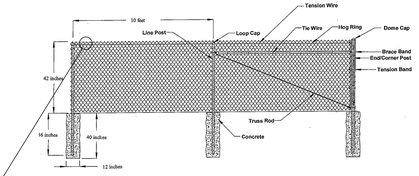
—o— CHAINLINK FENCE

—x— BARB WIRE FENCE

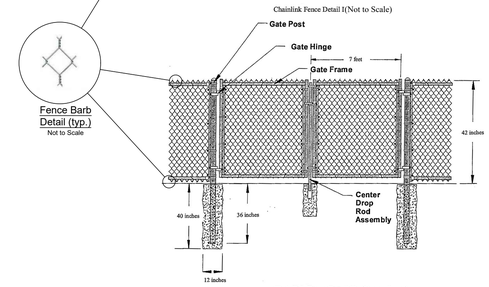
AS-CONSTRUCTED FENCE
INERT DISPOSAL AREA

IOWA ARMY AMMUNITION PLANT				MIDDLETOWN, IOWA	
Point#	Northing (M)	Easting (M)	Elevation (M)	Description	Fence Height (M)
1000	91203.038	688293.118	213.789	FENCE "C-LINK"	1.097
1001	91207.136	688288.551	214.001	FENCE "C-LINK"	1.036
1002	91211.265	688284.148	214.651	FENCE "C-LINK"	1.006
1007	91229.778	688249.622	214.777	FENCE "C-LINK"	1.128
1008	91235.682	688250.008	213.693	FENCE "C-LINK"	1.036
1011	91274.721	688252.722	213.712	FENCE "C-LINK"	1.067
1014	91307.967	688255.001	214.273	GATE POST	1.067
1015	91313.366	688255.373	214.242	GATE POST	1.036
1018	91326.468	688242.878	214.576	FENCE "C-LINK"	1.036
1022	91357.599	688223.948	214.598	FENCE "C-LINK"	1.097
1027	91408.066	688186.518	214.987	GATE POST	1.067
1028	91409.085	688184.744	214.959	GATE POST	1.097
1058	91186.481	687952.716	213.460	FENCE "C-LINK"	1.067
1060	91216.844	687955.733	213.684	FENCE "C-LINK"	1.036
1063	91274.391	687961.583	213.831	FENCE "C-LINK"	1.036
1066	91338.190	687968.089	215.089	FENCE "C-LINK"	1.067
1069	91392.749	687973.906	216.907	GATE POST	1.036
1082	91397.709	687973.659	216.744	GATE POST	1.067
1086	91401.356	688021.881	217.002	FENCE "C-LINK"	1.067
1088	91404.207	688043.075	216.819	FENCE "C-LINK"	1.067
1092	91409.343	688082.064	216.092	FENCE "C-LINK"	1.067
1096	91413.556	688136.307	215.495	FENCE "C-LINK"	1.036
1118	91186.485	688286.183	214.526	FENCE "C-LINK"	2.073
1121	91130.890	688263.049	213.808	FENCE "C-LINK"	2.073
1127	91095.459	688258.804	213.423	GATE POST	2.134
1128	91091.689	688258.740	213.304	GATE POST	2.195
1132	91071.502	688262.215	213.356	FENCE "C-LINK"	2.073
1134	91059.719	688273.375	213.119	FENCE "C-LINK"	2.103
1136	91052.232	688265.628	213.437	GATE POST	1.951
1155	91047.597	688260.744	213.334	GATE POST	2.012
1157	91036.589	688249.296	213.160	FENCE "C-LINK"	2.073
1159	91047.173	688238.823	213.274	FENCE "C-LINK"	2.073
1162	91008.535	688199.090	212.908	FENCE "C-LINK"	2.042
1163	90995.901	688187.461	212.183	FENCE "C-LINK"	2.073
1165	90968.100	688159.454	211.067	FENCE "C-LINK"	2.103
1166	90955.228	688146.397	210.812	FENCE "C-LINK"	1.067
1189	90937.497	688140.178	210.723	FENCE "C-LINK"	1.067
1193	90904.770	688136.960	210.534	FENCE "C-LINK"	1.067
1196	90889.717	688134.559	210.323	FENCE "C-LINK"	1.036
1199	90876.415	688128.928	209.792	FENCE "C-LINK"	1.067
1202	90863.191	688121.838	207.946	FENCE "C-LINK"	1.067
1207	90843.858	688108.858	206.391	FENCE "C-LINK"	1.067
1212	90839.670	688094.471	205.729	FENCE "C-LINK"	1.067
1218	90848.241	688062.421	205.585	FENCE "C-LINK"	1.067
1221	90854.875	688049.589	206.579	FENCE "C-LINK"	1.006
1223	90852.635	688041.319	207.064	FENCE "C-LINK"	1.097
5001	91164.942	687950.482	213.090	FENCE "C-LINK"	1.097
5002	91137.321	687947.802	212.044	GATE POST	1.097
5003	91130.814	687948.318	211.809	GATE POST	1.189
5004	91109.283	687946.975	211.134	FENCE "C-LINK"	1.128
5005	91087.733	687945.631	211.041	FENCE "C-LINK"	1.006
5006	91083.959	687937.945	209.812	FENCE "C-LINK"	1.128
5007	91077.967	687925.996	208.666	FENCE "C-LINK"	1.097
5008	91075.236	687920.615	208.145	FENCE "C-LINK"	1.158
5009	91073.944	687917.965	208.322	GATE POST	0.975
5010	91070.322	687915.012	208.202	GATE POST	1.036
5011	91068.125	687913.196	207.685	FENCE "C-LINK"	1.097
5012	91059.658	687906.248	207.416	FENCE "C-LINK"	1.067
5013	91059.281	687906.435	207.479	FENCE "BARBED"	
5014	91058.301	687907.242	207.630	FENCE "BARBED"	
5030	91045.851	687917.987	209.166	FENCE "BARBED"	
5032	91024.191	687936.320	209.931	FENCE "BARBED"	
5035	91020.355	687939.462	209.829	FENCE "BARBED"	
5036	91010.916	687946.878	208.493	FENCE "BARBED"	
5040	90852.649	688040.715	206.880	FENCE "BARBED"	
5042	90875.492	688036.874	208.164	FENCE "BARBED"	
5044	90892.290	688033.786	209.183	FENCE "BARBED"	
5046	90903.624	688032.232	209.609	FENCE "BARBED"	
5048	90916.734	688030.001	210.016	FENCE "BARBED"	
5050	90917.846	688027.263	209.793	GATE POST	
5052	90924.575	688025.587	210.117	GATE POST	
5054	90933.319	688017.029	210.150	FENCE "BARBED"	
5056	90939.857	688010.578	209.897	FENCE "BARBED"	
5059	90949.859	688001.426	208.690	FENCE "BARBED"	
5061	90962.608	687988.824	207.314	FENCE "BARBED"	

Note: Not all survey points displayed on map.



Chainlink Fence Detail I(Not to Scale)



Fence Barb
Detail (typ.)
Not to Scale

Chainlink Fence Detail II (Not to Scale)

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION

Aerostar SES LLC

1006 Floyd Culler Court Oak Ridge, Tennessee 37830 (865)481-7837

CHECKED Catherine McMillen, PE	DATE 7/12/16	CLIENT APPROVAL	DATE
DES. ENG.			
PROJ. ENG. Scott Ballard, PE	7/12/16		
PROJ. MGR. Darlene Abbott	7/12/16		
APPROVED			
APPROVED		ISSUED FOR	DATE

As Built Drawings

IAAAP OU-4 Fence Installation
Iowa Army Ammunition Plant
Middletown, Iowa

DRAWN As Shown	DATE July 12, 2016	DWG. NO.	REV. NO. 0
SCALE As Shown	W.O. NO. M3010.1161.0004.09	SHEET 1 OF 1	

R:\Projects\M3010.1161.0004.09 IAAAP\Graphics\As-Built-FENCE 6-29-16.dwg