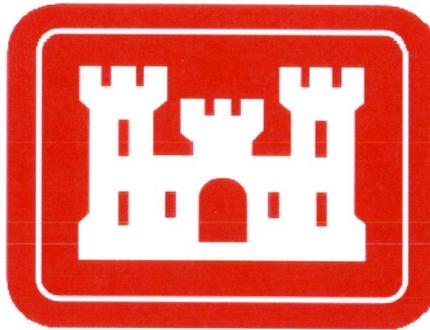


RECURRING REVIEW REPORT
Former Jefferson Barracks Post Dumping Grounds
St. Louis County, Missouri

Defense Environmental Restoration Program
Formerly Used Defense Site
Site ID: B07MO0143

Prepared By:



September 2014

U.S. Army Corps of Engineers
Kansas City District
Kansas City, Missouri

Approved by:

Date:

Col E Young

Chief / P.M.E

26 Sept 2014

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List of Acronyms

ASR	Archives Search Report
CEHNC	U.S. Army Engineering and Support Center, Huntsville (Huntsville Center)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS System	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
EECA	Engineering Evaluation Cost Analysis
EPA	U.S. Environmental Protection Agency
FPDG	Former Post Dumping Ground
FUDS	Formerly Used Defense Site
FY	Fiscal Year
FYR	five-year review
IC/RM	Institutional Controls and Risk Management
JBANG	Jefferson Barracks Missouri Air National Guard
KCD	Kansas City District
MC	munitions constituents
MDNR	Missouri Department of Natural Resources
Mm	millimeter
MOA	memorandum of agreement
MOANG	Missouri Air National Guard
MSD	St. Louis Metropolitan Sewer District
MVS	U.S. Army Corps of Engineers, St. Louis District
NCP	National Contingency Plan
NPL	National Priorities List
O&M	operations and maintenance
OE	Ordnance and Explosives
OED	Ordnance and Explosives Disposal
QAR	Quality Assurance Report
RAOs	remedial action objectives
RIP	remedy in place
ROD	Record of Decision
TCRA	time critical removal action
LTM	long-term management
USACE	United States Army Corps of Engineers
UXO	unexploded ordnance
VA	Veterans Administration
WWI	World War I

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Executive Summary

This is a Recurring Review of the Jefferson Barracks Former Post Dumping Ground (Site), located in St. Louis County, Missouri. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(c) and the National Contingency Plan (NCP) requirements for Five-Year Reviews (FYRs) apply only to remedial actions selected by the President that result in any hazardous substances, pollutants, or contaminants remaining at the site. The response action at the Site is limited to a removal action and is therefore not subject to the statutory requirements for Five-Year Reviews. While the Action Memorandum signed in October 1998 requires no periodic reviews, a Memorandum of Agreement (MOA) was prepared that provided for periodic reviews of the site every five years. The purpose of the review is to evaluate the implementation and performance of the selected response action, determine if the response action is or will be protective of human health and the environment, and identify issues and recommendations to resolve them. Accordingly, this Recurring Review report documents the findings of the most recent review of the response action.

The previous review was completed on 3 August 2009. Because a removal action was conducted at the Site and not a remedial action, the review performed in 2009 should have been titled "Recurring Review Report" and not a FYR. In accordance with the current MOA, future Recurring Reviews will be conducted every five years. However, because a final remedy was not achieved at the Site as a result of the 1999 removal action, plans are in place to transition the project to the remedial response process in Fiscal Year (FY) 2015. Returning to the remedial response process (Remedial Investigation/Feasibility Study (RI/FS), Proposed Plan, and Decision Document) will achieve a remedy in place (RIP) and a return to a FYR, if required, in FY 2019.

The Site is located approximately 12 miles south of the City of St. Louis Missouri and encompasses 7.61 acres within the eastern edge of the Jefferson Barracks Missouri Air National Guard installation (MOANG). The history of Jefferson Barracks begins in 1826, and includes the training of troops in the use of rifle grenades, Stokes mortars, and 37 mm guns. The Site had been used as the Post dump until 1950. Disposed materials found at the Site include mess hall plate ware, medical ceramic ware and glassware, building/construction debris, and ordnance such as mortar shells and rifle grenades.

During the mid to late 1990's, ordnance began to surface at the Site which required Ordnance and Explosives (OE) teams be dispatched to detonate the ordnance. Between 1996 and 1998, 1,363 ordnance and explosive were recovered and destroyed. Due to the Site's proximity to the Mississippi River and the erosional effects of the River, exposed artifacts were a predominant Site feature and this attracted souvenir hunters. The significant likelihood of the public being exposed to the Site's unexploded ordnance initiated the Department of Defense (DoD) to conduct a time critical removal action to address immediate exposures to ordnance. The time critical removal was completed on 12 Feb 1997 and is reported to have destroyed a total of 13 World War I grenades and 250 small arms ammunitions. In September of the same year, 170 small arms ammunitions and a grenade fuse were destroyed on-site.

Due to the imminent and substantial endangerment to public safety, welfare, and/or the environment, an Action Memorandum was signed on 23 Oct 1998 which selected a response action consisting of: installation of riprap over the area most likely to contain ordnance; posting of warning signs; creating or enforcing existing deed restrictions; distribution of informational packets/brochures; and, the creation of a memorandum of agreement (MOA) between the state of Missouri, the U.S. Army Corps of Engineers, and the MOANG. Initial riprap installation was completed in February 2000, the MOA was signed in

2001, and a second placement of riprap was completed in April 2003. EPA granted construction complete status in May 2003.

This Review has assessed the performance of the implemented removal action and concludes that the removal action has achieved the objective of preventing exposure of unexploded ordnance/ordnance and explosives (UXO/OE) at the surface due to river erosion. However, the following issues have been identified:

- An annual inspection during the spring time frame has not been conducted consistently by the MOANG.
- The 2014 five year resurvey has not been completed.

The protectiveness statement of this Review is: The response action at the Former Jefferson Barracks Post Dumping Ground Site is protective of human health and the environment.

Recurring Review Summary Form

SITE IDENTIFICATION		
Site Name: Former Jefferson Barracks Post Dumping Ground		
FUDS Project Number: B07MO0143		
Region: 7	State: MO	City/County: (near) St. Louis, Saint Louis County
SITE STATUS		
NPL Status: non-listed		
Multiple OUs? No	Has the site achieved construction completion? Yes, on May 20, 2003.	
REVIEW STATUS		
Lead agency: U.S. Army Corps of Engineers (USACE) If "Other Federal Agency" was selected above, enter Agency name: Click here to enter text.		
Author name (Federal or State Project Manager):		
Author affiliation: USACE, Kansas City District		
Review period: December 1, 2013 to June 17, 2014		
Date of site inspection: January 28, 2014		
Type of review: FUDS Policy		
Review number: 2		
Triggering action date: Previous policy review, August 3, 2009		
Due date (five years after triggering action date): August 3, 2014		

Recurring Review Summary Form (continued)

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the Recurring Review:				
None.				
Issues and Recommendations Identified in the Recurring Review:				
OU(s): Site	Issue Category: O&M			
	Issue: An annual inspection during the Spring time frame has not been performed consistently by MOANG.			
	Recommendation: MOANG conduct an inspection during the Spring time frame to determine: 1) if riprap has been damaged by high river flows; 2) condition of normally submerged riprap; and, 3) warning sign visibility when vegetation has foliage. USACE Kansas City District (KCD) will coordinate Spring inspections with MOANG and MDNR beginning in FY 15. In addition, starting in FY 15, KCD will make arrangements with St. Louis District to add the Site to their annual Mississippi River inspection.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	MOANG	KCD/MDNR	CY 2014
Issues and Recommendations Identified in the Recurring Review:				
OU(s): Site	Issue Category: O&M			
	Issue: The 2014 five year re-survey has not been completed.			
	Recommendation: Conduct survey. A survey of the Site will be planned for FY 15. However, consideration should be made to evaluate need of surveys on a set five-year frequency. KCD will discuss the potential for a change in frequency with MDNR after the results of the FY 15 survey are evaluated.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	KCD	MDNR	CY 2014

Issues and Recommendations Identified in the Recurring Review:				
OU(s): Site	Issue Category: O&M			
	Issue: Warning Sign #1 has degraded .			
	Recommendation: Replace sign. Replacement of the sign by KCD will be planned for FY 15 during the vegetation clearing event.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	KCD	MDNR	CY 2014
Protectiveness Statement(s)				
Operable Unit: Site	Protectiveness Determination: Protective.		Addendum Due Date (if applicable):	
Protectiveness Statement: <i>The removal action at the Former Jefferson Barracks Post Dumping Ground Site is protective of human health and the environment.</i>				

1.0 Introduction

The USACE has conducted a Recurring Review for the Ordnance and Explosives (OE) Response Action at the Former Jefferson Barracks Former Post Dumping Grounds (Site), B07MO0143, in St. Louis County, Missouri.

The purpose of this Recurring Review is to evaluate the implementation and performance of the response action selected to address the Former Jefferson Barracks Former Post Dumping Grounds (Site). This evaluation is to determine whether the response action at the site continues to minimize explosives safety risks and continues to be protective of human health and the environment. The methods, findings, and conclusions of the review are documented in this report.

The Recurring Review, a policy review under FUDS, was conducted from December 1, 2013 to June 17, 2014 and is the second review for the Site. The purpose of this review is to evaluate the implementation and performance of the Site selected response action, determine if the response action is or will be protective of human health and the environment, and identify issues and recommendations to resolve them. While the Action Memorandum signed in October 1998 requires no periodic reviews, FUDS policy includes provisions for periodic reviews for these sites. Accordingly, this Recurring Review report documents the findings of the most recent review of the response action. On-site field work for the selected response action at this Site began in 1999. The previous review was conducted in 2009.

2.0 Site Chronology

Table 1: Chronology of Site Events

Event	Date
Jefferson Barracks established	1826
Jefferson Barracks declared surplus	1946
Riverfront used as a post dumping grounds	1826 – 1950
Portion of Jefferson Barracks land is transferred to State of Missouri (for use in training and maintaining National Guard components)	1950
Missouri leases Jefferson Barracks property to Federal Gov't	1970
DERP-FUDS Inventory Project Report (INPR)- Hazardous and Toxic Waste (HTW) Project Recommendation	1990
DERP-FUDS Archives Search Report (ASR)	1994
Environmental Baseline Survey – Missouri Air National Guard	1996
Site visit by USACE-KC and Huntsville Center (CEHNC) – 14 WWI Era grenades discovered; an explosive ordnance disposal (EOD) team detonates items on site.	7-9 Feb 1996
Site visit by USACE and MOANG to address archeological issues related to ordnance disposal – an unexploded WWI-Era 3-inch Stokes mortar shell is discovered; EOD team detonates item on site.	11 Sep 1996
MOANG storm sewer construction (outfall upgrade) located in the northern portion of the riverfront post dumping grounds uncovers an expended WWI French-rifle grenade.	1997
Time Critical Removal Action (TCRA) completed	12 Feb 1998
1,363 OE items recovered and destroyed on site in a 2-year period.	1996 – 1998
Engineering Evaluation/Cost Analysis (EECA) conducted by USACE to assist in remedy selection.	1998
Action Memorandum (USACE)	Oct 1998
Remedy Implementation – rip-rap and warning signs installed.	Feb 2000
Memorandum of Agreement (MOA) signed between USACE (Kansas City and St. Louis Districts) and MOANG.	7 Aug 2001
Additional rip-rap installed due to a low water level inspection observing an approximate 200' by 850' rip-rap non-covered area.	April 2003
EPA closes Site in CERCLIS / Construction Complete	May 2003
Long term monitoring annual site inspection conducted	2003 – present

Table 2: Chronology of Site Events (continued)

Event	Date
Restrictive Covenant and Grant of Easement filed in St. Louis County, MO, by MOANG in accordance with MOA (Deed Restriction).	2004
St. Louis Metropolitan Sewer District (MSD) replaces sewer line and outfall located on Site's south side - no evidence of munitions.	2008
1 st Five Year Review Report	3 Aug 2009
Long-term Management (LTM) inspection conducted by USACE, MOANG, MDNR, and MSD.	2009 – 2013

3.0 Background

3.1 Site Location and History

The Former Jefferson Barracks Post Dumping Grounds (Site) is located within the Jefferson Barracks Missouri Air National Guard (JBANG) installation which is located approximately twelve miles south of the City of St. Louis, Missouri. The JBANG is bounded by the Mississippi River to the east, Interstate Highway 255 to the south, Telegraph Road to the west, and Kingston Road to the north. Figure 1 depicts the Site location and Figure 2 depicts Site detail information.

The former Jefferson Barracks army installation originally consisted of 1,702 acres and operated as a U.S. Army training post from 1826 to 1946. Military training included the use and storage of various ordnance and explosives (OE). Installation acreage had been reduced to a total of 1,293.89 acres during its active period. In 1946 the approximate 1,294 acre base was declared surplus by the War Administration. The Federal Government, in 1950, deeded a 135 acre site, formerly known as Jefferson Barracks, to the State of Missouri. The State, in turn, leased the 135 acre site back to the Federal Government. The USACE, acting as the agent, licensed approximately 26.76 acres to the Missouri Army National Guard and licensed the remainder of the site to the Missouri Air National Guard. JBANG Station occupies approximately 135 acres in the east-central portion of the Jefferson Barracks. The JNANG Station maintains administrative offices, storage facilities, training facilities, radar equipment and support facilities, and is operated approximately 90 full-time employees and 1,100 reservists (USACE, 2009a).

The Site is located between the east side of the JBANG Station and the Mississippi River and is reported to have been used as a Post dumping ground through 1950 (Figures 1 and 2). The Site was conservatively estimated (for investigation purposes) to occupy an approximate 10 to 12 acres (USACE, 1998b). A meets and bounds survey, conducted during August 2002, defines the Site as 7.61 acres situated between the waterline of the Mississippi River and the riverside woodline located on the east side of the JBANG Station (Appendix A). However, this survey did not include Site acreage which was submerged when the survey was performed. Appendix B provides additional survey data, also acquired during August 2002, which depicts the Site's extent submerged by the river.

3.2 Physical Characteristics

3.2.1 Topography

Dominant Site features consist of a wooded "Escarpment Area", "Beach Area", and "River Area". The wooded Escarpment Area forms the western portions of the Site, consists of approximately 6 acres, and is bounded on the west by the Union Pacific Railroad tracks and on the east by a 4 to 6 foot slope or escarpment (river eroded bank). The wooded escarpment is heavily vegetated with mature hardwood trees and thick undergrowth. The Beach Area is approximately 4-6 acres and encompasses everything between the escarpment bounding the wooded area and the Mississippi River. The Beach Area is relatively flat, but has a mildly rising slope which steepens as it meets the escarpment. The Beach Area size varies in accordance with the water level of the Mississippi River. The River Area is that portion of the Site which is

typically submerged by the Mississippi River. The River Area is estimated to encompass approximately 2.4 to 3.6 acres. Site topography is depicted in Figure 3.

3.2.2 Surface Hydrology and Drainage

The Site's Beach Area, the area between the escarpment and the Mississippi River, is subject to periodic flooding. Jefferson Barracks surface water runoff, both general and that collected by gutters and other surface features, is generally directed towards the Site. Figure 2 depicts two drainage outlet structures which discharge to the Site.

One surface water collection system drainage outlet structure is present at the east edge of the escarpment, approximately in alignment with Kearney Street. Photos 28 through 30 depict this outlet and its discharge channel. The photos document that this outlet's drainage channel has been rock lined, is relatively shallow, and that no significant erosion is present. The second outlet is a combined storm drain that is depicted in Figure 2 as the 4-ft diameter concrete storm sewer. This outlet was replaced in September 2008 with a 52-inch outlet (Appendix I). The discharge channel for this outlet is lined with geotextile and riprap. Photos 18 through 21 depict the condition at this outlet during the Recurring Review Site inspection. A Site inspection conducted in April 2014, provided in Appendix I, further depicts conditions resulting from this outlet's discharges.

3.2.3 Site Geology

Jefferson Barracks is located in south St Louis County just within the boundary of the Dissected Till Plain section of the Central Lowland province. The topography of this section, with the exception of the floodplains adjacent to the major rivers, varies from gently rolling to rugged, with the greatest relief occurring in the western portion of the section and along the bluffs of the river valleys. The site area is included in an area of rolling uplands. This area includes over half of the county and is the result of deposits of windblown silt covering the more rugged bedrock topography. Most of this area is characterized by slopes of from 2% to 5%, although relief seldom exceeds 30 m. The site is a karst area with solution enlargements of joints and cavern collapse expressed as surface depressions. Therefore, the internal drainage is directly into the groundwater system (USACE, 2006).

The bedrock geology consists of essentially flat-lying sedimentary formations, mostly limestone and dolomite. A slight regional northwest dip has been modified by several minor northwest-southeast trending folds or flexures and by a broad, irregularly shaped structural basin located to the north of the site. Geologic formations exposed in the county range in age from Ordovician to middle Pennsylvanian. As a result of an erosional period following Mississippian time, the contact between the older formations of Ordovician through Mississippian age and the younger rocks of Pennsylvanian age is very irregular (USACE, 2006).

3.2.4 Site Geohydrology

The Jefferson Barracks Installation is located within the Ozark Plateaus Aquifer System. The Aquifer System is composed of five Geohydrologic units, from the stratigraphically highest to lowest, the

Springfield Plateau Aquifer, the Ozark confining unit, the Ozark aquifer, the St. Francois confining unit. The Installation is underlain by post-Paleozoic sediment which in turn is underlain by the Ozark Aquifer (USACE, 2006).

3.3 Land and Resource Use

The approximately 1,294 acres of the former Jefferson Barracks is occupied by two St. Louis County parks (Jefferson Barracks Historic and Sylvan Springs), a Veteran's Administration (VA) Hospital, a National Cemetery, the Jefferson Barracks Air National Guard Station, a public school operated by the Mehlville School District, a Catholic church and school, manufacturing/warehouse facility, and residential homes and apartments. Figure 1 depicts land usage surrounding the Site (USACE, 2006).

3.4 History of Contamination

The former Jefferson Barracks was established on approximately 1,702 acres in 1826 as a garrison for the U.S. Army infantry units. The post was utilized for various U.S. military training activities from 1826 to 1946, except during the period from 1871 to 1894, when the site was operated by the Ordnance Department as the St. Louis Arsenal and was also used as a recruiting station for cavalry training. The facility served as a demobilization center for overseas troops during World War I (WW I). By 1890, most of the arsenal storage (powder, arms, and munitions) had been moved to the Rock Island Arsenal in Illinois. In 1920, the post became the home of the U.S. Army 6th Infantry, which conducted training with both conventional and chemical munitions. Rifle, submachine gun, and dummy grenade practice was conducted at ranges located in the southern portion of the base (USACE, 2009a).

Records from the early 1900's indicate that rifle grenade training took place on the Old Cavalry Drill Field. It is suspected that this field is now occupied by the VA Hospital. The majority of munitions and field training took place in a large wooded area in the southwest portion of the post following WW I. Additional training activities included night maneuvers, camouflage school, and artillery placement. Documents also indicate that instruction in the use of 37 millimeter (mm) guns and Stokes mortars occurred on these ranges (USACE, 2009a).

From 1826 to 1946, portions of the former Jefferson Barracks riverfront property are indicated to have been used for various waste disposal activities. The area is now referred to as the former Jefferson Barracks Post Dumping Grounds and has been the location of both historical artifact recovery and military munitions clearance activities. Due to the presence of historical artifacts, the former Jefferson Barracks Post Dumping Grounds is designated as a national archaeological site, but does not meet the criteria for National Register of Historic Places status. Based on a 1996 survey of riverfront area artifacts, artifacts dating from 1880-1940 (primarily time periods following the Spanish-American War and WW I) dominate the area. Dumping appears to have been primarily confined to the Mississippi River shore. Most of the material dumped in the riverfront area consists of general refuse and construction/building materials (USACE, 2009a).

Dump items include mess hall plate ware and china; medical ceramic ware and glassware; belt buckles; military uniform buttons and clasps; and large amounts of horseshoes, mule shoes and building/construction debris, including nails, bolts, and various metal scraps. Recovered military

munitions items in the former Jefferson Barracks Dumping Grounds have primarily been WW I-era mortar shells and rifle grenades and are assumed to have been disposed of as excess after the war ended (USACE, 2009a).

3.5 Initial Response

The initial set of responses to OE items found at the Site was to dispatch Ordnance and Explosives Disposal (OED) teams to detonate the OE on-site. During the years spanning 1996 through 1998 1,363 OE items were recovered and destroyed on-site (USACE, 2009a).

A time critical removal action (TCRA) was completed on 12 February 1997 which is reported to have destroyed a total of 13 WWI grenades and 250 small arms ammunition. Subsequent to the TCRA, a surface clearance occurred on 8 Sep 1997 during which 170 small arms ammunition and a grenade fuse were destroyed on-site. (USACE, 1997b)

3.6 Basis for Taking Action

The Action Memorandum of October 1998 (effectively the Record of Decision for the Site) describes the basis for taking action as being that remaining UXO presents an imminent and substantial endangerment to public safety, welfare, and/or the environment. The Engineering Evaluation/Cost Analysis (EECA), dated 1998, estimated a UXO density of less than 1 UXO item per acre, with remaining UXO items occurring within the uppermost 1 foot of soil and sediments. The estimate of 1 UXO/acre is based on geophysical investigations performed above the 6 foot waterline (USACE gauge reading). The Action Memorandum further states that although the area of concern is officially closed to the public, the lack of physical controls enables public access.

4.0 Removal Actions

4.1 Removal Action Selection

The Action Memorandum for the Former Jefferson Barracks was signed on October 23, 1998 and selected the removal action of Institutional Controls and Risk Management (IC/RM). The selected IC/RM is described in the action memorandum as containing the following components:

- Posting warning signs.
- Distributing informational packages and brochures.
- Installing riprap to the shoreline area most suspected for the presence of buried UXO/OE items to prevent surface exposure from future river erosion.
- Providing a written record of findings and recommendations of the Engineering Evaluation/Cost Analysis (EE/CA) report to the state of Missouri.
- Providing a Memorandum of Agreement (MOA) between the state of Missouri and the U.S. Air Force/MOANG.
- Creating or enforcing existing deed restrictions.

Each component of the selected removal action is further described in the Action Memorandum. A summary description is provided:

- **Warning Signs:** placement on access routes along the western edge of the Wooded Escarpment Area and in the Beach Area, along established access routes (roads and trails), and near the facility boundaries. Six warning signs are proposed for the Beach Area, and six warning signs are proposed for the Wooded Escarpment Area.
- **Distributing Informational Packages and Brochures:** informational packets regarding OE could be made available to the public either at the Installation, at public meetings, or by distribution upon request.
- **Installation of Riprap:** stone riprap would be added to the area most suspected of containing residual subsurface or near-surface UXO items to prevent future exposure of possibly present UXO in the Beach and River Areas. The proposed area is 200 feet wide (west to east) by 650 feet long (north to south), and is on the beach area east of the wooded escarpment, between gridlines 10 and 23. The easternmost 75 feet of the proposed area is approximately 3 acres. USACE graded Stone A (5,000 pound top size) riprap is proposed. A 2.5 foot minimum layer of riprap would be installed on top of the 200 foot by 650 foot area.
- **Providing a written record of findings and recommendations of this EE/CA report to the state of Missouri:** The state of Missouri and the MOANG would receive documentation from the USACE explaining the possible ordnance contamination and recommendations for dealing with possible ordnance contamination. This documentation should include the findings of the EE/CA

Report. The state of Missouri and the MOANG would also be required to convey this information to any future property owner.

- Providing a Memorandum of Agreement (MOA) between the state of Missouri and the U.S. Air Force/MOANG: If applicable to the JBANG Station, based upon the state of Missouri and MOANG's direction, agreements would be established to ensure that fact sheets would be adequately distributed, incidents involving ordnance items would be properly reported and appropriately responded to, and changes in land use or property ownership would be reported and documented. Additionally, the MOA between the state of Missouri and the MOANG would establish how warning signs would be maintained, repaired, or replaced in the event that the MOANG was not longer the custodian of the property.

4.2 Removal Action Implementation

An Engineering Evaluation/Cost Analysis (EE/CA) was completed by the USACE in 1998 and the Action Memorandum describing the selected removal action was signed the same year. Removal action implementation began in 1999 with the installment of riprap and warning signs. A minimum 2.5-foot layer of riprap was to be installed. Approximately 15,000 tons of USACE Graded Stone A riprap was installed on approximately 10 acres (approximately 315 feet by 1320 feet, as measured from the Topographic and Planimetric Survey, 2002, provided in Appendix B) of combined Beach and River areas. Placement of riprap was completed in February 2000. Appendix B contains the results of surveys which depict the extent of installed riprap. A meets and bounds survey of the Site (Appendix A), conducted in August 2002, depicts the Site as containing 7.61 acres; however, this survey does not include Site acreage submerged by the River.

The required twelve warning signs were installed in and around the former Jefferson Barracks Dumping Grounds, at locations not likely to be subjected to river flood stages, as depicted by Figure 4. The signs were installed along access routes along the western and eastern edges of the wooded area. The following text is depicted on the signs:

DANGER
UNEXPLODED ORDNANCE KEEP OUT
U.S. Air Force Installation
NO UNAUTHORIZED ENTRY
GROUND INTRUSIVE ACTIVITIES PROHIBITED
For information call Jefferson Barracks ANG
Environmental Office (314) 527-8369

In 2001, the MOA was signed by MOANG and USACE. The purpose of the MOA is to define the relationship, responsibilities and general objectives under which the MOANG and the USACE achieve revetment (riprap) and warning signs maintenance (USACE, 2009a).

In 2003, extremely low Mississippi River water levels allowed MOANG officials to inspect riprap that had been submerged since its installation in early 2000. This inspection resulted in the discovery of areas void of riprap, including evidence of former dump site debris, such as mule shoes and Quartermaster Corps china. A topographic survey was subsequently performed by a USACE-St. Louis

District survey contractor. In April 2003, additional riprap in the amount of 7,400 tons was placed on the previously discovered void areas as identified on Figure 5 (USACE, 2009a). In May 2003, EPA granted construction complete status upon the Site and removed its listing from CERCLIS.

In accordance with the terms of the MOA, MOANG filed a restrictive covenant and grant of easement (deed restriction) with St. Louis County on October 6, 2004 (Appendix C). The purpose of the deed restriction is to bind the property owner (State of Missouri, represented by the Office of the Adjutant General, Missouri National Guard) to the terms of the MOA, and to provide notice to all future owners of the following:

- UXO and/or military munitions located on the property;
- Continuing obligation of the property owner to notify the Department of Defense (DoD) if any grounds are or will be disturbed in any way or if UXO and/or military munitions become exposed;
- Requirement to provide notice of land use restrictions if the property is transferred, leased, or restrictions modified; and
- Requirement to provide notification prior to construction on the property.

4.3 Operation and Maintenance (O&M)

Operation and maintenance activities and responsibilities are described in the MOA as consisting of: periodic inspections of warning signs and revetment; replacement of damaged warning signs; and, revetment repair. Inspection responsibilities reside with both MOANG and KCD. In addition to the MOA specified O&M activities, the Kansas City District executed a contract in 2011 that provided for the cutting back of vegetation found to have obscured some of the warning signs. In accordance with remarks provided by the KCD project manager, Josephine Newton-Lund, a priced option is planned to be awarded in 2015 for follow-on tree clearing.

Inspections

Responsibility for conducting inspections resides with both the MOANG and the KCD. The MOANG is responsible for at least twice a year inspections of the warning signs and revetment (particularly during low water periods), and for the distribution of an annual report of results of inspection to the Missouri Department of Natural Resources (MDNR), the Environmental Protection Agency, (EPA) and the Kansas City District on or before the 31st of January each year. The KCD is responsible for the coordination and performance of a recurring review that is to include a complete survey of the revetment site to determine if any actions are necessary to restore the site to “as-built” conditions (to be conducted five years after the signed Action Memorandum dated 23 Oct 1998). The intent of this requirement is that this inspection be conducted on a continuous five year interval (J. Newton-Lund, conversation).

Reviewed documents indicate that the required minimum twice per year inspections have been condensed to a single annual inspection in the late Fall, early Winter months, led by the KCD project manager, with participation by MOANG and St. Louis District (MVS). Inspection reports for these annual inspections are provided in Appendix D. Based on a review of records and interviews, annual

inspections conducted by the MOANG during the Spring months have not been conducted during this review period.

Summary descriptions of the key findings of inspections conducted during this review period are provided in the following bullets:

- December 2013: No significant degradation or undercutting of riprap due to extensive siltation and continued tree growth; no UXO or ordnance found; warning signs (12) in good condition.
- November 2012: No significant degradation or undercutting of riprap due to extensive siltation and continued tree growth; no UXO or ordnance found; eleven of twelve warning signs were inspected and found to be in good condition.
- October 2011. Signs 1-6 were not inspected; replacement warning signs #8 and #12 were installed (sign #12 replaced due to the original sign being missing during the last inspection); extensive siltation and debris observed on top of riprap; no significant degradation or undercutting of riprap due to siltation and continued extensive tree growth on top of riprap; no UXO or ordnance found; post-tree clearing observations are that signs #7 through #12 are visible from the shoreline.
- November 2010. Only the upper portion was observed due to high river levels; observed no significant degradation or undercutting of the riprap due to siltation and continued extensive tree growth on top of riprap; significant soil erosion was observed at the outlet of the 54-inch sewer line; one warning sign facing river is surrounded by trees.
- December 2009. Only the upper portion was observed due to high river levels; observed no significant degradation or undercutting of riprap due to siltation and continued extensive tree growth on top of riprap; no UXO or ordnance observed; riprap installed previous year above newly installed 54-inch sewer line in good condition.

Surveys

In accordance with the MOA, a complete topographic survey is to be conducted during 2014. To date, this survey has yet to be completed.

The last topographic surveys were conducted in 2009 during high river elevations. A hydrographic survey conducted on 11 March 2009 and topographic survey conducted during April 2009 are reported as indicating no vertical or horizontal changes to the riprap based on a comparison of survey data obtained in 2003 (USACE, 2009a). The 2009 FYR states that a follow-up survey will be conducted during the late fall/early winter of the 2009 calendar year when water levels are historically low. This survey, however, was not conducted.

Vegetation Clearing

Clearing of Site vegetation having the potential for obscuring warning signs was completed on 13 Oct 2011. This clearing was conducted at Warning Sign Nos. 7, 9, 10, and 11 and consisted of removing trees and brush within a 15-foot radius of the signs. Trees having a greater than 6-inch diameter at breast height, were left in place, unless they impeded visibility of the sign. If left in place, lower limbs that may obstruct visibility of signs were removed. Trees or brush within the 30-foot corridor in front of each sign

were removed. This clearance is documented in the “Task Completion Report”, November 2011 (LATA, 2011) and appears to have been in response to an observation recorded in the 15 December 2010 inspection report that “...one of the warning signs that faces towards the river to be surrounded by trees.” It is unknown to what extent foliage may have been obscuring the visibility of the warning signs during the spring and summer of 2011.

Sign Replacement

Warning Signs Nos. 8 and 12 were replaced during the vegetation clearing operation conducted during October 2011. Warning Sign No. 8 was replaced, even though it was still erect, due to erosion around the sign’s base which had exposed its concrete footings. Warning Sign No. 12 was missing due to a past flood; however, no record of either the date of the flood or date of inspection during which the missing sign was observed was produced for this review. It is not known for what duration the Site had one warning sign missing (the 2010 inspection report does not identify a missing sign).

It is noted that the MOANG has extra warning signs stored for the purpose of replacing damaged signs.

5.0 Progress Since the 2009 Five-Year Review

5.1 2009 Five-Year Review Protectiveness Statement and Issues

Protectiveness Statements

The 2009 FYR provided the following protectiveness statement regarding the selected remedy:

“The remedy is expected to be protective of human health and the environment through the following actions that include LUCs, which consist of riprap cover on the former post dumping grounds to prevent surface exposure of potential UXO and military munitions; posing of warning signs in and near the former post dumping grounds; and enforcement of the deed restriction which provides notice to all future land owners of the hazards of potential UXO and military munitions on the property. All immediate threats at the site have been addressed through the implementation of the above LUCs. In addition, the remedy is protective of human health and the environment as demonstrated by no observance of UXO since construction complete. Furthermore, a recent hydrographic survey conducted on March 11, 2009 and topographic survey conducted at the site on April 28 and 29, 2009 indicated no vertical or horizontal changes to the riprap based on a comparison of survey data obtained in 2002 and 2003.”

“Long-term protectiveness of the remedial action will be verified by the continuation of annual inspections of the riprap and warning signs. In addition to the annual inspection, the riprap will be inspected during periodic low water periods to monitor any undercutting along the shoreline areas that could result in exposed areas.”

Issues

The 2009 FYR identified four issues and recommendations. Table 2 lists the actions taken in response to the identified issues.

Table2. Status of 2009 FYR Recommendations

Issues from Previous FYR	Recommendations	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Severely damaged warning sign	Replace the damaged warning sign. Continue to monitor the condition of all warning signs during annual site inspections.	MOANG	31 Dec 09	Sign replacement occurred in 2009 and documented in Site Inspection report of 15 Dec 09	Occurred in 2009 - exact date not known
Minor undercutting of riprap near shoreline	Closely monitor the potential for future undercutting of riprap along the Mississippi River shoreline during low water periods in addition to scheduled annual site inspections.	USACE and MOANG	31 Dec 09	Ongoing site inspections provide the required monitoring.	Annual Site inspections conducted late Autumn/early winter.

Issues from Previous FYR	Recommendations	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Inspection checklist not developed.	Develop an inspection checklist prior to next annual inspection of riprap and warning signs and second FYR.	USACE	15 Nov 09	Checklist is used	2 Dec 2009
Topographic survey conducted when Mississippi River levels were high	Perform follow-up survey in late fall/early winter of the 2009 calendar year when river levels are historically at their lowest.	USACE	31 Dec 09	Survey has not been conducted.	-----

5.2 Work Completed at the Site During the Review Period

Table 2 identifies work accomplished during this review period which addresses issues identified during the 2009 FYR.

6.0 Recurring Review Process

6.1 Administrative Components

The USACE KCD initiated the Recurring Review in January 2013 and scheduled its completion to be September 2014. The review was led by Josephine Newton-Lund, Project Manager (PM), with the technical review conducted by Daniel Mroz, Environmental Engineer, USACE KCD.

6.2 Community Involvement

On 19 February 2014, a public notice was published in the St. Louis Post-Dispatch, announcing the commencement of the review process for the Jefferson Barracks Post Dumping Grounds Site, providing Josephine Newton-Lund's contact information and inviting community participation. To date, USACE has not been contacted by members of the public as a result of this advertisement. The affidavit of publication is provided in Appendix E.

The Recurring Review report will be made available to the public once it has been finalized. Copies of this document will be placed in the MOANG Environmental Management Office. Upon completion of the report, a public notice will be placed in the St. Louis Post-Dispatch to announce the availability of the final Recurring Review report in the Site document repository.

6.3 Document Review

This Recurring Review included a review of relevant, site-related documents including: Action Memorandum, Memorandum of Agreement, inspection reports, topographic surveys, 2009 FYR, and technical reports supporting remedy selection. A complete list of the documents reviewed is provided in Appendix F.

6.4 Data Review

Reviewed 'data' consisted of inspection reports and topographic surveys conducted in 2002 and 2009. The reported conclusion of the 2009 topographic survey is that there had been no vertical or horizontal displacement of riprap (USACE, 2009a). Survey results have been provided in Appendix B.

6.5 Site Inspection

The purpose of the Site inspection was to verify site conditions as being in accordance with requirements of both the Action Memorandum and Memorandum of Agreement. However, emphasis was placed upon viewing riprap and identifying any areas of erosion on the Beach Area portion of the Site. The inspection was conducted on 28 January 2014 and performed by Josephine Newton-Lund, USACE KCD Project Manager, Mr. Daniel Mroz, USACE KCD Environmental Engineer, and David Rose, USACE, St. Louis District, Project Engineer. The MOANG point of contact, Lt. Loftus, was not available. The recorded USGS 07010000 Mississippi River St. Louis gauge level on 28 January 2014 was approximately -1.75 feet (Figure 6), which allowed inspection of riprap typically submerged. Site inspection photographs are provided in Appendix G and the site inspection form is provided in Appendix H.

The inspection commenced at the locked access gate located at the southeast end of Kearney Road. The inspection proceeded generally southward along the Union Pacific Railroad right of way to the south limit of the Site, as indicated by the presence of Warning Sign No. 1. Vegetation along this right of way was observed to be generally low to the ground, and at locations where vegetation was not close to the ground, it did not obscure the warning signs located west of the railroad tracks. Warning Sign No. 1 was observed to have been partially degraded such that the letters "D", "A", "N", and "G" were not legible. Photo No. 7 depicts this condition. It is noted that the previous Site inspection, conducted 3 December, recorded that all warning signs were "found to be in good condition." No other sign was identified as being in a degraded condition.

The inspection team navigated through the wooded portion of the escarpment and found, at least at the Site's south end, a vertical erosion face occurring at the interface of the Beach Area and the wooded top of the escarpment. Tree roots were visible in this erosion face. No evidence of either ordnance or items typically found to have been dumped at the Site were observed in this eroded area. Photo Nos. 11 through 13 depict this finding. The length of this erosion face was not determined as vegetation generally concealed the condition of this interface area as the inspection continued northward. However, it is noted that this is the type of erosion which caused Warning Sign No. 8 to be replaced.

In the Beach Area portion of the Site, riprap was generally observed to be present at the surface with sediment filling any voids between adjacent stones. Dead vegetation was present along with a few

scattered tree trunks. Riprap was present at the shoreline of the river and was also observed to continue past the shoreline, being submerged by the river. No depressions were observed which might indicate an absence of riprap. However; there were two areas where riprap was not as evident at the surface as compared to adjoining areas. Photo Nos. 15, 22, and 23 depict these areas.

One area of significant erosion was encountered in the Beach Area at a location estimated as being between Warning Sign Nos. 8 and 9. This area contained an erosion “gully” having an estimated depth of 4-5 feet and length of 12 to 15 feet. This feature is depicted in Photo Nos. 18 through 20. The cause of this erosion feature was not identified during the inspection (although it was later determined to be the result of an MSD combined sewer outfall – see below). No other significant findings were made.

Post-Inspection Information

A later inspection of the eroded area, conducted 2 April 2014, determined that this area is the location of the St Louis Metropolitan Sewer District (MSD) combined sewer outfall (48-inch storm sewer depicted in Figure 2) that had been replaced in September 2008 with a larger diameter pipe. Appendix I provides documentation generated from the 2 April inspection. The Field Oversight Report (Appendix I) documenting the replacement pipe installation, states that the old outfall was encountered at an estimated 12 feet below ground surface and was replaced with a flared unit from which a channel to the river was excavated and lined with both filter fabric and riprap. The invert of the outfall is stated to have been 1 foot lower than the river elevation; however, no survey elevation data is provided with the report.

The report documenting the 2 April 2014 inspection concludes that “no action is recommended in regards to placement of erosion protection measures” and that the MSD should inspect the channel to determine if accumulated sediment allows the outfall to perform as designed. Although not discussed in the 2 April 2014 inspection report, the existing sediment observed has accumulated on top of riprap installed in 1999 and also in 2008 by MSD when the larger diameter pipe was installed. Moreover, there was no evidence of military munitions or post dumping ground items, such as horseshoes or ceramic plates, observed during both site inspections in 2014, during installation of the larger diameter pipe by MSD in 2008, or at any of the previous inspections conducted post-riprap installation. In addition, an analysis of photographs from USACE site inspections of the outfall area on 28 January 2014 and 2 April 2014 was conducted on 18 August 2014 by MSD engineers and concluded that the combined sewer outfall is performing as designed. According to MSD engineers, additional erosion control measures, such as the installation of additional riprap, would not prevent future sediment erosion, which lies on top of the riprap that was installed in 1999 by USACE and 2008 by MSD.

6.6 Interviews

Josephine Newton-Lund, the USACE KCD project manager for the Site was asked a series of questions focused upon project management subjects. A copy of her email responses is provided in Appendix H, as an attachment to the interview form. The following is a summary of the questions and her responses:

- Does the FUDS program establish/commit funds on an annual basis in accordance with the Action Memorandum Section 8.0 regarding annual estimated maintenance of 5%? **RESPONSE:** Yes; the FUDS program has had an established budget of \$12,500 a year for long-term management activities.

- What level of funding is required to meet the riprap annual maintenance of 5%? RESPONSE: Initial funding of \$12,500 was established after the remedy was implemented in 1999. Beginning in fiscal year (FY)15, \$15,000 has been budgeted for long-term maintenance activities. As a result of this FYR, FY14 funding has been obtained to install additional riprap in an eroded area on the beachfront. Also, funds are budgeted in FY18 for the award of a new contract to provide tree clearing around warning signs.
- What annual maintenance expenditures have occurred during the past 5 year? RESPONSE: \$12,500 annually has been expended for long-term maintenance activities that include annual site inspections, Quality Assurance Report (QAR) writing, and ongoing communications with stakeholders to include Missouri National Air Guard and the Metropolitan Sewer District. In 2011, \$13,735 was expended for tree and brush clearing in front of six warning signs and the relocation of Sign No. 8 to a higher elevation.
- What is the interpretation/meaning of the responsibility stated in the MOA for the coordination and performance of a five year review that will include a complete survey of the revetment site to determine if any actions are necessary to restore the site to “as-built” conditions? RESPONSE: When the MOA was developed, conducting a topographic survey was considered to be a reoccurring action as necessary every five years.
- Are you aware of any recurring trespassing problems at the Site? RESPONSE: No; since riprap installation, there has been no evidence of trespassing observed during site inspections.

Lieutenant Loftus, Deputy Base Civil Engineer and Acting Environmental Facility Manager, was asked several questions pertaining to MOANG responsibilities and interactions with the public. Lt. Loftus has been in this position for approximately 12 months and stated that she did not have direct knowledge regarding all events of the past five years related to the former Post Dumping Grounds Site. This interview was conducted via telephone, as Lt. Loftus was not available the day of the inspection. The following is a summary of the questions and her responses:

- Have there been any recurring trespassing problems identified during the past five years? RESPONSE: Lt. Loftus stated that she had no knowledge of trespassing problems associated with the Site.
- Are you aware of any public or adjacent land owners/tenants having questions or issues related to the FPDG? RESPONSE: Lt. Loftus stated she was not aware of any public or adjacent landowners having questions or issues related to the FPDG. Additional information was also provided: the National Cemetery utilizes shoreline area for soil storage; and, that “all property” is intended to be transferred to the State – working on returning all land to the east back to the State.
- Has MOANG been conducting at least twice a year inspection of the warning signs and/or revetment? RESPONSE: Lt. Loftus was not aware of the MOA requirement for conducting such inspections and asked that a copy of the MOA be provided (copies of the MOA and Action Memorandum were provided as well as a copy of the 1st FYR report).
- Is there a process in place to transition new personnel into the environmental office such that responsibilities are identified to the new individual assigned environmental responsibilities? RESPONSE: Currently there is not such a system/process in place; however, a computer based system being named “Site Plan” is being developed that would allow an individual to readily access

all relevant information and documents for a given site. This would greatly assist any individual in managing a given site.

- Who is responsible for Site security? Overall Installation security has recently been assigned to a private contractor. Installation Civil Engineering is responsible for conducting inspections of the Installation perimeter security fencing.

In summation, no instance of either trespassing or of finding OE is stated to have occurred during the recent past five years. However, one issue has been identified: at least twice per year inspections of the FPDG are not being conducted in accordance with the MOA. It is also recognized that having no process in place to provide relevant Site information/responsibilities to new personnel assigned Installation environmental responsibilities has likely impacted MOANG's compliance with MOA inspection requirements.

6.7 Institutional Controls

Institutional control of the Site is the responsibility of MOANG and has been accomplished by filing a restrictive covenant and by the posting of warning signs. In accordance with the terms of the MOA, MOANG filed a restrictive covenant and grant of easement (deed restriction) with St. Louis County on October 6, 2004. Appendix C provides a copy of the restrictive covenant. The purpose of the deed restriction is to bind the property owner (State of Missouri, represented by the Office of the Adjutant General, Missouri National Guard) to the terms of the MOA, and to provide notice to all future owners of the following:

- UXO and/or military munitions located on the property;
- Continuing obligation of the property owner to notify the Department of Defense (DoD) if any grounds are or will be disturbed in any way or if UXO and/or military munitions become exposed;
- Requirement to provide notice of land use restrictions if the property is transferred, leased, or restrictions modified; and
- Requirement to provide notification prior to construction on the property.

Maintaining physical control of the Site is problematic as fencing is impractical due to frequent flooding of the Site. Flooding of the Site by the Mississippi River would be expected to severely damage any potentially implemented Site fencing. It is noted that occurrences of trespassing at the Site are reported to have stopped since riprap installation. It is believed that since artifacts are no longer surfacing at the Site, the motivation for artifact collector to trespass onto the Site no longer exists.

In conclusion, application of institutional controls at the Site is assessed as achieving its intended objective.

7.0 Technical Assessment

7.1 *Question A: Is the remedy functioning as intended by the decision documents?*

Removal Action Performance

Yes, the selected removal action is performing as intended by the Action Memorandum. During the past five years, the installed riprap has remained in place and to have had additional river sediment deposited on top, which further isolates potentially remaining OE and minimizes the likelihood that such OE may become exposed at the surface. No instances of OE surfacing at the Site have been reported during the period subject to this review. Observations made during this recurring review Site inspection are consistent with the reported observations made during MOANG/KCD Site inspections conducted during the duration subject to this review - riprap is in place and appears to be further covered by river silt/sediment.

System Operations/O&M

Riprap has been operating as intended – no significant riprap repairs have been made during the period subject to this review. River sediment deposited on the riprap provides protection to the riprap and provides additional separation between any potentially remaining ordnance and the surface. This serves to increase the effectiveness of the remedy.

Two instances of erosion have been observed at the MSD 52-inch sewer outlet which replaced the 48-inch sewer outlet depicted on Figure 2 – the first instance occurred during the November 2010 inspection; the second occurred during this review’s Site inspection (Photos 18 through 20). As long as this “erosion” is occurring within the geotextile and riprap lined channel constructed for this outlet’s discharge (USACE, 2008), this should not warrant repair. Continued monitoring of this area is recommended.

A vegetation and tree clearing operation was conducted during October 2011 for the purpose of clearing vegetation located adjacent Warning Signs No. 7 through No. 12 in order to provide clear lines of sight. To date, tree clearing is under contract and a second vegetation clearing event is planned to occur in 2015. The award of a contract for future tree clearing is planned for 2018. It is noted that vegetation/tree clearing should be conducted on an as-needed basis, driven by observations made during Site inspections.

Signage maintenance has been executed during this review period. Warning Signs No. 8 and No. 12 were replaced during the October 2011 vegetation clearing operation. Additional warning signs are in MOANG possession and are in storage.

Reviewed documents indicate that inspections conducted by MOANG during the Spring time frame have not occurred during this review period. It is recommended that MOANG conduct an annual inspection of riprap and warning signs in the spring.

7.2 *Question B: Are the exposure assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?*

Are the exposure assumptions used at the time of remedy selection still valid?

Yes, exposure assumptions at the time of the removal action selection remain valid. Adjacent and Site land use have remained unchanged since remedy selection.

Are the Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?

Yes, the RAOs used at the time of removal action selection remain valid. The primary objective of the selected removal action is the prevention of OE becoming exposed due to river erosion. This has been accomplished by the application of riprap onto the area suspected to most likely have buried OE. Adjacent and Site land use have remained unchanged since remedy selection.

7.3 *Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?*

No additional information has come to light that could call into question the protectiveness of the remedy.

7.4 Technical Assessment Summary

The selected removal action is performing as intended by the Action Memorandum. No OE has been reported either on the Site's surface or adjoining areas either north or south of the Site. Repair of the riprap has not been required during the period subject to this review. The MOA required 5-year resurvey of the revetment area, due during calendar year 2014, has not been conducted as of the writing of this review. However, based on a review of annual inspection reports, there has been no observance of riprap movement or evidence of military munitions. Additionally, no incidences of Site trespassing have been reported or known to have occurred during the past five years.

The exposure assumptions used at the time of removal action selection remain valid as Site use and adjacent land use remain unchanged. RAOs have also remained valid since preventing public exposure to potential Site OE has been achieved since removal action implementation.

Annual site inspections during the spring months by MOANG staff have not been conducted during this review period. However, based on a review of the annual inspection reports for inspections conducted in late Fall, early Winter, the absence of a Spring inspection does not appear to affect the current or future protectiveness of the removal action.

8.0 Issues

Table 3: Current Issues for the Former Post Dumping Ground Site

Issue	Affects Current Protectiveness (Yes or No)	Affects Future Protectiveness (Yes or No)
1. An annual inspection during the Spring months has not been performed consistently by MOANG.	No	Yes
2. The 2014 five year re-survey has not been completed.	No ¹	No

Notes: 1. "No" is based upon observations made during the Site inspection that riprap is in place.

9.0 Recommendations and Follow-up Actions

Table 4: Recommendations to Address Current Issues

Issue	Recommendations/ Follow-Up Actions	Responsible Party	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
1. Inspections are not being conducted in accordance with the requirements of the MOA.	MOANG conduct, at a minimum, twice per year inspections that satisfy the objectives of determining: 1) if riprap has been damaged by high river flows; 2) condition of normally submerged riprap; and, 3) warning sign visibility when vegetation has foliage. KCD will coordinate Spring inspections with MOANG and MDNR beginning in FY 15. In addition, KCD will make arrangements with St. Louis District to add the Site to their annual Mississippi River inspection.	MOANG	KCD	CY 2014	No	Yes
2. The 2014 five year re-survey has not been completed.	Conduct survey. A survey of the Site will be planned for FY 15. However, consideration should be made to evaluate need of surveys on a set five-year frequency. KCD will discuss the potential for a change in frequency with MDNR after the results of the FY 15 survey are evaluated.	KCD	MDNR	CY 2014	No ¹	No
3. Warning Sign #1 has degraded	Replace sign. Replacement of the sign by KCD will be planned for FY 15 during the vegetation clearing event.	KCD	MDNR	CY2014	No	Yes

Notes: 1. "No" is based upon observations made during the Site inspection that riprap is in place

10.0 Protectiveness Statements

The removal action at the Former Jefferson Barracks Post Dumping Ground Site is protective of human health and the environment.

The selected removal action component of riprap installation to the shoreline area most suspected for the presence of buried UXO/OE items has achieved the objective of preventing exposure of UXO/OE at the surface due to river erosion. Continued achievement of this RAO is contingent upon appropriate inspections being conducted and the continuous implementation of appropriate O&M practices. The installed riprap is susceptible to being damaged from high river flows and it is imperative that inspection and O&M be conducted as soon as practicable after any occurrence of a high river event having the potential to damage the riprap.

11.0 Next Review

This is a site that requires ongoing recurring reviews as long as waste is left on site that does not allow for unrestricted use and unlimited exposure. The next recurring Review will be due not later than five years after the signature date of this report.

10.0 Protectiveness Statements

The removal action at the Former Jefferson Barracks Post Dumping Ground Site is protective of human health and the environment.

The selected removal action component of riprap installation to the shoreline area most suspected for the presence of buried UXO/OE items has achieved the objective of preventing exposure of UXO/OE at the surface due to river erosion. Continued achievement of this RAO is contingent upon appropriate inspections being conducted and the continuous implementation of appropriate O&M practices. The installed riprap is susceptible to being damaged from high river flows and it is imperative that inspection and O&M be conducted as soon as practicable after any occurrence of a high river event having the potential to damage the riprap.

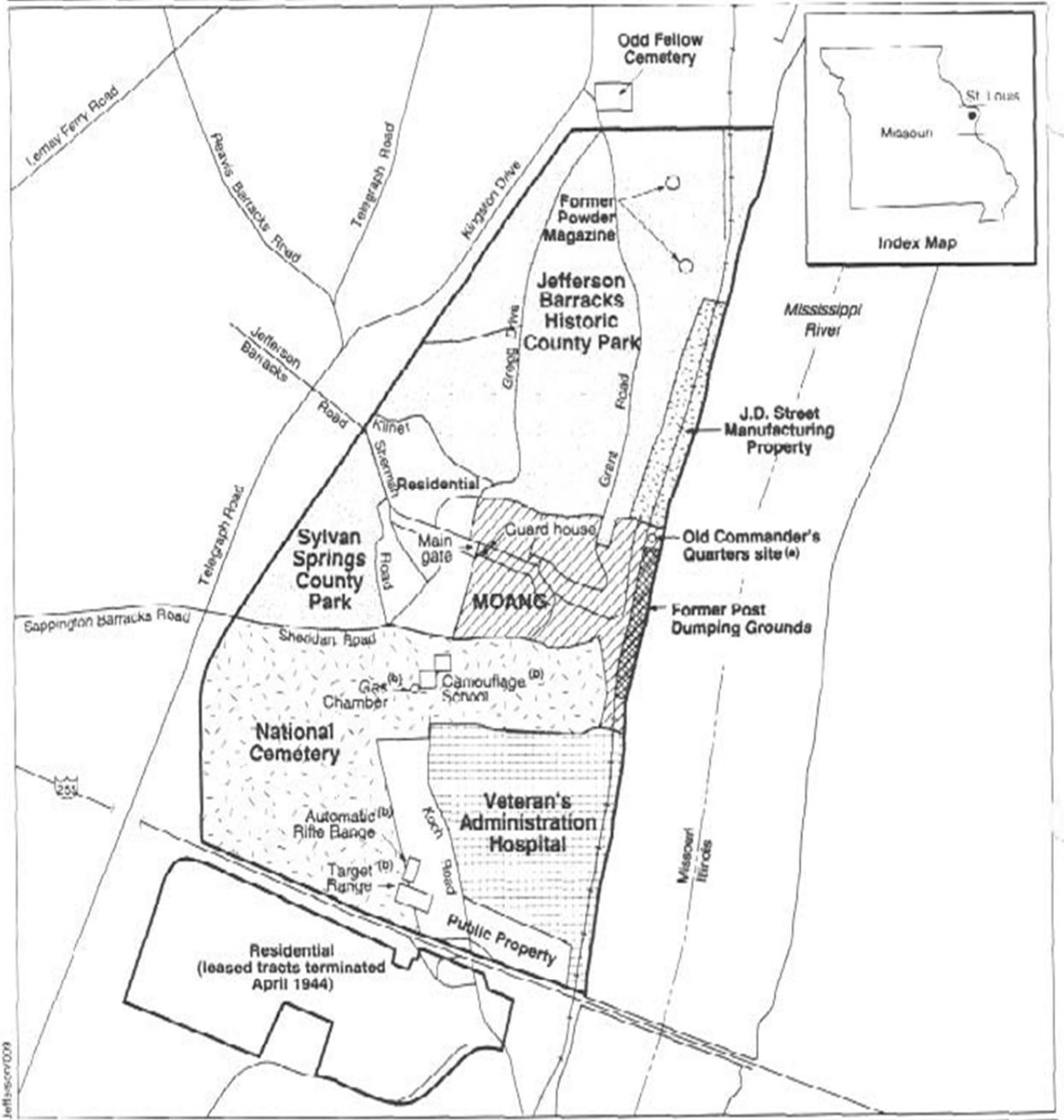
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11.0 Next Review

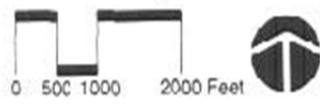
This is a site that requires ongoing recurring reviews as long as waste is left on site that does not allow for unrestricted use and unlimited exposure. The next recurring Review will be due not later than five years after the signature date of this report.

Figures

Figure 1. Site Location



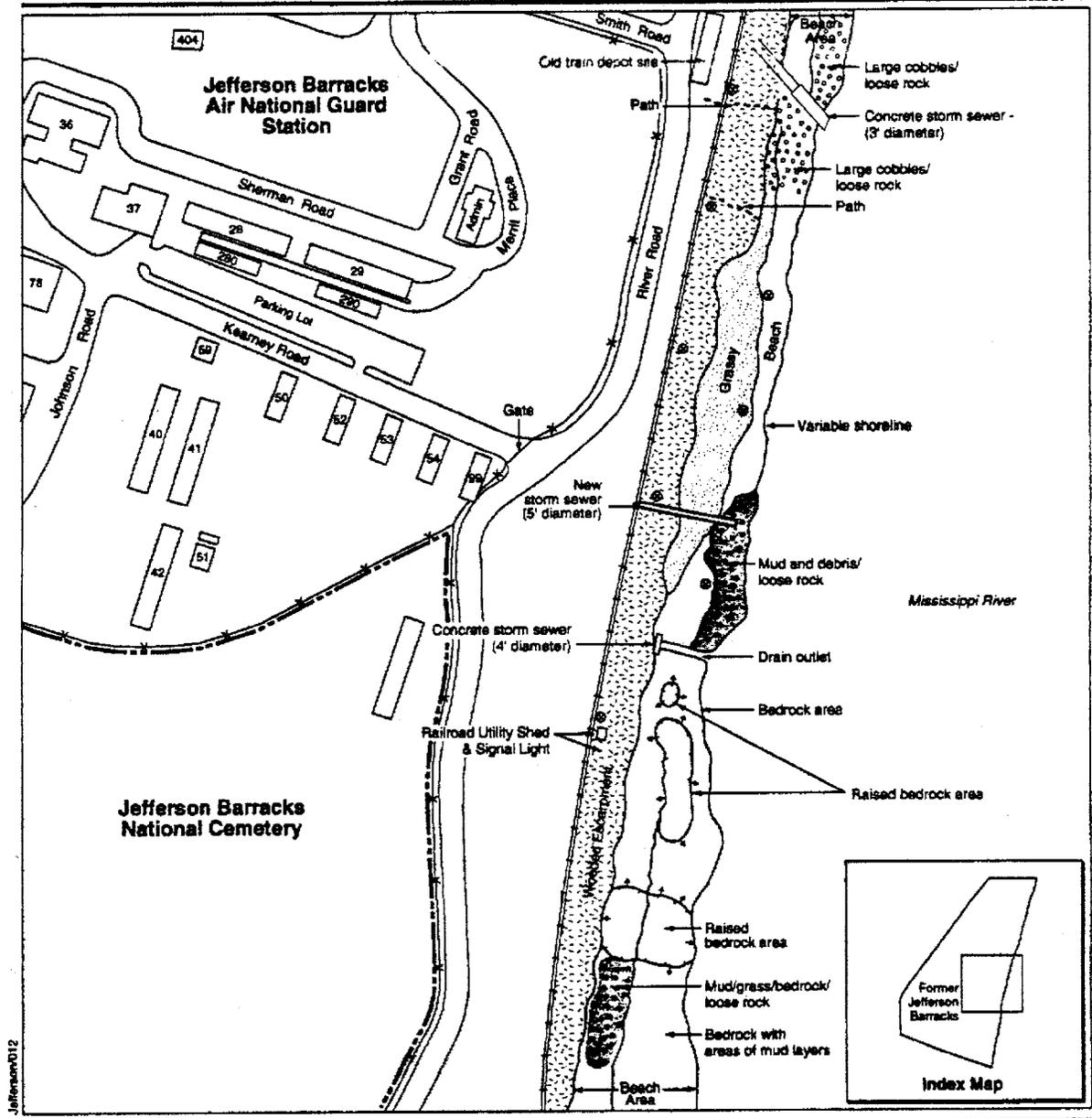
- EXPLANATION**
- Boundary of former Jefferson Barracks
 - Union Pacific Railroad
 - MOANG** Missouri Air National Guard-Jefferson Barracks Station
 - (a) Present 1826-1875
 - (b) Present prior to World War II



Former Jefferson Barracks Location Map

Figure 1-1

Figure 2. Site Details

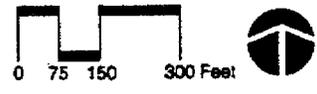


Jefferson012

EXPLANATION

- Air National Guard (ANG) boundary
- Fence
- Road
- Union Pacific Railroad tracks

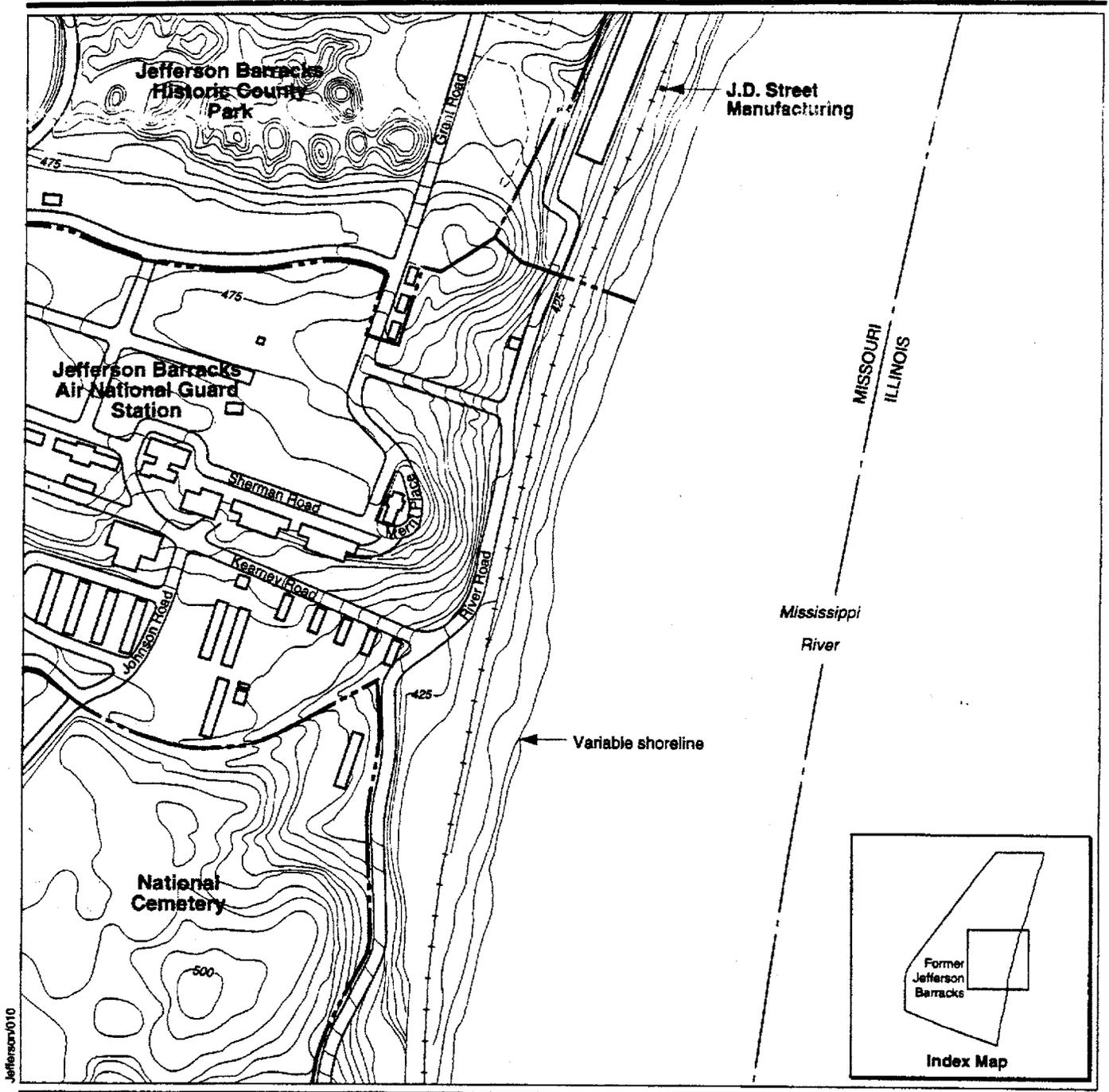
- 59 Building and ANG number
- Existing ANG unexploded ordnance warning sign (wood sign and post)



Former Post Dumping Grounds Site Map

Figure 1-2

Figure 3. Site Topography



EXPLANATION

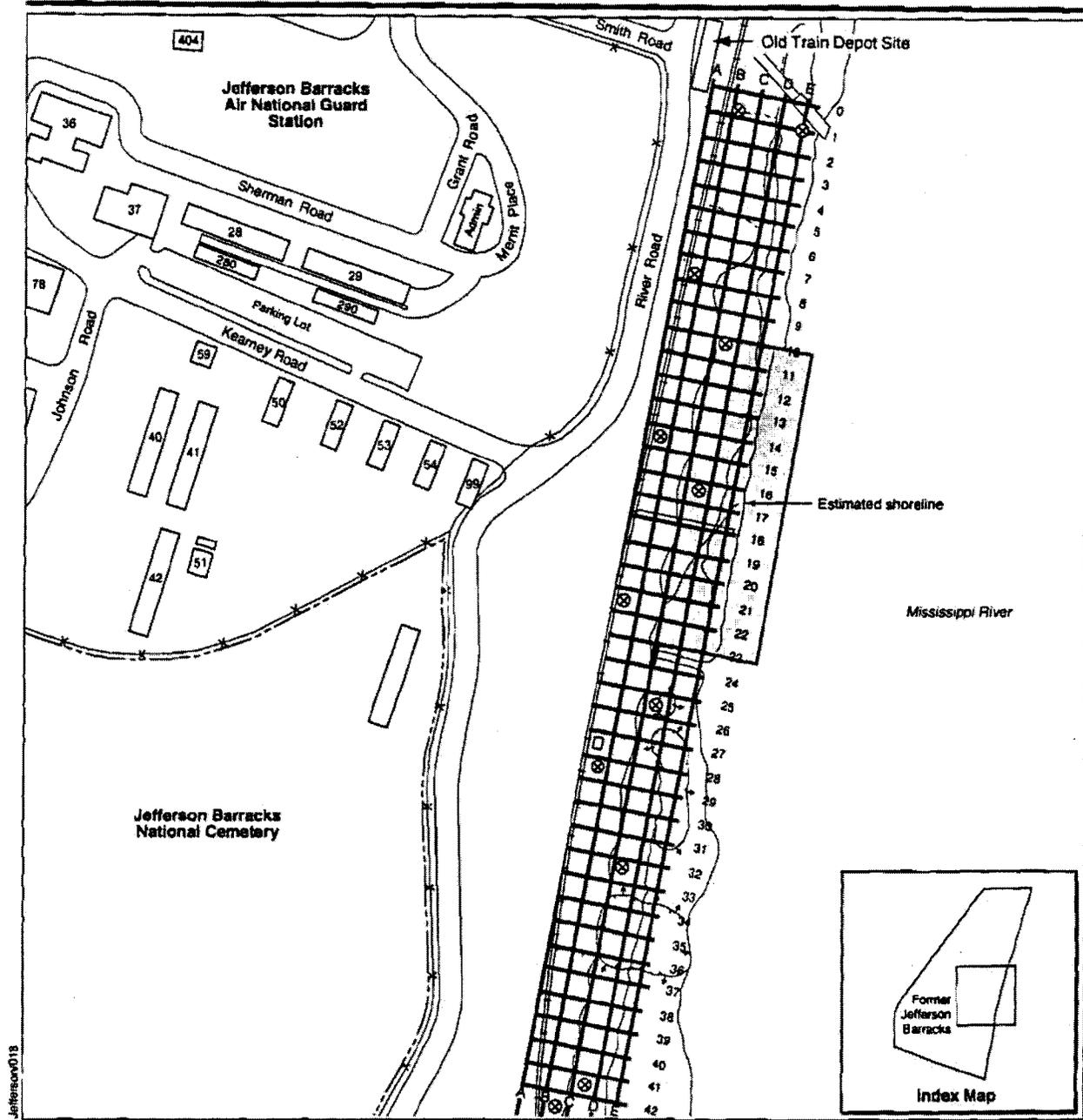
- 425 — Topographic elevations in feet above mean sea level. Contour interval 5 feet (from 1995 Metropolitan St. Louis Sewer District map data)
- +—+— Union Pacific Railroad tracks
- Building
- == Road
- - - - Property boundary



**Topographic Map -
Jefferson Barracks
Air National Guard
Station and Former Post
Dumping Grounds Area**

Figure 2-1

Figure 4. Proposed Riprap Installaion Location



Jefferson018

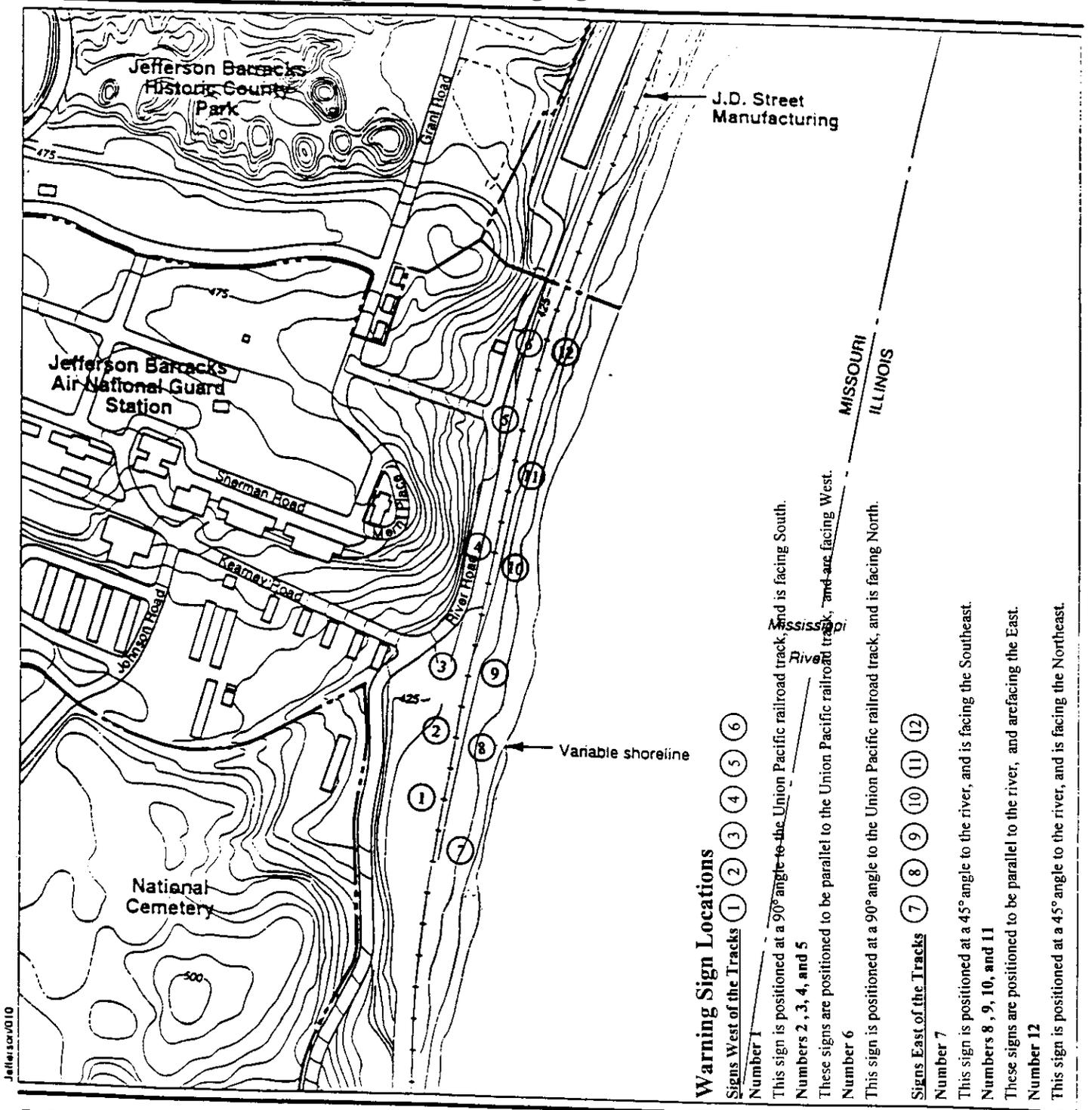
EXPLANATION

- ANG boundary
 - Fence
 - Road
 - Union Pacific Railroad tracks
 - Building and ANG number
 - Location Survey and Network (50x50 feet sub grids)
 - Proposed Riprap Installation area (* Alternative 3- 4 foot clearance would be limited to the land portion of area)
 - Proposed ordnance and explosives (OE) warning sign (metal sign and post)
- 0 75 150 300 Feet

Proposed Warning Sign and Riprap Installation Locations, Alternative 2 - Institutional Controls/Risk Management - Former Post Dumping Grounds

Figure 3

Figure 5. Warning Sign Locations



Jefferson 0110

Warning Sign Locations

Signs West of the Tracks ① ② ③ ④ ⑤ ⑥

Number 1
This sign is positioned at a 90° angle to the Union Pacific railroad track, and is facing South.

Numbers 2, 3, 4, and 5

These signs are positioned to be parallel to the Union Pacific railroad track, and are facing West.

Number 6

This sign is positioned at a 90° angle to the Union Pacific railroad track, and is facing North.

Signs East of the Tracks ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

Number 7

This sign is positioned at a 45° angle to the river, and is facing the Southeast.

Numbers 8, 9, 10, and 11

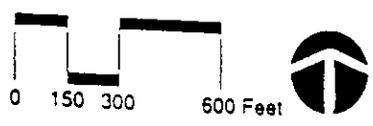
These signs are positioned to be parallel to the river, and are facing the East.

Number 12

This sign is positioned at a 45° angle to the river, and is facing the Northeast.

EXPLANATION

- 425 — Topographic elevations in feet above mean sea level. Contour interval 5 feet (from 1995 Metropolitan St. Louis Sewer District map data)
- Union Pacific Railroad tracks
- Building
- Road
- - - Property boundary



Topographic Map - Jefferson Barracks Air National Guard Station and Former Post Dumping Grounds Area

Figure 2-1

Figure 6. 2003 Riprap Repair/Replacement

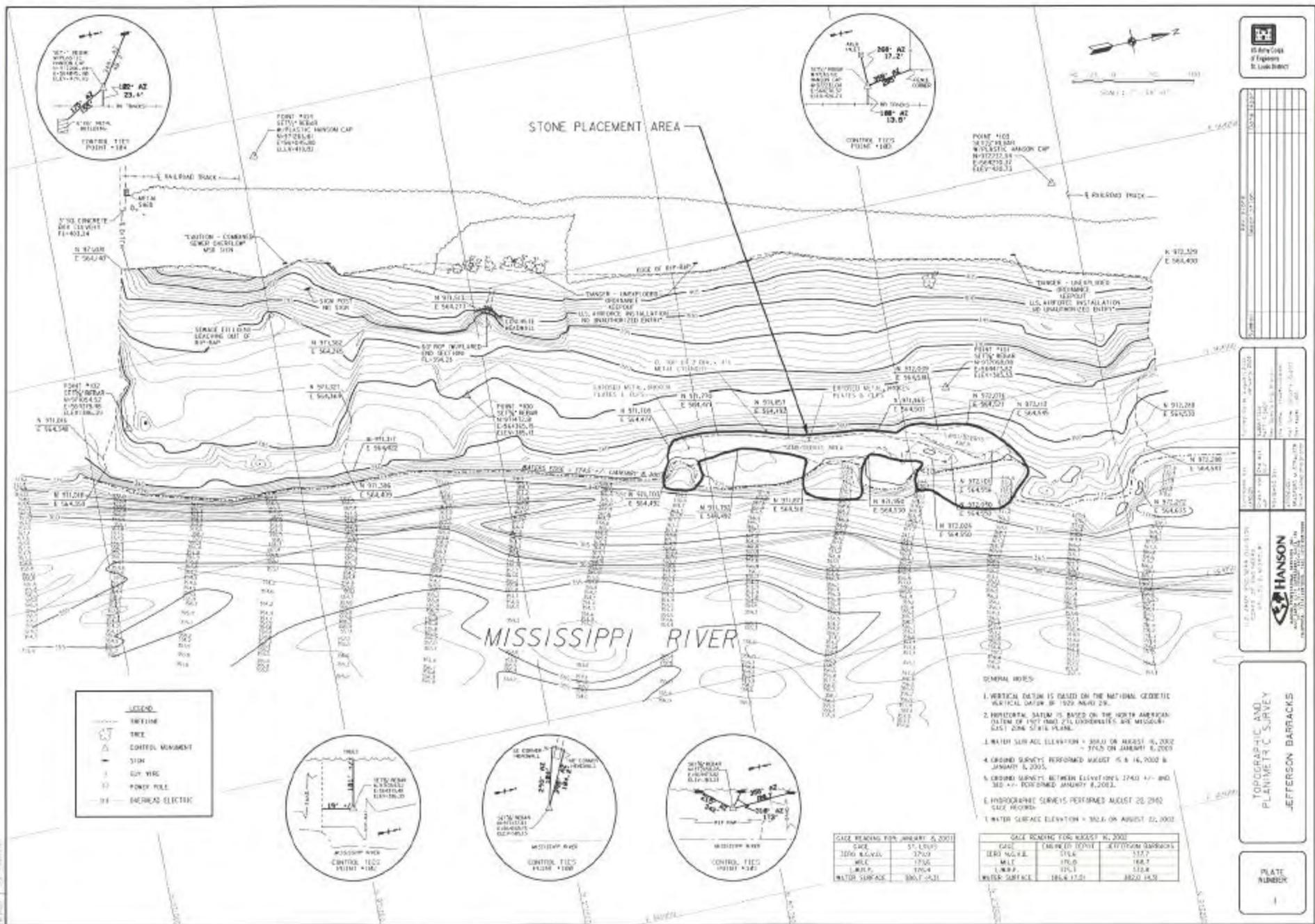


Figure 7. Mississippi River St. Louis Gauge Data for 1/28/14

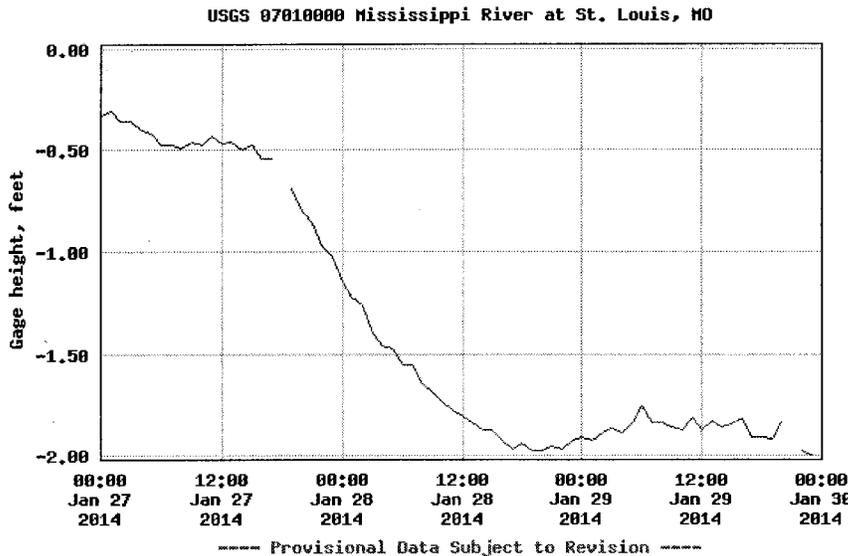
This station managed by the Rolla Field Office.

Available Parameters	Available Period	Output format	Days
<input type="checkbox"/> All 2 Available Parameters for this site		<input checked="" type="radio"/> Graph	<input type="text"/>
<input checked="" type="checkbox"/> 00065 Gage height	2007-10-01 2014-03-24	<input type="radio"/> Graph w/ stats	-- 0
<input checked="" type="checkbox"/> 00060 Discharge	2007-10-01 2014-03-24	<input type="radio"/> Graph w/o stats	Begin
		<input type="radio"/> Graph w/ (up to 3) parms	2014
		<input type="radio"/> Table	End d
		<input type="radio"/> Tab-separated	2014

Summary of all available data for this site
Instantaneous-data availability statement

Gage height, feet

Most recent instantaneous value: 9.69 03-24-2014 15:00 CDT



Add up to 2 more sites and replot for "Gage height, feet"

?
 Add site numbers
 Note

Enter up to 2 site numbers separated by a comma. A site number consists of 8 to 15 digits

GO

Create [presentation-quality](#) / [stand-alone](#) graph. [Subscribe to](#)
 ?
[WaterAlert](#)

P00065 DD02 A1

[Share this graph](#) |

Discharge, cubic feet per second

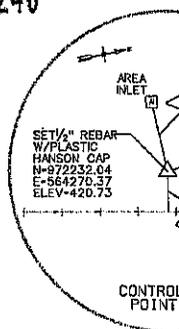
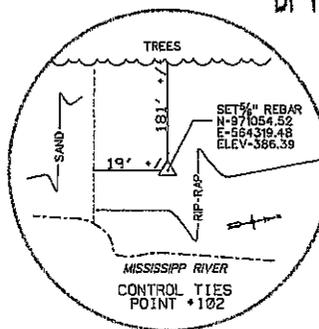
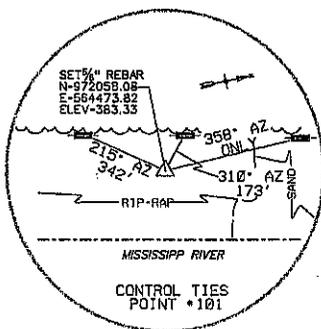
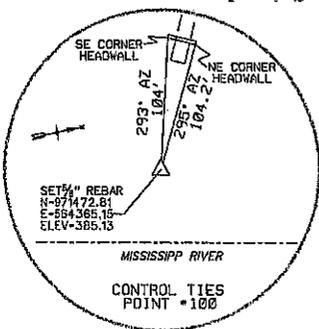
Most recent instantaneous value: 184,000 03-24-2014 15:00 CDT

Add up to 2 mo sites and replot "Discharge, cubic feet per second"

?

Appendix A

Site Legal Survey



LEGAL DESCRIPTION - 7.61 ACRE TRACT

A PART OF UNITED STATES PRIVATE SURVEY NO. 3344, TOWNSHIP 44 NORTH, RANGE 6 EAST OF THE FIFTH PRINCIPAL MERIDIAN, COUNTY OF ST. LOUIS, STATE OF MISSOURI BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

Commencing at the southwest corner of Lot no. 1 of Sylvan Place Subdivision, Phase II, as recorded in the land records of the County Recorder's Office in plat book no. 332, at page no. 22; thence S 36° 49' 21\" E, 515.41 feet along the south line of said subdivision to the southeast corner thereof; thence S 65° 33' 17\" E, 3072.72 feet to the TRUE POINT OF BEGINNING:

thence N 08° 43' 01\" E, 240.97 feet;
 thence N 10° 22' 50\" E, 572.68 feet;
 thence N 13° 01' 59\" E, 275.11 feet;
 thence N 17° 56' 57\" E, 191.74 feet;
 thence S 80° 47' 06\" E, 102.13 feet;
 thence S 71° 06' 07\" E, 139.88 feet;
 thence S 14° 30' 26\" E, 22.71 feet to the waters edge of the Mississippi River (elevation 374.5, as measured on January 8, 2003); thence along said waters edge the following courses and distances:

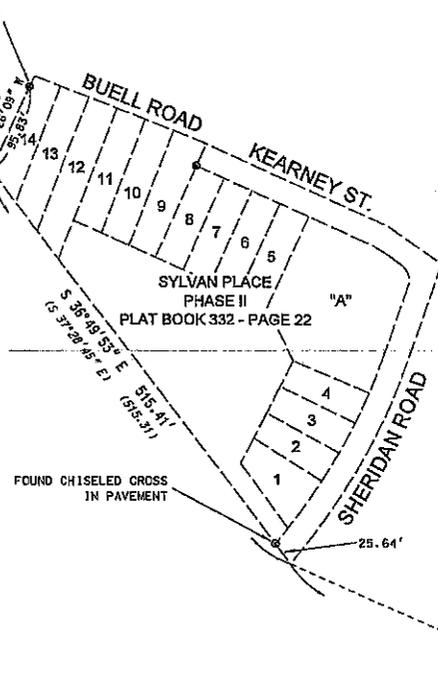
S 05° 44' 47\" W, 90.99 feet;
 thence S 22° 38' 56\" W, 43.35 feet;
 thence N 53° 17' 02\" W, 34.31 feet;
 thence S 23° 55' 41\" W, 40.63 feet;
 thence S 02° 57' 36\" E, 125.30 feet;
 thence S 21° 37' 19\" W, 46.24 feet;
 thence S 11° 44' 35\" W, 82.25 feet;
 thence S 08° 06' 37\" W, 115.11 feet;
 thence S 15° 59' 24\" W, 100.59 feet;
 thence S 15° 32' 51\" W, 130.51 feet;
 thence S 10° 51' 42\" W, 122.32 feet;
 thence S 02° 09' 10\" W, 112.87 feet;
 thence S 05° 21' 53\" W, 132.41 feet;
 thence S 15° 02' 36\" W, 97.28 feet;
 thence S 24° 59' 25\" W, 56.09 feet; thence leaving said water's edge, N 72° 38' 46\" W, 27.36 feet;
 thence N 72° 38' 46\" W, 217.92 feet, containing 7.61 acres, more or less.

POINT OF COMMENCEMENT
 S.W. CORNER LOT 14, SYLVAN PLACE SUBDIVISION, PHASE II
 P.B. 332 - PAGE 22

LINE DIMENSION TABLE

NO.	BEARING	DISTANCE
1	N 72° 38' 46\" W	27.36'
2	S 80° 47' 06\" E	102.13'
3	S 14° 30' 26\" E	22.71'
4	S 05° 44' 47\" W	90.99'
5	S 22° 38' 56\" W	43.35'
6	N 53° 17' 02\" W	34.31'
7	S 23° 55' 41\" W	40.63'
8	S 21° 37' 19\" W	46.24'
9	S 11° 44' 35\" W	82.25'
10	S 08° 06' 37\" W	115.11'
11	S 15° 59' 24\" W	100.59'
12	S 10° 51' 42\" W	122.32'
13	S 02° 09' 10\" W	112.87'
14	S 15° 02' 36\" W	97.28'
15	S 24° 59' 25\" W	56.09'

FOUND 1/2\" IRON PIN WITH CAP (LS 219-D)



SURVEY NOTES:

THIS SURVEY CREATES A NEW 7.61 ACRE PARCEL AT THE REQUEST OF THE ST. LOUIS DISTRICT CORPS OF ENGINEERS

MEASURED DIMENSIONS SHOWN WITHOUT PARENTHESES DEED OR RECORD DIMENSIONS SHOWN WITH PARENTHESES

BASIS OF BEARINGS - GRID NORTH ADOPTED FROM PREVIOUS SURVEY BY HANSON ENGINEERS AND SURVEYORS, SUPPLIED BY THE ST. LOUIS DISTRICT CORPS OF ENGINEERS

NO MONUMENTATION WAS SET AT ANY CORNERS OF THE 7.61 ACRE TRACT AT THE REQUEST OF THE ST. LOUIS DISTRICT CORPS OF ENGINEERS

SURVEY CLASS "A" - RURAL

GENERAL NOTES:

VERTICAL DATUM IS BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29).

HORIZONTAL DATUM IS BASED ON THE NORTH AMERICAN DATUM OF 1927 (NAD 27), COORDINATES ARE MISSOURI EAST ZONE STATE PLANE.

WATER SURFACE ELEVATION - 380.0 ON AUGUST 16, 2002 - 374.5 ON JANUARY 8, 2003

GROUND SURVEYS OF SITE PERFORMED AUGUST 15 & 16, 2002 & JANUARY 8, 2003, BY HANSON ENGINEERS AND SURVEYORS ALL HORIZONTAL AND VERTICAL CONTROL SHOWN WAS SET BY HANSON. THE COORDINATES SHOWN FOR THE CONTROL MONUMENTS WAS ACCEPTED, AND NOT VERIFIED TO PUBLISHED STATE PLANE CONTROL MONUMENTS

HYDROGRAPHIC SURVEYS PERFORMED AUGUST 22, 2002 BY HANSON ENGINEERS AND SURVEYORS. WATER SURFACE ELEVATION - 382.6 ON AUGUST 22, 2002

REFERENCES:

PREVIOUS SURVEY BY HANSON ENGINEERS AND SURVEYORS SUPPLIED BY THE ST. LOUIS DISTRICT CORPS OF ENGINEERS

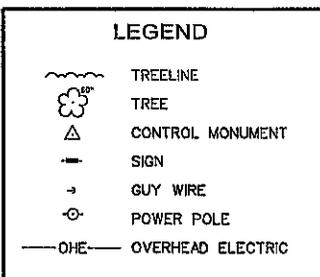
RECORD PLAT OF SYLVAN PLACE SUBDIVISION, PHASE II PLAT BOOK 322 - PAGE 22

FILED FOR RECORD

STATE OF MISSOURI)
 COUNTY OF ST. LOUIS) ss

FILED FOR RECORD THIS _____ DAY OF _____
 AND DULY RECORDED IN BOOK _____ AT PAGE _____

RECORDER, ST. LOUIS COUNTY, MISSOURI



SURVEYOR'S CERTIFICATION

THIS IS TO CERTIFY THAT AT THE REQUEST OF THE St. Louis Corps of Engineers, THE TRACT SHOWN HEREON WAS SURVEYED UNDER MY DIRECT SUPERVISION, AND THE RESULTS OF SAID SURVEY ARE REPRESENTED CORRECTLY ON THIS PLAT. SAID SURVEY WAS EXECUTED IN ACCORDANCE WITH THE CURRENT MINIMUM STANDARDS FOR PROPERTY BOUNDARY SURVEYS OF THE MISSOURI DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGY AND LAND SURVEYING. THERE MAY EXIST OTHER DOCUMENTS THAT COULD AFFECT THE ACCURACY OF WHICH AN ACCURATE AND CURRENT TITLE SEARCH MAY DISCLOSE.

IN WITNESS WHEREOF I HAVE SET MY SEAL AND SIGNATURE

THIS 29th DAY OF SEPTEMBER 2003

R. CHRISTOPHER BOWEN, LAND SURVEYOR



169.9 11/12/41



Symbol	Description	Date	Appr.

Survey Date: August 2002	Drawn by: JAP	Checked by: CCH	Reviewed by: Chris Bowen	Approved: Dennis D. Morgan	Chief, Geospatial Branch
Submitted: PATTIFISHER	Geospatial Eng. Branch	File name: Sheet_1.dgn	Plot date: July 26, 2004	Plot scale: 1"=100'	

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

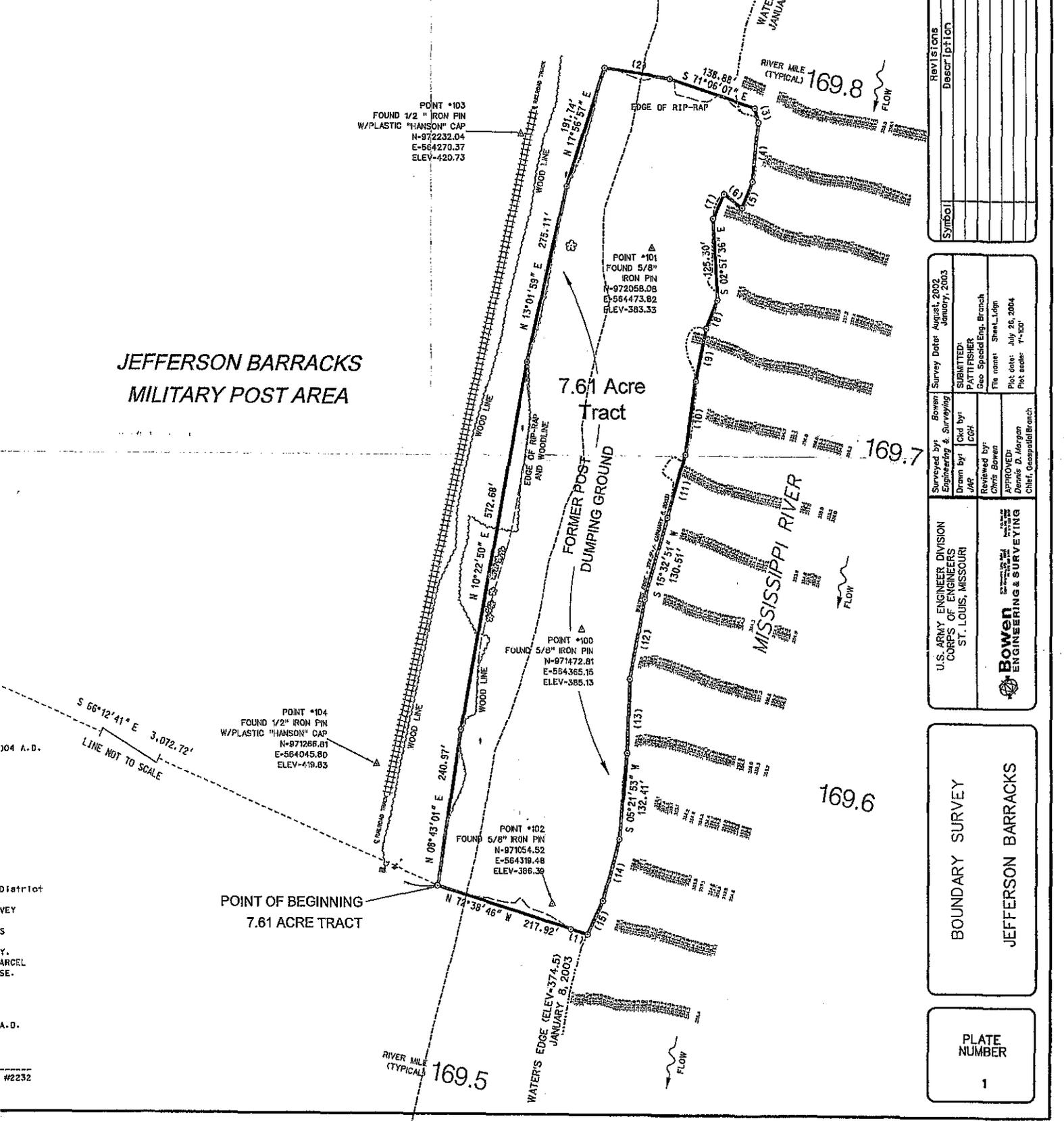
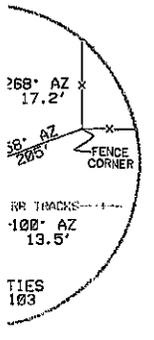
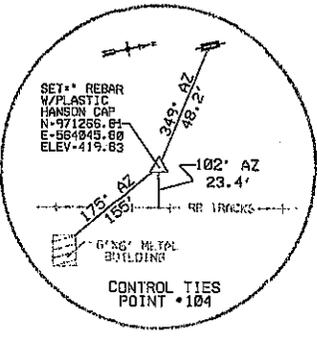
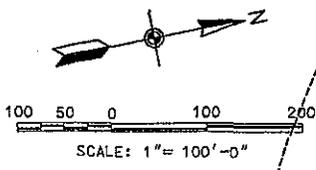
Bowen
ENGINEERING & SURVEYING

BOUNDARY SURVEY

JEFFERSON BARRACKS

PLATE NUMBER

1



JEFFERSON BARRACKS
MILITARY POST AREA

7.61 Acre
Tract

FORMER POST
DUMPING GROUND

MISSISSIPPI RIVER

POINT *104
FOUND 1/2" IRON PIN
W/PLASTIC "HANSON" CAP
N-871266.61
E-564045.60
ELEV-419.63

POINT *100
FOUND 5/8" IRON PIN
N-871472.61
E-564365.15
ELEV-385.13

POINT *102
FOUND 5/8" IRON PIN
N-871054.52
E-564319.48
ELEV-386.39

POINT *103
FOUND 1/2" IRON PIN
W/PLASTIC "HANSON" CAP
N-972232.04
E-564270.37
ELEV-420.73

POINT *101
FOUND 5/8" IRON PIN
N-972058.08
E-564473.82
ELEV-383.33

S 66°12'41" E 3,072.72'
LINE NOT TO SCALE

POINT OF BEGINNING
7.61 ACRE TRACT

RIVER MILE (TYPICAL) 169.5

WATER'S EDGE (ELEV-374.5)
JANUARY 8, 2003

WATER'S EDGE (ELEV-374.5)
JANUARY 8, 2003

RIVER MILE (TYPICAL) 169.8

RIVER MILE (TYPICAL) 169.7

RIVER MILE (TYPICAL) 169.6

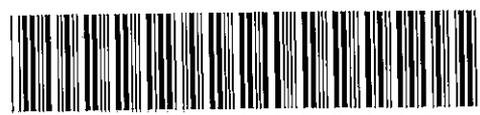
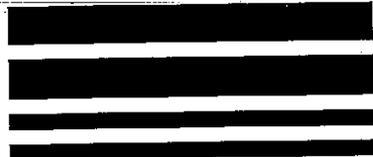
District
VEY
S
Y.
ARCEL
SE.
A.D.
#2232

Appendix B

Site Survey

Appendix C

Restrictive Covenant



JANICE M. HAMMONDS, RECORDER OF DEEDS
ST. LOUIS COUNTY MISSOURI
41 SOUTH CENTRAL, CLAYTON, MO 63105

TYPE OF INSTRUMENT: ESMT
GRANTOR: STATE OF MISSOURI
TO:
GRANTEE: COUNTY OF ST LOUIS

PROPERTY DESCRIPTION: SUR 3344 T 44 R 6E

Three empty rectangular boxes labeled: Lien Number, Notation, Locator

NOTE: I, the undersigned Recorder of Deeds, do hereby certify that the information shown on this Certification Sheet as to the TYPE OF INSTRUMENT, the NAMES of the GRANTOR and GRANTEE as well as the DESCRIPTION of the REAL PROPERTY affected is furnished merely as a convenience only, and in the case of any discrepancy of such information between this Certification Sheet and the attached Document, the ATTACHED DOCUMENT governs. Only the DOCUMENT NUMBER, the DATE and TIME of filing for record, and the BOOK and PAGE of the recorded Document is taken from this CERTIFICATION SHEET.

RECORDER OF DEEDS DOCUMENT CERTIFICATION

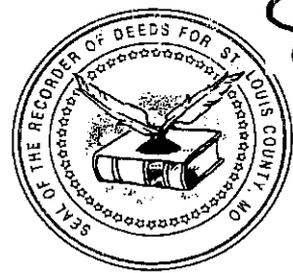
STATE OF MISSOURI)
SS.
COUNTY OF ST. LOUIS)

Document Number
449

I, the undersigned Recorder of Deeds for said County and State, do hereby certify that the following and annexed instrument of writing, which consists of 12 pages, (this page inclusive), was filed for record in my office on the 6 day of October 2004 at 10:00 AM and is truly recorded in the book and at the page shown at the top and/or bottom of this page.

In witness whereof I have hereunto set my hand and official seal the day, month and year aforesaid.

Janice Reber
Deputy Recorder



Janice M. Hammonds
Recorder of Deeds
St. Louis County, Missouri

- N.P.
- N.P.C.
- N.N.C.
- N.N.I.

RECORDING FEE \$54.37
(Paid at the time of Recording)

Mail to:

FACILITIES DIV
6819 N. BOUNDARY RD.
JEFFERSON CITY, MO
65101-1207

B-16131 P-1230/1241

**RESTRICTIVE COVENANT AND
GRANT OF EASEMENT**

THIS INDENTURE, made this 27 day of September, 2004, by the State of Missouri, represented by the Office of the Adjutant General, Missouri National Guard, 2302 Militia Drive, Jefferson City, Missouri, 65101-1203, of St. Louis County, in the State of Missouri, to provide notice of this Restrictive Covenant and Grant of Easement to all future Owner(s).

WITNESSETH: On this 27 day of September, 2004, pursuant to the terms of a Memorandum of Agreement (MOA) entered into by and between the Missouri Air National Guard (MOANG) and the U.S. Army Engineer District, St. Louis, and the U.S. Army Engineer District Kansas City, a Restrictive Covenant and Grant of Easement is hereby granted and recorded with the St. Louis County Recorder of Deeds in the Real Property Records of St. Louis County, Missouri, with respect to the Property described as follows:

See attached legal description, which by this reference is incorporated herein.

NOW THEREFORE, the State of Missouri, represented by the Office of the Adjutant General, Missouri National Guard, 2302 Militia Drive, Jefferson City, Missouri, 65101-1203, (hereinafter referred to as "Owner"), hereby imposes the following restrictions on the Property and covenants and agrees that:

A. Purpose

In accordance with terms of the Memorandum of Agreement (MOA), this Restrictive Covenant and Grant of Easement is for the purpose of binding the Owner to the terms of the MOA, and provide notice to all future Owner(s) of the following: of the unexploded ordnance/ordnance explosives (UXO/OE) located on the property, of the continuing obligation to notify the Department of Defense (DoD) if any grounds are or will be disturbed in any way or if UXO/OE becomes exposed, or if the Property is transferred, leased, or restrictions modified, to provide notice of land use restrictions, and provision for construction on the Property.

Because the contaminants of concern will remain at levels above those appropriate for unrestricted use of the property, this Restrictive Covenant is being recorded with the St. Louis County Recorder of Deeds (the county where the Property is located) for the purposes of protecting public health and safety, the environment, and to prevent interference with the performance, operation, and maintenance of any response activities selected and/or undertaken by the Missouri Department of Natural Resources (MDNR) or USACE, any party acting as an agent for the MDNR or USACE, or any party acting pursuant to a work plan approved by the MDNR, or USACE.

The Property is classified as a Formerly Used Defense Site (FUDS).

B. Notification of Presence, Location, and Disposition of UXO/OE on the Property

1. Notice of UXO/OE.

The Owner is hereby informed and does hereby acknowledge that UXO/OE has been found and is still presumably present at a site located on the easternmost portion of Former Jefferson Barracks currently known as the Jefferson Barracks Air National Guard Station, and owned by the State of Missouri.

Various munitions were disposed of at the site, which was known as the Former Jefferson Barracks Post Dumping Grounds, and was used from 1826 until 1950. The site is located between the Mississippi River and the Union Pacific railroad tracks from just North of where the old railroad depot stood, and extends South to within 500 feet of the property boundary of the former Veteran's Hospital. Long, narrow, and somewhat irregularly-shaped, the site extends some 2100 feet (North to South) and some 200 feet (East to West), and is approximately 10 to 12 acres in size. A survey and a legal description which are attached, and by this reference are incorporated herein, illustrate and describe the dimensions and location of the site.

References documenting the history, background, and current state of the site are listed as attachments, and by this reference are incorporated herein.

2. Location of UXO/OE.

The Owner is hereby informed and does hereby acknowledge that a clearance action of surface OE that included World War I era grenades and mortars was conducted on approximately 10 acres of the riverfront portion of the Former Jefferson Barracks Post Dumping Grounds (American Technologies, Inc., 1997). Subsequent investigations concluded that a defined area with larger amounts of metal, an approximately 200 feet by 850 feet area, located between the Union Pacific railroad tracks and the Mississippi River, was probably the historic disposal site (Earth Tech, 1998). Specific corrective measures have been implemented for this area because it was the area most suspected of containing remaining subsurface or near-surface UXO/OE items. The area was covered with a minimum 2.5 foot layer of riprap (USACE, 2003 Letter) to prevent surface exposure resulting from future river erosion. The attached surveyed map, which by this reference is incorporated herein, illustrates areas where riprap was applied to the site. Remedial work was completed in April 2003, and the U.S. Army Corps of Engineers (USACE) subsequently sent a letter to the U.S. Environmental Protection Agency (EPA) documenting completion (USACE, 2003). The USEPA closed out the project in September 2003 and officially entered the project into EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database as a long-term monitored site, under CERCLIS ID No. MO0002222883.

C. Notice of Memorandum of Agreement.

The Owner is hereby informed and does hereby acknowledge that the U.S. Army Engineer District, St. Louis, the U.S. Army Engineer District, Kansas City, and the Missouri Air National Guard (MOANG) are parties to a Memorandum of Agreement (MOA) (U.S. Army Corps of Engineers, Kansas City District, 2001), which assigns and documents oversight responsibilities. A copy of this Memorandum of Agreement can be obtained by written request to the Missouri Air National Guard, 65 Kearney Street, Jefferson Barracks, St. Louis, Missouri 63125-4190.

D. Duration.

The restrictions and other requirements described in this Restrictive Covenant and Grant of Easement shall run with the land and shall be binding upon any future Owner(s), heirs, successors, lessees, or assigns and their authorized agents, employees, or persons acting under their direction or control. This Restrictive Covenant and Grant of Easement shall continue into perpetuity, unless and until rescinded by MDNR and USACE. A copy of this Restrictive Covenant and Grant of Easement shall be provided to all heirs, successors, assigns, and transferees of Owner.

E. Notice to Lessees and Other Holders of Interest in the Property.

Owner, or any future holder of any interest in the Property, shall cause any lease, grant, or other transfer of any interest in the Property to include a provision expressly requiring the lessee or transferee to comply with this Restrictive Covenant and Grant of Easement. The failure to include such provision shall not affect the validity or applicability to the Property of this Restrictive Covenant and Grant of Easement.

F. Grant of Easement to MDNR and USACE.

1. Maintenance and Control.

The MOA defines operations and maintenance (O&M) responsibilities mutually agreed upon by both U.S. Army Engineer Districts and MOANG for the Former Jefferson Barracks Post Dumping Grounds. The O&M includes, but is not limited to, maintaining the warning signs and the revetment, and conducting semiannual inspections, which are institutional controls that were implemented to provide effective protection of human health from potential exposure to UXO/OE.

2. Notice and Time of Entry onto Property.

Entry onto the Property by MDNR or USACE pursuant to this Easement shall be upon reasonable notice and at reasonable times, provided that entry shall not be subject to these limitations if the MDNR or USACE determines that immediate entry is necessary to protect human health or the environment.

3. Emergencies, Operation, Maintenance and Inspections of the Property.

In the event of an emergency which presents a significant risk to human health or the environment, Subsection F.2. above may be suspended, provided such risk cannot be abated without suspending such Subsection.

4. Grant of Easement.

Owner hereby grants and conveys to the MDNR and USACE, their agents, contractors, and employees, and to any person performing remediation activities under the direction thereof, a non-exclusive easement (the "Easement") over the Property and over such other parts of the Property as are necessary for access to the Property or for carrying out any actions to abate a threat to human health or the environment. Pursuant to this Easement, the MDNR and/or USACE, their agents, contractors, and employees, and any person performing remediation activities under the direction thereof, may enter upon and inspect the Property and perform such investigations and actions as the MDNR and/or USACE deem necessary for any one or more of the following purposes:

- a. Ensuring that use, occupancy, and activities of and at the Property are consistent with this Restrictive Covenant;

- b. Ensuring that any remediation implemented complies with state law, including, but not limited to, § 260.350, *et seq.*, RSMo; § 260.565, *et seq.*, RSMo; § 260.435, *et seq.*, RSMo; § 260.500, *et seq.*, RSMo;
- c. Performing any additional investigations or remediation deemed necessary to protect human health and the environment;
- d. [if engineering controls are used:] Ensuring the structural integrity of any engineering controls described in this Restrictive Covenant and Grant of Declaration of Restrictive Covenant and Grant of Access, access and their continuing effectiveness in containing contaminants and limiting human and ecological exposure to the contaminants.

G. Restrictions

1. UXO/OE located on the Property shall not be disturbed.

Except as provided below, no action shall be taken, allowed, suffered, or omitted if such action or omission is reasonably likely to create a risk of migration of contaminants or explosion of contaminants or a potential health hazard to human health or the environment, including such actions as construction, excavation, or any activity that disturbs the ground surface.

2. Potential Hazards – Required Notice to DoD if ground disturbed or if UXO/OE becomes exposed.

The Owner is hereby informed and does hereby acknowledge that the he/she will promptly notify the Department of Defense (DoD) if the Former Jefferson Barracks Post Dumping Grounds is or will be disturbed in any way, or if any UXO/OE becomes exposed at the site. Proper handling and disposal of UXO/OE is required, and must be managed by the DoD, the designated response authority for this site. The Defense Environmental Restoration Program, 10 USC 2701, authorizes the Secretary of Defense to conduct response actions at this site. 40 CFR 300.120 designated DoD as the response authority for incidents involving DoD military weapons and munitions under the jurisdiction, custody, and control of DoD.

3. Property Conveyance, and any changes in ownership, title, or restrictions.

The Owner shall not convey any title, easement, or other interest in the Property without adequate and complete provision for the continued implementation, operation, and maintenance of any remedial action that has been implemented on the Property and without assuring prevention of the releases and exposures described in the provisions of the above subsections. Owner shall not convey any title, easement, or other interest in the Property without giving written notice to the Director, Missouri Department of Natural Resources – Hazardous Waste Program (MDNR-HWP), the State of Missouri Attorney General’s office, and USACE not less than thirty (30) days prior to the expected date of transfer.

4. Land Use Restrictions and Provision for Alterations of Property.

In furtherance of the purposes of this Restrictive Covenant, Owner shall assure that use, occupancy, and activity of and at the Property are restricted as indicated in this Restrictive Covenant and Grant of Easement.

Owner shall prohibit all activities as presented above that will result in human exposures above those specified in the cleanup assessment or risk assessment performed by MDNR

and/or USACE, or that would result in the release of a hazardous substance or explosive hazards that were addressed as a part of the remedial action.

5. Interference.

Owner shall prohibit all activities on the Property which may interfere with the response activities, operation and maintenance, long-term monitoring, or measures necessary to assure the effectiveness of the remedial action.

6. Alterations.

Owner shall not make, or allow or suffer to be made, any alteration of any kind in, to, or about any portion of the Property inconsistent with this Restrictive Covenant unless the Owner has first recorded MDNR Hazardous Waste Program's (MDNR-HWP) and the USACE's written approval of such alteration in the records of St. Louis County Recorder of Deeds. Owner shall request said written approval of proposed alteration at least thirty (30) days before the desired alteration is scheduled to commence.

7. Persons Entitled to Enforce Restrictions.

The restrictions in this Restrictive Covenant and Grant of Easement shall be enforceable in a Court of competent jurisdiction by Owner, and/or by the MDNR, and/or the USACE, their successors, transferees, and assigns.

8. Attachments.

- a. Legal Description of Former Jefferson Barracks Post Dumping Grounds,
- b. References, and
- c. Survey.

H. General Provisions

1. Conflicting statutes or regulations.

If any of this Restrictive Covenant and Grant of Easement is subject to any laws or regulations established by federal, state, or local government(s), the stricter of the two standards shall prevail.

2. Invalid Provisions.

If any provision of this Restrictive Covenant and Grant of Easement is held invalid by any Court of competent jurisdiction, invalidity of any such provision shall not affect the validity of any other provisions hereof. Also, such provisions shall continue unimpaired in full force and effect.

3. Amending, Modifying, or Rescinding the Restrictive Covenant.

This Restrictive Covenant and Grant of Easement shall not be amended, modified, or terminated except by a written instrument executed at the time of the proposed amendment, modification, or termination, by and between the Owner, the Director of MDNR-HWP, and the USACE. Within five (5) days of executing an amendment, modification, or termination of this Restrictive Covenant and Grant of Easement, the Owner shall record such amendment, modification, or termination on the appropriate form, with the St. Louis County Recorder of deeds, and within five (5) days thereafter, the Owner shall provide a true copy of the recorded amendment, modification, or termination to the Director of MDNR-HWP, and USACE.

In the event the MDNR or USACE determines that risks posed by the site have substantially changed subsequent to the execution of this Restrictive Covenant and Grant of easement (e.g., contaminant levels at the site change, or cleanup levels change), the agency(ies) may rescind this Restrictive Covenant and Grant of Easement.

5. Written Notice Required.

Written notice as required in the above subsections shall be via Certified, U.S. Mail to the MDNR-HWP and USACE at the following addresses:

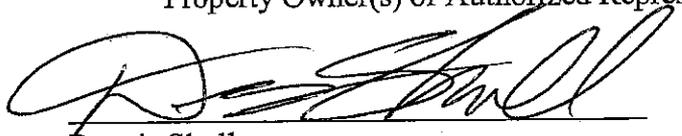
Director
Missouri Department of Natural Resources
Hazardous Waste Program
Director's Office
P.O. Box 176
Jefferson City, MO 65102-0176

Commander
U.S. Army Corps of Engineers
Kansas City District
601 E. 12th Street
Kansas City, Missouri 64106-2896

I. SIGNATURES.

IN WITNESS WHEREOF, the undersigned property Owner or person executing this Restrictive Covenant and Grant of Easement on behalf of the Owner represents and certifies that they are truly authorized and have been fully empowered to execute and deliver this Restrictive Covenant and Grant of Easement.

Property Owner(s) or Authorized Representative(s) thereof:



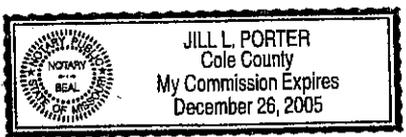
Date: 27 Sep 2004

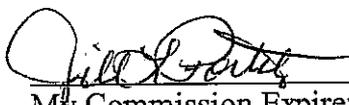
Dennis Shull
Brigadier General (MO), MOARNG
The Adjutant General

STATE OF MISSOURI)
) ss:
COUNTY OF COLE)

Before me, the undersigned, a Notary Public, in and for said County and State, on this ___ day of September, 2004, personally appeared Owner(s) and/or Authorized Agent of Owner(s) State of Missouri, represented by the Brigadier General Dennis Shull, The Adjutant General, Missouri National Guard, to me known to be the identical person who executed the within and foregoing instrument, and acknowledged to me that they executed the same as their free and voluntary act and deed for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I hereunto set my official signature and affixed my notarial seal the day and year last above written.




My Commission Expires: Dec 26, 2005

Attachments

- a. Legal Description of Former Jefferson Barracks Post Dumping Grounds
- b. References
- c. Survey

A PART OF UNITED STATES PRIVATE SURVEY NO. 3344, TOWNSHIP 44 NORTH, RANGE 6 EAST OF THE FIFTH PRINCIPAL MERIDIAN, COUNTY OF ST. LOUIS, STATE OF MISSOURI BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

Commencing at the southwest corner of Lot no. 1 of Sylvan Place Subdivision, Phase II, as recorded in the land records of the County Recorder's Office in plat book no. 332, at page no. 22; thence S 36° 49' 21" E, 515.41 feet along the south line of said subdivision to the southeast corner thereof; thence S 65° 33' 17" E, 3072.72 feet to the TRUE POINT OF BEGINNING:

thence N 08° 43' 01" E, 240.97 feet;
 thence N 10° 22' 50" E, 572.68 feet;
 thence N 13° 01' 59" E, 275.11 feet;
 thence N 17° 56' 57" E, 191.74 feet;
 thence S 80° 47' 06" E, 102.13 feet;
 thence S 71° 06' 07" E, 138.88 feet;
 thence S 14° 30' 26" E, 22.71 feet to the waters edge of the Mississippi River (elevation 374.5, as measured on January 8, 2002); thence along said waters edge the following courses and distances:

S 05° 44' 47" W, 90.99 feet;
 thence S 22° 36' 50" W, 43.35 feet;
 thence N 53° 17' 02" W, 34.31 feet;
 thence S 23° 55' 41" W, 40.63 feet;
 thence S 02° 57' 36" E, 125.30 feet;
 thence S 21° 37' 19" W, 46.24 feet;
 thence S 11° 44' 35" W, 82.25 feet;
 thence S 08° 06' 37" W, 115.11 feet;
 thence S 15° 59' 24" W, 100.59 feet;
 thence S 15° 32' 51" W, 130.51 feet;
 thence S 10° 51' 42" W, 122.32 feet;
 thence S 02° 09' 10" W, 112.87 feet;
 thence S 05° 21' 53" W, 132.41 feet;
 thence S 15° 02' 36" W, 97.28 feet;
 thence S 24° 59' 25" W, 56.09 feet; thence leaving said water's edge, N 72° 38' 46" W, 27.36 feet;
 thence N 72° 38' 46" W, 217.92 feet, containing 7.61 acres, more or less.

Attachment A

8. References:

U.S. Army Corps of Engineers, Kansas City District, 2003, Letter to U.S. Environmental Protection Agency regarding Former Jefferson Barracks Post Dumping Grounds Revetment (Riprap) Project, St. Louis, Missouri, Project Close Out, May. (Document functions as final report.)

TechLaw, Inc., 2002, Oversight of Followup Final Inspection Trip Report No. 2, Jefferson Barracks (ex) Post Dumping Grounds, St. Louis County, Missouri, December.

TechLaw, Inc., 2002, Oversight/Review of Final Inspection Trip Report, Jefferson Barracks (ex) Post Dumping Grounds, St. Louis County, Missouri, March.

U.S. Army Corps of Engineers, Kansas City District, 2001, Memorandum of Agreement (MOA) Between U.S. Army Engineer District, St. Louis and U.S. Army Engineer District, Kansas City, and Missouri Air National Guard for Formerly Used Defense Site Program (FUDS) Former Jefferson Barracks Post Dumping Grounds, St. Louis, Missouri, August.

Earth Tech, 1998, U.S. Army Engineering and Support Center, Huntsville, Action Memorandum, Former Jefferson Barracks, St. Louis County, Missouri, September.

Earth Tech, 1997, U.S. Army Engineering and Support Center, Huntsville, Project Work Plan (Part 1) and Site Safety and Health Plan (Part 2), Engineering Evaluation/Cost Analysis Investigation, Former Jefferson Barracks, St. Louis County, Missouri, October.

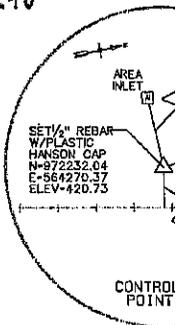
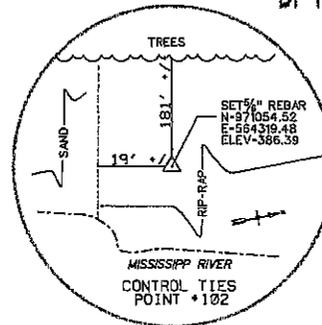
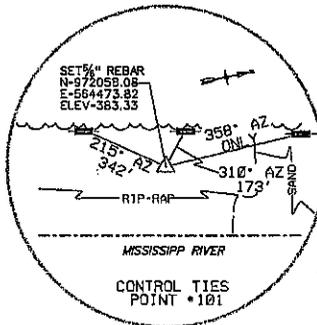
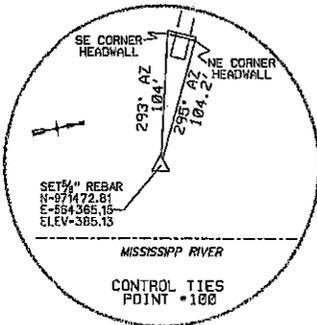
Earth Tech, 1998, U.S. Army Engineering and Support Center, Huntsville, Engineering Evaluation/Cost Analysis, Former Jefferson Barracks, St. Louis County, Missouri, September.

American Technologies, Inc, 1997, Final Report Ordnance Detection and Clearance Contract; prepared for the U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Alabama, June.

U.S. Army Corps of Engineers, St. Louis District, 1994, Ordnance and Explosive Waste Chemical Warfare Material Archives Search Report Conclusions and Recommendations, Jefferson Barracks, St. Louis County, Missouri, Project No. BO7MO014303, October.

U.S. Army Corps of Engineers, Kansas City District, 1990 - DERP FUDS Inventory Project Report for Site No. B07MO014300, Jefferson Barracks, Missouri (Formerly Jefferson Barracks Military Post), May.

Attachment B



LEGAL DESCRIPTION - 7.61 ACRE TRACT

A PART OF UNITED STATES PRIVATE SURVEY NO. 3344, TOWNSHIP 44 NORTH, RANGE 6 EAST OF THE FIFTH PRINCIPAL MERIDIAN, COUNTY OF ST. LOUIS, STATE OF MISSOURI BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

Commencing at the southwest corner of Lot no. 1 of Sylvan Place Subdivision, Phase II, as recorded in the land records of the County Recorder's Office in plat book no. 332, at page no. 22; thence S 36° 49' 21" E, 515.41 feet along the south line of said subdivision to the southeast corner thereof; thence S 65° 33' 17" E, 3072.72 feet to the TRUE POINT OF BEGINNING:

thence N 08° 43' 01" E, 240.97 feet;
 thence N 10° 22' 50" E, 572.68 feet;
 thence N 13° 01' 59" E, 275.11 feet;
 thence N 17° 56' 57" E, 191.74 feet;
 thence S 80° 47' 06" E, 102.13 feet;
 thence S 71° 06' 07" E, 139.88 feet;
 thence S 14° 30' 26" E, 22.71 feet to the waters edge of the Mississippi River (elevation 374.5, as measured on January 8, 2003); thence along said waters edge the following courses and distances:

S 05° 44' 47" W, 90.99 feet;
 thence S 22° 36' 50" W, 43.35 feet;
 thence N 53° 17' 02" W, 34.31 feet;
 thence S 23° 55' 41" W, 40.63 feet;
 thence S 02° 57' 36" E, 125.30 feet;
 thence S 21° 37' 19" W, 46.24 feet;
 thence S 11° 44' 35" W, 82.25 feet;
 thence S 08° 06' 37" W, 115.11 feet;
 thence S 15° 59' 24" W, 100.59 feet;
 thence S 15° 32' 51" W, 130.51 feet;
 thence S 10° 51' 42" W, 122.32 feet;
 thence S 02° 09' 10" W, 112.87 feet;
 thence S 05° 21' 53" W, 132.41 feet;
 thence S 15° 02' 36" W, 97.28 feet;
 thence S 24° 59' 25" W, 56.09 feet; thence leaving said water's edge, N 72° 38' 46" W, 27.36 feet;
 thence N 72° 38' 46" W, 217.92 feet, containing 7.61 acres, more or less.

SURVEY NOTES:

THIS SURVEY CREATES A NEW 7.61 ACRE PARCEL AT THE REQUEST OF THE ST. LOUIS DISTRICT CORPS OF ENGINEERS

MEASURED DIMENSIONS SHOWN WITHOUT PARENTHESES DEED OR RECORD DIMENSIONS SHOWN WITH PARENTHESES

BASIS OF BEARINGS - GRID NORTH ADOPTED FROM PREVIOUS SURVEY BY HANSON ENGINEERS AND SURVEYORS, SUPPLIED BY THE ST. LOUIS DISTRICT CORPS OF ENGINEERS

NO MONUMENTATION WAS SET AT ANY CORNERS OF THE 7.61 ACRE TRACT AT THE REQUEST OF THE ST. LOUIS DISTRICT CORPS OF ENGINEERS

SURVEY CLASS "A" - RURAL

GENERAL NOTES:

VERTICAL DATUM IS BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29).

HORIZONTAL DATUM IS BASED ON THE NORTH AMERICAN DATUM OF 1927 (NAD 27), COORDINATES ARE MISSOURI EAST ZONE STATE PLANE.

WATER SURFACE ELEVATION - 380.0 ON AUGUST 16, 2002
 - 374.5 ON JANUARY 8, 2003

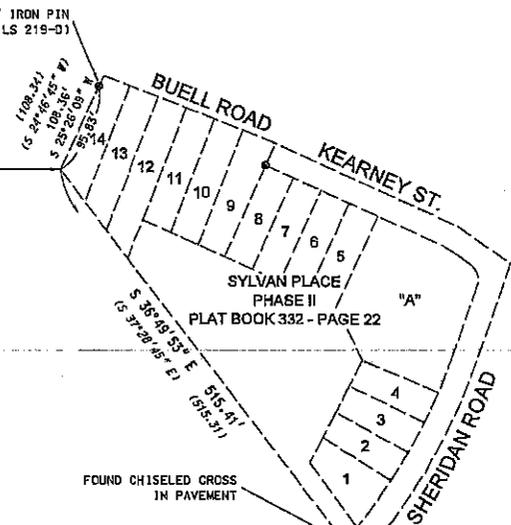
GROUND SURVEYS OF SITE PERFORMED AUGUST 15 & 16, 2002 & JANUARY 8, 2003, BY HANSON ENGINEERS AND SURVEYORS ALL HORIZONTAL AND VERTICAL CONTROL SHOWN WAS SET BY HANSON. THE COORDINATES SHOWN FOR THE CONTROL MONUMENTS WAS ACCEPTED, AND NOT VERIFIED TO PUBLISHED STATE PLANE CONTROL MONUMENTS

HYDROGRAPHIC SURVEYS PERFORMED AUGUST 22, 2002 BY HANSON ENGINEERS AND SURVEYORS. WATER SURFACE ELEVATION - 382.6 ON AUGUST 22, 2002

POINT OF COMMENCEMENT
 S.W. CORNER LOT 14, SYLVAN PLACE SUBDIVISION, PHASE II
 P.B. 332 - PAGE 22

LINE DIMENSION TABLE

NO.	BEARING	DISTANCE
1	N 72° 38' 46" W	27.36'
2	S 80° 47' 06" E	102.13'
3	S 14° 30' 26" E	22.71'
4	S 05° 44' 47" W	90.99'
5	S 22° 36' 50" W	43.35'
6	N 53° 17' 02" W	34.31'
7	S 23° 55' 41" W	40.63'
8	S 21° 37' 19" W	46.24'
9	S 11° 44' 35" W	82.25'
10	S 08° 06' 37" W	115.11'
11	S 15° 59' 24" W	100.59'
12	S 10° 51' 42" W	122.32'
13	S 02° 09' 10" W	112.87'
14	S 15° 02' 36" W	97.28'
15	S 24° 59' 25" W	56.09'



REFERENCES:

PREVIOUS SURVEY BY HANSON ENGINEERS AND SURVEYORS SUPPLIED BY THE ST. LOUIS DISTRICT CORPS OF ENGINEERS

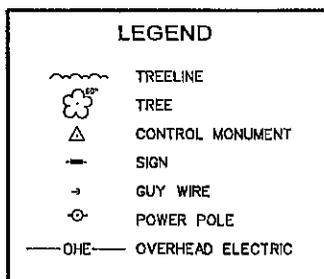
RECORD PLAT OF SYLVAN PLACE SUBDIVISION, PHASE II PLAT BOOK 322 - PAGE 22

FILED FOR RECORD

STATE OF MISSOURI)
 COUNTY OF ST. LOUIS) 88

FILED FOR RECORD THIS _____ DAY OF _____
 AND DULY RECORDED IN BOOK _____ AT PAGE _____

RECORDER, ST. LOUIS COUNTY, MISSOURI



SURVEYOR'S CERTIFICATION

THIS IS TO CERTIFY THAT AT THE REQUEST OF THE ST. LOUIS DISTRICT CORPS OF ENGINEERS, THE TRACT SHOWN HEREON WAS SURVEYED UNDER MY DIRECT SUPERVISION, AND THE RESULTS OF SAID SURVEY ARE REPRESENTED CORRECTLY ON THIS PLAT. SAID SURVEY WAS EXECUTED IN ACCORDANCE WITH THE CURRENT MINIMUM STANDARDS FOR PROPERTY BOUNDARY SURVEYS OF THE MISSOURI DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGY AND LAND SURVEYING. THERE MAY EXIST OTHER DOCUMENTS THAT COULD AFFECT THE TITLE OF WHICH AN ACCURATE AND CURRENT TITLE SEARCH MAY DISCLOSE.

IN WITNESS WHEREOF, I HAVE HEREON SET MY SEAL AND SIGNATURE

THIS 29th DAY OF SEPTEMBER 2003

R. CHRISTOPHER BOERD, LAND SURVEYOR



Appendix D

Inspection Reports

INSPECTORS QUALITY ASSURANCE REPORT (QAR) (ER 1180-1-6)						THE QCR WILL BE ATTACHED TO OR FILED WITH THE QAR			
TO: Jesse Scott, MDNR						REPORT NUMBER: 7- 120209			
PROJECT: Former Jefferson Barracks Post Dumping Grounds, St. Louis, MO Long Term Monitoring – Site Inspection of Riprap						CONTRACT NO: NA			
CONTRACTOR (Or hired labor): NA						WEATHER: Cloudy, Windy and a trace of precipitation			
PORTION OF SCHEDULED DAY SUITABLE FOR OPERATIONS						TEMPERATURE			
Structural Excavation	Borrow Excavation	Embankment	Concrete	Structure	MINIMUM 34	MAXIMUM 43			
HAS ANYTHING DEVELOPED ON THE WORK WHICH MIGHT LEAD TO A CHANGE ORDER OR FINDING OF FACT? <input type="checkbox"/> NO <input type="checkbox"/> YES (Explain)						24 HOUR PRECIPITATION			
						INCHES 0	ENDING .0		
NUMBER OF FEDERAL GOVERNMENT EMPLOYEES						RIVER STAGE			
SUPERVISORY	OFFICE	LAYOUT	INSPECTION 3	TOTAL 3	LABOR	FEET N/A 2.73	TIME 1:00PM		
NUMBER OF NON- FEDERAL GOVERNMENT EMPLOYEES				NUMBER OF SHIFTS <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3					
SUPERVISION 4	SKILLED	LABORERS	TOTAL 4	FROM 1300	TO 1430	FROM	TO	FROM	TO
Attach list of the following if applicable: (a) Major items of equipment either idle or working, and (b) Number and classification of contractor or Government personnel onsite. Note: If the contractor's Quality Control Report (QCR) contains the information it need not be repeated.									
INSPECTION PARTICIPANTS									
a. Art Schuermann, MO Air National Guard					e.				
b. Jesse Scott, MO Department of Natural Resources					f. George Sloan, St. Louis District (Ordnance and Technical Services)				
c. George Tyhurst, Metropolitan Sewer District (MSD)					g. Josephine Newton-Lund, Kansas City District (PM)				
d. John Shrewsbury, Metropolitan Sewer District (MSD)					h.				
WORK PERFORMED TODAY (Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in Table above, if applicable):									
a. Site Inspection of riprap and warning signs by USACE, MOANG, MDNR and EPA					e.				
b.					f.				
c.					g.				
d.					h.				
Days of no work and reasons for same: NA									

Information on progress of work, causes for delays and extent of delays, Plant, material, etc.

Equipment List: NONE

ENG FORM 2538-2 R, May 94 (CIVIL)

Page 1 of 2

CQC INSPECTION PHASES ATTENDED AND INSTRUCTIONS GIVEN

- 1) Prior to the inspection, a safety briefing was given by George Sloan.
- 2) Inspection of riprap. Purpose of site inspection was to observe the condition and effectiveness of the riprap cover that was placed at the site in order to contain potential unexploded ordnance (UXO) items, such as WWI Stokes mortars and rifle grenades. Additionally, warning signs were inspected for any damage.

RESULTS OF QA INSPECTIONS AND TESTS, DEFICIENCIES OBSERVED, ACTIONS TAKEN AND CORRECTIVE ACTION OF CONTRACTOR. INCLUDE COMMENT PERTAINING TO CONTRACTORS CQC ACTIVITIES

- Because the Mississippi River level was at 16.12 feet, only the upper portion was observed.
- Observed no significant degradation or undercutting of the riprap due to the fact that there was additional siltation and continued extensive tree growth on top of riprap (See Attachment 2-photos), since last inspection of December 2, 2008.
- Observed no UXO or ordnance items of any kind.
- Observed the new warning sign that replaced the sign that was damaged last year during the sewer work (See Attachment 2- photos).
- Observed riprap that was installed a year ago by the MSD after a new 54" sewer line was installed. Additional riprap was placed on top of the newly installed sewer line. Riprap was observed to be in good condition. (See Attachment 2- photos)
- MSD officials observed that the CSO (Combined Sewer Overflow) sign was still missing.

ACTIONS TO BE TAKEN:

1. John Shrewsbury will look into the replacement of the missing CSO sign.
2. Art Schuermann will conduct the annual MOANG inspection in Spring 2010 during a low water period.
3. A follow-on land and hydro survey will be conducted by the Kansas City District when the Mississippi River levels are lower.

VERBAL INSTRUCTIONS GIVEN TO CONTRACTOR. (Include names, reaction, remarks)

- NA

CONTROVERSIAL MATTERS IN DETAIL

- NONE.

INFORMATION, INSTRUCTIONS OR ACTIONS TAKEN NOT COVERED IN QCR REPORT OR DISAGREEMENTS

- Attachments 1 and 2 are attached. Attachment 1 is an inspection checklist and Attachment 2 includes site inspection photos.

REMARKS (Include visitors to project and miscellaneous remarks pertinent to work)

SAFETY (Include any infractions of approved safety plan, safety manual or instructions from Government personnel. Specify corrective action taken.)

- No safety infractions or injuries occurred during site inspection.

INSPECTOR'S SIGNATURE	DATE	SUPERVISOR'S INITIALS	DATE
Josephine Newton-Lund, PMP	12/15/2009		

Reverse of ENG FORM 2538-2 R, May94 (CIVIL)

Page 2 of 2

Attachment 1

Site Inspection Checklist

**Annual LTM Site Inspection Supplemental Checklist to Inspectors
Quality Assurance Report (QAR)
Jefferson Barracks Former Post Dumping Grounds MMRP Project,
St. Louis, MO
2 December 2009**

Stone Revetment	
<p>Displacement of Stone</p> <p>Comments: <i>There is no evidence of displaced stone on the upper portion of the site due to a significant amount of sedimentation and vegetative cover. The lower portion of riprap was under water and could not be inspected.</i></p>	<input checked="" type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Significant (UXO/Dump Debris Exposed)
<p>Degradation of Stone</p> <p>Comments: <i>There is no evidence of degraded stone on the upper portion of the site. See above comment.</i></p>	<input checked="" type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Significant (More than 50% Breakdown)
<p>Erosion/Undermining of Stone</p> <p>Comments: <i>There is no evidence of dug stone erosion. See above comments.</i></p>	<input checked="" type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Significant
Warning Signs	
<p>Overall Condition of Signs</p> <p>Comments: <i>Because of the significant amount of vegetative growths one sign is completely surrounded by trees. USACE + MOANS do not plan to cut trees around the sign because there are other warning signs located in visible areas.</i></p>	<input checked="" type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable
<p>Legibility of Signs</p> <p>Comments:</p>	<input checked="" type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable
Miscellaneous Observations	
<p>Comments: <i>Because of the high water conditions, Art Schuurmann will conduct an inspection in the Spring during a low-water period in accordance with the 1999 MOA. Because of the significant amount of tree growth and sedimentation since the riprap was installed in 1999, it is apparent that very little riprap will be exposed and visible for observation in the next few years.</i></p>	

see note below for further discussion

In addition, are no trespassers observed prior to the riprap installation.

the next few years.

Attachment 2- December 2, 2009 Site Inspection Photos



Newly installed warning sign



Extensive tree growth on riprap



Riprap cover that was placed on sewer line by MSD in October 2008



Extensive tree growth on top of riprap

INSPECTORS QUALITY ASSURANCE REPORT (QAR) (ER 1180-1-6)					THE QCR WILL BE ATTACHED TO OR FILED WITH THE QAR				
TO: Jesse Scott, MDNR					REPORT NUMBER: 8- 113010				
PROJECT: Former Jefferson Barracks Post Dumping Grounds, St. Louis, MO Long Term Monitoring – Site Inspection of Riprap					CONTRACT NO: NA				
CONTRACTOR (Or hired labor): NA					WEATHER: Cloudy, Windy and a trace of precipitation				
PORTION OF SCHEDULED DAY SUITABLE FOR OPERATIONS					TEMPERATURE				
Structural Excavation	Borrow Excavation	Embankment	Concrete	Structure	MINIMUM 29	MAXIMUM 50			
HAS ANYTHING DEVELOPED ON THE WORK WHICH MIGHT LEAD TO A CHANGE ORDER OR FINDING OF FACT? <input type="checkbox"/> NO <input type="checkbox"/> YES (Explain)					24 HOUR PRECIPITATION				
					INCHES Trace		ENDING Trace		
NUMBER OF FEDERAL GOVERNMENT EMPLOYEES					RIVER STAGE				
SUPERVISORY	OFFICE	LAYOUT	INSPECTION 3	TOTAL 3	LABOR	FEET N/A 11.8	TIME 1:00PM		
NUMBER OF NON- FEDERAL GOVERNMENT EMPLOYEES				NUMBER OF SHIFTS <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3					
SUPERVISION 2	SKILLED	LABORERS	TOTAL 2	FROM 1300	TO 1430	FROM	TO	FROM	TO
Attach list of the following if applicable: (a) Major items of equipment either idle or working, and (b) Number and classification of contractor or Government personnel onsite. Note: If the contractor's Quality Control Report (QCR) contains the information it need not be repeated.									
INSPECTION PARTICIPANTS									
a. Art Schuermann, MO Air National Guard					e.				
b. Jesse Scott, MO Department of Natural Resources					f. Randy Fraser, St. Louis District (Ordnance and Technical Services)				
c. George Tyhurst, Metropolitan Sewer District (MSD)					g. Josephine Newton-Lund, Kansas City District (PM)				
d.					h.				
WORK PERFORMED TODAY (Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in Table above, if applicable):									
a. Site Inspection of riprap and warning signs by USACE, MOANG, MDNR and EPA					e.				
b.					f.				
c.					g.				
d.					h.				
Days of no work and reasons for same: NA									

Information on progress of work, causes for delays and extent of delays, Plant, material, etc.

Equipment List: NONE

CQC INSPECTION PHASES ATTENDED AND INSTRUCTIONS GIVEN

- 1) Prior to the inspection, a safety briefing was given by Randy Fraser.
- 2) Inspection of riprap. Purpose of site inspection was to observe the condition and effectiveness of the riprap cover that was placed at the site in order to contain potential unexploded ordnance (UXO) items, such as WWI Stokes mortars and rifle grenades. Additionally, warning signs were inspected for any damage.

RESULTS OF QA INSPECTIONS AND TESTS, DEFICIENCIES OBSERVED, ACTIONS TAKEN AND CORRECTIVE ACTION OF CONTRACTOR. INCLUDE COMMENT PERTAINING TO CONTRACTORS CQC ACTIVITIES

- Because the Mississippi River level was at 11.8 feet, only the upper portion was observed.
- Observed no significant degradation or undercutting of the riprap due to the fact that there was additional siltation and continued extensive tree growth on top of riprap (See Attachment 2-Page 3 includes a photo taken during a 2003 inspection and a photo taken of the same view during this inspection), since last inspection of December 2, 2009.
- Observed no UXO or ordnance items of any kind.
- Observed riprap that was installed two years ago by the MSD after a new 54" sewer line was installed. Additional riprap was placed on top of the newly installed sewer line. Riprap was observed to be in good condition. However, significant soil erosion was observed at the outlet (See Attachment 2- photos)
- Observed one of the warning signs that faces towards the river to be surrounded by trees
- George Tyhurst observed that the CSO (Combined Sewer Overflow) sign was still missing.

ACTIONS TO BE TAKEN:

1. George Tyhurst will look into the replacement of the missing CSO sign.
2. Art Schuermann will conduct the annual MOANG inspection in Spring 2011 during a low water period.
3. Art Schuermann and Josephine Newton-Lund will discuss options relative to tree removal around one warning sign

VERBAL INSTRUCTIONS GIVEN TO CONTRACTOR. (Include names, reaction, remarks)

- NA

CONTROVERSIAL MATTERS IN DETAIL

- NONE.

INFORMATION, INSTRUCTIONS OR ACTIONS TAKEN NOT COVERED IN QCR REPORT OR DISAGREEMENTS

- Attachments 1 and 2 are included. Attachment 1 is an inspection checklist and Attachment 2 includes site inspection photos.

REMARKS (Include visitors to project and miscellaneous remarks pertinent to work)

SAFETY (Include any infractions of approved safety plan, safety manual or instructions from Government personnel. Specify corrective action taken.)

- No safety infractions or injuries occurred during site inspection.

INSPECTOR'S SIGNATURE

DATE

SUPERVISOR'S INITIALS

DATE

Josephine Newton-Lund, PMP

12/15/2010

INSPECTORS QUALITY ASSURANCE REPORT (QAR) <i>(ER 1180-1-6)</i>						THE QCR WILL BE ATTACHED TO OR FILED WITH THE QAR					
						REPORT NUMBER: 9- 101311					
TO: Ramona Huckstep, MDNR						DATE: December 16, 2011					
PROJECT: Former Jefferson Barracks Post Dumping Grounds, St. Louis, MO Long Term Monitoring – Site Inspection of Riprap						CONTRACT NO: NA					
CONTRACTOR <i>(Or hired labor)</i> : NA						WEATHER: Sunny					
PORTION OF SCHEDULED DAY SUITABLE FOR OPERATIONS						TEMPERATURE					
Structural Excavation	Borrow Excavation	Embankment	Concrete	Structure	MINIMUM 59		MAXIMUM 75				
HAS ANYTHING DEVELOPED ON THE WORK WHICH MIGHT LEAD TO A CHANGE ORDER OR FINDING OF FACT? <input type="checkbox"/> NO <input type="checkbox"/> YES <i>(Explain)</i>						24 HOUR PRECIPITATION					
						INCHES 0		ENDING 0			
NUMBER OF FEDERAL GOVERNMENT EMPLOYEES						RIVER STAGE					
SUPERVISORY	OFFICE	LAYOUT	INSPECTION 3	TOTAL 3	LABOR	FEET N/A 4.14		TIME 10:00AM			
NUMBER OF NON- FEDERAL GOVERNMENT EMPLOYEES				NUMBER OF SHIFTS <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3							
SUPERVISION 2	SKILLED	LABORERS	TOTAL 2	FROM 1000	TO 1100	FROM	TO	FROM	TO		
Attach list of the following if applicable: (a) Major items of equipment either idle or working, and (b) Number and classification of contractor or Government personnel onsite. Note: If the contractor's Quality Control Report (QCR) contains the information it need not be repeated.											
INSPECTION PARTICIPANTS <table style="width:100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> a. Art Schuermann, MO Air National Guard b. Tiffany Burgess, MO Department of Natural Resources c. Robert "Zeke" Secore, Los Alamos Technical Associates (LATA) d. </td> <td style="width: 50%; vertical-align: top;"> e. Dane Morris, Kansas City District Asst PM f. Josephine Newton-Lund, Kansas City District PM g. h. </td> </tr> </table>										a. Art Schuermann, MO Air National Guard b. Tiffany Burgess, MO Department of Natural Resources c. Robert "Zeke" Secore, Los Alamos Technical Associates (LATA) d.	e. Dane Morris, Kansas City District Asst PM f. Josephine Newton-Lund, Kansas City District PM g. h.
a. Art Schuermann, MO Air National Guard b. Tiffany Burgess, MO Department of Natural Resources c. Robert "Zeke" Secore, Los Alamos Technical Associates (LATA) d.	e. Dane Morris, Kansas City District Asst PM f. Josephine Newton-Lund, Kansas City District PM g. h.										
WORK PERFORMED TODAY <i>(Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in Table above, if applicable:</i>											
<table style="width:100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> a. Site Inspection of tree clearing and sign replacement activities including an inspection of riprap and warning signs by USACE, MOANG, MDNR and LATA, a Corps contractor b. c. d. </td> <td style="width: 50%; vertical-align: top;"> e. f. g. h. </td> </tr> </table>										a. Site Inspection of tree clearing and sign replacement activities including an inspection of riprap and warning signs by USACE, MOANG, MDNR and LATA, a Corps contractor b. c. d.	e. f. g. h.
a. Site Inspection of tree clearing and sign replacement activities including an inspection of riprap and warning signs by USACE, MOANG, MDNR and LATA, a Corps contractor b. c. d.	e. f. g. h.										
Days of no work and reasons for same: NA											

Information on progress of work, causes for delays and extent of delays, Plant, material, etc.

Equipment List: NONE

CQC INSPECTION PHASES ATTENDED AND INSTRUCTIONS GIVEN

- 1) Inspection of tree clearing and warning sign replacement including riprap inspection. Purpose of site inspection was to determine the effectiveness of the tree removal with respect to the legibility of the warning signs. Additionally, the post-removal inspection also served as this project's annual Long-Term Management (LTM) inspection of riprap and warning signs. The purpose of the annual LTM inspections is to observe the condition and effectiveness of the riprap cover that was placed at the site in order to contain potential unexploded ordnance (UXO) items, such as WWI Stokes mortars and rifle grenades. During this inspection and also at a pre-solicitation site visit on 22 March 2011, warning signs were inspected for any damage.

RESULTS OF QA INSPECTIONS AND TESTS, DEFICIENCIES OBSERVED, ACTIONS TAKEN AND CORRECTIVE ACTION OF CONTRACTOR. INCLUDE COMMENT PERTAINING TO CONTRACTORS CQC ACTIVITIES

- In order to take advantage of the low Mississippi River level of 4 feet, the group agreed to cancel the annual LTM inspection scheduled in late November/early December and consider the October 13, 2011 post-tree clearing inspection to also be the annual LTM inspection. The low river level allowed the inspection team to observe almost all of the riprap, which hasn't been able to be done for several years.
- Extensive siltation and debris observed on top of riprap due to months of elevated Mississippi River levels, which averaged between 25-30 feet, due to the 2011 flood.
- Observed no significant degradation or undercutting of the riprap due to the fact that there was additional siltation and continued extensive tree growth on top of riprap (See Attachment 1, which is a summary report prepared by Tiffany Burgess of MDNR and includes photos taken during the post-tree clearing and sign replacement inspection on 13 October 2011).
- Observed no UXO or ordnance items of any kind.

ACTIONS TO BE TAKEN:

-Josephine Newton-Lund will plan next year's annual LTM inspection for November/December 2012.

VERBAL INSTRUCTIONS GIVEN TO CONTRACTOR. (Include names, reaction, remarks)

- NA

CONTROVERSIAL MATTERS IN DETAIL

- NONE.

INFORMATION, INSTRUCTIONS OR ACTIONS TAKEN NOT COVERED IN QCR REPORT OR DISAGREEMENTS

- Attachments 1 and 2 are included. Attachment 1 is a site inspection report prepared by MDNR and Attachment 2 is a USACE field activities Quality Assurance checklist.

REMARKS (Include visitors to project and miscellaneous remarks pertinent to work)

SAFETY (Include any infractions of approved safety plan, safety manual or instructions from Government personnel. Specify corrective action taken.)

- No safety infractions or injuries occurred during site inspection.

INSPECTOR'S SIGNATURE



Josephine Newton-Lund, PMP

DATE

12/16/2011

SUPERVISOR'S INITIALS

DATE

ATTACHMENT 1

Site Inspection Report Prepared by MDNR

Missouri Department of Natural Resources

Hazardous Waste Program Federal Facilities Section Summary Report

The purpose of this report is to summarize the inspection of brush-clearing activities around signs 7-12 at the Jefferson Barracks Post-Dumping Ground Site located in St. Louis, Missouri on Thursday, October 13, 2011. The brush-clearing was done due to vegetative growth obstructing sign visibility from the shoreline. The inspection began at 1000 with introductions and was completed at 1100. Attendees included Dane Morris (USACE), Josephine Newton-Lund (USACE), Art Schuermann (MOANG) and Zeke Secore with LATA (contractor for brush-clearing) and Tiffany Burgess (MDNR FFS).

SIGNS #1-6

Signs 1-6 are located west of the railroad tracks. These signs were not inspected since the purpose of the inspection was to view the adequacy of brush-clearing around signs 7-12. Signs 1-6 were in place at the time of the site inspection but will be inspected during the annual site inspection later this year (late November/early December according to Josephine Newton-Lund).

SIGNS #7-12

According to Josephine Newton-Lund, the contract with LATA specified that brush-clearing around the signs would be 30-feet in front and 15-feet to the sides. The contractor would leave trees greater than 6-inches in diameter in place if the trees did not obstruct the sign's visibility. The contractors cleared the brush from around the signs in order to make them visible from the shoreline. The signs appeared to be in good condition as well. The USACE had signs #8 and #12 replaced due to be missing or damaged. The original sign #8 was still in place next to the new sign and will stay in place but may not withstand the next flood event.

RIP-RAP

During the inspection, river levels were low and exposed a good majority of the rip-rap. The rip-rap appeared to be in good condition. There were portions of the rip-rap not visible, which was likely due to silt deposition during higher river levels. Since the rip-rap was only looked at while walking along the shoreline to view the signage, a more thorough inspection of the rip-rap should be conducted during the annual inspection.

An inspection checklist and map are located in Appendix A of this report. Photographs taken during the inspection are located in Appendix B.

APPENDIX A:
INSPECTION CHECKLIST AND MAP

Jefferson Barracks Former Post-Dumping Grounds

Inspection of Brush-Clearing around Warning Signs 7-12

Date: Thursday, October 13, 2011

Time: 1000-1100

Weather: Overcast, 60's

Conducted by: Tiffany Burgess

Attendees: Dane Morris (USACE), Josephine Newton-Lund (USACE), Art Schuermann (MOANG), Zeke Secore (LATA – contractor)

Warning Signs				
Sign	Location	Visible	Condition	Notes
Sign #1-6	West of RR tracks See attached map	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Good <input type="checkbox"/> Poor <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Did not observe signs 1-6 up-close since the purpose of the site visit was to visually observe the brush clearing around signs 7-12. Signs 1-6 were visible from the railroad tracks and will be inspected during the annual inspection later this year.
Sign #7	East of RR tracks See attached map	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Good <input checked="" type="checkbox"/> Poor <input type="checkbox"/>	According to Josephine Newton-Lund, the clearing dimensions were 30-ft in front and 15-ft around the sides. The brush was cleared from around sign #7, was visible from the shoreline and did not appear damaged.
Sign #8	East of RR tracks See attached map	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Good <input checked="" type="checkbox"/> Poor <input type="checkbox"/>	Sign #8 was replaced due to undercutting and cracking of the concrete base. The original sign was still up next to the new sign and will stay in place. The brush was cleared from around sign #8, was visible from the shoreline and did not appear damaged.
Sign #9	East of RR tracks See attached map	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Good <input checked="" type="checkbox"/> Poor <input type="checkbox"/>	The brush was cleared from around sign #9, was visible from the shoreline and did not appear damaged.
Sign #10	East of RR tracks See attached map	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Good <input checked="" type="checkbox"/> Poor <input type="checkbox"/>	The brush was cleared from around sign #10, was visible from the shoreline and did not appear damaged.
Sign #11	East of RR tracks See attached map	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Good <input checked="" type="checkbox"/> Poor <input type="checkbox"/>	The brush was cleared from around sign #11, was visible from the shoreline and did not appear damaged.
Sign #12	East of RR tracks See attached map	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Good <input checked="" type="checkbox"/> Poor <input type="checkbox"/>	Sign #12 was replaced due to the original sign being missing during the last inspection. The brush was cleared from around sign #12, was visible from the shoreline and did not appear damaged.
Rip-Rap				
During the inspection, river levels were low, which exposed a lot of the rip-rap. The rip-rap was inspected as we walked up the shoreline to view the signs. The rip-rap appeared to be in adequate condition. There were locations where rip-rap was not visible, most likely due to silt deposition during high water levels. A more thorough inspection of the rip-rap will be conducted during the site inspection later this year.				

Jefferson Barracks Post-Dumping Ground Map with Sign Locations

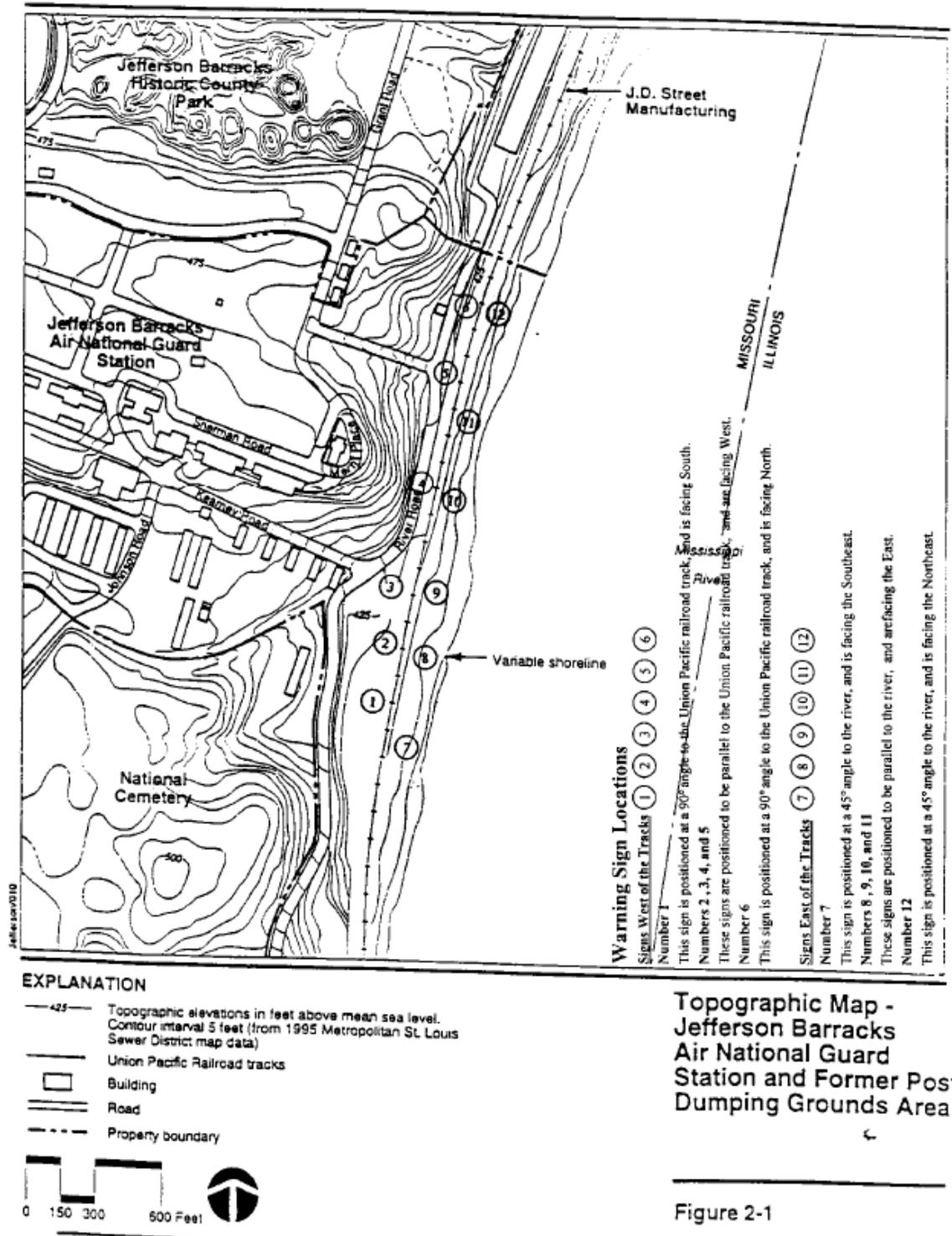


Figure 2-1

Map taken from Tree Removal SOW

APPENDIX B:
PHOTOGRAPHS



Back of sign 7, facing southeast.



Sign 8, facing west. Sign on left is new sign.



Sign 8 facing southwest. Undercutting visible on old sign pad.



Sign 9, facing west.



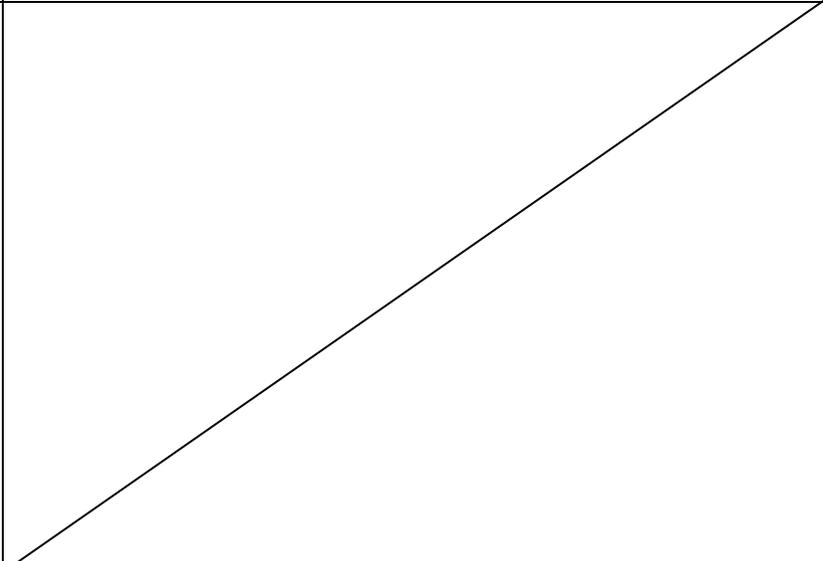
Sign 10, facing west.



Sign 11, facing west.



Sign 12, facing southwest.



Not used.



Signs 1-3, facing southwest.



Signs 4-6, facing northwest.



Beginning of rip-rap, facing east.



Beginning of rip-rap, facing northeast.



Rip-rap, facing north.



Rip-rap, facing south.



End of rip-rap, facing south.



End of rip-rap, facing north.

ATTACHMENT 2

USACE Field Activities Quality Assurance Checklist

**Former Jefferson Barracks Dumping Grounds
Tree Removal**

FIELD ACTIVITIES QA CHECKLIST

<u>Field QA Activity</u>	<u>Yes</u>	<u>No</u>	<u>N/O</u>	<u>N/A</u>
<u>General</u>				
1. Are the Work Plans available onsite?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is the Site Health and Safety Plan available onsite?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Tree and Vegetation Removal</u>				
3. General:				
• Were safety precautions followed using methods and procedures described in the Work Plans?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Was removal equipment appropriate for the purpose and site conditions?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. For vegetation and tree clearance:				
• Was vegetation removal accomplished using methods and procedures described in the Work Plans?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Was vegetation removal accomplished in a consistent, efficient, and systematic manner?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Was the removed vegetation disposed of in accordance with procedures described in the Work Plan?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Sign Replacement</u>				
5. Were signs installed to match existing signs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were signs installed with a 15' radius and 30' corridor in front of the sign clear of brush and vegetation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Documentation</u>				
7. Were field activities being documented during removal activities (photographs, logbooks)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

List any additional or alternate field forms completed:

Other observations:

All signs were visible from the shoreline following the tree and branch removals. However, the type of vegetation that was typically found and removed from areas around the signs were fast growing species, and seedlings were already seen spouting in the area. It is suspected that vegetation growth will again impede the view of the signs from the water in no more than 3 to 6 years. Therefore it will most likely be necessary to exercise the options in the LATA task order. Personnel from both LATA and Davey Tree Service were quick, efficient, responsive, and accommodating during work and site visits.

Corrective actions:

NONE

To be signed by the QA Inspector upon completion of all items on the checklist.

QA Inspector Signature:

A handwritten signature in black ink, appearing to be 'DM' with a stylized flourish.

Dane Morris

Date: 13-October-2011

INSPECTORS QUALITY ASSURANCE REPORT (QAR) <i>(ER 1180-1-6)</i>						THE QCR WILL BE ATTACHED TO OR FILED WITH THE QAR					
						REPORT NUMBER: 10- 110112					
TO: Ramona Huckstep, MDNR						DATE: November 19, 2012					
PROJECT: Former Jefferson Barracks Post Dumping Grounds, St. Louis, MO Long Term Monitoring – Site Inspection of Riprap						CONTRACT NO: NA					
CONTRACTOR <i>(Or hired labor)</i> : NA						WEATHER: Sunny					
PORTION OF SCHEDULED DAY SUITABLE FOR OPERATIONS						TEMPERATURE					
Structural Excavation	Borrow Excavation	Embankment	Concrete	Structure	MINIMUM 37		MAXIMUM 63				
HAS ANYTHING DEVELOPED ON THE WORK WHICH MIGHT LEAD TO A CHANGE ORDER OR FINDING OF FACT? <input type="checkbox"/> NO <input type="checkbox"/> YES <i>(Explain)</i>						24 HOUR PRECIPITATION					
						INCHES 0		ENDING 0			
NUMBER OF FEDERAL GOVERNMENT EMPLOYEES						RIVER STAGE					
SUPERVISORY	OFFICE	LAYOUT	INSPECTION 3	TOTAL 3	LABOR	FEET N/A -0.60		TIME 1:00PM			
NUMBER OF NON- FEDERAL GOVERNMENT EMPLOYEES				NUMBER OF SHIFTS <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3							
SUPERVISION 2	SKILLED	LABORERS	TOTAL 2	FROM 1000	TO 1100	FROM	TO	FROM	TO		
Attach list of the following if applicable: (a) Major items of equipment either idle or working, and (b) Number and classification of contractor or Government personnel onsite. Note: If the contractor's Quality Control Report (QCR) contains the information it need not be repeated.											
INSPECTION PARTICIPANTS <table style="width:100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> a. Art Schuermann, MO Air National Guard b. Ramona Huckstep, MO Department of Natural Resources c. Randy Fraser, St. Louis District d. David Rose, St. Louis District </td> <td style="width: 50%; vertical-align: top;"> e. Josephine Newton-Lund, Kansas City District PM f. g. h. </td> </tr> </table>										a. Art Schuermann, MO Air National Guard b. Ramona Huckstep, MO Department of Natural Resources c. Randy Fraser, St. Louis District d. David Rose, St. Louis District	e. Josephine Newton-Lund, Kansas City District PM f. g. h.
a. Art Schuermann, MO Air National Guard b. Ramona Huckstep, MO Department of Natural Resources c. Randy Fraser, St. Louis District d. David Rose, St. Louis District	e. Josephine Newton-Lund, Kansas City District PM f. g. h.										
WORK PERFORMED TODAY <i>(Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in Table above, if applicable:</i> <table style="width:100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> a. Site Inspection of riprap and warning signs b. c. d. </td> <td style="width: 50%; vertical-align: top;"> e. f. g. h. </td> </tr> </table>										a. Site Inspection of riprap and warning signs b. c. d.	e. f. g. h.
a. Site Inspection of riprap and warning signs b. c. d.	e. f. g. h.										
Days of no work and reasons for same: NA											

Information on progress of work, causes for delays and extent of delays, Plant, material, etc.

Equipment List: NONE

ENG FORM 2538-2 R, May 94 (CIVIL)

Page 1 of 2

CQC INSPECTION PHASES ATTENDED AND INSTRUCTIONS GIVEN

- 1) Prior to the inspection, a safety briefing was given by Randy Fraser.
- 2) Inspection of riprap. Purpose of site inspection was to observe the condition and effectiveness of the riprap cover that was placed at the site in order to contain potential unexploded ordnance (UXO) items, such as WWI Stokes mortars and rifle grenades. Additionally, warning signs were inspected for any damage.

RESULTS OF QA INSPECTIONS AND TESTS, DEFICIENCIES OBSERVED, ACTIONS TAKEN AND CORRECTIVE ACTION OF CONTRACTOR. INCLUDE COMMENT PERTAINING TO CONTRACTORS CQC ACTIVITIES

- The low river level allowed the inspection team to observe almost all of the lower riprap.
- Observed no significant degradation or undercutting of riprap due to extensive siltation and continued tree growth.
- Observed no UXO or ordnance items of any kind.
- Eleven of the twelve warning signs were inspected and found to be in good condition.

ACTIONS TO BE TAKEN:

- Josephine Newton-Lund will plan next year's annual LTM inspection for November/December 2013. The next inspection will be arranged with Major Jennifer Coolidge, who is replacing Art Schuermann due to his upcoming retirement.
- Another site visit has been planned for 27 November 2012 with George Tyhurst of the Metropolitan Sewer District (MSD) and representatives from MSD's design team from Jacobs Engineering. MSD will be constructing a new sewer line west of and adjacent to the Union Pacific Rail Road tracks. The purpose of the site visit is to ensure that the Corps has a full understanding of the work in relation to the former post dumping area. Those planning on attending in addition to the USACE-KC, MSD, and Jacobs Engineering, include MOANG, MDNR, and St. Louis District.

VERBAL INSTRUCTIONS GIVEN TO CONTRACTOR. (Include names, reaction, remarks)

- NA

CONTROVERSIAL MATTERS IN DETAIL

- NONE.

INFORMATION, INSTRUCTIONS OR ACTIONS TAKEN NOT COVERED IN QCR REPORT OR DISAGREEMENTS

- Attachments 1 includes photos of the site inspection. Attachment 2 is a USACE field activities Quality Assurance checklist.

REMARKS (Include visitors to project and miscellaneous remarks pertinent to work)

SAFETY (Include any infractions of approved safety plan, safety manual or instructions from Government personnel. Specify corrective action taken.)

- No safety infractions or injuries occurred during site inspection.

INSPECTOR'S SIGNATURE



Josephine Newton-Lund, PMP

DATE

11/19/2012

SUPERVISOR'S INITIALS

DATE

Reverse of ENG FORM 2538-2 R, May94 (CIVIL)

Page 2 of 2

ATTACHMENT 1

Site Inspection Photos

November 1, 2012 Site Inspection Photos



Lower riprap area looking east with barge in the background
photos courtesy of Ramona Huckstep, MDNR



Lower riprap area looking northeast



Replacement warning sign on left. Older warning sign still stands even though base has eroded.



Extensive siltation and vegetation



Extensive siltation and vegetation



Riprap looking north

ATTACHMENT 2

USACE Field Activities Quality Assurance Checklist

**Annual LTM Site Inspection Supplemental Checklist to Inspectors
Quality Assurance Report (QAR)
Jefferson Barracks Former Post Dumping Grounds MMRP Project,
St. Louis, MO
1 November 2012**

Stone Revetment	
<p>Displacement of Stone</p> <p>Comments: <i>There is no evidence of displaced stone due to a significant amount of sedimentation and vegetative cover.</i></p>	<p><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> Minor</p> <p><input type="checkbox"/> Significant (UXO/Dump Debris Exposed)</p>
<p>Degradation of Stone</p> <p>Comments: <i>There is no evidence of degraded stone.</i></p>	<p><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> Minor</p> <p><input type="checkbox"/> Significant (More than 50% Breakdown)</p>
<p>Erosion/Undermining of Stone</p> <p>Comments: <i>There is no evidence of stone erosion.</i></p>	<p><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> Minor</p> <p><input type="checkbox"/> Significant</p>
Warning Signs	
<p>Overall Condition of Signs</p> <p>Comments:</p>	<p><input checked="" type="checkbox"/> Acceptable</p> <p><input type="checkbox"/> Unacceptable</p>
<p>Legibility of Signs</p> <p>Comments: <i>Due to last year's tree clearing and sign replacement work, warning signs were observed to be adequately visible from the river and railroad tracks.</i></p>	<p><input checked="" type="checkbox"/> Acceptable</p> <p><input type="checkbox"/> Unacceptable</p>
Miscellaneous Observations	
<p>Comments: <i>None</i></p>	

INSPECTORS QUALITY ASSURANCE REPORT (QAR)						THE QCR WILL BE ATTACHED TO OR FILED WITH THE QAR			
<i>(ER 1180-1-6)</i>						REPORT NUMBER: 11- 120313			
TO: Ramona Huckstep, MDNR						DATE: December 3, 2013			
PROJECT: Former Jefferson Barracks Post Dumping Grounds, St. Louis, MO						CONTRACT NO: NA			
Long Term Monitoring – Site Inspection of Riprap						WEATHER: Partly Sunny			
CONTRACTOR (Or hired labor): NA									
PORTION OF SCHEDULED DAY SUITABLE FOR OPERATIONS						TEMPERATURE			
Structural Excavation	Borrow Excavation	Embankment	Concrete	Structure	MINIMUM 46		MAXIMUM 60		
HAS ANYTHING DEVELOPED ON THE WORK WHICH MIGHT LEAD TO A CHANGE ORDER OR FINDING OF FACT? <input type="checkbox"/> NO <input type="checkbox"/> YES (Explain)						24 HOUR PRECIPITATION			
						INCHES 0		ENDING 0	
NUMBER OF FEDERAL GOVERNMENT EMPLOYEES						RIVER STAGE			
SUPERVISORY	OFFICE	LAYOUT	INSPECTION 3	TOTAL 3	LABOR	FEET N/A 0.15		TIME 1:00PM	
NUMBER OF NON- FEDERAL GOVERNMENT EMPLOYEES				NUMBER OF SHIFTS <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3					
SUPERVISION 1	SKILLED	LABORERS	TOTAL 1	FROM 1300	TO 1430	FROM	TO	FROM	TO
Attach list of the following if applicable: (a) Major items of equipment either idle or working, and (b) Number and classification of contractor or Government personnel onsite. Note: If the contractor's Quality Control Report (QCR) contains the information it need not be repeated.									
INSPECTION PARTICIPANTS									
a. LT Star Loftus, MO Air National Guard					e.				
b. Ramona Huckstep, MO Department of Natural Resources					f.				
c. David Rose, St. Louis District					g.				
d. Josephine Newton-Lund, KC District PM					h.				
WORK PERFORMED TODAY (Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in Table above, if applicable:									
a. Site Inspection of riprap and warning signs					e.				
b.					f.				
c.					g.				
d.					h.				
Days of no work and reasons for same: NA									

Information on progress of work, causes for delays and extent of delays, Plant, material, etc.

Equipment List: NONE

CQC INSPECTION PHASES ATTENDED AND INSTRUCTIONS GIVEN

- 1) Prior to the inspection, a safety briefing was given by David Rose, who instructed participants not to pick up anything and to be careful not to slip and fall on the riprap.
- 2) Inspection of riprap. Purpose of site inspection was to observe the condition and effectiveness of the riprap cover that was placed at the site in order to contain potential unexploded ordnance (UXO) items, such as WWI Stokes mortars and rifle grenades. Additionally, warning signs were inspected for any damage and tree/vegetation obstructions.

RESULTS OF QA INSPECTIONS AND TESTS, DEFICIENCIES OBSERVED, ACTIONS TAKEN AND CORRECTIVE ACTION OF CONTRACTOR. INCLUDE COMMENT PERTAINING TO CONTRACTORS CQC ACTIVITIES

- The low river level allowed the inspection team to observe a majority of the lower riprap.
- Observed no significant degradation or undercutting of riprap due to extensive siltation and continued tree growth.
- Observed no UXO or ordnance items of any kind.
- The twelve warning signs were inspected and found to be in good condition and visible from the railroad and river.

ACTIONS TO BE TAKEN:

- Josephine Newton-Lund will plan next year's annual LTM inspection for the same time next year (November/December 2014).
- Another site visit will be planned for 28 January 2014 with Dan Mroz of the KC District who will be leading the second 5-year review effort. The second 5-year report will be due by September 2014. The purpose of the site visit is for Dan Mroz to familiarize himself with the project site.
- LT Loftus will check the location of the spare warning signs that were manufactured back in 1999 by MOANG. She believes they are in the basement of Building 65.
- George Tyhurst of the Metropolitan Sewer District (MSD) was unable to participate but informed USACE that the new sewer line/tunnel project is being designed with construction planned two to four years out.

VERBAL INSTRUCTIONS GIVEN TO CONTRACTOR. (Include names, reaction, remarks)

- NA

CONTROVERSIAL MATTERS IN DETAIL

- NONE.

INFORMATION, INSTRUCTIONS OR ACTIONS TAKEN NOT COVERED IN QCR REPORT OR DISAGREEMENTS

- Attachments 1 includes photos of the site inspection. Attachment 2 is a USACE field activities Quality Assurance checklist.

REMARKS (Include visitors to project and miscellaneous remarks pertinent to work)

SAFETY (Include any infractions of approved safety plan, safety manual or instructions from Government personnel. Specify corrective action taken.)

- No safety infractions or injuries occurred during site inspection.

INSPECTOR'S SIGNATURE



Josephine Newton-Lund, PMP

DATE

12/9/2013

SUPERVISOR'S INITIALS

DATE

ATTACHMENT 1

Site Inspection Photos

December 3, 2013 Site Inspection Photos



Lower riprap looking north-extensive siltation
photos courtesy of Ramona Huckstep, MDNR



Lower riprap area looking southeast- extensive siltation



Looking west at upper riprap- extensive vegetation



Looking east at Mississippi River- lower riprap



Looking south- lower riprap



One of the six warning signs on the west side of the railroad tracks

ATTACHMENT 2

USACE Field Activities Quality Assurance Checklist

**Annual LTM Site Inspection Supplemental Checklist to Inspectors
Quality Assurance Report (QAR)
Jefferson Barracks Former Post Dumping Grounds MMRP Project,
St. Louis, MO
3 December 2013**

Stone Revetment	
<p>Displacement of Stone</p> <p>Comments: <i>There is no evidence of displaced riprap due to a significant amount of sedimentation and tree cover.</i></p>	<p><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> Minor</p> <p><input type="checkbox"/> Significant (UXO/Dump Debris Exposed)</p>
<p>Degradation of Stone</p> <p>Comments: <i>There is no evidence of degraded stone.</i></p>	<p><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> Minor</p> <p><input type="checkbox"/> Significant (More than 50% Breakdown)</p>
<p>Erosion/Undermining of Stone</p> <p>Comments: <i>There is no evidence of stone erosion</i></p>	<p><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> Minor</p> <p><input type="checkbox"/> Significant</p>
Warning Signs	
<p>Overall Condition of Signs</p> <p>Comments: <i>No damage observed.</i></p>	<p><input checked="" type="checkbox"/> Acceptable</p> <p><input type="checkbox"/> Unacceptable</p>
<p>Legibility of Signs</p> <p>Comments: <i>Warning signs are adequately visible from the river and railroad tracks. Tree growth since the 2011 tree clearing event are not high enough to obstruct visibility.</i></p>	<p><input checked="" type="checkbox"/> Acceptable</p> <p><input type="checkbox"/> Unacceptable</p>
Miscellaneous Observations	
<p>Comments: <i>Another tree clearing event will be scheduled in 2015. An option for another event is on contract and is expected to be awarded the first quarter of Fiscal Year 2015.</i></p>	

Appendix E

Public Notice

PUBLIC NOTICE

A SECOND FIVE-YEAR REVIEW IS BEING CONDUCTED AT THE FORMER JEFFERSON BARRACKS POST DUMPING GROUNDS SITE, ST. LOUIS COUNTY, MISSOURI

The U.S. Army Corps of Engineers, Kansas City District is conducting the second five-year review for the former Jefferson Barracks Post Dumping Grounds Military Munitions Response Program Site. The first five-year review was completed in August 2009. Jefferson Barracks was established in 1826 as a garrison for U.S. Army infantry units. From 1826 to 1946, portions of Jefferson Barracks riverfront property were used for waste disposal, including World War I-era military munitions, such as mortar rounds. The approximately 10-acre area on the Mississippi River water front is now referred to as the former Jefferson Barracks Post Dumping Grounds Site. The selected remedy for the site, which was implemented in 1999, includes land use controls consisting of the installation of riprap (riprap is a material consisting of stone or crushed rock, which is placed along shorelines to protect against erosion) at the former dump area and posting of warning signs.

What is the purpose of a five-year review?

The purpose of a five-year review is to determine if the remedy is protecting human health and the environment. The five-year review report documents the methods, findings, conclusions and any recommendations of the review which includes a visual site inspection of the remedies in place.

Why is a five-year review being done for this site?

Conducting this five-year review of the remedy is required by law because military munitions may remain at the former Jefferson Barracks Post Dumping Grounds site which may endanger human health and safety. It is required by law for the USACE to conduct reviews of these types of sites beginning five years following the installation of the remedy at a site. USACE will continue to conduct reviews and issue a report every five years or as needed.

The Administrative Record contains all the relevant cleanup documents for this site and is available at the following location during normal business hours:

Jefferson Barracks Air National Guard Station
Missouri Air National Guard
Environmental Management Office
157th Air Operations Group
65 Kearney Street
St. Louis, Missouri 63125
(314) 527-8369
Point of Contact:
Lt. Star Loftus
star.loftus@ang.af.mil

Relevant cleanup documents pertaining to this site may also be viewed at:
<http://www.dnr.mo.gov/env/hwp/fedfac/ffs-dod.htm#jeff-barracks-fud>

Questions or requests for information can be submitted to:

Josephine Newton-Lund,
PMP - Senior Project Manager
601 East 12th Street
Kansas City, MO 64106
(816) 389-3912
Josephine.M.Newton-Lund@usace.army.mil

David S. Kolarik
Chief, Public Affairs
601 East 12th Street
Kansas City, MO 64106
(816) 389-3072
David.S.Kolarik@usace.army.mil

ST. LOUIS POST-DISPATCH

St. Charles County and Illinois Suburban Journals

AFFIDAVIT OF PUBLICATION

Josephine Newton-Lund, PMP - Senior Project Manager - Environmental Branch
U.S. Army Corps of Engineers, Kansas City District
601 East 12th Street/CENWK-PM-ES
Kansas City, MO 64106

Ad #: 1867921-00

THE ATTACHED ADVERTISEMENT WAS PUBLISHED
In the St. Louis Post-Dispatch and online STLToday.com on the following dates:
February 19, 2014

Cynthia L. Alderton

Cynthia L. Alderton
COMPANY REPRESENTATIVE

SWORN TO AND SUBSCRIBED BEFORE ME
THIS February 19, 2014.

Beth A Bradley
NOTARY PUBLIC, CITY OF ST. LOUIS

BETH A. BRADLEY
Notary Public, Notary Seal
State of Missouri
St. Louis City
Commission # 10991746
My Commission Expires July 01, 2014

Appendix F

Reference List

Reference List

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U. S. Army Corps of Engineers, 2009b, *Inspectors Quality Assurance Report (QAR) (ER 1180-1-6)*. December.

Reference List (continuation)

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Appendix G

Site Inspection Photo Log

Photo 1. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Entry gate to the Former Post Dumping Ground Site. Locked chain-linked fence topped with multiple strands of barbed wire. View is to the west.



Description: Warning Sign No. 3, located at the end of the entry road depicted in Photo 1; note railroad tracks running parallel to river located directly behind sign; the top portion of Sign #9 is visible just above the RR tracks and to the left of Sign #3.



Description: Close-up of Warning Sign No. 3.

Photo 4. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is to the south after having walked southward from Warning Sign No. 3; Warning Sign No. 2 is in foreground (backside); Warning Sign no. 1 is visible in the distant center-background (back side of sign).

Photo 5. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is to the east, from east-side of railroad tracks; Warning Sign No. 8 is visible; the original Warning Sign No. 8 is severely undercut and its replacement has already been erected; riprap is visible between the river and the tree line.

Photo 6. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Panoramic (photo 2 of 2) scanning right to left from starting point of Photo No. 5.



Description: Warning Sign No. 1, located at south end of Site, west of the railroad tracks; weathering of the “DANGER” portion of the warning sign is evident.



Description: Warning Sign No. 7, located at south end of Site, east of the railroad tracks; view is generally to the north.

Photo 9. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Warning Sign No. 7 (facing southward); view is generally to the east; the southern extent of placed riprap is visible at center-right of photo.

Photo 10. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Zoomed photo of riprap as taken from vantage point of Warning Sign No. 7.

Photo 11. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is towards the west (toward railroad tracks) as taken from a location believed to have been between warning signs #7 and #8, near top of escarpment; however, upon close inspection of the photo, a warning sign is visible near the center top of photo, and based upon the sign's orientation and placement on the east side of railroad tracks, it appears likely to be Warning Sign No. 7 – which would mean that the subject matter of this photo is beyond (south) of where riprap had been placed. Also present in the photo is what appears to be a metal manhole structure located approximately right of center. A vertical erosion face is present along the center of the photo as tree roots are visible. No evidence of post dumping was observed at the erosion face.

Photo 12. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Panoramic photo, taken from vantage point of Photo No. 11, panning to the right.

Photo 13. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Zoomed photo of tree root mass which is located approximately in the center of Photo No. 12.

Photo 14. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Riprap as viewed to the north from a location between warning signs #7 and #8; note the presence of sediment.

Photo 15. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is towards the north and is focused upon an area where sediment is a more predominant feature; subject matter is the center left edge of Photo No. 14.

Photo 16. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is towards the west, looking at Warning Sign No. 8. Note that the right sign has been severely undercut and its replacement has been erected in close proximity. Riprap is present.

Photo 17. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is towards the east as taken from the vantage point of Photo No. 16.

Photo 18. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Significant erosion, located between warning signs #8 and #9; depth of erosion estimated at between 4 to 5 ft.; sidewalls did not exhibit rip-rap; length is estimated at 12 to 15 ft; large tree trunk is present in the eroded area.

Photo 19. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Subject is eroded area depicted in Photo No. 18, view is to the west – towards the escarpment; riprap is present in area between escarpment and the eroded area.

Photo 20. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Erosion ravine (subject of Photos #18 and #19); looking west towards escarpment. Note the riprap present near top of escarpment; possible undercutting depicted in photo, just above mid-photo, left-half.

Photo 21. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Warning Sign No. 8 (center top), as viewed from the eroded area depicted by photos #18, #19 and #20.

Photo 22. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is towards the north, taken from an area apparently having more sediment than adjacent area as riprap is not as predominant on the surface. USACE PM states that this area had received placement of riprap. Location is north of the erosion channel, between warning signs #8 and #9. Panoramic photo 1 of 2.

Photo 23. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Panoramic (left to right) from vantage point of Photo #22 (panoramic 2 of 2).

Photo 24. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is to the north, as taken at river's edge from a location north of Photo No. 23; panoramic photo 1 of 2, panning to the left (north to west).

Photo 25. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Panoramic photo 2 of 2, panning to the west from vantage of Photo No. 24.

Photo 26. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is to the south, taken from the vantage point of Photo No. 25.

Photo 27. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Continuation of panoramic of photo #26, panning from looking south along the river towards looking westward toward the escarpment. Warning Sign No. 8 (paired with its replacement sign) is visible just left of center, and the erosion channel depicted in photos #18 through #20 is believed to be located at center-right.

Photo 28. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Storm drain outfall, believed to be in alignment with Kearney Street.

Photo 29. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Drainage way from the outfall depicted in Photo No. 28, lined with stone.

Photo 30. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Drainage ditch depicted in Photo No. 29.

Photo 31. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Warning Sign believed to be #9, taken from a location north of where photos #32 through #35 were taken.

Photo 32. Jefferson Barracks



Description: Zoomed photo of suspected Warning Sign No. 9.

Photo 33. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is northwest, from a location between signs #9 and #10.

Photo 34. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is northwest, further northward from location of Photo No. 34. The warning sign visible in the center of the photo (above the riprap) is believed to be Warning Sign No. 10.

Photo 35. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Panoramic from location of Photo No. 34, panning northward. What is believed to be Warning Sign No. 10 is located at the top left of the photo.

Photo 36. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Warning Sign believed to be No. 11 is visible at center of photo; train is visible behind the sign.

Photo 37.



Description: Zoomed image of warning sign depicted by Photo No. 36.

Photo 38. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Photo taken from an area that has less visible surface riprap than adjacent and surrounding area – view is to the north; Photo No. 39 is a second photo taken from this location, which is panned towards the river (eastward).

Photo 39. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Second photo taken from location of Photo 38, the camera has been panned towards the river (eastward); surface riprap is more abundant between camera location and the river.

Photo 40. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is to the south; taken from beyond the northern boundary of the area which received rip-rap; first of three panoramic photos taken (photos 40, 41, 42) which has the camera panning to the west (towards the escarpment).

Photo 41. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Second of three panoramic photos taken (photos 40, 41, 42) – view is generally south-southwest as taken from the vantage point of Photo No. 40; camera is panning to the west (towards the escarpment). Warning Sign believed to be No. 12 is visible (circled) in the upper right quadrant of photo.

Photo 42. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Third of three panoramic photos taken (photos 40, 41, 42) – view is generally south-southwest as taken from the vantage point of Photo No. 40; camera is panning to the west (towards the escarpment). Warning Sign believed to be No. 12 is visible (circled) in the upper left quadrant of photo.

Photo 43. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Zoomed view of Photo No. 42 – view is generally south-southwest as taken from the vantage point of Photo No. 40; this is the northern extent of placed riprap.

Photo 44. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is to the northwest as taken from the northern limits of placed riprap; subject of photo is the storm water outfall which is centrally located in the photo.

Photo 45. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Warning Sign No. 6; view is towards the south.

Photo 46.



Description: Backside of Warning Sign No. 6

Photo 47. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Warning Sign No. 5, located on east side of railroad tracks.

Photo 48.



Description: Backside of Warning Sign No. 5.

Photo 49. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: View is towards the north, as taken from the vantage point of Warning Sign No. 5; the backside of Warning Sign No. 6 is visible at center of photo. Note chain link security fence topped with barbed wire situated west of the railroad tracks.

Appendix H

Interview and Inspection Forms

INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

<u>Josephin Newton-Lund</u>	<u>Project Manager</u>	<u>USACE Kansas City</u>	<u>11 March 2014</u>
Name	Title/Position	Organization	Date

<u>Lt. Loftus</u>	<u>Acting Environmental Facility Manager</u>	<u>MO Air National Guard</u>	<u>11 March 2014</u>
Name	Title/Position	Organization	Date

_____	_____	_____	_____
Name	Title/Position	Organization	Date

_____	_____	_____	_____
Name	Title/Position	Organization	Date

_____	_____	_____	_____
Name	Title/Position	Organization	Date

_____	_____	_____	_____
Name	Title/Position	Organization	Date

INTERVIEW RECORD

Site Name: Former Jefferson Barracks Post Dumping Ground		EPA ID No.:	
Subject: 2 nd Five Year Review Report		Time:	Date: 3/11/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit:			
Contact Made By:			
Name: Daniel Mroz		Title: Environmental Engineer	Organization: USACE, KCD
Individual Contacted:			
Name: Josephine Newton-Lund		Title: Sr. Project Manager	Organization: USACE, KCD
Telephone No: 816-389-3912		Street Address: 610 East 12 th Street	
Fax No:		City, State, Zip: Kansas City, MO 64106	
E-Mail Address:			
Summary Of Conversation			
{See attached email record of questions asked and responses}			

Mroz, Daniel L NWK

From: Newton-lund, Josephine M NWK
Sent: Tuesday, March 11, 2014 2:27 PM
To: Mroz, Daniel L NWK
Subject: RE: Jefferson Barracks FYR - Interview Question(s) for YOU (UNCLASSIFIED)
Attachments: jb appendix C 2014.doc

Classification: UNCLASSIFIED
Caveats: NONE

Dan: My answers to your questions are below.

Josephine

Josephine Newton-Lund, PMP
Senior Project Manager
Environmental Branch
U.S. Army Corps of Engineers, Kansas City District
601 East 12th Street/CENWK-PM-ES
Kansas City, MO 64106
816-389-3912
816-289-1420 (cell)
816-392-7936 (blackberry)

-----Original Message-----

From: Mroz, Daniel L NWK
Sent: Tuesday, March 11, 2014 10:39 AM
To: Newton-lund, Josephine M NWK
Cc: Mroz, Daniel L NWK
Subject: Jefferson Barracks FYR - Interview Question(s) for YOU (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Josephine,

The following are my interview questions to you as the PM of the Site. If permitted, my intention is to insert your responses into the text of the appropriate section of the FYR rpt.

The Action Memorandum states in Section 8.0, Description of the Selected Remedy: "The posting of warning signs and installation of riprap is planned for a 10-year period. It is assumed that 24 signs and 12 posts will be replaced every 10 years at a rate of 2.4 signs and 1.2 posts per year. Annual maintenance of 5 percent is estimated for the riprap installation."

Q1.1. Does the FUDS program establish/commit funds on an annual basis in accordance with this requirement? Yes. The FUDS program has had an established budget of \$12,500 a year for long-term management activities that include an annual site inspection of riprap and signs. When maintenance issues do arise, funds have been programmed to address the problems. For instance, in 2011, it was observed that vegetation was blocking the view of six warning signs facing the Mississippi River. Also, warning sign #8 was close to being washed away. Funds were programmed in FY11 for the award of a task order for tree-clearing activities and sign relocation. Additionally, when the remedy was implemented in 1999, the Missouri Air National Guard manufactured extra warning signs for future replacement.

Q1.2. What level of funding is required to meet the riprap annual maintenance of 5 percent? Initial funding of \$12,500 was established after the remedy was implemented in 1999.

Beginning in FY15, \$15,000 has been budgeted for long-term maintenance activities.

Q1.3. What annual maintenance expenditures have occurred during the past 5-yrs? \$12,500 annually has been expended for long-term maintenance activities that includes annual site inspections, Quality Assurance Report writing, and ongoing communications with stakeholders to include Missouri National Air Guard and the Metropolitan Sewer District. In 2011, \$13,735 was expended for tree and brush clearing in front of 6 warning signs and the relocation of Sign #8 to a higher elevation.

Q1.4. What process is used to obtain O&M funds in a given year if funding is not committed at the beginning of the FY? A funds request by the Project Manager is sent to the FUDS Program Manager, who reallocates funding for the unplanned O&M requirement.

The Memorandum of Agreement (MOA), signed Aug 2001, states that NWK is responsible for maintaining a current Point of Contact (POC) list (as is provided in Appendix C of the MOA).

Q2.1. Is such a POC list maintained? If so, please provide a copy for inclusion into the FYR rpt. Yes. See attached. I updated it today with LT Loftus' info.

The MOA states that NWK is responsible for the coordination and performance of a five year review that will include a complete survey of the revetment site to determine if any actions are necessary to restore the site to "as-built" conditions. This review shall begin five years after the signed Action Memorandum dated 23 Oct 1998. The last topographic survey was conducted on April 28 and 29, 2009. The last hydrographic survey was conducted on March 11, 2009.

Q3.1. what is the interpretation/meaning of this responsibility? Is this interpreted to mean that the described survey is to be completed one time only, or is this a recurring responsibility to be conducted on a recurring five year basis? When the MOA was developed, conducting a topographic survey was considered to be a reoccurring action as necessary every five years.

Q4.1. Are you aware of any recurring trespassing problems at the Site? No. Trespassing was a frequent problem prior to the installation of riprap in 1999. Since riprap installation, there has been no evidence of trespassing observed during site inspections.

Thanks. Feel free to discuss any aspect of these questions - I will likely be in Mtg room 445 the remainder of the day (connected to the NWK intranet) if I am not at my duty station/cubicle.

Daniel L. Mroz
U.S. Army Corps of Engineers
Kansas City District
816-389-3787 (office)
daniel.l.mroz@usace.army.mil

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

INTERVIEW RECORD

Site Name: Former Jefferson Barracks Post Dumping Ground		EPA ID No.:	
Subject: 2 nd Five Year Review Report		Time: ~1315	Date: 3/11/14
Type: <input checked="" type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other Location of Visit:		<input type="checkbox"/> Incoming <input checked="" type="checkbox"/> Outgoing	
Contact Made By:			
Name: Daniel Mroz		Title: Environmental Engineer	Organization: USACE, KCD
Individual Contacted:			
Name: Lt Loftus		Title: Acting Environmental Facility Manager	Organization: Missouri Air National Guard
Telephone No: 314-527-7000		Street Address:	
Fax No:		City, State, Zip:	
E-Mail Address:			
Summary Of Conversation			
To Lt. Loftus's knowledge, there have been no trespassing problems identified/reported during the past five years;			
Adjacent landowners/tenants have not raised issues/questions concerning the Site; the MOANG is working on transferring land "to the east" back to the State.			
Lt. Loftus was not aware of the MOANG responsibility to conduct at a min. twice per year inspections of the Site; the MOA and Action Memorandum were requested and provided; Lt. Loftus discussed that it would be best to have a flexible schedule for conducting the inspections			
Overall Installation security is provided by a private contractor; Installation Civil Engineering is responsible for conducting inspections of the Installation perimeter fencing			
No OE has been found at the Site during the past five years.			

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION													
Site name: <u>Former Jefferson Barracks Post Dumping Ground</u>	Date of inspection: <u>1/28/2014</u>												
Location and Region: <u>St Louis, MO; EPA 7</u>	EPA ID: <u>FUDS # B07M00143</u>												
Agency, office, or company leading the five-year review: <u>USACE, KCD</u>	Weather/temperature: <u>≈ 25°F; clear sky; calm wind</u>												
Remedy Includes: (Check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____ </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls </td> </tr> </table>		<input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	<input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls										
<input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	<input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls												
Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input checked="" type="checkbox"/> Site map attached													
II. INTERVIEWS (Check all that apply)													
1. O&M site manager _____ <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 30%; text-align: center;">Name</td> <td style="width: 30%; text-align: center;">Title</td> <td style="width: 40%; text-align: center;">Date</td> </tr> <tr> <td colspan="3"> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ </td> </tr> <tr> <td colspan="3"> Problems, suggestions; <input type="checkbox"/> Report attached _____ </td> </tr> <tr> <td colspan="3"> _____ </td> </tr> </table>		Name	Title	Date	Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____			Problems, suggestions; <input type="checkbox"/> Report attached _____			_____		
Name	Title	Date											
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____													
Problems, suggestions; <input type="checkbox"/> Report attached _____													

2. O&M staff _____ <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 30%; text-align: center;">Name</td> <td style="width: 30%; text-align: center;">Title</td> <td style="width: 40%; text-align: center;">Date</td> </tr> <tr> <td colspan="3"> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ </td> </tr> <tr> <td colspan="3"> Problems, suggestions; <input type="checkbox"/> Report attached _____ </td> </tr> <tr> <td colspan="3"> _____ </td> </tr> </table>		Name	Title	Date	Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____			Problems, suggestions; <input type="checkbox"/> Report attached _____			_____		
Name	Title	Date											
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____													
Problems, suggestions; <input type="checkbox"/> Report attached _____													

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	O&M Documents <input type="checkbox"/> O&M manual <input checked="" type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs Remarks <u>Retrieved from the FUDS Record Management Database (FRMD)</u>	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A
2.	Site-Specific Health and Safety Plan <input type="checkbox"/> Contingency plan/emergency response plan Remarks <u>Did Not Review</u>	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
3.	O&M and OSHA Training Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
4.	Permits and Service Agreements <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits _____ Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
5.	Gas Generation Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
6.	Settlement Monument Records Remarks <u>A topographic resurvey is required to be conducted every 5 yrs.</u>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
7.	Groundwater Monitoring Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
8.	Leachate Extraction Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
9.	Discharge Compliance Records <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
10.	Daily Access/Security Logs Remarks <u>Not Reviewed; not applicable</u>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A

C. Institutional Controls (ICs)			
1.	Implementation and enforcement		
	Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Type of monitoring (e.g., self-reporting, drive by)	<u>manual physical inspections</u>	
	Frequency	<u>minimally to be performed twice/yr → not being conducted</u>	
	Responsible party/agency	<u>MD AN 6</u>	
	Contact	<u>Lt Loftus</u>	<u>Acting Env. Fac. Mgr</u>
	Name	Title	Date Phone no.
	Reporting is up-to-date	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Reports are verified by the lead agency	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Specific requirements in deed or decision documents have been met	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Violations have been reported	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
	Other problems or suggestions:	<input type="checkbox"/> Report attached	
		<u>Inspections not conducted with reg'd frequency</u>	
		<u>Inspections appear to not assess visibility of posted signage as inspections are conducted typically during the fall.</u>	
2.	Adequacy	<input checked="" type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A
D. General			
1.	Vandalism/trespassing	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident
	Remarks	<u>Lt. Loftus stated there are no instances of known trespassing</u>	
2.	Land use changes on site	<input type="checkbox"/> N/A	
	Remarks	<u>None</u>	
3.	Land use changes off site	<input type="checkbox"/> N/A	
	Remarks	<u>None</u>	
VI. GENERAL SITE CONDITIONS			
A. Roads	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
1.	Roads damaged	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Roads adequate <input checked="" type="checkbox"/> N/A
	Remarks		

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS Applicable N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
 Areal extent _____ Depth _____
 Remarks _____

2. **Cracks** Location shown on site map Cracking not evident
 Lengths _____ Widths _____ Depths _____
 Remarks not applicable - cover & site conditions do not make cracking a plausible scenario

3. **Erosion** Location shown on site map Erosion not evident
 Areal extent 2/5 linear ft. Depth 4-5 ft
 Remarks Erosion channel; riprap not evident in sidewalls nor bottom; Refer to 2nd FYR report, see photo log.

4. **Holes** Location shown on site map Holes not evident
 Areal extent _____ Depth _____
 Remarks _____

5. **Vegetative Cover** Grass Cover properly established No signs of stress
 Trees/Shrubs (indicate size and locations on a diagram)
 Remarks Not Applicable - cover consists of USACE Grade A riprap and river sediments.

6. **Alternative Cover** (armored rock, concrete, etc.) N/A
 Remarks Riprap - Grade A

7. **Bulges** Location shown on site map Bulges not evident
 Areal extent _____ Height _____
 Remarks _____

8. **Wet Areas/Water Damage** Wet areas/water damage not evident
 Wet areas Location shown on site map Areal extent _____
 Ponding Location shown on site map Areal extent _____
 Seeps Location shown on site map Areal extent _____
 Soft subgrade Location shown on site map Areal extent _____
 Remarks Site is adjacent the Mississippi River - it will be wet

9.	Slope Instability	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of slope instability
	Areal extent _____			
	Remarks _____	<i>Not Applicable</i>		
B. Benches				
	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A		
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)				
1.	Flows Bypass Bench	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
	Remarks _____			
2.	Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
	Remarks _____			
3.	Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
	Remarks _____			
C. Letdown Channels				
	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A		
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)				
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement	
	Areal extent _____	Depth _____		
	Remarks _____			
2.	Material Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation	
	Material type _____	Areal extent _____		
	Remarks _____			
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion	
	Areal extent _____	Depth _____		
	Remarks _____			

4.	Undercutting	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
5.	Obstructions	Type _____	<input type="checkbox"/> No obstructions
	<input type="checkbox"/> Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
6.	Excessive Vegetative Growth	Type _____	
	<input type="checkbox"/> No evidence of excessive growth		
	<input type="checkbox"/> Vegetation in channels does not obstruct flow		
	<input type="checkbox"/> Location shown on site map	Areal extent _____	
	Remarks _____		
D. Cover Penetrations <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	Gas Vents	<input type="checkbox"/> Active	<input type="checkbox"/> Passive
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance
	<input type="checkbox"/> N/A		
	Remarks _____		
2.	Gas Monitoring Probes		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
	Remarks _____		
3.	Monitoring Wells (within surface area of landfill)		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
	Remarks _____		
4.	Leachate Extraction Wells		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
	Remarks _____		
5.	Settlement Monuments	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A
	Remarks _____		

E. Gas Collection and Treatment		Γ Applicable	<input checked="" type="checkbox"/> N/A
1.	Gas Treatment Facilities Γ Flaring Γ Thermal destruction Γ Collection for reuse Γ Good condition Γ Needs Maintenance Remarks _____		
2.	Gas Collection Wells, Manifolds and Piping Γ Good condition Γ Needs Maintenance Remarks _____		
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings) Γ Good condition Γ Needs Maintenance Γ N/A Remarks _____		
F. Cover Drainage Layer		Γ Applicable	<input checked="" type="checkbox"/> N/A
1.	Outlet Pipes Inspected Remarks _____	Γ Functioning	Γ N/A
2.	Outlet Rock Inspected Remarks _____	Γ Functioning	Γ N/A
G. Detention/Sedimentation Ponds		Γ Applicable	<input checked="" type="checkbox"/> N/A
1.	Siltation Areal extent _____ Depth _____ Γ Siltation not evident Remarks _____		Γ N/A
2.	Erosion Areal extent _____ Depth _____ Γ Erosion not evident Remarks _____		
3.	Outlet Works Remarks _____	Γ Functioning	Γ N/A
4.	Dam Remarks _____	Γ Functioning	Γ N/A

H. Retaining Walls		<input checked="" type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Horizontal displacement _____		Vertical displacement _____
	Rotational displacement _____		
	Remarks _____		
2.	Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
	Remarks _____		
I. Perimeter Ditches/Off-Site Discharge		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Siltation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
	Areal extent _____		Depth _____
	Remarks _____		
2.	Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
	<input type="checkbox"/> Vegetation does not impede flow		
	Areal extent _____		Type _____
	Remarks _____		
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
	Areal extent _____		Depth _____
	Remarks _____		
4.	Discharge Structure	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
VIII. VERTICAL BARRIER WALLS		<input checked="" type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
	Areal extent _____		Depth _____
	Remarks _____		
2.	Performance Monitoring	Type of monitoring _____	
	<input type="checkbox"/> Performance not monitored		
	Frequency _____		<input type="checkbox"/> Evidence of breaching
	Head differential _____		
	Remarks _____		

IX. GROUNDWATER/SURFACE WATER REMEDIES		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____		
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____		
B. Surface Water Collection Structures, Pumps, and Pipelines		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____		

C. Treatment System		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Treatment Train (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____		
2.	Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____		
3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____		
4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____		
5.	Treatment Building(s) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____		
6.	Monitoring Wells (pump and treatment remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____		
D. Monitoring Data		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Monitoring Data <input type="checkbox"/> Is routinely submitted on time <input type="checkbox"/> Is of acceptable quality		
2.	Monitoring data suggests: <input type="checkbox"/> Groundwater plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining		

D. Monitored Natural Attenuation		<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	Monitoring Wells (natural attenuation remedy)	<input type="checkbox"/> Properly secured/locked <input type="checkbox"/> All required wells located Remarks _____	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Good condition <input type="checkbox"/> N/A
X. OTHER REMEDIES			
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.			
XI. OVERALL OBSERVATIONS			
A. Implementation of the Remedy			
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).			
<p>Remedy (rip rap) appeared functioning/performing as designed - no voids in coverage were observed; finer sediment appears to be building up on the rip rap - this is considered good.</p>			
B. Adequacy of O&M			
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.			
<p>Inspections ① Not performed frequently enough; ② Not performed at appropriate time of year to verify that vegetation is not obscuring sign visibility; ③ Excessive duration between observation of deficiency and maintenance activity to address/remedy problem.</p>			

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

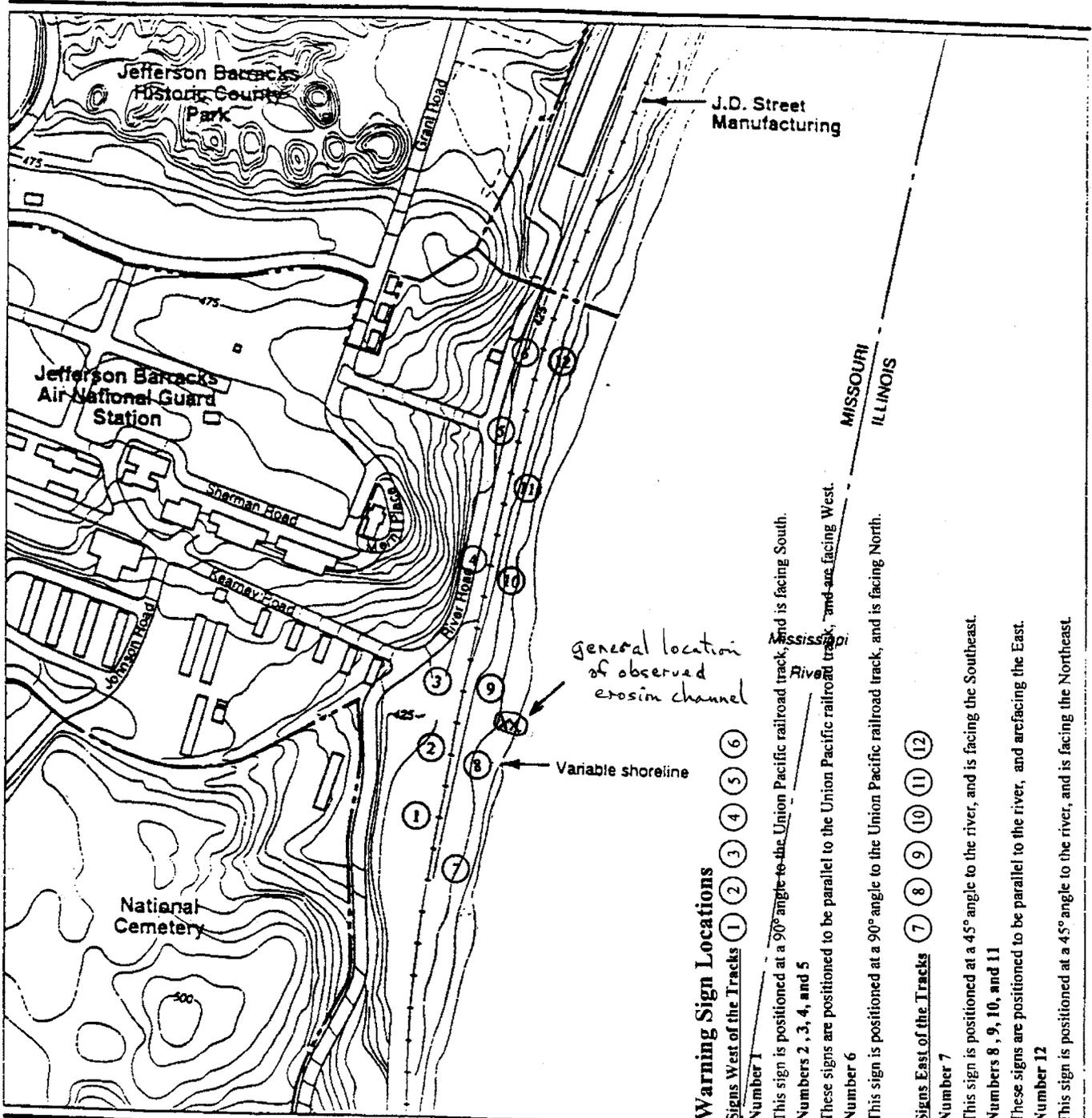
- Erosion feature discovered this inspection should be evaluated to determine if a structural feature might be channeling water to cause the observed erosion - if so, this will likely repeat

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

- Five Year Frequency of Resurveying site should be assessed to determine if alternative frequency or something other than a complete resurvey can accomplish the same objective.

Jeffers010



Warning Sign Locations

Signs West of the Tracks ① ② ③ ④ ⑤ ⑥

Number 1

This sign is positioned at a 90° angle to the Union Pacific railroad track, and is facing South.

Numbers 2, 3, 4, and 5

These signs are positioned to be parallel to the Union Pacific railroad track, and are facing West.

Number 6

This sign is positioned at a 90° angle to the Union Pacific railroad track, and is facing North.

Signs East of the Tracks ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

Number 7

This sign is positioned at a 45° angle to the river, and is facing the Southeast.

Numbers 8, 9, 10, and 11

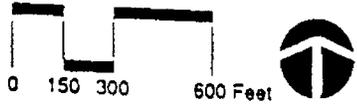
These signs are positioned to be parallel to the river, and are facing the East.

Number 12

This sign is positioned at a 45° angle to the river, and is facing the Northeast.

EXPLANATION

- 425 — Topographic elevations in feet above mean sea level. Contour interval 5 feet (from 1995 Metropolitan St. Louis Sewer District map data)
- — Union Pacific Railroad tracks
- Building
- == Road
- - - Property boundary



Topographic Map - Jefferson Barracks Air National Guard Station and Former Post Dumping Grounds Area

Figure 2-1

Photo 18. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Significant erosion, located between warning signs #8 and #9; depth of erosion estimated at between 4 to 5 ft.; sidewalls did not exhibit rip-rap; length is estimated at 12 to 15 ft; large tree trunk is present in the eroded area.

Photo 19. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Subject is eroded area depicted in Photo No. 18, view is to the west – towards the escarpment; riprap is present in area between escarpment and the eroded area.

Photo 20. Jefferson Barracks Former Post Dumping Grounds

Date: January 28, 2014



Description: Erosion ravine (subject of Photos #18 and #19); looking west towards escarpment. Note the riprap present near top of escarpment; possible undercutting depicted in photo, just above mid-photo, left-half.

Appendix I

Metropolitan Sewer District Replacement Sewer

Caving Bank Inspection Report

April 2014

Caving Bank Inspection Report

Location: Jefferson Barracks, Mississippi River mile 169.6 L

Date Inspected: 04/02/2014, St. Louis Gage reading of 9.0

Inspector(s) : Dawn Lamm MVS, David Rose MVS, Josephine Newton-Lund NWK, Eric Gilstrap MDNR

Contact:

Josephine Newton-Lund, PMP
Senior Project Manager
Environmental Branch
U.S. Army Corps of Engineers, Kansas City District
601 East 12th Street/CENWK-PM-ES
Kansas City, MO 64106
816-389-3912
816-289-1420 (cell)
816-392-7936 (blackberry)

Summary: Site visit to access erosion issues at the Jefferson Barracks former post dumping grounds at MRM 169.6 L.

Erosion issues are directly related to an MESD outfall structure buried in the bankline. Only a small portion of the outfall structure was visible above the water line flowing out of the pipe from recent storms. It is estimated that it is a 54" concrete outfall pipe.



The drainage channel for the outfall appeared to have filled in and the outfall pipe was no longer exposed and was forgotten. It is assumed that the original outfall channel was lined with stone but

during subsequent flooding events it has filled in with sediment. During a January 28, 2014 inspection, it was observed that some erosion was occurring but the forgotten outfall pipe did not become exposed until recent storm events. The outfall channel was thought to be bankline erosion possible in need of repair.



Recommendations:

No action is recommended in regards to placement of erosion protection measures.

It is recommended that MESD should inspect the current outfall channel to determine if excavation of deposited sediments should be performed to allow the outfall pipe to perform as designed.

Metropolitan Sewer District Replacement Sewer

Excavation Field Oversight Report

2008

**Jefferson Barracks Dumping Ground,
St. Louis Metropolitan Sewer District Excavation,
Field Oversight Report**

ISSUE

The Jefferson Barracks Dumping Grounds (JBDG) is a U. S. Army Corps of Engineers (USACE) formerly used defense site (FUDS). Historically, through the early portion of the 20th Century, Jefferson Barracks used the western bank of the Mississippi River as a dumping ground. Periodic flooding would wash away all but the heaviest debris disposed of at the dumping grounds. In recent years this area became a popular recreation area for picnickers, anglers and souvenir hunters. Occasionally, during low river events, live pre-World War I and World War I ordnance would become exposed. In an effort to sequester this potential hazard the USACE, with the Missouri Department of Natural Resources (MDNR) concurrence, covered the area with a four foot thick blanket of rip-rap (large quarried stone). The St. Louis Metropolitan Sewer District (MSD) is in the process of upgrading their infrastructure, which requires that they install a new 52 inch sewer line through a portion of the rip-rapped dumping grounds. MSD has hired the J.H. Berra Construction Company to excavate a trench approximately 20 feet wide and 134 feet long.

In addition to the sewer line, MSD required that a filter fabric lined, rip-rap filled drainage channel be installed from the new outfall to the river's edge. This channel extends a distance of approximately 70 feet. The original sewer was constructed by the Civilian Conservation Corps (CCC) in the early 1930s and, therefore, the potential of encountering debris from the former dumping grounds exists.

KICK-OFF MEETINGS

On the afternoon of September 30, 2008, a meeting was conducted to discuss upcoming activities and identify potential associated hazards. Mr. George Sloan, USACE, briefed field personnel of the potential hazards of unexploded ordnance (UXO) and what to do if encountered. Mr. Sloan showed examples of ordnance previously encountered at JBDG and provided drawings and specifications for other ordnance that could potentially be encountered. In attendance were representatives from MSD, USACE, MDNR and the field crew from J. H. Berra Construction Company.

On the morning of October 1, 2008 a Safety Meeting was conducted. The usual topics such as slips, trips, and falls, hazards associated with working around heavy equipment and potentially hazardous plants and animals were discussed. However, the main topic focused on working in close proximity to the Union Pacific Rail Road (RR) track and the transportation of materials and equipment from the staging area west of the track to the excavation/construction area on the eastern side of the tracks. A Union Pacific flagman was on-site for both the meeting and whenever it was necessary to transport materials and equipment across the rails. Safety Meeting participants included representatives from MSD, MDNR and J. H. Berra personnel (1 foreman, 2 heavy equipment operators and 4 laborers).

MOBILIZATION

Two large pieces of heavy equipment (1 trackhoe and 1 front end loader) and pads (Figures 1-3) were off-loaded. The trackhoe crossed the RR tracks (Figures 4-5) to begin clearing and

grubbing operations. The front end loader remained at the staging area (Figure 6) on the western side of the RR tracks to off-load sewer pipes and transport and stockpile crushed aggregate and rip-rap. The representative from MSD rejected the first loads of rip-rap (Figure 7) due to the fact that it failed the specifications for Class C stone. This issue was later resolved and the stone used. Work was periodically interrupted by passing trains (Figure 8). There were no other noteworthy incidents during site mobilization.

CLEARING AND GRUBBING

Prior to commencing with excavation/construction activities it was necessary to remove a band of vegetation from the eastern edge of the RR tracks to the bank of the Mississippi River (Figures 9-10); in addition to debris that had been deposited by flood water (Figure 11). The clearing operation was wider than originally anticipated. This was necessary to accommodate both the spoil piles and the volumes of materials that needed to be staged east of the RR tracks. Approximately eight trees having a trunk diameter of one foot or greater were taken down. The trunks of these trees were repeatedly used as temporary pads to support the weight of the trackhoe throughout the trenching and filling operations. The trunks were finally dug out and neatly placed side-by-side at the eastern base of the RR levy. This was done to enhance the wildlife habitat within the area.

REPLACEMENT OF SEWER LINE

Excavation activities started at the location of the buried outfall of the historic sewer line. Excavated material was stockpiled parallel to the excavation (Figures 12-14). The trackhoe encountered the outfall and footwall (Figure 15) approximately 12 feet below ground surface. Both structures were constructed of CCC era concrete and proved extremely difficult to remove. The outfall was a concrete box channel with a semi-circular top (Figure 16– note raw sewage). Berra set the sewer flare pipe (Figure 17) at the location of the previous outfall and installed the first section of the sewer pipe (Figure 18). The elevation of the bottom of the flare was approximately one foot below the river's elevation. The trench remained open overnight and the fluid level in the trench equalized with the elevation of that of the river. The fluid in the trench was pumped out and measurements for the filter fabric lined, rip-rap channel were taken off of the end of the flare.

The excavation for the filter fabric lined, rip-rap channel began at the river's edge (Figure 19), and was cut back to the flare (Figure 20). Procedures included excavation (Figure 21), grade surveying (Figure 22), the placement of a section of filter fabric (Figure 23) and rip-rap placement (Figures 24-31). Berra constructed the concrete foot wall and completed the rip-rap lined channel (Figure 32). There were no other noteworthy incidents during the installation of the rip-rap channel.

The sewer line replacement standard operating procedure was to excavate a sufficient length of the trench to allow for the installation of two sections of sewer pipe (Figure 33). The trench was excavated (Figures 34-37) to required depth, surveyed, backfilled with crushed aggregate (Figure 38), and pipes were set and joints glued. This process was repeated continuously until

the end of the day when additional aggregate was placed around the pipe and the trench was backfilled and rip-rap was placed on top of the excavation.

The excavation removed the southern side of the 1930s era sewer (Figures 39-40). Due to unexpected site conditions the excavation was both wider and deeper than originally expected (Figures 36-37). The manhole was then removed (Figures 41-42). Shoring was installed (Figure 43) and the headwall was being installed. Although the excavation was still open at the time, MDNR suspended field oversight, the rip-rap remaining to be installed was staged at the end of the trench and the remaining spoil/backfill had been examined repeatedly for munitions debris and solid waste.

MDNR OVERSIGHT

Mr. Mitchell Scherzinger and Mr. Patrick Anderson provided MDNR field oversight for this project. Their primary responsibility was to ensure that no solid waste or hazardous waste attributable to the Jefferson Barracks Dumping Grounds, were excavated. Their secondary responsibility was to assist the USACE in watching for excavated munitions debris and UXO. MDNR personnel scrutinized the material as it was being excavated (paying particular attention to sidewalls and the bottom of the trench), the spoil as it was being dumped, and the spoil piles. Spoil piles and disturbed areas were routinely reexamining for debris. Only two items potentially attributable to the Jefferson Barracks Dumping Grounds were encountered. These were found in the spoil piles. The first item resembles the remnants of a hand grenade fuse (Figures 44-45) and a slag (slightly magnetic) covered rock (Figure 46).

RECOMMENDATIONS

One of the unexploded ordnance warning signs has been severely damaged (Figures 47-48). It is recommended that this sign be replaced. It is also recommended that during the November Joint USACE/MDNR Annual Inspection, particular attention be paid to the areas disturbed by excavation. Precipitation may expose undesirable materials that were brought to the surface during the sewer replacement. The disturbed areas of the JBDG should be inspected prior to spring revegetation.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8



Figure 9



Figure 10



Figure 11



Figure 12



Figure 13



Figure 14



Figure 15



Figure 16



Figure 17



Figure 18



Figure 19



Figure 20



Figure 21



Figure 22



Figure 23



Figure 24



Figure 25



Figure 26



Figure 27



Figure 28



Figure 29



Figure 30



Figure 31



Figure 32



Figure 33



Figure 34



Figure 35



Figure 36



Figure 37



Figure 38



Figure 39



Figure 40



Figure 41



Figure 42



Figure 43

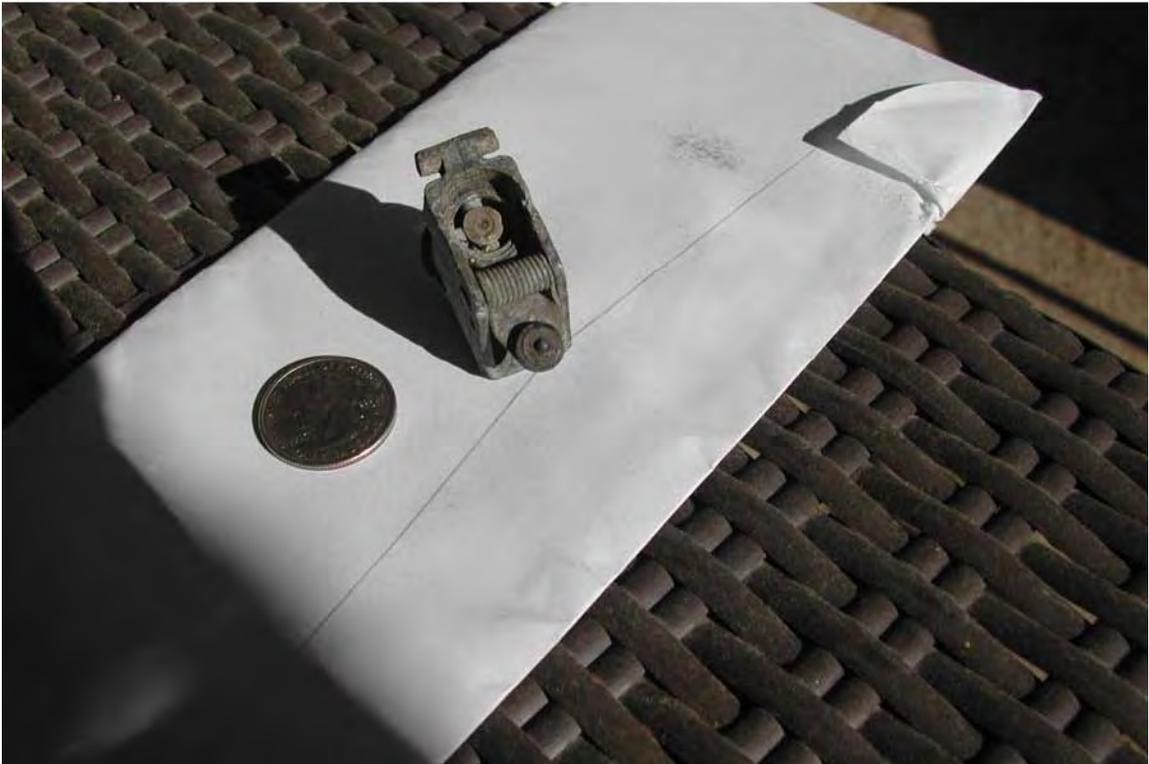


Figure 44



Figure 45



Figure 46



Figure 47



Figure 48



Figure 49



Figure 50