# **REVISION 0**

# PRE-DESIGN INVESTIGATION SUMMARY REPORT FOR ST. CIN PARK, THE ARCHDIOCESE OF ST. LOUIS PROPERTY, AND DUCHESNE PARK

ST. LOUIS, MISSOURI

**JUNE 24, 2015** 



U.S. Army Corps of Engineers St. Louis District Office Formerly Utilized Sites Remedial Action Program

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prepared by

U.S. Army Corps of Engineers, St. Louis District Office Formerly Utilized Sites Remedial Action Program

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# TABLE OF CONTENTS

SEC'	<b>TION</b>		<b>PAGE</b>
LIST	OF T	ABLES	ii
LIST	OF F	IGURES	ii
LIST	OF A	PPENDICES	ii
ACR	ONYM	IS AND ABBREVIATIONS	iii
1.0	INT	RODUCTION	1
2.0	PRO	PERTY DESCRIPTION	3
	2.1	ST. CIN PARK	3
	2.2	ARCHDIOCESE OF ST. LOUIS PROPERTY	3
	2.3	DUCHESNE PARK	3
3.0	HIST	FORICAL INFORMATION	5
	3.1	HISTORICAL LAND USE	5
	3.2	GEOLOGY, HYDROGEOLOGY, AND HYDROLOGY	5
4.0	PRE	-DESIGN INVESTIGATION METHODS	7
	4.1	SOIL SAMPLE COLLECTION	7
	4.2	EVALUATION CRITERIA (REMEDIATION GOALS)	8
	4.3	INVESTIGATION-DERIVED WASTE	9
5.0	PRE	-DESIGN INVESTIGATION RESULTS	11
	5.1	RADIOLOGICAL SOIL SAMPLE ANALYTICAL RESULTS	11
		5.1.1 St. Cin Park	
		5.1.2 Archdiocese of St. Louis Property	
	5.2	GAMMA WALKOVER SURVEY RESULTS	14
6.0	SUM	IMARY AND CONCLUSIONS	15
	6.1	AREA 1	15
	6.2	AREA 2	15
	6.3	AREA 3	15
	6.4	AREA 4	16
	6.5	AREA 5	16
7.0	REF	ERENCES	17

# LIST OF TABLES

<b>NUMBER</b>	<u>PAGE</u>
Table 1.	Addresses, Parcels, and Designations4
Table 2.	Radiological Background Values for North St. Louis County Sites
Table 3.	Radiological Remediation Goals for North St. Louis County Sites8
Table 4.	Area 1 Soil Sample Location IDs with SOR <sub>N</sub> Values Greater than 1.0
Table 5.	•
	Area 2 Soil Sample Location IDs with SOR <sub>N</sub> Values Greater than 1.0
Table 6.	Area 3 Soil Sample Location IDs with SOR <sub>N</sub> Values Greater than 1.0
Table 7.	Area 4 Soil Sample Location IDs with SOR <sub>N</sub> Values Greater than 1.0
Table 8.	Area 5 Soil Sample Location IDs with SOR <sub>N</sub> Values Greater than 1.014
	LIST OF FIGURES
<b>NUMBER</b>	
Figure 1.	Location of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne
C	Park
Figure 2.	2014 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property,
<i>S</i>	and Duchesne Park
Figure 3.	2010 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property,
8	and Duchesne Park
Figure 4.	1995 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property,
8	and Duchesne Park
Figure 5.	1981 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property,
8	and Duchesne Park
Figure 6.	1971 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property,
8	and Duchesne Park
Figure 7.	1966 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property,
8	and Duchesne Park
Figure 8.	1955 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property,
118010 0.	and Duchesne Park
Figure 9.	1937 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property,
118010 ).	and Duchesne Park
Figure 10.	St. Cin Park Radiological Soil Sample Locations
Figure 11.	The Archdiocese of St. Louis Property Radiological Soil Sample Locations
Figure 12.	Duchesne Park Radiological Soil Sample Locations
Figure 13.	St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park Gamma
riguic 13.	Walkover Survey
	LICT OF ADDENDICES
	LIST OF APPENDICES
Appendix A*	Boring Logs and Field Logbook Entries for St. Cin Park, the Archdiocese of
	St. Louis Property, and Duchesne Park Soil Samples
Appendix B	St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park
	Radiological Soil Sample Analytical Results

# **BACK COVER**

\*CD-ROM Appendix A

#### **ACRONYMS AND ABBREVIATIONS**

Both English and metric units are used in this report. The units used in a specific situation are based on common unit usage or regulatory language (e.g., depths are given in feet and meters, and areas are given in square feet and square meters). Acres are given for areas when applicable.

Ac actinium

AEC U.S. Atomic Energy Commission

ASTM ASTM International bgs below ground surface

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

cm centimeter

COC contaminant of concern CSM conceptual site model CWC Coldwater Creek

DOE U.S. Department of Energy DOD U.S. Department of Defense

EM Engineer Manual

FS Feasibility Study for the St. Louis North County Site

FSS final status survey

FSSE final status survey evaluation

ft foot/feet

FUSRAP Formerly Utilized Sites Remedial Action Program

GIS geographic information system

GM Geiger Mueller

GWS gamma walkover survey

HTZ biased (sample prefix designation)

IDW investigation-derived waste LiDAR Light Detection and Ranging

m meter(s)

m<sup>2</sup> square meter(s)

MARSSIM Multi-Agency Radiation Survey and Site Investigation Manual

MDC minimum detectable concentration

MDNR Missouri Department of Natural Resources

MED Manhattan Engineer District

MSD Metropolitan St. Louis Sewer District

NaI sodium iodide

NCP National Oil and Hazardous Substances Contingency Plan

Pa protactinium

Pb lead

pCi/g picocuries per gram
PDI pre-design investigation

PDI WP Pre-Design Investigation Work Plan for Coldwater Creek from Frost Avenue to

St. Denis Bridge

PDIR pre-design investigation report PPE personal protective equipment

# **ACRONYMS AND ABBREVIATIONS (Continued)**

QA quality assurance QC quality control

Ra radium

RG remediation goal

ROD Record of Decision for the North St. Louis County Sites
SAG Sampling and Analysis Guide for the St. Louis Sites

SLAPS St. Louis Airport Site

 $\begin{array}{cc} SOR & sum \ of \ ratios \\ SOR_N & net \ sum \ of \ ratios \end{array}$ 

SVP St. Louis Airport Site vicinity property (sample prefix designation)

Th thorium U uranium

USACE U.S. Army Corps of Engineers

USEPA U.S. Environmental Protection Agency

USGS U.S. Geological Survey

VP vicinity property VQ validation qualifier

# 1.0 INTRODUCTION

The pre-design investigation (PDI) activities described in this report were performed by the U.S. Army Corps of Engineers (USACE) St. Louis District as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP) in accordance with the *Record of Decision for the North St. Louis County Sites* (ROD) (USACE 2005). The FUSRAP was initiated in 1974 to identify and remediate or otherwise control sites at which residual radioactivity remains from activities conducted while under contract to the Manhattan Engineer District (MED) and U.S. Atomic Energy Commission (AEC) during the early years of the nation's atomic energy program. In 1997, the U.S. Congress transferred responsibility for the execution aspect of the FUSRAP from the U.S. Department of Energy (DOE) to the USACE. The DOE will assume a stewardship responsibility beginning 2 years after completion of the response action at the North St. Louis County Sites.

The USACE was authorized by the U.S. Congress as the lead agency for implementation of the selected remedy. The remedy was selected by the USACE in consultation with the U.S. Environmental Protection Agency (USEPA) and with the concurrence of the Missouri Department of Natural Resources (MDNR).

The work within the scope of this pre-design investigation report (PDIR) was managed by the USACE St. Louis District FUSRAP Project Office and was accomplished in accordance with the National Oil and Hazardous Substances Contingency Plan (NCP) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Cleanup activities will continue to follow NCP and CERCLA guidelines.

Coldwater Creek (CWC) (from top of bank to top of bank) is considered a St. Louis Airport Site (SLAPS) vicinity property (VP) and is located within the ROD boundary as defined by Figure 2-2 of the ROD (USACE 2005). CWC is therefore subject to the requirements of the ROD. Because CWC is subject to flooding, all areas within the 10-year floodplain of CWC have been included within the investigation area and are also subject to the requirements of the ROD. Areas outside the 10-year floodplain may be added to the investigation area if it is determined that contamination extends beyond the boundary of the 10-year floodplain.

The portion of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park included within the scope of this PDIR is shown on Figure 1. As described in the *Pre-Design Investigation Work Plan for Coldwater Creek from Frost Avenue to St. Denis Bridge* (PDI WP) (USACE 2014), investigations were focused within the 10-year floodplain of CWC. As discussed in Section 5.0 of this PDIR, soil contamination appears to be laterally bounded within the 10-year floodplain; therefore, investigation of these properties outside of the 10-year floodplain was not necessary.

Based on elevations from the *Coldwater Creek, Missouri, Feasibility Report for Flood Control and Related Purpose* (USACE 1987a) and the *Coldwater Creek Watershed Study for Stormwater System Master Plan* (MSD 1998), and on current Light Detection and Ranging (LiDAR) elevation data, the 10-year floodplain of CWC represents areas with a 10 percent chance of flooding in any given year. LiDAR is an optical remote-sensing technique that uses laser light to densely sample the surface of the earth, producing highly accurate 3-dimensional data. The LiDAR data used in this document were downloaded from the Missouri Spatial Data Information Service at http://www.msdis.missouri.edu/data/lidar/index.html.

The purposes of the PDI activities at St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park were to obtain analytical data to define the nature and extent of contamination, to determine if residual radiological contamination exceeding ROD remediation goals (RGs) is

present, and to provide analytical data needed to support remedial design (if required) or the final status survey evaluation (FSSE), as applicable.

Radiological contaminants of concern (COCs) apply to the North St. Louis County Sites (including St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park) per Table 2-2 of the ROD (USACE 2005). The primary COCs for these properties are radium (Ra)-226, thorium (Th)-230, and uranium (U)-238. The ROD identifies the selected remedy to address contamination that exceeds RGs at the North St. Louis County Sites. Consistent with the ROD (USACE 2005), non-radiological COCs are not applicable to the properties included in this PDIR.

#### 2.0 PROPERTY DESCRIPTION

#### 2.1 ST. CIN PARK

As shown on Figure 2, two covered picnic structures are located on this property, along with a basketball court, a baseball diamond, and a playground. Paved paths for jogging/walking are positioned along the perimeter of the park. The topography is relatively flat in this area, and the ground cover consists mainly of grass with a few trees. The portion of St. Cin Park most adjacent to the CWC corridor is heavily wooded.

St. Cin Park is owned by the City of Hazelwood and is located at 135 St. Cin Lane, Hazelwood, Missouri. The parcel number associated with St. Cin Park is Parcel 09K520318. The area of St. Cin Park included within the scope of this report is approximately 26,990 square meters (m²) (6.7 acres). St. Cin Park is bound to the west, north, and south by residential property and to the east by the CWC corridor.

#### 2.2 ARCHDIOCESE OF ST. LOUIS PROPERTY

As shown on Figure 2, no buildings or parking lots exist on the area of the Archdiocese of St. Louis Property included in this PDIR. The topography is relatively flat in this area, and the ground cover consists mainly of grass with a few trees. The portion of the Archdiocese of St. Louis Property most adjacent to the CWC corridor is heavily wooded.

The Archdiocese of St. Louis Property, designated as Parcel 09K630484, is owned by the Archdiocese of St. Louis and is located at 205 Manion Park Road, Hazelwood, Missouri. The area of the Archdiocese of St. Louis Property included within the scope of this report is approximately 17,490 m² (4.3 acres). The Archdiocese of St. Louis Property is bound to the west by the CWC corridor, to the north by property owned by the Catholic Cemeteries of the St. Louis Archdiocese, and to the east by additional property owned by the Archdiocese of St. Louis and residential property.

#### 2.3 DUCHESNE PARK

As shown on Figure 2, no buildings or parking lots exist on the portion of Duchesne Park included in this PDIR. The topography is relatively flat in this area, and the ground cover consists mainly of grass with a few trees. The portion of Duchesne Park most adjacent to the CWC corridor is heavily wooded.

Two parcels comprise the area referred to as Duchesne Park: Parcels 08K310888 and 08K220150. Parcel 08K310888 is owned by the City of Florissant and is located at 5 Brower Lane, Florissant, Missouri. Parcel 08K220150 is owned by the Catholic Cemeteries of the St. Louis Archdiocese and is located at 9 Brower Lane, Florissant, Missouri. Together, and in the context established in this document, both parcels are collectively referred to as Duchesne Park. The area of Duchesne Park included within the scope of this PDIR is approximately 10,340 m<sup>2</sup> (2.6 acres). The portion of Duchesne Park included in the scope of this PDIR is bound to the west by the CWC corridor, to the north by an undeveloped parcel of land (Parcel 08K310866), to the east by the remainder of Duchesne Park not within the scope of this PDIR, and to the south by property owned by the Catholic Cemeteries of the St. Louis Archdiocese.

Table 1 contains the addresses of the properties described in this PDIR and the parcel designations established by St. Louis County (STLCO 2015).

**Table 1. Addresses, Parcels, and Designations** 

Address	Parcel	Designation
135 St. Cin Lane	09K520318	St. Cin Park
205 Manion Park Road	09K630484	Archdiocese of St. Louis
5 Brower Lane	08K310888	Durch come Doub
9 Brower Lane	08K220150	Duchesne Park

#### 3.0 HISTORICAL INFORMATION

Historical information was reviewed as part of the PDI planning discussed in the PDI WP (USACE 2014) for these properties to gain insights as to the nature and extent of land development activities on the property that may have occurred in relation to the MED/AEC activities (i.e., the storage and transport of uranium process residues). Land development activities include the addition, modification, and removal of man-made structural elements (e.g., buildings, parking lots, etc.); fill material placement; earth movement; and/or related physical changes to St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park. The historical information was also reviewed to gain insights on drainage and/or erosional features, if present, relative to the land development activities, to determine the potential for radiological contamination around, within, or beneath the identified historical features.

As discussed in the PDI WP (USACE 2014), a conceptual site model (CSM) was developed as part of the CERCLA process for the North St. Louis County Sites (including St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park). Historical data and the CSM were used to determine which areas would require sampling, determine the type of sampling (systematic or random) required, and identify target areas recommended for biased sampling. Biased samples were typically planned for collection within low-lying areas, drainage areas, and depositional areas within the 10-year floodplain.

#### 3.1 HISTORICAL LAND USE

Comparison of St. Louis County GIS Service Center aerial photographs from 1937 to 2014 indicates that St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park were primarily used for agricultural purposes from 1937 through the 1950s. The Archdiocese of St. Louis Property appears to have remained undisturbed since its agricultural usage was discontinued in the 1950s. By 1966, St. Cin Park and Duchesne Park appear to have been established and in use for recreational purposes. The aerial photographs are included as Figures 2 through 9.

The Coldwater Creek, Missouri, Feasibility Report and Environmental Impact Statement (USACE 1987b) states (1) that a drainage district was established in 1927 to straighten, widen, deepen, and alter CWC and (2) that most of the channel has been re-aligned to a more curvilinear shape. Aerial photographs from 1937 to 2014 were reviewed and indicate that the re-alignment occurred prior to the initiation of MED/AEC activities in North St. Louis County in 1942. The channel was altered to reduce flooding, which was caused by increased storm-water discharge and sheet-water runoff due to land use development of the surrounding area. The 1937 and 1955 aerial photographs of St. Cin Park and the Archdiocese of St. Louis Property indicate shaded and/or tree-lined areas that seem to follow a curved path through the properties, appearing to be a historic oxbow, which could indicate the original channel of CWC.

Based on the 1935 U.S. Geological Survey (USGS) topographic map, historical elevations on these properties ranged from 500 to 510 feet (ft) (152.4 to 155.4 meters [m]). Elevations still range from 500 to 510 ft (152.4 to 155.4 m), based on the current LiDAR data. The properties generally slope toward the CWC corridor.

# 3.2 GEOLOGY, HYDROGEOLOGY, AND HYDROLOGY

St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park are situated on a modest upland area between the Missouri and Mississippi River floodplains in northern St. Louis

County. This upland area has Pleistocene sediments and historical shale and limestone bedrock. Faulting is not evident, and bedrock at depth appears to be almost flat.

The soils of this upland area are predominantly silty deposits that originated from former glacial advances and historical Missouri and Mississippi River flooding and depositional activities. The current topographic ground surface of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park is primarily flat, sloping toward CWC. Ground cover consists of gravel, grass, or trees, with cover material such as concrete or asphalt. The areas that directly border CWC are covered with a narrow band of riparian forest (i.e., trees, brush, and grass) (USACE 2014).

#### 4.0 PRE-DESIGN INVESTIGATION METHODS

The PDI activities at St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park were conducted in accordance with the PDI WP (USACE 2014) and the *Sampling and Analysis Guide for the St. Louis Sites* (SAG) (USACE 2000). Activities performed as part of the PDI consisted of a review of the available historical information, completion of a gamma walkover survey (GWS), collection of PDI soil samples of the appropriate quantity and quality for use in the final status survey (FSS) process, and data review and evaluation.

Soil sampling locations and depths (both systematic and biased) were planned in the PDI WP based on *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)* (DOD 2000) recommendations, the CSM, and information gathered from the historical review and field reconnaissance activities. Subsequent rounds of PDI soil sampling (based on the analytical data from the soil samples collected as a result of the PDI WP) were performed as part of the PDI activities to investigate areas with concentrations of radiological COCs that resulted in a net sum of ratios (SOR<sub>N</sub>) value greater than 1.0 (see Section 4.2 for additional information).

#### 4.1 SOIL SAMPLE COLLECTION

Because subsurface sampling could encounter buried utilities, Missouri One Call was utilized to identify any utilities prior to commencement of intrusive subsurface soil sampling activities. Leidos (formerly part of Science Applications International Corporation) maintained a site map depicting the locations of all known utilities, and this map was also reviewed prior to performance of intrusive field activities.

Soil samples were collected by hand-sampling methods (e.g., a scoop, trowel, or a hand auger). Surface vegetation and debris were removed from the immediate area around the marked soil sampling points as needed. A polyethylene sheet was placed around work areas, as necessary, to prevent equipment from coming in contact with potentially contaminated surfaces.

Hand augers with T-handle extensions were used to collect subsurface soil samples. A decontaminated auger, extension, and T-handle were assembled; and the hand auger was then advanced, in 0.5-ft (0.2-m) increments, into the soil to the desired depth. The hand auger was withdrawn from the soil with care to prevent dislodging the sidewall material.

The soil cores extracted during PDI activities were examined and lithologically described (logged) by the field geologist in accordance with the geologic guidance provided in Chapter 13 and Appendix E of Engineer Manual (EM)-1110-1-1906 (USACE 1996) and in the ASTM International (ASTM) Method D2488-09a, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)* (ASTM 2009).

The soil sample intervals were field screened for radiological activity using a Ludlum Model 2221 (scaler/ratemeter) coupled to a Ludlum Model 44-10 (2-inch-by-2-inch [5- centimeter {cm}-by-5-cm] sodium iodide [NaI] detector) and a Ludlum Model 2221 coupled to a Ludlum Model 44-9 (Geiger Mueller [GM] pancake probe). The soil with the highest screening results was collected from the sample interval for laboratory analysis.

Information gathered in the field regarding the sampling activity (PDI sampling or sampling prior to the PDI) was recorded on a boring log form or in a field logbook. A field logbook is used to record information about field activities when samples less than 2.0 ft (0.6 m) below ground surface (bgs) in depth are collected; in all other cases, a boring log is used. For either method, the recorded information includes the sampler name, date and time, location and sample identifier,

property being sampled, coordinates, the soil type, the sampling depth, and the chain-of-custody number. Copies of boring logs and field logbook entries for soil samples are contained in Appendix A (included on the CD-ROM on the back cover of this PDIR).

All large rocks or other organic material (e.g., worms, grass, leaves, roots) were removed from each soil sample prior to packaging and submission for analysis. Using a decontaminated stainless steel or Teflon spoon, spatula, or disposable scoop, as appropriate, each soil sample was placed in a 1-quart container with a tight-fitting lid. Soil sample containers were appropriately labeled and submitted under chain-of-custody to the USACE FUSRAP laboratory for radiological analysis or to the Test America laboratory for analysis of quality assurance (QA)/quality control (QC) split or duplicate soil samples.

# 4.2 EVALUATION CRITERIA (REMEDIATION GOALS)

Per Table 2-2 of the ROD (USACE 2005), the radiological COCs for surface and subsurface soil at the North St. Louis County Sites are actinium (Ac)-227, lead (Pb)-210, protactinium (Pa)-231, Ra-226, Ra-228, Th-228, Th-230, Th-232, U-234, U-235, and U-238. When multiple radiological contaminants are present, the concentration-based soil RGs are expressed and evaluated in terms of a "unity rule." The result of a unity rule calculation is referred to as a sum of ratios (SOR) and uses the primary radiological COCs (i.e., Ra-226, Th-230, and U-238) as surrogates for other radionuclides within the North St. Louis County Sites. A SOR<sub>N</sub> in excess of 1.0 averaged over 100 m<sup>2</sup> reflects a land area that exceeds the RG. The subscript "N" represents net concentration(s) above background. The net value for a specific radionuclide is obtained by subtracting the average North St. Louis County background value (background values for applicable radionuclides in North St. Louis County can be found in the Feasibility Study for the St. Louis North County Site [FS] [USACE 2003]) from the gross value obtained from the analytical results of the soil sample. Average background values for calculating net radionuclide concentrations were developed from 37 surface and 37 subsurface soil samples collected in the North St. Louis County reference area. Average values (in picocuries per gram [pCi/g]) for this population are presented in Table 2.

Table 2. Radiological Background Values for North St. Louis County Sites

	Ra-226	Th-230	U-238
Surface	0.95	1.49	1.08
Subsurface	1.15	1.83	1.27

The RGs (in pCi/g) for radiological constituents in the ROD (USACE 2005) are presented in Table 3.

Table 3. Radiological Remediation Goals for North St. Louis County Sites

	Ra-226	Th-230	U-238
Surface Soil	5	14	50
Subsurface Soil	15	15	50

The SOR<sub>N</sub> calculations for surface (upper 0.5 ft [0.2 m]) and subsurface (0.5 ft [0.2 m] bgs) soil layers are provided in the following equations.

$$SOR_{N-surface} = \frac{Ra-226_{N}}{5 pCi/g} + \frac{Th-230_{N}}{14 pCi/g} + \frac{U-238_{N}}{50 pCi/g}$$

$$SOR_{N-subsurface} = \frac{Ra-226_{N}}{15 \text{ pCi/g}} + \frac{Th-230_{N}}{15 \text{ pCi/g}} + \frac{U-238_{N}}{50 \text{ pCi/g}}$$

These calculations were performed for the data acquired from each sampling location and depth. An  $SOR_N$  value greater than 1.0 indicates that further investigation and/or remediation may be necessary.

For the purposes of this PDIR, the term *contamination* refers to the presence of COCs in concentrations that exceed the ROD RGs. If contamination was identified, all available data were further evaluated to estimate the vertical and horizontal extent of radiological contamination.

The evaluation of the estimated extent of radiological contamination was performed by considering the results of the adjacent soil sample analytical data, GWS results, and any adjacent geological features. Information regarding any structural features or barriers that might influence the path of contaminant migration (e.g., the CWC corridor) was also considered. Because St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park are directly adjacent to the CWC corridor, and because rapid changes in elevation occur at the property lines (i.e., top of the bank of CWC), special attention was paid to topography and changes in elevation when estimating the extent of radiological contamination.

Consistent with the ROD (USACE 2005), non-radiological COCs are not applicable to the properties included in this PDIR.

# 4.3 INVESTIGATION-DERIVED WASTE

The types of investigation-derived waste (IDW) generated during this effort were soil cuttings, decontamination water, disposable sampling equipment, plastic sheeting, and personal protective equipment (PPE). IDW was managed according to the applicable USACE contractor procedures and the guidelines prescribed in the SAG (USACE 2000).

Pre-Design Investigation Sumn	nary Report for St. Cin Park, the Arc	hdiocese of St. Louis Property,	and Duchesne Park
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#### 5.0 PRE-DESIGN INVESTIGATION RESULTS

From February through April 2014 and January through February 2015, a total of 435 soil samples were collected from St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park as part of the PDI to determine if radiological COCs were present at concentrations exceeding ROD RGs (USACE 2005). Sixteen (16) soil sample locations on St. Cin Park, 27 soil sample locations on the Archdiocese of St. Louis Property, and 6 soil sample locations on Duchesne Park were identified as having at least 1 soil sample with concentrations of radiological COCs that resulted in an SOR<sub>N</sub> value greater than 1.0. The analytical results for the soil samples are contained in Appendix B. The locations of these soil samples are shown on Figures 10 through 13.

To facilitate the discussion of the results and subsequent evaluation of the data collected during the PDI, St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park have been divided into five areas (Areas 1 through 5). Radiological contamination was identified within the surface and subsurface soils in each of the 5 areas. The results from the PDI soil sampling, the GWS, and the estimated horizontal and vertical extents of radiological contamination at St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park are discussed in the following sections.

#### 5.1 RADIOLOGICAL SOIL SAMPLE ANALYTICAL RESULTS

The analytical results of systematic and biased radiological soil samples collected by the USACE on St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park during the PDI are included in Tables B-1, B-2, and B-3 of Appendix B, respectively.

The following discussion of the results focuses on those samples with an  $SOR_N$  value greater than 1.0. For the purposes of this PDIR, the term *contamination* refers to the presence of COCs in concentrations that exceed the ROD RGs. If contamination was identified, all available data were further evaluated to estimate the vertical and horizontal extent of radiological contamination.

Samples with  $SOR_N$  values less than or equal to 1.0 had radiological concentrations of COCs that met the ROD RGs.

#### **5.1.1 St. Cin Park**

Systematic soil samples were collected from 23 locations on St. Cin Park. Four (4) of the initial systematic sample locations with St. Louis Airport Site vicinity property (SVP) sample prefix designations (i.e., SVP164075, SVP164069, SVP161934, and SVP161959) had analytical results with concentrations of radiological COCs that resulted in SOR<sub>N</sub> values greater than 1.0. Thirty (30) bounding sample locations were planned, and samples were collected to delineate the areas of radiological contamination. Two (2) soil samples with biased (HTZ) sample prefix designations were collected on this property to investigate drainage areas.

The previously discussed soil samples with  $SOR_N$  values greater than 1.0 are located in two distinct areas. These areas are referred to herein as Area 1 and Area 2. Area 1 is located in the central portion of the property, and Area 2 is located adjacent to the CWC corridor along the northeastern portion of the property.

Area 1 consists of 12 soil sample locations with  $SOR_N$  values greater than 1.0. Table 4 lists the soil sample location IDs, the corresponding depths, and the  $SOR_N$  values of the soil samples greater than 1.0.

Table 4. Area 1 Soil Sample Location IDs with SOR<sub>N</sub> Values Greater than 1.0

Soil Sample Location ID	Depth (bgs)	SOR <sub>N</sub> Value
SVP164069, SVP167089, SVP167091, and SVP171301	0.0 to 0.5 ft (0.0 to 0.15 m)	1.13, 1.67, 1.69, and 1.64
SVP171305 and SVP167117	0.0 to 0.5 ft (0.0 to 0.15 m)	1.26 and 1.03
SVF1/1303 and SVF10/11/	0.5 to 1.0 ft (0.15 to 0.3 m)	1.68 and 1.01
SVP177354	1.0 to 1.5 ft (0.3 to 0.46 m)	1.17
	1.5 to 2.0 ft (0.46 to 0.6 m)	1.03
SVD167102	2.0 to 2.5 ft (0.6 to 0.76 m)	1.69
SVP167103	2.5 to 3.0 ft (0.76 to 0.9 m)	1.23
	3.0 to 3.5 ft (0.9 to 1.1 m)	5.14
SVP177369	2.0 to 2.5 ft (0.6 to 0.76 m)	3.32
SVP167110	2.5 to 3.0 ft (0.76 to 0.9 m)	1.15
	3.0 to 3.5 ft (0.9 to 1.1 m)	1.04
SVP167096	2.5 to 3.0 ft (0.76 to 0.9 m)	1.43
SVP164075	3.0 to 3.5 ft (0.9 to 1.1 m)	2.02

The vertical extent of radiological contamination in Area 1 is delineated by soil samples at each location from deeper intervals, except at locations SVP167117 and SVP177354. The areal extent of radiological contamination is delineated by soil samples from locations SVP171322, SVP171319, SVP171315, SVP171309, SVP171307, SVP177357, SVP164059, SVP174894, SVP174892, SVP177360, SVP171303, SVP177363, SVP177365, SVP177367, SVP163693, SVP171328, and SVP171325. The soil sample locations in Area 1 are shown on Figure 10.

Area 2 consists of 4 soil sample locations with  $SOR_N$  values greater than 1.0. Table 5 lists the soil sample location IDs, the corresponding depths, and the  $SOR_N$  values of the soil samples greater than 1.0.

Table 5. Area 2 Soil Sample Location IDs with SOR<sub>N</sub> Values Greater than 1.0

Soil Sample Location ID	Depth (bgs)	SOR <sub>N</sub> Value
SVP161959	0.0 to 0.5 ft (0.0 to 0.15 m)	1.08
SVP179157	0.5 to 1.0 ft (0.15 to 0.3 m)	1.25
SVP161934	0.0 to 0.5 ft (0.0 to 0.15 m)	1.11
	1.5 to 2.0 ft (0.46 to 0.6 m)	2.49
SVP179167	2.0 to 2.5 ft (0.6 to 0.76 m)	4.66
SVF1/910/	2.5 to 3.0 ft (0.76 to 1.0 m)	3.35

The vertical extent of radiological contamination in Area 2 is delineated by soil samples at each location from deeper intervals, except at location SVP179167. The areal extent of radiological contamination is delineated by soil samples from locations SVP161929, SVP164083, SVP161949, SVP179153, and SVP179151. The soil sample locations in Area 2 are shown on Figure 10.

# **5.1.2** Archdiocese of St. Louis Property

Systematic soil samples were collected from 34 locations on the Archdiocese of St. Louis Property. Seventeen (17) of the initial systematic sample locations had analytical results with concentrations of radiological COCs that resulted in SOR<sub>N</sub> values greater than 1.0. Eighteen (18) bounding sample

locations were planned, and samples were collected to delineate the area of radiological contamination.

The portion of the Archdiocese of St. Louis Property from which soil samples with  $SOR_N$  values greater than 1.0 were collected is referred to as Area 3. Area 3 is located in the central portion of the property.

Area 3 consists of 27 soil sample locations with  $SOR_N$  values greater than 1.0. Table 6 lists the soil sample location IDs, the corresponding depths, and the  $SOR_N$  values of the soil samples greater than 1.0.

Table 6. Area 3 Soil Sample Location IDs with  $SOR_N$  Values Greater than 1.0

Soil Sample Location ID	Depth (bgs)	SOR <sub>N</sub> Value
SVP162003, SVP162032, SVP162038, SVP162046, SVP162051, SVP162056, SVP162063, SVP162068, SVP163695, SVP164105, SVP164111, SVP164123, SVP174898, SVP176749, SVP176754, SVP176758, SVP178223, SVP178268, and	0.0 to 0.5 ft (0.0 to 0.15 m)	1.40, 1.41, 1.45, 1.17, 1.57, 1.66, 1.88, 2.40, 2.54, 2.64, 1.39, 2.37, 1.44, 3.21, 1.06, 2.72, 1.14, 1.06, and 1.54
SVP162030, SVP162042,	0.0 to 0.5 ft (0.0 to 0.15 m)	1.85, 1.08, 2.63, 3.09, 1.65, and 1.32
SVP176743, SVP176748, SVP178207, and SVP178241	0.5 to 1.0 ft (0.15 to 0.3 m)	1.33, 1.19, 2.17, 2.07, 1.29, and 1.24
	0.0 to 0.5 ft (0.0 to 0.15 m)	3.95 and 2.13
SVP162010 and SVP162012	1.5 to 2.0 ft (0.46 to 0.6 m)	2.73 and 4.14
	2.0 to 2.5 ft (0.6 to 0.76 m)	1.36 and 1.36

The vertical extent of radiological contamination in Area 3 is delineated by soil samples at each location from deeper intervals, except at locations SVP176748, SVP176749, SVP176754, SVP176758, and SVP178241. The areal extent of radiological contamination is delineated by soil samples from locations SVP178227, SVP178225, SVP178221, SVP176757, SVP176756, SVP178211, SVP164117, SVP176753, SVP176752, SVP176750, SVP176751, SVP164097, SVP178243, SVP178245, SVP161971, SVP161976, SVP161985, SVP161990, SVP161996, and additional samples collected from locations within the CWC corridor. The soil sample locations in Area 3 are shown on Figure 11.

#### **5.1.3** Duchesne Park

Systematic soil samples were collected from 12 locations on Duchesne Park. Two (2) of the initial systematic sample locations (SVP164235 and SVP162307) had analytical results with concentrations of radiological COCs that resulted in  $SOR_N$  values greater than 1.0. Eight (8) bounding sample locations were planned, and samples were collected to delineate the areas of radiological contamination.

The previously discussed soil samples with  $SOR_N$  values greater than 1.0 are located in two distinct areas. These areas are referred to herein as Area 4 and Area 5. Area 4 is located in the southwestern portion of the property adjacent to the CWC corridor, and Area 5 is located in the northwestern portion of the property along the CWC corridor.

Area 4 consists of 1 soil sample location that has soil samples with  $SOR_N$  values greater than 1.0. Table 7 lists the soil sample location IDs, the corresponding depths, and the  $SOR_N$  values of the soil samples greater than 1.0.

Table 7. Area 4 Soil Sample Location IDs with SOR<sub>N</sub> Values Greater than 1.0

Soil Sample Location ID	Depth (bgs)	SOR <sub>N</sub> Value
	0.0 to 0.5 ft (0.0 to 0.15 m)	2.94
SVP162307	0.5 to 1.0 ft (0.15 to 0.3 m)	1.42
	1.5 to 2.0 ft (0.46 to 0.6 m)	2.18

Both the vertical and the areal extent of radiological contamination are delineated by soil samples from the following adjacent locations: SVP178262 and SVP178265. Vertical delineation was not performed at SVP162307. The soil sample locations in Area 4 are shown on Figure 12.

Area 5 consists of 5 soil sample locations with  $SOR_N$  values greater than 1.0. Table 8 lists the soil sample location IDs, the corresponding depths, and the  $SOR_N$  values of the soil samples greater than 1.0.

Table 8. Area 5 Soil Sample Location IDs with SOR<sub>N</sub> Values Greater than 1.0

Soil Sample Location ID	Depth (bgs)	SOR <sub>N</sub> Value
SVP169481 and SVP162374	0.0 to 0.5 ft (0.0 to 0.15 m)	1.11 and 1.08
SVP164235	1.0 to 1.5 ft (0.3 to 0.46 m)	1.33
SVP169470	0.5 to 1.0 ft (0.15 to 0.3 m)	1.20
	1.0 to 1.5 ft (0.3 to 0.46 m)	1.11
SVP173252	1.0 to 1.5 ft (0.3 to 0.46 m)	1.08

The vertical extent of radiological contamination in Area 5 is delineated by soil samples at each location from deeper intervals. The areal extent of radiological contamination is delineated by soil samples from locations SVP162362, SVP169483, SVP169473, SVP169476, SVP173256, SVP178254, SVP178256, and SVP162350. The soil sample locations in Area 5 are shown on Figure 12.

#### 5.2 GAMMA WALKOVER SURVEY RESULTS

GWSs were performed as part of the PDI activities on St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park prior to the soil sampling activities; the results are shown on Figure 13<sup>1</sup>. No additional areas of elevated radiological activity were identified as a result of the GWS; therefore, no additional biased soil samples were collected.

<sup>&</sup>lt;sup>1</sup> Because MARSSIM recognizes that environmental data generally do not fit a normal distribution and use non-parametric tests, Chebyshev's Inequality was used for setting the ranges of the colors for presentation of the GWS data. The 85th and 95th percentiles of the data were chosen to focus on areas of interest with higher count rates.

#### 6.0 SUMMARY AND CONCLUSIONS

The PDI activities at St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park were conducted from February through April 2014 and January through February 2015 under USACE direction. The USACE initiated PDI activities at these properties based upon the location of these properties within the 10-year floodplain of CWC. The PDI activities were conducted in accordance with the PDI WP (USACE 2014) to obtain analytical data to define the nature and extent of radiological contamination, to determine if residual radiological contamination above the ROD RGs is present, and to provide analytical data needed to support remedial design (if required) and/or the FSSE.

As part of the PDI soil sampling on these properties, a total of 435 soil samples were collected. Soil boring depths ranged from 0.0 to 6.5 ft (0.0 to 2.0 m) bgs, depending on the location of the soil borings in relation to apparent changes in topography over time. As discussed in Section 5.0, the soil on St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park was evaluated for the presence of radiological COCs in excess of ROD RGs. A total of five areas (Areas 1 through 5) on St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park contained 1 or more samples with  $SOR_N$  values exceeding ROD RGs.

Because an  $SOR_N$  value in excess of 1.0 averaged over 100 m<sup>2</sup> reflects a land area that exceeds the ROD RGs, area-weighted averaging was performed for areas in which the estimated extent of radiological contamination was less than 100 m<sup>2</sup>. If necessary, soil sample analytical data within the adjacent CWC corridor were utilized for averaging purposes. Results from these evaluations indicated the soil in Areas 1 through 5 exceeds ROD RGs.

Specific conclusions for Areas 1 through 5 are provided in the following subsections.

#### **6.1 AREA 1**

Area 1 is located in the central portion of St. Cin Park adjacent to the CWC corridor (see Figure 10). Twelve (12) soil sample locations with  $SOR_N$  values greater than 1.0 were identified in Area 1. As discussed in Section 5.1.1, the radiological results from these sample locations were used to estimate the areal and vertical extent of radiological contamination in this area.

#### 6.2 AREA 2

Area 2 is located near the CWC corridor in the northeastern portion of St. Cin Park (see Figure 10). Four (4) soil sample locations with  $SOR_N$  values greater than 1.0 were identified, in two separate locations, in Area 2. As discussed in Section 5.1.1, the radiological results from these sample locations were used to estimate the areal and vertical extent of radiological contamination in this area.

#### 6.3 AREA 3

Area 3 is located in the central portion of the Archdiocese of St. Louis Property, adjacent to the CWC corridor (see Figure 11). Twenty-seven (27) soil sample locations with  $SOR_N$  values greater than 1.0 were identified in Area 3. As discussed in Section 5.1.2, the radiological results from these sample locations were used to estimate the areal and vertical extent of radiological contamination in this area.

#### 6.4 AREA 4

Area 4 is located near the CWC corridor in the southwestern portion of Duchesne Park, adjacent to the CWC corridor (see Figure 12). One (1) soil sample location with an  $SOR_N$  value greater than 1.0 was identified in Area 4. As discussed in Section 5.1.3, the radiological results from this sample location were used to estimate the areal and vertical extent of radiological contamination in this area.

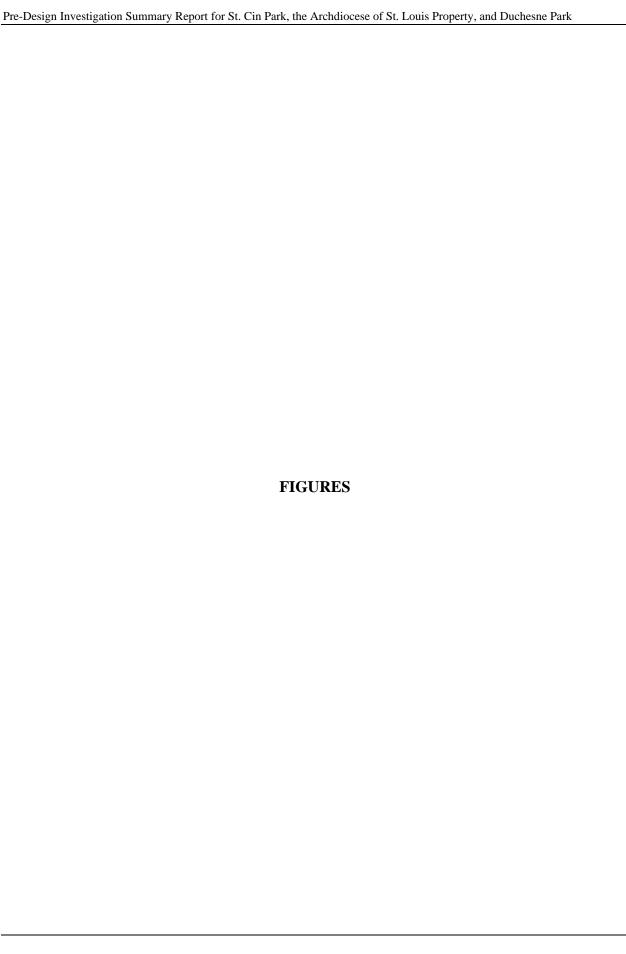
#### 6.5 AREA 5

Area 5 is located adjacent to the CWC corridor in the northwestern portion of Duchesne Park (see Figure 12). Five (5) soil sample locations with  $SOR_N$  values greater than 1.0 were identified in Area 5. As discussed in Section 5.1.3, the radiological results from these sample locations were used to estimate the areal and vertical extent of radiological contamination in this area.

#### 7.0 REFERENCES

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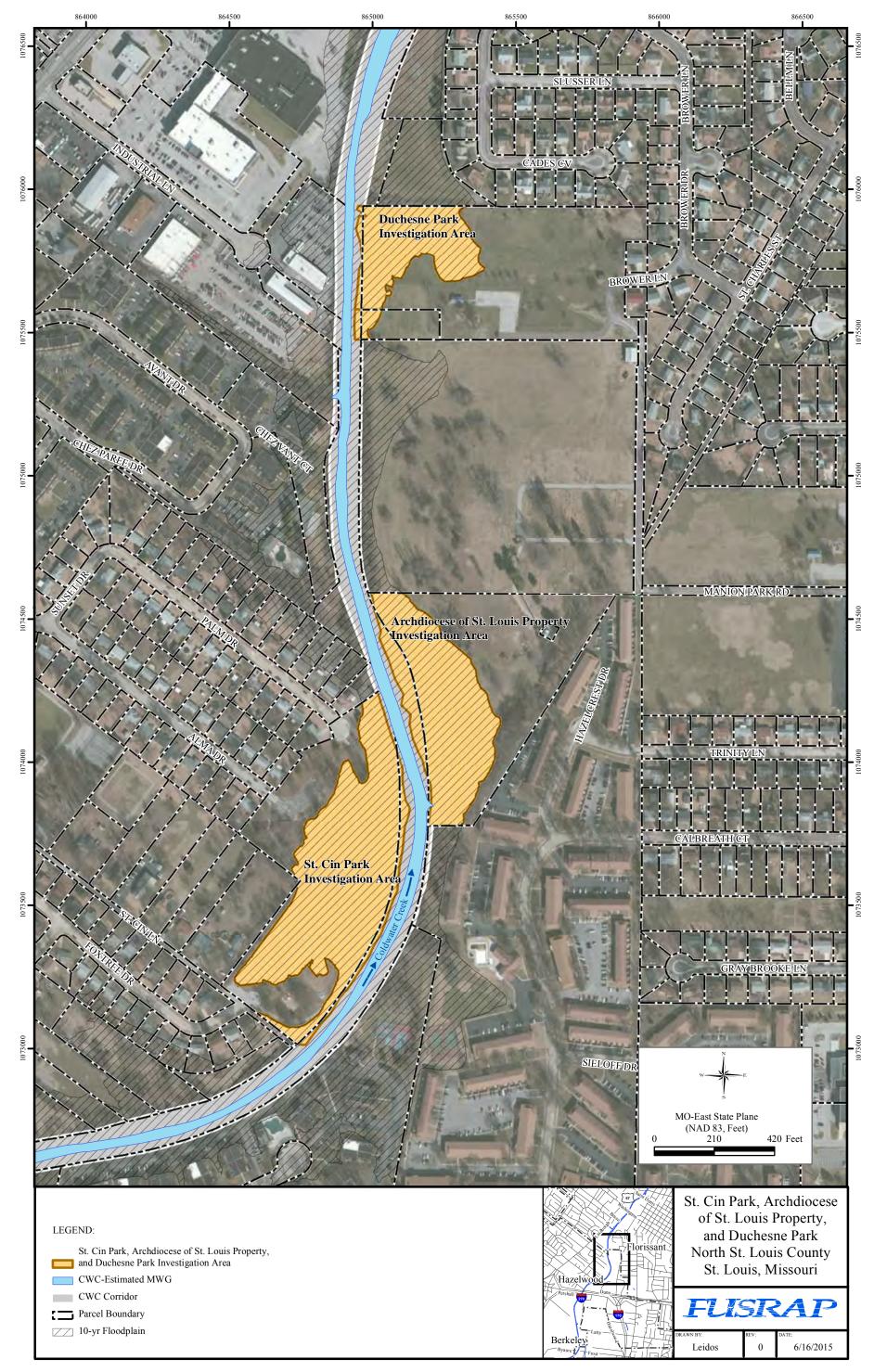


Figure 1. Location of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park



Figure 2. 2014 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park

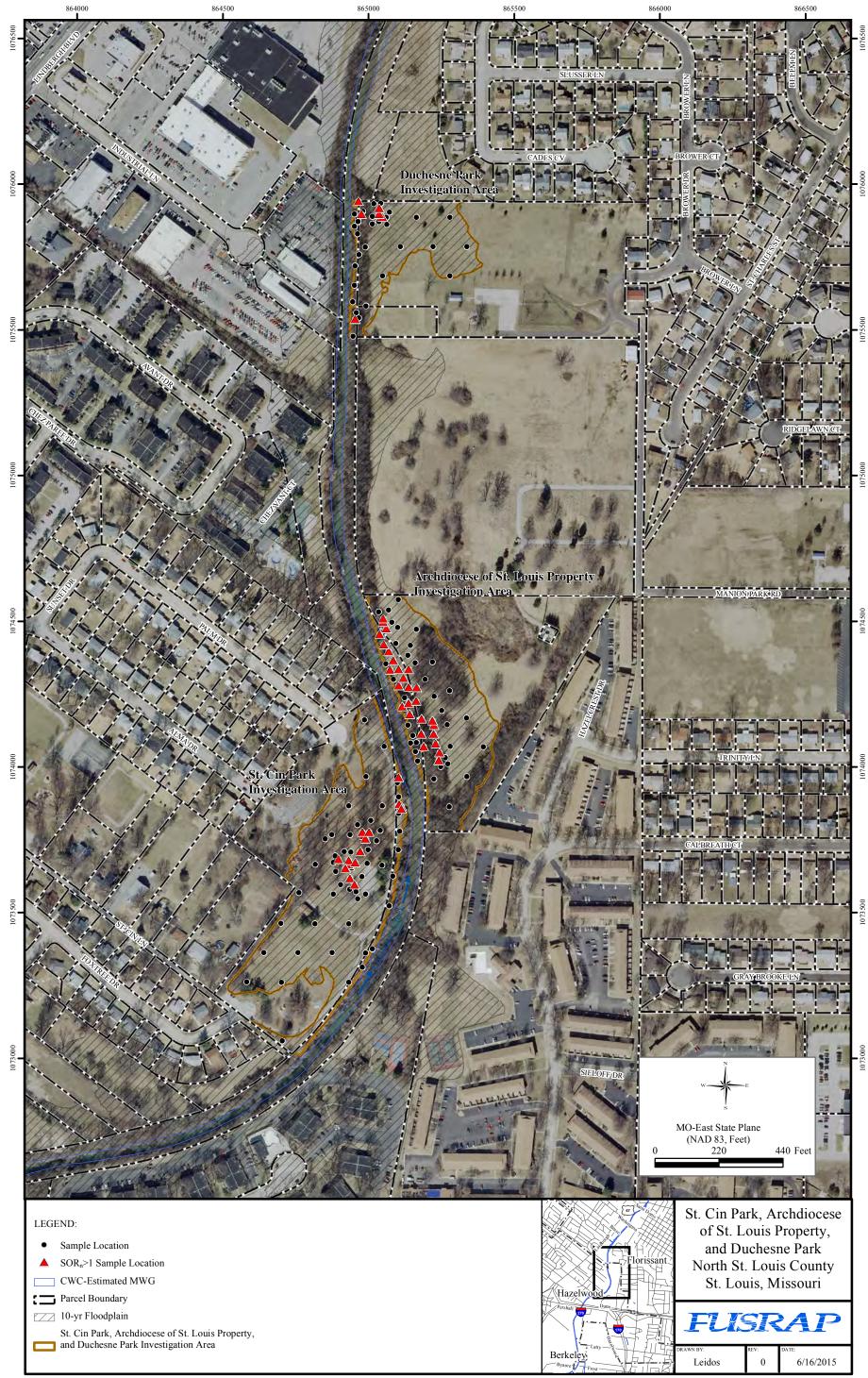


Figure 3. 2010 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park

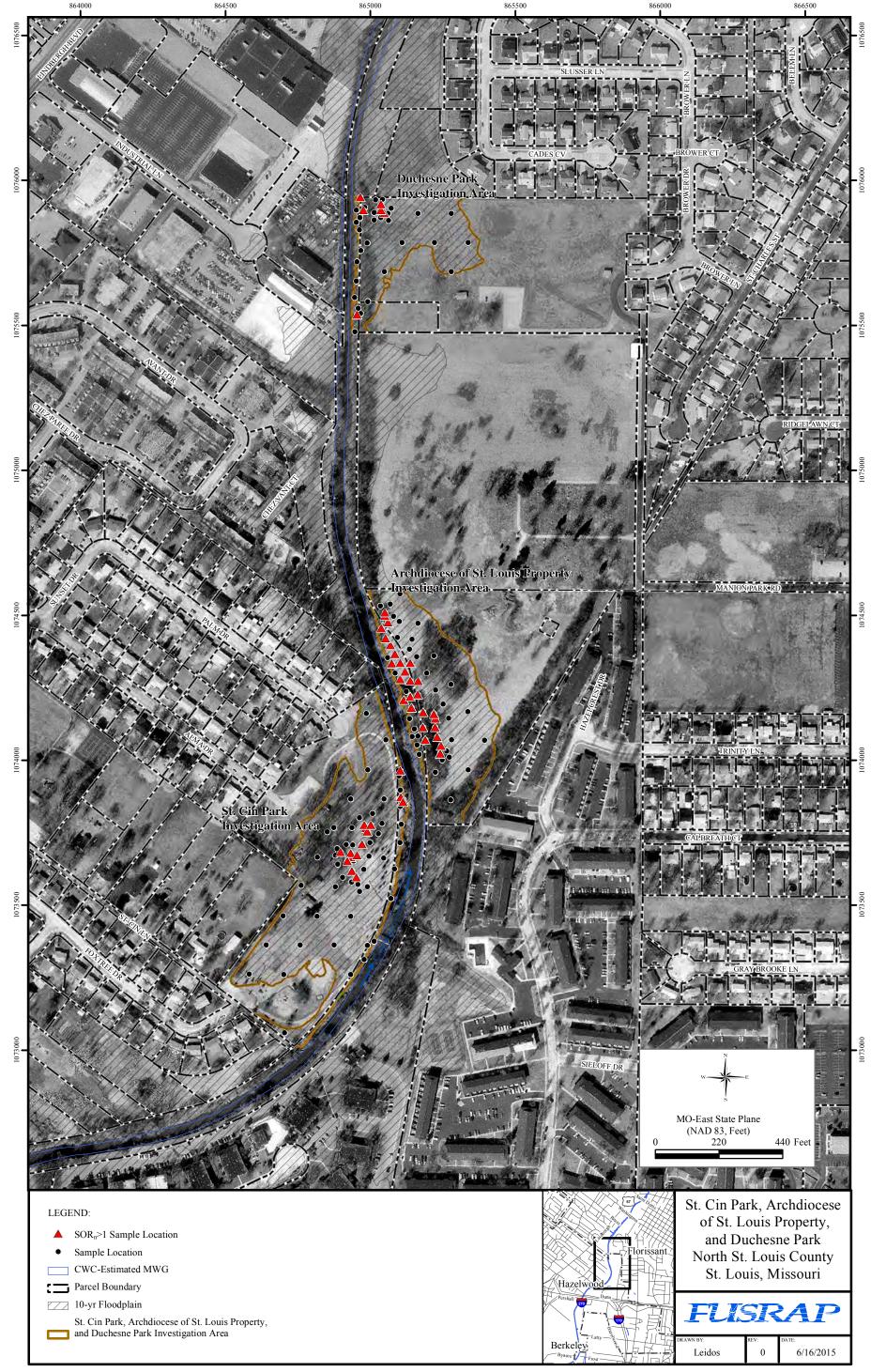


Figure 4. 1995 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park

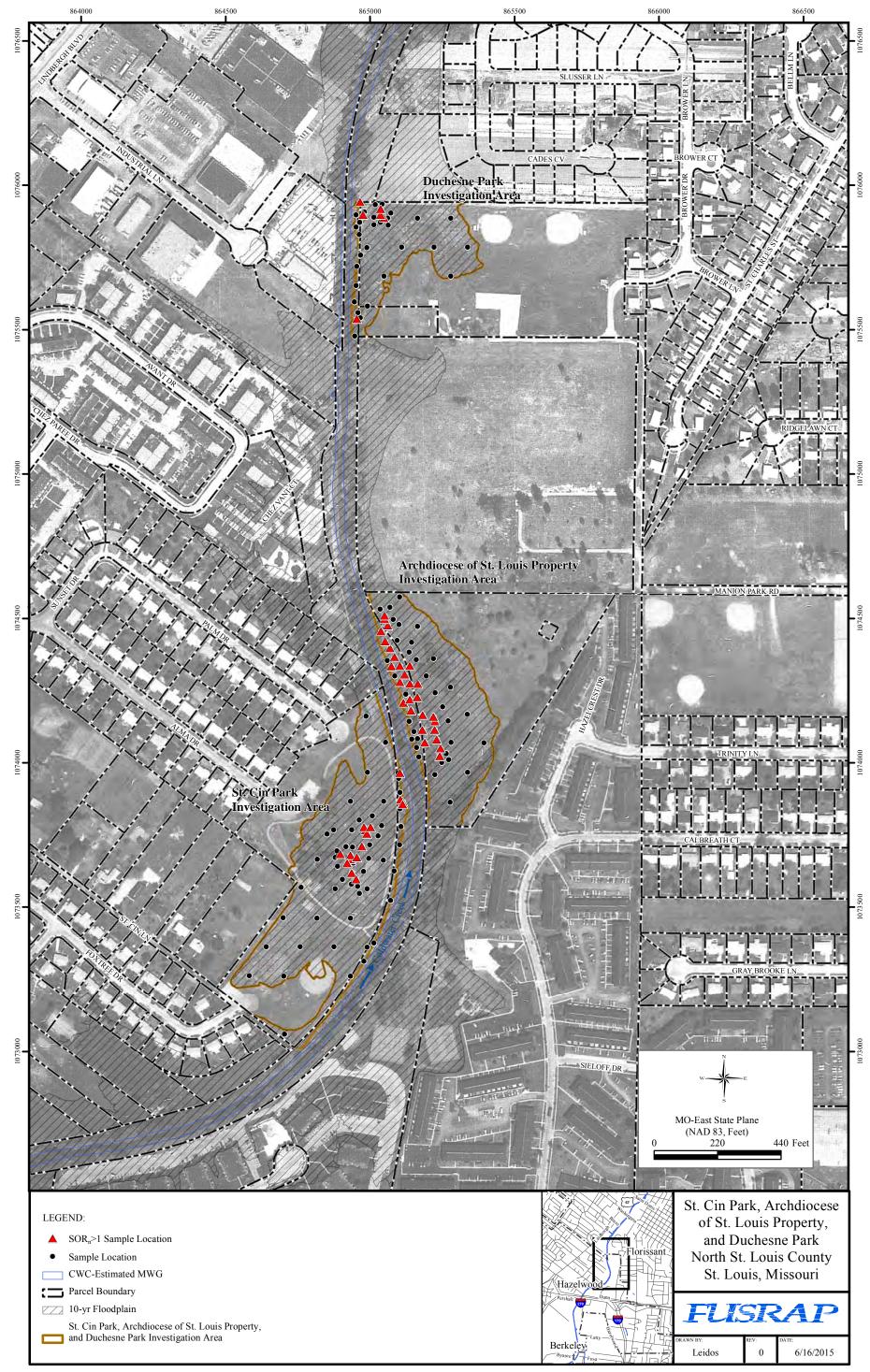


Figure 5. 1981 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park



Figure 6. 1971 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park



Figure 7. 1966 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park

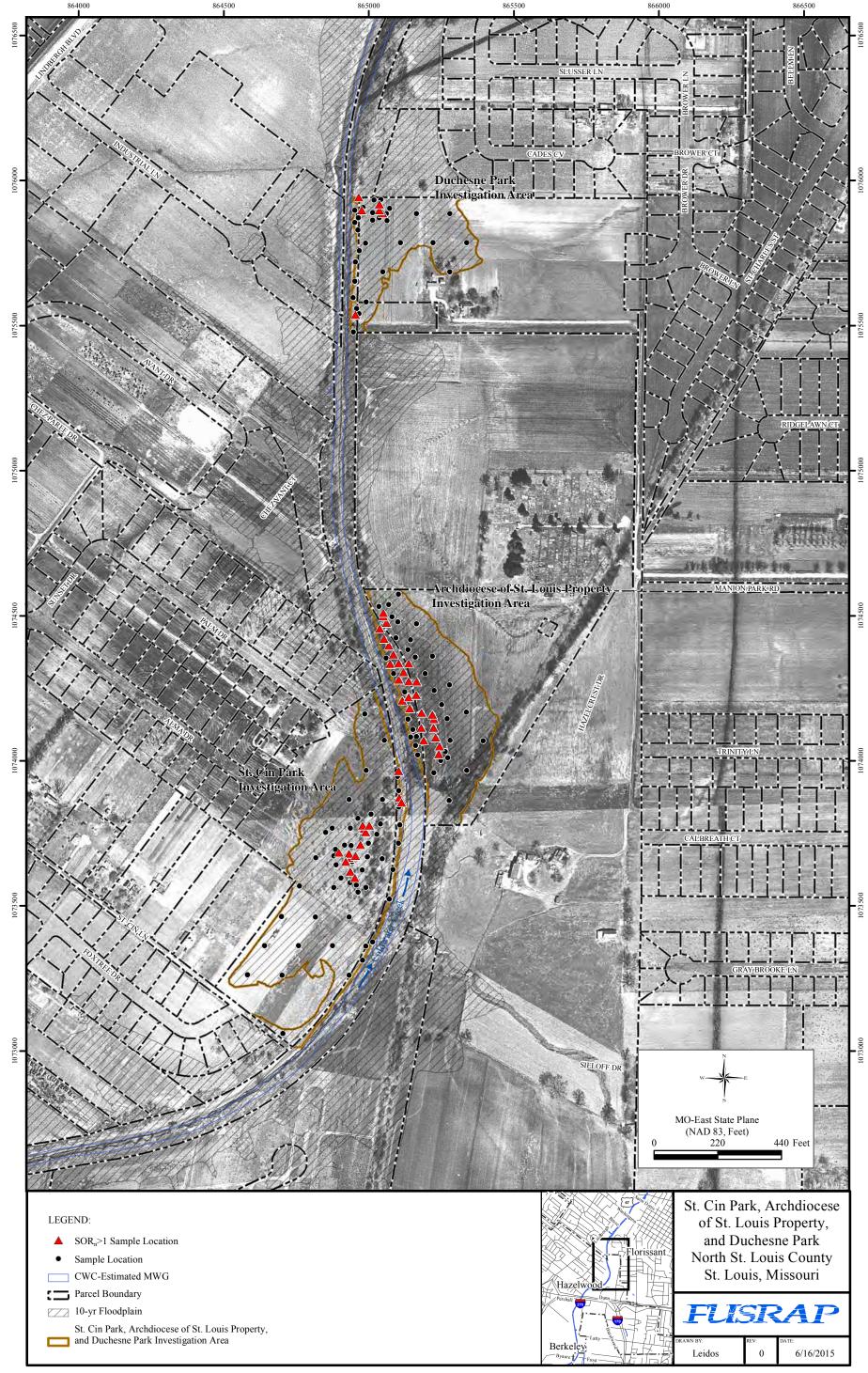


Figure 8. 1955 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park



Figure 9. 1937 Aerial Photograph of St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park

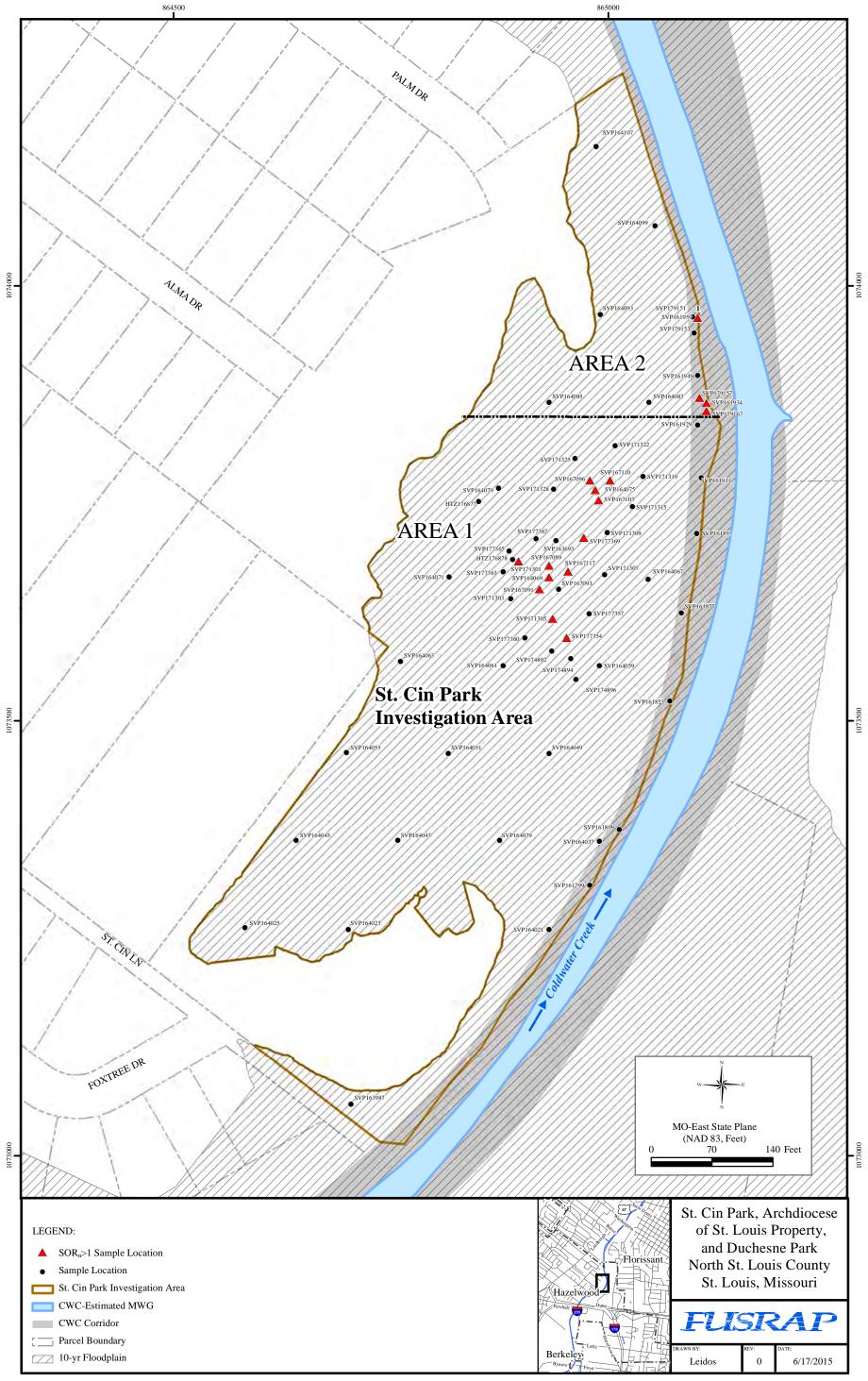


Figure 10. St. Cin Park Radiological Soil Sample Locations

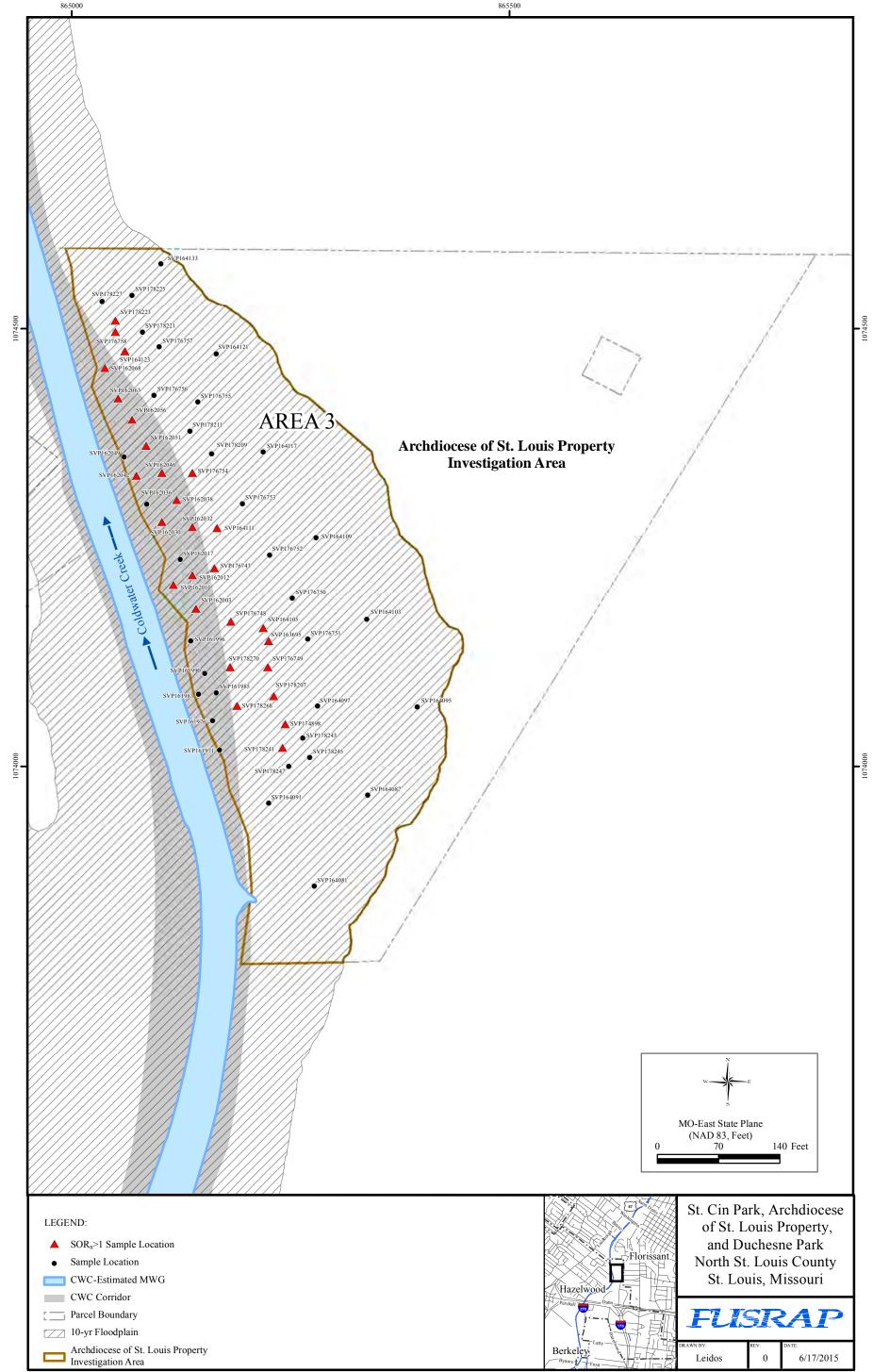


Figure 11. The Archdiocese of St. Louis Property Radiological Soil Sample Locations

Figure 12. Duchesne Park Radiological Soil Sample Locations

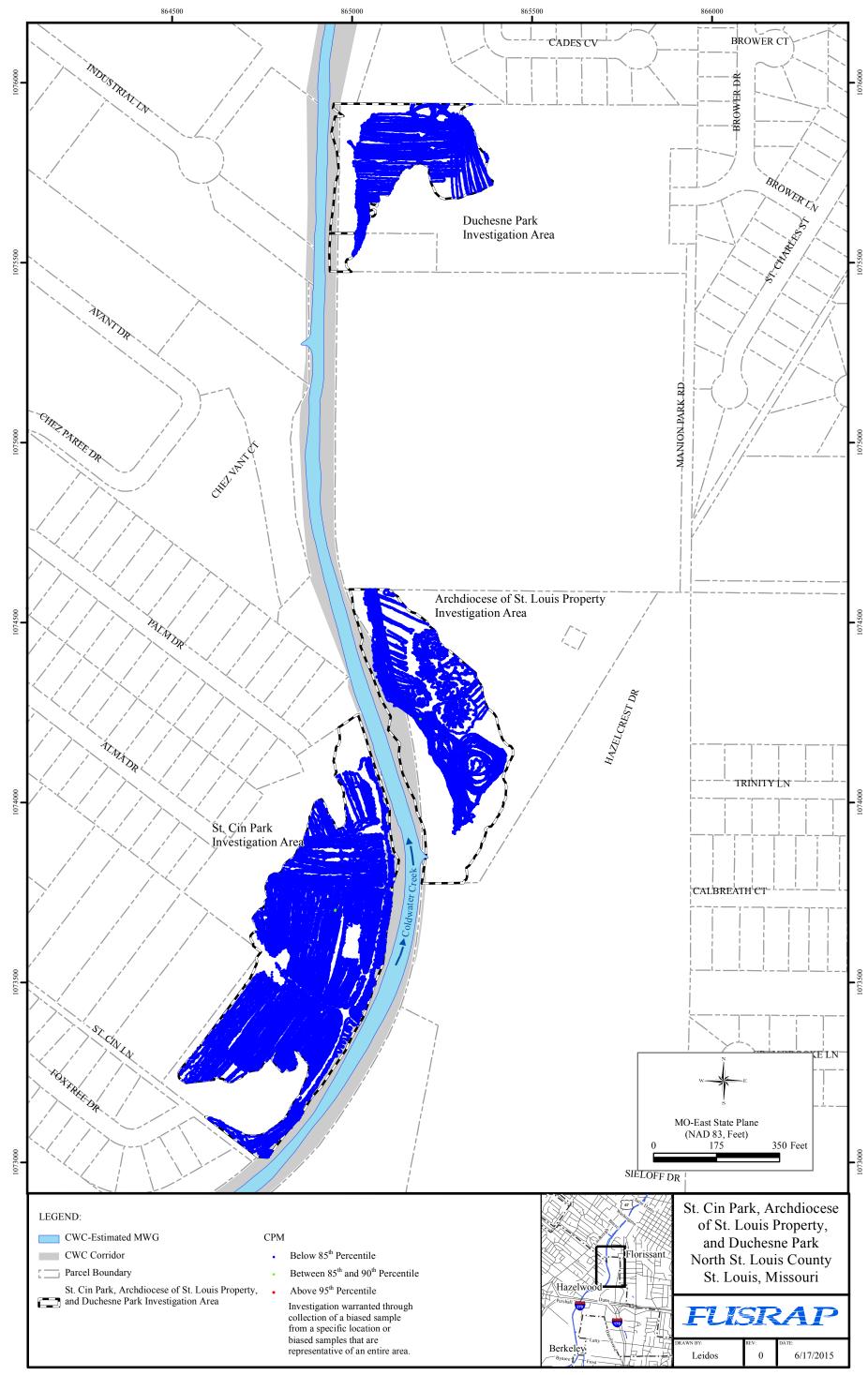
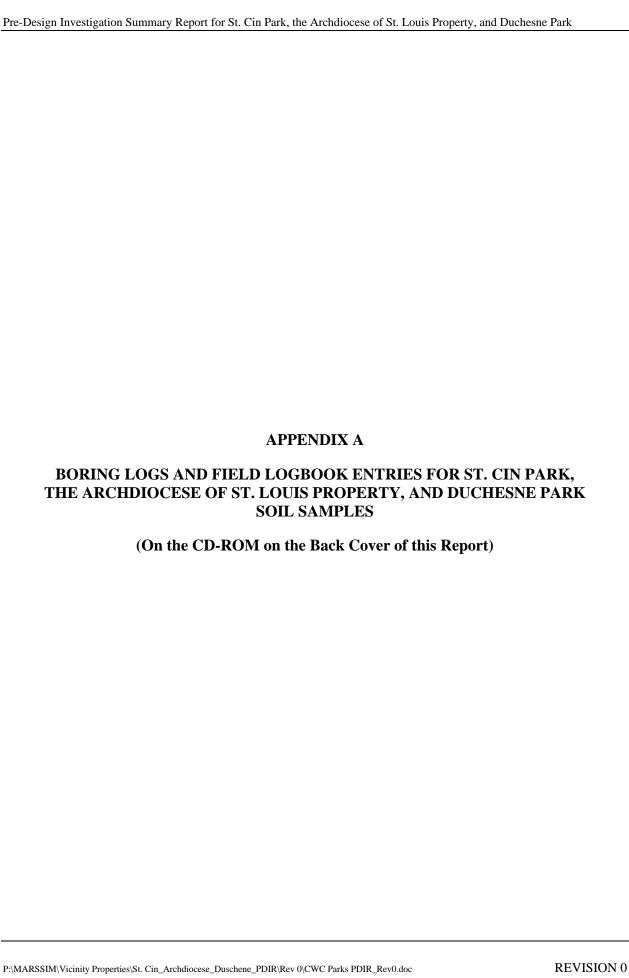


Figure 13. St. Cin Park, Archdiocese of St. Louis Property, and Duchesne Park Gamma Walkover Survey



Pre-Design Investigation Summary Report for St. Cin Park, the Archdiocese of St. Louis Property, and Duchesne Park
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Recorded By A. Mustyling Date 2/24/14		2.25.4		1	,					
Recorded By X/- // Date 2/24/14	QA By Date	e 2-26.14	Recorded By	1. Tentzling Date :	2/19/14		(			
			The second of th	Date_	<u> </u>	⊋A By	1	1	Date	L-26. H

				HTRW DRILLING	G LOG (Continuation S	Sheet)			HOLE N	UMBER 922 61893
HTRW DRILLING LOG	DISTRICT: St. Lou	uis USACE	HOLE NUMBER	PROJECT: Coldwater Cre		INSPECTOR:	6.1	Jestzling		SHEET 2 of 2
1. COMPANY NAME: <b>Leidos</b>	2. DRILL SUBCONTR	ACTOR: Leidos	SHEET 1 OF 2	USCS Depth (ft bgs)	Description of Materials	449 NAI	PID	Si	alytical Blow imple Counts	Remarks
3. PROJECT: Coldwater Creek		OCATION # 922 (system			eyey SILT, brown, little	57/			161843	
		MANUFACTURERS DESIGNATION OF DRI		The state of the s	we sawly low plasticely			- 73		
7. SIZES AND TYPES OF DRILLING Stainless Steel (ss) bo	wl, ss trowel, 8 H	HOLE COORDINATES		W W	WEI - ML	6563		23	pec	
with ss hand auger 3in sediment sampler with	plastic sleeve	E 865103 N/073715	5	05		PP-0				
Meter - Background		SURFACE ELEVATION N/A		1		59		- 14	02	
14-9 F - 35com 14-10 K - 5854erm	10	DATE STARTED 2/19/14	11 DATE COMPLETED 2/19/14	WIALK =		6197				
N/A			A	122				SVI	16194	
2. OVERBURDEN THICKNESS N/A		DEPTH GROUNDWATER ENCOUNTERED	-			68/				
3. DEPTH DRILLED INTO ROCK N/A		DEPTH TO WATER AND ELAPSED TIME				/ /	_	- I	76 -	
4. TOTAL DEPTH OF HOLE 2.0 Cf be		OTHER WATER LEVEL MEASUREMENTS				6454		98	AGC.	
18 GEOTECHNICAL SAMPLES N/A SISTURBED 20. SAMPLES FOR CHEMICAL ANALYSIS VOC	UNDISTURBED  METALS RAD	19 TOTAL NUMBER OF CORE BO SAMPLES QA/QC SAMPLES A	OXES N/A ARCHIVE SAMPLE 21 TOTAL CORE	15 = 51	Ky CLAY, brown mother	1		Au	chine	
N/A N/A	N/A	2 0	RECOVERY N/A	lung by	grey orange brown,	53		1 1 1 1 1	58 _	
22. DISPOSITION OF HOLE BACKFILLED  Backfill using bentonite w/bentonite		R (SPECIFY) 23 SIGNATURE OF INS	PECTOR	aliality for	car sand moderation	6311		Zse	7%	
LOCATION SKETCH/COMMENTS	MAC AND BASE	SCALE: N		4	145 THE, MOIST - GL	3,,,		73	pec	-
	: LE02202014	1-014		20 = 2	porchole terminated					(Soil)
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Approximately										
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Recorded By Aluftun Di	2/19/14/15		2.226.11		newtylung D					

ITOW BRILLING LOG	T: St. Louis USACE	HOLE NUMBER		LLING LOG (Continuation S			1 11		SVP 6	911
ITRW DRILLING LOG	. C. LOUIS USACE	SVP 161911	PROJECT Coldwa	Description of Materials	INSPECTOR:	1	entilin	Analytical	Blow	SHEET 2 of 2
COMPANY NAME: Leidos 2 DRILL	SUBCONTRACTOR Leidos	SHEET 1 OF 2	USCS Depth (ft bgs)		NAI	PID	Recovery	Sample VPIG-17	Counts	Remarks
PROJECT: Coldwater Creek	4 LOCATION # 930 (systematic a	mug) soil		Silty CLAY, brown, trace sould, low plasticity,	51/			·	11	
NAME OF DRILLER Mat Dostal Mandi Mayers	6 MANUFACTURERS DESIGNATION OF DRILL: N/A	0		moist - CL		-	1	1320 13074	-	
SIZES AND TYPES OF DRILLING Stainless Steel (ss) bowl, ss trowel,	8 HOLE COORDINATES:		==	(Possible Fill)	6552			Spec		
with ss hand auger 3in ID or ss sediment sampler with plastic sleeve	E 865103 N 1073777		0.5	Sitty CLAY, brown w/ few				3/		
Meter - Background	9 SURFACE ELEVATION: N/A		_=	pieces of tan silty CLA			_	/327	_	
4-9 F - 38 cpm 4-10 T - 5728 cpm	10 DATE STARTED: 2/26/14 11. DATE COM	PLETED 2 20/14	_	trace sand, low plasted				,		
		2/20/14	7	moist-CL (Passible P	100					
2 OVERBURDEN THICKNESS <b>N/A</b>	15 DEPTH GROUNDWATER ENCOUNTERED: N/A			Siky CLAY, grayish	52/			ا م ۔۔۔		
3 DEPTH DRILLED INTO ROCK N/A	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLIN		gram 1 at	love of death most		-	-	/334	_	
4 TOTAL DEPTH OF HOLE 2.6 ft bgs	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	N/A	1/20/14	low plasticity, moist —CL	6475					
18 GEOTECHNICAL SAMPLES N/A DISTURBED UND 20 SAMPLES FOR CHEMICAL ANALYSIS VOC METALS	DISTURBED 19 TOTAL NUMBER OF CORE BOXES: N/A  RAD SAMPLES QA/QC SAMPLES ARCHIVE SAMP	PLE 21 TOTAL CORE	3 =				9	PILIS	12	
N/A N/A N/A	2 0 0	RECOVERY: N/A	10 =		64		27	/338		
22 DISPOSITION OF HOLE BACKFILLED MONITORING Backfill using bentonite w/bentonite	OTHER (SPECIFY)  N/A  23. SIGNATURE OF HISPECTOR				6299	_		Is. 74		
and goals play 10 g 20 1							7	Spec		
LOCATION SKETCH/COMMENTS COC 4: LED22	2/20/4-01 H		2.0	Burchole terminates						
										Soil
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DISTRICT St. Louis USACE   HOLE NUMBER SVP	Leidos  SHEET 1 OF 2  # 913 (systematic among) 5011  TURERS DESIGNATION OF DRILL N/A  RDINATES: Q.D. 1215.14  36508541 N 107362244  SELEVATION N/A  ROUNDWATER ENCOUNTERED: N/A  DOWNTER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  DOWNTER AFTER DRILLING COMPLETED: 21 TOTAL CORE RECOVERY: N/A  SCALE: None  DOWNTER AFTER DRILLING COMPLETED: 21 TOTAL CORE RECOVERY: N/A  SCALE: None  DESCRIPTION of Materials  AND PID RECOVERY  FROCOVERY  SIMU CLAY, bream, trace  SAM, for plasticity, first consist of the materials  AND PID RECOVERY  SAMPLES  SIMU CLAY, bream, trace  SAMPLES  SOLOTION  SOLOTION  AND PID RECOVERY  SAMPLES  SAMPLES  SOLOTION	SVP / 6	MBER 913
COMPANY NAME: Leidos  2 ORAL SUBCONTRACTOR Leidos  3 PROJECT Coldwater Creek  4 LOCATION # 913 (Systematic array) 5 sil  5 PROJECT Coldwater Creek  4 LOCATION # 913 (Systematic array) 5 sil  5 MANUFACTURERS DEBIGNATION OF DRIEL NA  5 MANUFACTURERS DEBIGNATION OF DRIEL NA  6 MANUFACTURERS DEBIGNATION OF DRIEL NA  7 SUBPACE ELEVATION NA  10 DATE STARTED 2 2 2 1 1 1 DATE COMPLETED. NIA  10 DATE STARTED 2 2 2 1 1 1 DATE COMPLETED. NIA  10 DATE STARTED 2 2 2 1 1 1 TO THER WATER AND ELAPSED TIME AFTER ORALING COMPLETED. NIA  10 DATE STARTED 2 2 2 1 1 1 TO THER WATER AND ELAPSED TIME AFTER ORALING COMPLETED. NIA  10 DATE STARTED 2 2 2 1 1 1 TO THER WATER AND ELAPSED TIME AFTER ORALING COMPLETED. NIA  11 OTHER WATER LEVAL MEANURES SIPPOCEN NIA  12 DEPTIC OR CHAMBEA MANYEIS NIA  2 DASPOSITION OF HOLE 2 ADMITLES IN NIA  2 DASPOSITION OF HOLE 3 ADMITLES NIA  3 DEPTIC STARTED 2 2 2 1 TO TAL COME  8 MANUFACTURERS DEBIGNATION OF DRIEL NIA  15 DEPTI GROUNDWATER BECOUNTERED. NIA  16 DEPTI GROUNDWATER BECOUNTERED. NIA  17 OTHER WATER AND ELAPSED TIME AFTER ORALING COMPLETED. NIA  18 DEPTI GROUNDWATER BECOUNTERED. NIA  19 DEPTI GROUNDWATER BECOUNTERED. NIA  19 DEPTI GROUNDWATER BECOUNTERED. NIA  10 DATE STARTED 2 2 2 1 1 1 DATE COMPLETED. NIA  10 DATE STARTED 2 2 2 1 1 1 DATE COMPLETED. NIA  10 DATE STARTED 2 2 2 1 1 1 DATE COMPLETED. NIA  11 DATE COMPLETED NIA  12 TO THER WATER LEVAL MEASUREMENT (SPECIEVY)  10 DATE STARTED 2 2 2 1 1 TO TAL COME  10 DATE STARTED 2 2 2 1 TO TAL COME  11 TO THE STARTED 2 2 2 1 TO TAL COME  12 TO TAL STARTED 2 2 2 1 TO TAL COME  13 TO THE STARTED 2 2 2 1 TO TAL COME  14 DATE STARTED 2 2 1 TO TAL COME  15 TO THE STARTED 2 2 2 1 TO TAL COME  16 DATE STARTED 2 2 TO TALL COME  17 TO THE STARTED 2 2 2 1 TO TAL COME  18 DATE STARTED 2 2 TO TALL COME  19 DATE STARTED 2 2 TO TALL COME	Leidos  SHEET 1 OF 2  # 913 (systematic among) 5011  TURERS DESIGNATION OF DRILL N/A  RDINATES: Q.D. 1215.14  36508541 N 107362244  SELEVATION N/A  ROUNDWATER ENCOUNTERED: N/A  DOWNTER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  DOWNTER AFTER DRILLING COMPLETED: 21 TOTAL CORE RECOVERY: N/A  SCALE: None  DOWNTER AFTER DRILLING COMPLETED: 21 TOTAL CORE RECOVERY: N/A  SCALE: None  DESCRIPTION of Materials  AND PID RECOVERY  FROCOVERY  SIMU CLAY, bream, trace  SAM, for plasticity, first consist of the materials  AND PID RECOVERY  SAMPLES  SIMU CLAY, bream, trace  SAMPLES  SOLOTION  SOLOTION  AND PID RECOVERY  SAMPLES  SAMPLES  SOLOTION	ling	SHEET 2 of 2
A LOCATION # 915 (Systematic cares) 55 in Standard Corek  IN MARE OF DRILLER MAT Dostal (Marel Legacy  STANDARD OF DRILL NIA  B HOLE COORDINATES & Q.D. 12 15 - 14  E 86 50 854 N N N O 7 3 6 2 2 4  S SURFACE ELEVATION NIA  10 DATE STANDARD NIA  10 DATE STANDARD 2 2 2 2 4 1 11 DATE COMPLETED 2 2 2 1 1  11 DATE COMPLETED NIA  3. DEPTH DRILLER INTO ROCK: NIA  4. TOTAL DEPTH TO WASTER AND ELAPSED THAE AFTER DRILLING COMPLETED NIA  4. TOTAL DEPTH OF DRILLE NIO ROCK: NIA  4. TOTAL DEPTH OF DRILLER NIO ROCK: NIA  5. DEPTH DRILLER NIO ROCK: NIA  4. TOTAL DEPTH OF DRILLER NIO ROCK: NIA  6. REDITECTIONAL SAMPLES NIA  6. REDITECTIONAL SAMPLES NIA  6. REDITECTIONAL SAMPLES NIA  6. REDITECTIONAL SAMPLES NIA  7. TOTAL WASTER ROCOUNTERED NIA  8. REDITECTIONAL SAMPLES NIA  8. REDITECTIONAL SAMPLES NIA  9. SURFISHER CHARLES NICH SAMPLES NIA  9. SURFISHER CHARLES NICH SAMPLES NIA  1. TOTAL NIABERING OF CORE ROCKS NIA  1. SAMPLES OF CARRIES NICH SAMPLES NIC	# 913 (systematic among) Soil  FURERS DESIGNATION OF DRILL N/A  ROINATES: Q.D. 1215.14  36508X4 N.107362X4  ELEVATION N/A  ROUNDWATER ENCOUNTERED: N/A  ROUNDWATER ENCOUNTERED: N/A  DIVATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  B. QAIQC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  SCALE: None  SCALE: None  SIMY CLAY bream, frace  54  C4467  SAMPLES SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  SCALE: None	Sample Counts	Remarks
Standers Steel (se) bowl, as trowel, with the steel seven with the steel	RELEVATION N/A  SELEVATION N/A  RETED 2/2014  11. DATE COMPLETED 2/20/14  ROUNDWATER ENCOUNTERED: N/A  DIVATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  SO QUACK SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  SO QUACK SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE	519161877 1347	
Standes Steel (se) pow, as trovel, with a part of the	RELEVATION N/A  SELEVATION N/A  RETED 2/2014  11. DATE COMPLETED 2/20/14  ROUNDWATER ENCOUNTERED: N/A  DIVATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  SO QUACK SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  SO QUACK SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE	IsoTh -	
Moter - Background  443 9	ELEVATION N/A  RETED 2/20/14  11. DATE COMPLETED 2/20/14  ROUNDWATER ENCOUNTERED: N/A  DEPARTMENT OF LAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  G. QA/QC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  TOTAL NUMBER OF INSPECTOR  SCALE: None  SCALE: None	9 anna 3 pcc	
9 SURFACE ELEVATION N/A  4449	ROUNDWATER ENCOUNTERED: N/A  O WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  S QAYQC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  Y) 23 SIGNATURE OF INSPECTOR  SCALE: None  11. DATE COMPLETED 2/20/14  12. DATE COMPLETED 2/20/14  13. DATE COMPLETED 2/20/14  14. DATE COMPLETED 2/20/14  15. DATE COMPLETED 2/20/14  16. DATE COMPLETED 2/20/14  16. DATE COMPLETED 2/20/14  17. DATE COMPLETED 2/20/14  18. DATE COMPLETED 2/20/14  19. DATE COMPLETED 2/2		
10 DATE STARTED 2/2011  11 DATE COMPLETED 2/2014  12 OVERBURDEN THICKNESS NIA  15 DEPTH GROUNDWATER ENCOUNTERED. NIA  16 DEPTH TO WATER AND EAPSED TIME AFTER DRAILING CONPLETED. NIA  16 DEPTH TO WATER AND EAPSED TIME AFTER DRAILING CONPLETED. NIA  17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NIA  18 GEOTECHNICAL SAMPLES: NIA  20 SAMPLES FOR CHEMICAL ANALYSIS. VOC METALS RAD SAMPLES OACC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORR  NIA  NIA  NIA  NIA  NIA  NIA  NIA  N	ROUNDWATER ENCOUNTERED: N/A  ROUNDWATER ENCOUNTERED: N/A  D WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  S QAVOC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  Y) 23 SIGNAFURE OF INSPECTOR  SCALE: None  1.5 CALE: None  L625  SIFTY Clay, brown w/  Mit of Can method by  dark bring army ish brown,  Authority of Can method by  Army State Sand Jon to  RECOVERY: N/A  S GALE: None	1352 _	
15. DEPTH GROUNDWATER ENCOUNTERED. N/A  16. DEPTH DRILLED INTO ROCK. N/A  17. OTHER WATER LEVEI. MEASUREMENTS (SPECIFY). N/A  18. GEOTECHNICAL SAMPLES: N/A  19. DISTURBED  19. TOTAL NUMBER OF CORE BOXES. N/A  20. DISTURBED  19. TOTAL NUMBER OF CORE BOXES. N/A  20. DEPTH DRILLED INTO ROCK. N/A  18. GEOTECHNICAL SAMPLES: N/A  19. N/A  10. N/A  10. N/A  20. DEPTH DRILLED INTO ROCK. N/A  19. TOTAL NUMBER OF CORE BOXES. N/A  20. DEPTH DRILLED INTO ROCK. N/A  20. DEPTH DRILLED INTO ROCK. N/A  21. DEPTH DRILLED INTO ROCK. N/A  22. DEPTH DRILLED INTO ROCK. N/A  23. DISTURBED  19. TOTAL NUMBER OF CORE BOXES. N/A  24. DEPTH DRILLED INTO ROCK. N/A  25. DEPTH DRILLED INTO ROCK. N/A  26. DEPTH DRILLED INTO ROCK. N/A  27. DEPTH DRILLED INTO ROCK. N/A  28. DEPTH DRILLED INTO ROCK. N/A  29. DEPTH DRILLED INTO ROCK. N/A  20. DEPTH DRILLED INTO ROCK. N/A  21. DEPTH DRILLED INTO ROCK. N/A  22. DEPTH DRILLED INTO ROCK. N/A  23. DEPTH DRILLED INTO ROCK. N/A  24. DEPTH DRILLED INTO ROCK. N/A  25. DEPTH DRILLED INTO ROCK. N/A  26. DEPTH DRILLED INTO ROCK. N/A  27. DEPTH DRILLED INTO ROCK. N/A  28. DEPTH DRILLED INTO ROCK. N/A  29. DE	SUND ROUNDWATER ENCOUNTERED: N/A  SO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  SO QA/QC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  SO QA/QC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVER		
3. DEPTH DRILLED INTO ROCK. N/A  4. TOTAL DEPTH OF HOLE  2. Of  17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY). N/A  8. GEOTECHNICAL SAMPLES: N/A  19. SAMPLES FOR CHEMICAL ANALYSIS  10. SAMPLES FOR CHEMICAL ANALYSIS  11. TOTAL DUMBER OF CORE BOXES. N/A  12. TOTAL DUMBER OF CORE BOXES. N/A  13. TOTAL DUMBER OF CORE BOXES. N/A  14. SAMPLES FOR CHEMICAL ANALYSIS  15. TOTAL DUMBER OF CORE BOXES. N/A  16. SAMPLES FOR CHEMICAL ANALYSIS  17. TOTAL DUMBER OF CORE BOXES. N/A  18. SAMPLES FOR CHEMICAL ANALYSIS  18. SAMPLES FOR CHEMICAL ANALYSIS  19. TOTAL DUMBER OF CORE BOXES. N/A  19. TOTAL DUMBER OF CORE BOXES. N/A  19. SAMPLES FOR CHEMICAL ANALYSIS  19. SAMPLES FOR CHEMICAL ANALYSI	WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A  ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  GOA/QC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  Y) 23 SIGNATURE OF INSPECTOR  SCALE: None  A Mix of tan mathbalby dayle by any sisk of tan mathbalby dayle by a	4.5444	-
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A  18. GEOTECHNICAL SAMPLES N/A  19. TOTAL DEPTH OF HOLE  19. TOTAL NUMBER OF CORE BOXES: N/A  10. SAMPLES FOR CHEMICAL ANALYSIS  10. VOC  10. N/A  10. N/A  10. N/A  10. N/A  10. N/A  10. DISTURBED  11. TOTAL DEPTH OF HOLE  12. TOTAL CORE  12. TOTAL CORE  13. RAD SAMPLES  14. OAQC SAMPLES  15. ACHIVE SAMPLE  16. GAVG SAMPLES  17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)  18. GEOTECHNICAL ANALYSIS  19. TOTAL NUMBER OF CORE BOXES: N/A  10. ANA  10.	ATER LEVEL MEASUREMENTS (SPECIFY) N/A  TOTAL NUMBER OF CORE BOXES: N/A  G QA/QC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  Y) 23 SIGNATURE OF INSPECTOR  SCALE: None  Adout bon 9 analysh botton, to hardwark plasficity, the same plasficity that the same plasficity the same plasficity that the same plasf	SUPIL(878	2
18. GEOTECHNICAL SAMPLES: N/A DISTURBED UNDISTURBED 19 TOTAL NUMBER OF CORE BOXES: N/A 20. SAMPLES FOR CHEMICAL ANALYSIS VOC METALS RAD SAMPLES QUACC SAMPLES N/A N/A N/A N/A 21. SOURCE SAMPLES N/A N/A N/A 22. DISPOSITION OF HOLE BACKFILLED MINTORING OTHER (SPECIFY) 23. SIGN SUITE OF PURPLETOR BEACKFILLED SCOCK: LE 022/20/4 - 0/H  SCALE: None  COCK: LE 022/20/4 - 0/H  SCALE: None  13. 4PF3 13. 4PF	TOTAL NUMBER OF CORE BOXES: N/A  G QA/QC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  Y) 23 SIGNATURE OF INSPECTOR  SCALE: None  There said, lon to moderable plasficity, and a signature of inspector  Brown of the said plasficity, and a signature of inspector  Brown of the said plasficity, and a signature of inspector  Brown of the said plasficity, and a signature of inspector.	- 1353 Iso TA	Possible Fill
20. SAMPLES FOR CHEMICAL ANALYSIS  VOC  METALS  RAD SAMPLES  RAD SAMPLES  RAD SAMPLES  RACKINES SAMPLE  RECOVERY: N/A  RACKINES SAMPLE  RECOVERY: N/A  RECOV	QAVQC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A  Y) 23 SIGNATURE OF INSPECTOR  SCALE: None  A Republication of the sample of the samp	Spee	transition
22. DISPOSITION OF HOLE  BACKFILLED  BACKFILLED  MONITORING  OTHER (SPECIFY)  23 SIGNATURE OF MARTITOR  N/A  N/A  N/A  N/A  N/A  N/A  N/A  N/	y) 23 SIGNATURE OF INSPECTOR SCALE: None  4 Republic term in a tal	Archive	to mottled
Backfill using bentonite w/bentonite N/A N/A N/A Solder None  LOCATION SKETCH/COMMENTS  COC #: LE 022/20/4 - 0/H  SCALE: None  5  124FP3  907  904  904  905  904  8	SCALE: None  SCALE: None  SCALE: None	/349 _	Soil. 7
COC #: LE 022/20/4 - 6/H  pproximately  913  915  917  124F8  907  123FF8  8	1 Romando Terra in a test		
5 ————————————————————————————————————	5		
pproximately 913 \$915 \$915 \$915 \$915 \$915 \$915 \$915 \$915	5 6 8 9 9 9 10 10 10 10 10 10 10 10 10 10 10 10 10		
Approximately  4 913 915 915 915 915 915 915 915 915 915 915	5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		Soil
Approximately  124FF3  907  908  908  908  8	7 7 2 1 1 2 1 1 2 1 2 1 2 1 2 1 2 1 2 1		
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900 \$901 \$902 \$904 \$903 \$904 \$904 \$905 \$904 \$905 \$905 \$905 \$905 \$905 \$905 \$905 \$905	6 7 7 123FP9 8 9 9 10		
913 914 915 4 915	6 — 7 — 7 — 7 — 7 — 7 — 7 — 7 — 7 — 7 —		
7 ————————————————————————————————————	7 - 123FPB 8 - 9 - 10 - 10 - 10 - 10 - 10 - 10 - 10		-
912 910 911 7 7 123FPS 8 907 904 905 901 905 901 900 900 900 900 900 900 900 900 900	7 - 1131FPS 8 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -		
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TRW DRILLING LOG				NG LOG (Continuation SI					1949
IVII DIVILLING LOG	DISTRICT: St. Louis USACE	HOLE NUMBER	HINT Coldwater C	reek	INSPECTOR:	5. Neut	ling		SHEET 2 of 2
OMPANY NAME: Leidos	2. DRILL SUBCONTRACTOR Leidos	SVP 161949 SHEET 1 OF 2	Depth (ft bgs)	Description of waterials	449 NAI	PID R		nalytical Blow Sample Counts	Remarks
ROJECT: Coldwater Creek	4 LOCATION # 948 (Systems			SILT, brown, some clay to little find	65		1	19161949 758 —	moved 2 ft west.
AME OF DRILLER: Charle Finkenbein / Rick Whit	6 MANUFACTURERS DESIGNATION OF DRILL:	01		end, low plasticity,	2078	436		• 73	Nest.
Stainless Steel (ss) bowl, s with ss hand auger 3in ID o sediment sampler with plas	ss trowel, 8 HOLE COORDINATES &3 12.15.1	99 )	1,=	moist	20 10		-75	P161950	·
er - Background		164-	0.5		67/				1
0 F - 1939 Cpm (30 see count)	9 SURFACE ELEVATION N/A		Must live		2052	-	J	800 -	
- 12 Cpm (30 Sec Commot)	10. DATE STARTED: 2/24/14 11. DA	ATE COMPLETED 2/24/14	1/2/201		2092		3	spec	
OVERBURDEN THICKNESS N/A	15 DEPTH GROUNDWATER ENCOUNTERED: N/A		1 2 =		EAI		1		
EPTH DRILLED INTO ROCK N/A	16 DEPTH TO WATER AND ELAPSED TIME AFTER	R DRILLING COMPLETED. N/A			54/	_	- 0	802 -	
OTAL DEPTH OF HOLE 2.0 ft bgs	17 OTHER WATER LEVEL MEASUREMENTS (SPE	CIFY) N/A			12164				
SEOTECHNICAL SAMPLES N/A DISTURBED	UNDISTURBED 19. TOTAL NUMBER OF CORE BOXES:	N/A	x -=						
AMPLES FOR CHEMICAL ANALYSIS VOC  N/A  N/A		VE SAMPLE 21 TOTAL CORE RECOVERY N/A	1.5 <u>=</u>		54			chino	
ISPOSITION OF HOLE BACKFILLED M					1	_		1804 _	
kfill using bentonite w/bentonite	MONITORING OTHER (SPECIFY)  N/A  N/A  N/A  23. GENATURE OF INSPECTO	uc			2226			Spee	
CATION SKETCH/COMMENTS	SCALE: None		A -		-			Spee	
	: LE02242014-09H		20 =	Borhole terminated					
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rded By 1. Mentsless Date 2	Challe QA By	Date 2-26-14		600 1 1 1 1			1		
	/ /		Recorded By	1. Neutrling 2/24/14 Da	te	QA By		5	Date 2-26

						UTRW DR	ILLING LOG	(Continuation Sh	eet)				HOLE NUM	•	
HTRW DRILLING L	LOG	DISTRICT:	St. Louis USACE		HOLE NUMBE SVP 16/1	BER Colde			INSPECTOR:	G.N.	act 1	ing	OVITA	SHEET 2 of 2	
1. COMPANY NAME: Leidos		2 DRIII SUI	BCONTRACTOR: Lei		SHEET 1 OF	USCS Depth	Desc	cription of Materials	449 NAI	PID	Recovery	Analytical Sample	Blow Counts	Remarks	-
3. PROJECT: Coldwater Creek		a. Divice dol					Clayer SI	LT, brown, trace uplasticity, moisi	ed -		3	VP1618	33	Collect ada	A
5. NAME OF DRILLER: Chuck F		White		ERS DESIGNATION O	9	Sui)	- sandy in	Moisi	/ 7			08/9 Iso Th	-(	SVP161853-1	Y
7. SIZES AND TYPES OF DRILLING	Stainless Steel (ss) b	owl, ss trowel,	8 HOLE COORDII		312-15-14		$\equiv$	,	2.124			Spec	(	SVP161853-2	Æ
1 **	vith ss hand auger 3 sediment sampler wi			6871 NIC		1 -5	Sith CLA	Y rad but bunner				11-			
Meter - Background 44-9 F - 38 cam			9 SURFACE ELEV	ATION N/A			- trace son	y, red that brown, of moderately moist - CL	58			0825	_	Possible	
44-10 F - 1939 Cpm	(30 sec com	<u>t)</u>	10. DATE STARTE	D: 2/24/14	11. DATE COMPLETED 2/24	4/4	plastic,	moist - CL	2105					£1.11.1.3	
12. OVERBURDEN THICKNESS N/A	Α			NDWATER ENCOUNT		2 -						YP1618	EA.		
13. DEPTH DRILLED INTO ROCK: N					TIME AFTER DRILLING COMPLETED.	N/A	=		60/ 4		_	0828			
14. TOTAL DEPTH OF HOLE 6.0					ENTS (SPECIFY): N/A	WWW.			2288			Tio The			
18. GEOTECHNICAL SAMPLES: N/A	7	D UNDIST		TAL NUMBER OF CO		J. J. J.						Spec			
20. SAMPLES FOR CHEMICAL ANAL	YSIS VOC	METALS	RAD SAMPLES	QA/QC SAMPLES			=		55			drich.	1		E
N/A 22. DISPOSITION OF HOLE	N/A BACKFILLED	N/A MONITORING	OTHER (SPECIFY)	/sefef 2		RY IN/A	$\equiv$		×	-	_	0830			
Backfill using bentonite	w/bentonite	N/A	N/A	23. SIGNATURE OF	FINSPECTOR METAL STATE OF THE S			a University	2202			IsoTh.			
LOCATION SKETCH/COMM	MENTS SOIL P	124114 LEO22426	id - AQU	SCAL	E: None	4	215		Γ. 🗸			Spec			1
		1 1 1				2,0	Bornelse	www.spa	2145 <sup>x</sup>		_	0936	_	(Soil)	
									59/			0937			
N						8	$\equiv$		12189		_		-		, E
						3			70/2074	* -		50744 50744	59	sample id fr pec loc #903	3710
Approximately							] `	N d	/2014	1	•	4 soth of	Conne !	pec 100 4-703	' E
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12481		4 903	904	A 608	123FP8	7	- lettle from	somely low plastice	2/43		-	0,0,0		10 20,000	
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Recorded By	withred	Date <u>474/14</u>	QA By		Date 2-26-14	Recorded	In 1	long 1/24/14 Date		QA By		$\approx$	\	Date <u>2</u> -	ຼາ
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			HTRW DRILLING	G LOG (Continuation Sh	eet)			HOLE NUMBI	R 1/5 FPS
HTRW DRILLING LOG	DISTRICT: St. Louis USACE	HOLE NUMBER	PROJECT Coldwater Cree	ek	INSPECTOR:	6 11	est fine		SHEET 2 of 2
III/44 DIVIETING FOO		SVP164037	USCS Depth (ft bgs)	Description of Materials	449	11	Analytical	Blow	Remarks
. COMPANY NAME: Leidos	2. DRILL SUBCONTRACTOR: Leidos	SHEET 1 OF 2		anew SILT. homen little	NAI		Sample SVP1640	Counts	
3. PROJECT: Coldwater Creek	4 LOCATION # 115 FPS Glood	Iplain systematic	A Air	ayey SILT, brown, little in band, low plestreity, orst pre	62		_ 1011	_	
5. NAME OF DRILLER: Chack Finkenbein Rick	White 6 MANUFACTURERS DESIGNATION OF DRILL		m	oist me	2038		Iso The	Samuel A	
7 SIZES AND TYPES OF DRILLING STAINLING EQUIPMENT Stainless Steel (ss) bowl, with ss hand auger 3in ID	D =		7.5				spec		
sediment sampler with pl	plastic sleeve E 864990 N 107336	5/	0.5		1				
Meter - Background 44-9 F - 38 Cpm	9. SURFACE ELEVATION N/A		IIIWW -		74/	-	_ 1013	_	
44-10 F - 1939 cpm (30 second co	10. DATE STARTED: 2/21/14	. DATE COMPLETED: 3/34/14	1 2		2126				
12. OVERBURDEN THICKNESS <b>N/A</b>	15. DEPTH GROUNDWATER ENCOUNTERED. N	N/A	1 3 50	by CLAY brown little					
13. DEPTH DRILLED INTO ROCK N/A	16 DEPTH TO WATER AND ELAPSED TIME AFT	TER DRILLING COMPLETED: N/A	fin =	by CLAY, borns, little search, lowplasticity,	65/		1015		
14. TOTAL DEPTH OF HOLE 2.5 Ft b45	17 OTHER WATER LEVEL MEASUREMENTS (S			soist _ CL	2138*				1 8
18. GEOTECHNICAL SAMPLES: N/A DISTURBED	UNDISTURBED 19 TOTAL NUMBER OF CORE BOXE	ES: N/A	8		6100				
20. SAMPLES FOR CHEMICAL ANALYSIS VOC	METALS RAD SAMPLES QA/QC SAMPLES ARC	CHIVE SAMPLE 21. TOTAL CORE RECOVERY. N/A	1.5		0,	1 1	SUP164	938	
N/A N/A 22. DISPOSITION OF HOLE BACKFILLED	N/A 2 O STATURE OF INSPEC			1 4	83 *	_	- 1010	-	
Backfill using bentonite w/bentonite	N/A N/A Gary fee	utslang		a // // //	2212		Tso Th	-	
LOCATION SKETCH/COMMENTS	LE02242014-09 H	ne	A	12/20			Archiva	1	
			2.0		54		_ 1019		
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N			8		/2120		5000		
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			= *:	30 second count					
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Recorded By Author Da	to 2/24/14 04 BV	Date 2-26-14	Recorded By	Maria de la companya della companya					

OMPANY NAME: Leidos 2. D  ROJECT: Coldwater Creek	TRICT: St. Louis USACE	HOLE NUMBER	Coldwater Creek		INIODEOTOD					1
ROJECT: Coldwater Creek		SVP 163987	PROJECT: Coldwater Creek	Description of Materials	INSPECTOR:	— т	Apal	ytical Blow	SHEET 2 of 2	
ROJECT: Coldwater Creek	RILL SUBCONTRACTOR Leidos	SHEET 1 OF 2	Depth (ft bgs)		449 NAI	PID	Recovery Sar	npie Counts	Remarks	
	4 LOCATION # 94 FPS (Flora Plan		Clay	sand, longlastrut	65/		12	1.00		
AME OF DRILLER: RickWhitney / Check Finkey	6 MANUFACTURERS DESIGNATION OF DRILL N/A	An 5457 countre	- fine	Sand, broplastical	2221	_	Tso			
ZES AND TYPES OF DRILLING Stainless Steel (ss) bowl, ss trowe			] J = Mo	ist - Mc	3721		700	000		E
with ss hand auger 3in ID or ss sediment sampler with plastic sle	* 0 / dm		10h =				7			
ter - Background	9 SURFACE ELEVATION N/A				32		/2	19 _	Change in	
9 F - 32 cpm		OMDI ETER	UNIV 183 CU	MINU WILLIAM	3824				bowt.	
	10. DATE STARTED: 2/24/14 11. DATE CO	DMPLETED 2/34/14	12 3/1	14 Trace	1					
OVERBURDEN THICKNESS N/A	15 DEPTH GROUNDWATER ENCOUNTERED: N/A		1 may race	, CLAY, redthirt brown sand, trice according plasticity, moist - CL	7 60			163988		
DEPTH DRILLED INTO ROCK: N/A	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILL	LING COMPLETED: N/A	121-100	7	58			76 -		
TOTAL DEPTH OF HOLE 2.0 ft bes	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	N/A			4009		9	mand.		
GEOTECHNICAL SAMPLES: N/A DISTURBED	UNDISTURBED 19 TOTAL NUMBER OF CORE BOXES N/A		36					1-		
SAMPLES FOR CHEMICAL ANALYSIS VOC METALS  N/A N/A N/A	RAD SAMPLES QA/QC SAMPLES ARCHIVE SAM	MPLE 21. TOTAL CORE RECOVERY: N/A	16		10 1		-	21 -		
DISPOSITION OF HOLE BACKFILLED MONITORI	NG OTHER (SPECIFY) 23. SIGNATURE OF INSPECTOR				49	_	Ties			
ckfill using bentonite w/bentonite N/A	N/A Sary Kentofer				3882		gan	sper		
CATION SKETCH/COMMENTS	SCALE: None		A D	orthole terminated	,					
202 4: 12	02252014-01H		2.0	trasu termalu	-				(Soil)	
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orded By A New Zhing Date 2/24/	8									

HTRW DRILLING LOG  DISTRICT: St. Louis USACE  SVP   64025  1. COMPANY NAME: Leidos  2. DRILL SUBCONTRACTOR Leidos  3. PROJECT: Coldwater Creek  4. LOCATION #   10 FPS (Float Plain Systematic)  5. NAME OF DRILLING  5. NAME OF DRILLING  6. MANUFACTURERS DESIGNATION OF DRILL N/A  7. SUESS AND TYPES OF DRILLING  AND SAMPLING COLUMNENT  With ss hand auger 3 in 1D or ss  sediment sampler with plastic sleeve  Meter - Background  449 F - 32 cpm  440 E - 3747 cm  10 DATE STATED 2/24/4 11. DATE COMPLETED 2/24/4  12. OVERBURDEN THICKNESS N/A  15. DEPTH GROUNDWATER ENCOUNTERED. N/A  16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  17. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  17. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  18. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  18. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  18. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  18. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  19. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  19. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A				Lauis HSACE			HOLE NUMBER		LING LOG (Continuations Crock				SV	LE NUMBER //09/FP3
COMPANY NAME Leidos  2 DRILL SURCOMMENTO FERM  4 ALCORTOM 8   DFPF Florifiem Systematic  5 AND DFP STATE COldivator Creek  4 ALCORTOM 8   DFPF Florifiem Systematic  5 ALCORTOM 9   DFPF Florifiem Systematic  5 ALCORTOM 9   DFPF Florifiem Sys	HTRW DRILLIN	G LOG	DISTRICT: St.	Louis USACE				Depth Depth		40				SHEET 2 of 2
Section and sampler with plastic sleeve of superace Elevation NA of the property of the proper	COMPANY NAME: Leidos		2 DRILL SUBCO	ONTRACTOR: Leic	los		SHEET 1 OF 2	(ft bgs)		NA NA	PID			low Remarks
Reter - Background 49 F 37-6 pm  9 SURFACE ELEVATION NA  10 DATE STARTED 2/24/14  11 DATE COMPRETED TAIL AT THE RECOUNT RESO. NIA  1 TOTAL DEPTH ORGILED INTO ROCK NA  2 DEPTH ORGILED INTO ROCK NA  2 DEPTH ORGILED INTO ROCK NA  3 CONTREST FOR ROCK NA  4 TOTAL DEPTH ORGILED INTO ROCK NA  5 CONTREST FOR ROCK NA  5 CONTREST FOR ROCK NA  1 TOTAL DEPTH ORGILED INTO ROCK NA  2 DEPTH ORGILED INTO ROCK NA  3 CONTREST FOR ROCK NA  4 TOTAL DEPTH ORGILED INTO ROCK NA  5 CONTREST FOR ROCK SERVING NA  5 CONTREST FOR ROCK NA  5 CONTREST FOR RO	PROJECT: Coldwater C	reek		4 LOCATION #	110 FPS (	Flood Plans	ystametre)		truck Can low man	best 65/				Collect agas
Idea - Background  9 SURFACE ELEVATION NA  10 DATE STATED 2/2/14  11 DATE COMPLETED 2/2/14  12 OVERBURGEN INCORES NA  10 DETERMINATE HOUSE INCORES NA  10 DETURBURGEN INCORES NA  10 DE	NAME OF DRILLER:	Whothery Church For	nkarbein						moist - CL	2716			_	CYP164025-
SUBSCIPRION OF MALE DISTORBED UNDESTREED AND NA	. SIZES AND TYPES OF DRILLING	Stainless Steel (ss) bowl,	, ss trowel,						1 Possible Fill	3166		194	bada-structure.	5VP164025-
14-0 F 37-7 epr.  10 DATE STARTED 2/4/1/4  11 DATE COMPRETED 2/4/1/4  12 OVERBURDEN THICKNESS N/A  13 DEPTH ORALLED INTO ROOK N/A  14 TOTAL DEPTH OF MOLE 2.0 f 45.  17 OTHER WATER LDVIEL MEASUREMENTS (SPECEY). N/A  18 GEOTECHNICAL SAMPLES N/A  10 DATE STARTED 2/4/1/4  15 DEPTH ORALLED INTO ROOK N/A  16 DEPTH TO WATER AND ELARSED TIME AFTER DRILLING COMPLETED N/A  17 OTHER WATER LDVIEL MEASUREMENTS (SPECEY). N/A  18 GEOTECHNICAL SAMPLES N/A  20 DAMPHES FOR CHEMICAL SAMPLES N/A  21 TOTAL CORE  21 TOTAL CORE  22 DISPOSITION OF HOLE  23 DAMPHES N/A  24 DAMPHES N/A  25 DAMPHES N/A  26 DAMPHES N/A  27 DAMPHES N/A  27 DAMPHES N/A  28 DAMPHES N/A  29 DAMPHES N/A  20 DAMPHES N/A  20 DAMPHES N/A  20 DAMPHES N/A  21 TOTAL CORE  21 TOTAL CORE  21 TOTAL CORE  21 TOTAL CORE  22 DISPOSITION OF HOLE  23 DAMPHES N/A  24 DAMPHES N/A  25 DAMPHES N/A  26 DAMPHES N/A  27 DAMPHES N/A  28 DAMPHES N/A  29 DAMPHES N/A  20 DAMPHES N/A  20 DAMPHES N/A  20 DAMPHES N/A  20 DAMPHES N/A  21 TOTAL CORE  21 TOTAL CORE  22 TOTAL CORE  23 TOTAL CORE  24 TOTAL CORE  25 TOTAL CORE  26 TOTAL CORE  26 TOTAL CORE  27 TOTAL CORE  28 TOTAL CORE  29 TOTAL CO		sediment sampler with pl	lastic sleeve	€ 864	584 N	1073260		06	(1000201111)				7	The
20 DATE STATTED  10 DATE STATTED 2/2/14  11 DATE COMPLETED 2/2/14  21 DATE COMPLETED 2/2/14  22 DEPTH DROUGHOWATER ENCOUNTERED N/A  3 DEPTH DROUGHOWATER ENCOUNTERED N/A  4 TOTAL DEPTH OF NOLE  2.0 OF MA  4 TOTAL DEPTH OF NOLE  2.0 OF MA  55  3704		190		9 SURFACE ELEV	ATION N/A		4.0	Mark		56		- 1	327 -	_
15 DEPTH GROUNDWATER BENCOUNTERED: N/A  15 DEPTH GROUNDWATER BENCOUNTERED: N/A  16 DEPTH TO WATER AND ELAPSED TIME AFTER GRILLING COMPLETED N/A  17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A  18 DEPTH GROUNDWATER BENCOUNTERED: 17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A  18 DEPTH OF HOLE 2.01				10 DATE STARTE	2/24/14	11. DATE COMP	PLETED 2/24/14	John It		3704		120		1 - 1
13 DEPTH DRILLED INTO ROCK. N/A  16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY). N/A  18 GEOTECHNICAL SAMPLES. N/A  18 DISTURBED  19 TOTAL NUMBER OF CORE BOXES. N/A  19 SAMPLES FOR CHEMICAL ANALYSIS  N/A  2 DISPOSITION OF HOLE  18 BACKFILLED  18 BACKFILLED  18 MONITORING  19 TOTAL NUMBER OF CORE BOXES. N/A  18 ANA  2 DISPOSITION OF HOLE  18 BACKFILLED  18 MONITORING  19 TOTAL CORE  18 ACHIVE SAMPLE  18 TOTAL CORE  18 ACHIVE SAMPLE	OVERBURDEN THICKNESS	· Ν/Δ		15 DEPTH GROUN	IDWATER ENCOUN		/	7412 -				W	01407/	_
38 CEPTH PRILED BY OR POLE 2.01  17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY). NIA  18 OEDTECHNICAL SMAPLES NIA  18 OEDTECHNICAL MANLYSIS  VOC METALS RAD SAMPLES OR CHEMICAL MANLYSIS  NIA  18 OEDTECHNICAL SMAPLES NIA  19 OSAMPLES NOR CHEMICAL MANLYSIS  VOC METALS RAD SAMPLES OR OR SMAPLES ARCHIVE SAMPLE 2T TOTAL CORE  NIA  NIA  NIA  NIA  10 SAMPLES NOR CHEMICAL MANLYSIS  VOC METALS  RAD SAMPLES NOR NIA  20 SEPTEMBLE DIMONITORING DITHER SPECIFY)  10 SEPTEMBLE DIMONITORING DITHER SPECIFY	9.6						IG COMPLETED N/A	-		55				
S. GOTECHNICAL SAMPLES N/A DISTURBED UNDISTURBED UNDISTURBED UNDISTURBED 19 TOTAL NUMBER OF CORE BOXES. N/A 10 SAMPLES FOR CHEMICAL ANALYSIS VOC METALS RAD SAMPLES O ANGC SAMPLES O ANGC SAMPLES N/A		A 1						=				SVI	164020	
20 SAMPLES FOR CHEMICAL ANALYSIS VOC METALS RAD SAMPLES ARCHIVE SAMPLE PROTOTAL CORE RECOVERY. N/A		7	UNDISTUR		-			2 =		3856		96	30.	en.
NA N		ANALYSIS VOC	METALS	RAD SAMPLES	QA/QC SAMPLES			15				And	hove	
Backfill using bentonite whentonite whentoni						PAWSPECTOR A	REGOVERT NIA			50	_	- 4	32 -	_
LOCATION SKETCH/COMMENTS PAGE PLANT SCALE: None  COLE: LE 0252014-01H  SCALE: None  Scale: None  109Frs  109Frs			A. NA I.		23, 5100 1100	lengton				4027	-	2	neway	100
COLE: LECOLISIONA Surehole forminated  Superiority  Interest to the surehole forminated to the surehol	LOCATION SKETCH/C	OMMENTS Press Play	1 -1			LE: None		A =	2 / / /				sper	
Approximately togges togges		COLE	LE 0225	2014-01H		ГТТ		2.0	Breaket termina	ted				
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Date 2-26. 14

HTRW DRILLING	LOG			DIST	RICT: St.	Louis l	JSACE							640	
COMPANY NAME: Leidos		1		2. DR	ILL SUBC									1 OF 2	
PROJECT: Coldwater Cre	ek					4 LOCA	TION #	109	FPS	(Flo	od I	Plain	Sus	toma	tie)
NAME OF DRILLER: Rick	Matre	1 Quentina	Berei	ie			JFACTURI						1		-
SIZES AND TYPES OF DRILLING ND SAMPLING EQUIPMENT	Stainles with ss I	s Steel (ss) b nand auger 3 at sampler with	owl, ss in ID or	trowe ss		8 HOLE	coordii	NATES					3		
Meter - Background	Sedimen	it sampler wi	in plasti	0 3100											-
14-9 F - 32 CP	2						ACE ELEV			_					,
4-10 F - 3747'cf	m					10 DAT	E STARTE	0 2/2	4/14	. 1	1. DATE	COMPL	ETED .	2/24	14
2 OVERBURDEN THICKNESS	N/A					15 DEF	TH GROU	NDWATE	R ENCOL	INTERED	N/A				
3. DEPTH DRILLED INTO ROCK	N/A					16 DEF	TH TO W	ATER AND	ELAPSE	D TIME A	FTER D	RILLING	COMPLE	ETED N	I/A
	.of	hac					IER WATE	_							
		DISTURBE	-D	T	UNDISTUR	RBED	19 TO	TAI NIIM	BER OF (	CORE BO	xes N	/A			
8 GEOTECHNICAL SAMPLES 0. SAMPLES FOR CHEMICAL AN	_	voc	_	METALS		RAD SAI			C SAMPLI	_		SAMPLE		TOTAL C	
N/A		N/A		N/A		2		1	tofz			1	REC	OVERY	N/A
2. DISPOSITION OF HOLE	- 1	BACKFILLED w/bentonite		NITORII N/A	NG	OTHER (S	_	23 %	NATURE	OE INSP	ECTOR	1			
Backfill using bentonite	-	Soil /	- 100	IANA		197.		1	my	-	1		9		_
LOCATION SKETCH/COM	MENTS	COCA		E 02	252	014-	OIH		'SC	ALE: No	one				
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DJECT: Coldwate	er Creek	INSPECTOR:	Gul	Ventelo	-		4023 SHEET 2 of 2	
CS Depth (ft bgs)	Description of Materials	449 NAI	PID	Recovery	nalytical Sample	Blow	Remerks	
	Clayer SLIT, brown, little fine sand, low plasticity, most - MC (Possible FII)			- ;	1335 1335 13074	Counts	Collect QC/QA Solf somy les SVP16+023-1 SVP16+023-2	1
2/24/1+		75		-	VPILAD 1337 Iso Th german Spec	24	1 in board	2/2
i : =	Sitty CLAY, red-tint bri little to trace same, four plastrests, must - CL (possible fill)	54/		_	1334			
* =		3882		_	1341 1341 1507h	1		1,5
1.0	Borehole terminates	/			7/		soil	2.0
5								5
6				<b>3</b> ,7		ų		6 
8 —		2	24/14					8
9 —				/				9
10 —								10
	S. Newtyling 2/20/14 Da		QA By		2		Date 1.3	

				HTRV	V DRILI	ING LOG (Continuation Sh	eet)				HOLE NUM	
HTRW DRILLING LOG	DISTRICT: St	t. Louis USACE	HOLE NUMBER SVP164045	PROJECT:	Coldwate		INSPECTOR:	GA	Jentz			SHEET 2 of 2
1. COMPANY NAME: Leidos	2 DRIII SUBC	CONTRACTOR Leidos	SHEET 1 OF 2	USCS	Depth (ft bgs)	Description of Materials	449 NAI	PID	Recovery	Analytical Sample	Blow Counts	Remarks
3 PROJECT: Coldwater Creek	2 DRILL SOBO	4 LOCATION # 118 FPS (Flood Plain &			=	SulfyCLAY, red-tint brown,	7		5	PP16404	5	
5. NAME OF DRILLER: Rick Whitney / Quenting	ai	6 MANUFACTURERS DESIGNATION OF DRILL: N/A	delamatic)		-	little fine sand, low plasticity, most - AL (Possible Fill)	76	_	-	Teo 7%	—	
7. SIZES AND TYPES OF DRILLING Stainless Steel (ss) bowl, s	s trovel,	8 HOLE COORDINATES			/ =	(Possible Fill)	4002			german 500C		
AND SAMPLING EQUIPMENT with ss hand auger 3in ID o sediment sampler with plas	r ss stic sleeve	R 864642 N 1073361	100		0.5	(, 55). 55				2,000		
Meter - Background		9 SURFACE ELEVATION N/A	4				58	*	_	1350	_	
44-10 P - 3747cem		10. DATE STARTED: 2/24//4 11. DATE COM	PLETED 2/24//4		JA 20-11		3956					
			4/24/14		2 _		3,00					
12. OVERBURDEN THICKNESS N/A		15. DEPTH GROUNDWATER ENCOUNTERED: N/A			ı =							
13. DEPTH DRILLED INTO ROCK: N/A		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLIN			-=		54	_		1354	-	
14. TOTAL DEPTH OF HOLE 2.5 & bys	Т	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	W/A		=		3881					
18. GEOTECHNICAL SAMPLES: N/A DISTURBED  20. SAMPLES FOR CHEMICAL ANALYSIS VOC	UNDISTUR	RBED 19. TOTAL NUMBER OF CORE BOXES: N/A  RAD SAMPLES QA/QC SAMPLES ARCHIVE SAMP	LE 21 TOTAL CORE	1	3 =				9	VP1646	46	
N/A N/A	N/A	2 0 1	RECOVERY N/A		., =		73	_	_	1357		mix of soils?
Backfill using bentonite w/bentonite	N/A	OTHER (SPECIFY)  N/A  23. SIGNATURE OF INSPECTOR	2		=		3936			TSo 74		go duper!
LOCATION SKETCH/COMMENTS	المرالة وما	SCALE: None			4	01 0:41 14:				Speci		go duper!
LOCATION SKETCH/COMMENTS VIEW Play on COCE: LEOZISZOIF	-013	<del></del>		1 2	/.6	Clayer Sitt brown lotte fine sand, low plasticity	EA,		1.74	Archie	e	no so red the
<del>                                     </del>	-				1	mie sand, four plasticity				1419		
N		4			_ =	100154 - 195	4097			IsoTh genna	Spec	
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Approximately		++++++++			=	Bonehole terminated	v.					
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Date Date	// ~	Date		Record	ded Bv	A. Mentilong, Date	2/24/14	QA By	-	1	_	Date <u> </u>
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COMPANY NAME: Leidos  PROJECT: Coldwater Creek  NAME OF DRILLER: PICK Whitney Counting Born  SIZES AND TYPES OF DRILLING D SAMPLING EQUIPMENT  Stainless Steel (ss) bowl, ss with ss hand auger 3in ID or sediment sampler with plasti  eter - Background  1-9 # - 32 cm  1-10 # - 3747 cm  OVERBURDEN THICKNESS N/A	## 10. DATE STARTED: 2/24/14 11. DA	1	USCS Depth (ft bgs)	Description of Materials  Gitt, CLAY, red-that brown  Inttle fine same, low  plasticity, moist — CL	449 NAI	PID PID	Recovery	Analytical Sample SVPILAC 1460 IsoTh	Blow Counts	SHEET 2 of 2  Remarks
PROJECT: Coldwater Creek  NAME OF DRILLER: PICK Whitney Crumbine Bord SIZES AND TYPES OF DRILLING D SAMPLING EQUIPMENT  Stainless Steel (ss) bowl, ss with ss hand auger 3 in 1D or sediment sampler with plastieleter - Background  1-9 F - 32 Com  1-10 F - 3747 Cpm	4 LOCATION # 117 FPS (Flow)  6 MANUFACTURERS DESIGNATION OF DRILL: Note that the second state of the second	Plain Systamas 2)	(ft bgs)	•	54		-	SVPILAC 1460 Isoth	Counts	Remarks
NAME OF DRILLER: PICK Whitney Counting Bord SIZES AND TYPES OF DRILLING D SAMPLING EQUIPMENT  Stainless Steel (ss) bowl, ss with ss hand auger 3 in ID or sediment sampler with plastieter - Background  19 F - 32 Com  10 F - 3747 Com	trowel, ss c sleeve  8. HOLE COORDINATES E 864758 NIO73361  9 SURFACE ELEVATION N/A  10. DATE STARTED: 2/24/14  11. DA	I/A		little fine sand, low plasticity, moist - CL	3751		_	1400 Isoth	75 	Adapt
Stainless Steel (ss) bowl, so with ss hand auger 3 in ID or sediment sampler with plasticeter - Background  -9 # - 32 Com  -10 \$ - 3747 Com	trowel, ss c sleeve  8. HOLE COORDINATES E 864758 NIO73361  9 SURFACE ELEVATION N/A  10. DATE STARTED: 2/24/14  11. DA	I/A		plasticity, moist - CL	3751			Isoth	, -44	ALC:
with ss hand auger 3in ID or sediment sampler with plastieter - Background  -9 \$\mathcal{F}\$ - 32 Cpm	9 SURFACE ELEVATION N/A  10. DATE STARTED: 2/24/14 11. DA	ATE COMPLETED & A. A.		, ,,	1616			2	1	
sediment sampler with plasti eter - Background	9 SURFACE ELEVATION N/A  10. DATE STARTED: 2/24/14 11. DA	TE COMPLETED - A- 1	of =				1	Spec		
-9 F - 32 cen -10 F - 3747 cen	10. DATE STARTED: 2/24/14 11. DA	TE COMPLETED - In . I .						v71640.	4	
-10 F - 3747 CPM		TE COMPLETED - Is al.			67	_	_	1403	_	
OVERBURDEN THICKNESS N/A		THE COMPLETED 2/24/14	Show =		3799			Iso The games Spec		
OVERBORDEN THIORINESS IVA	15 DEPTH GROUNDWATER ENCOUNTERED N/A		1 2 -					spec		
DEPTH DRILLED INTO ROCK N/A	16 DEPTH TO WATER AND ELAPSED TIME AFTER				56	_	_	1407		
TOTAL DEPTH OF HOLE 2.0 (1 bg;	17 OTHER WATER LEVEL MEASUREMENTS (SPEC				3845					
GEOTECHNICAL SAMPLES: N/A DISTURBED	UNDISTURBED 19. TOTAL NUMBER OF CORE BOXES	N/A	8 =		3040					
		VE SAMPLE 21 TOTAL CORE RECOVERY: N/A	1.5		18/		1	Archin	0	
	N/A NITORING OTHER (SPECIFY) 23 SIGNATURE OF INSPECT				45	-	-	1411		
ackfill using bentonite w/bentonite	N/A N/A Som New	telan			4035			Rook		
OCATION SKETCH/COMMENTS and goas play on COC#: LE 02252014 - O	SCALE: None	0 0	A _					Spen	-	-
COCE: LE 02152014-0	<i>                                      </i>		no =	Bonchole terminated				1		(soil)
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		1			-				ING LOG (Continuation Sh	1				SVP
HTRW DRILLING LO	G	DISTRICT: S	t. Louis USACE			SVP 16402	PROJEC	Coldwater		INSPECTOR	Gu	Neutzh		
1. COMPANY NAME: Leidos		2. DRILL SUB	CONTRACTOR: Leid	os		SHEET 1 OF 2	USCS	Depth (ft bgs)	Description of Materials	449 NAI	PID	Recovery	Analytical Sample	Blow
3. PROJECT: Coldwater Creek	·		4 LOCATION #	108 FPS (	Eland Place				Clayey Sitt, Mix of medain brown of ped-tint brown, trece sand, luw plasticity, moist —ML				FVP164 1417	021
5 NAME OF DRILLER: Rick White	and Quenting Bo	Vaic		RS DESIGNATION OF D		( ) y - ( ) and ( )			Send live Dlashcity maist	52	_	_	TSOTA	_
7. SIZES AND TYPES OF DRILLING Stair	nless Steel (ss) bowl, ss	trowel,	8 HOLE COORDINA					_ =	-ML	3700			Spec	•
1 ******	ss hand auger 3in ID o ment sampler with plas		PE 864	1932 NIO	73260			0.5	becomes red-tint brown from 1/2 to 1 A					
Meter - Background			9 SURFACE ELEVA	TION N/A				1	from 1/2 to 1 ft	64/	_	_	1420	_
44-9 F - 32 Cpm 44-10 F - 3747 cpm			10. DATE STARTED	- 1 - 1	11 DATE COMP	PLETED - 4 al.	l lyn	114 =		13923		1		
				-		PLETED 2/24/14	12	2 =						
12. OVERBURDEN THICKNESS N/A			15 DEPTH GROUN	DWATER ENCOUNTER	RED: N/A			1.0					W164	022
13. DEPTH DRILLED INTO ROCK: N/A			16 DEPTH TO WAT	ER AND ELAPSED TIM	ME AFTER DRILLING	G COMPLETED: N/A		=		67	_	_	1424 Iso 14	_
14. TOTAL DEPTH OF HOLE 2.04	f bgs		17. OTHER WATER	LEVEL MEASUREMEN	NTS (SPECIFY): N	I/A				13904			gamm	-
18. GEOTECHNICAL SAMPLES: N/A	DISTURBED	UNDISTU	10 1017	AL NUMBER OF CORE			1	36	11 6:14				Spee	
20. SAMPLES FOR CHEMICAL ANALYSIS  N/A	VOC N/A	METALS N/A	RAD SAMPLES	QA/QC SAMPLES	ARCHIVE SAMPL	LE 21. TOTAL CORE RECOVERY: N/A		1.2	Clayer Sitt, gray is h brown Attle time sand, low plasticity moist - ML	14		1	Archi.	e
22. DISPOSITION OF HOLE	BACKFILLED M	NITORING	OTHER (SPECIFY)	23. SIGNATURE OF	NSPECTOR				Mile time samel, low plasticaty	40			E- 77	-
Backfill using bentonite	w/bentonite	N/A	N/A	7	0 /	7		$\equiv$	moist - ML	4000			Spec	
LOCATION SKETCH/COMMENT	TS wights plug of	1/2/2	MIA	SCALE	: None			A	Poorehole terminated				3/100	
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HOLE NUMBER 108 FFS
SVP | 64 02 |
SHEET 2 of 2

Remarks

Soil

Date 2.26.14

HTRW DRILLING	LOG			DIS	TRICT	St. Louis	s US	ACE									NUMBI	R 055
. COMPANY NAME: Leidos				2 D	RILL SU	BCONTRAC	TOR	Leid	dos						s	HEET	1 OF	2
3. PROJECT: Coldwater Cre	ek					4 LO	CATIC	N #	/2	2 F	PS	(Fla	od -	Pla	. 5	yst	1000	(:)
5. NAME OF DRILLER: RIC	White	en Rus	witne .	Borg	ii			CTURE										1
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Stainles	s Steel (ss)	bowl, ss	trow				ORDIN										
		hand auger nt sampler w			eve		3	364	700	5	NIC	273	346	2				
Meter - Background						9 SU	RFAC	E ELEV	ATION	N/A								
14-10 F - 32 CON						10.04	ATF S	TARTE	D: •	1	1 .	T	11 DA	TE CO	MPLET	FD 4	-1-	1.
	14					10.57			- 4/	124	14	_	11 07	12 00			3/24	1/4
2. OVERBURDEN THICKNESS	N/A	,				15 DE	EPTH	GROUN	NDWAT	TER EN	COUNT	TERE	N/A					
3. DEPTH DRILLED INTO ROCK:						16 DE	EPTH	TO WA	TER AI	ND ELA	PSED	TIME /	AFTER	DRILL	ING CO	OMPLI	ETED	N/A
4. TOTAL DEPTH OF HOLE	2.0 ft	645				17, 0	THER	WATER	RLEVE	L MEA	SUREM	ENTS	(SPEC	CIFY)	N/A			
8. GEOTECHNICAL SAMPLES:		DISTUR	BED		UNDIST	TURBED		19 TOT	TAL NU	IMBER	OF CO	RE BC	XES	N/A				
0. SAMPLES FOR CHEMICAL AN	IALYSIS	VOC		METALS	S	RAD S	AMPL	ES	QAV	QC SA	MPLES	A	RCHIV	E SAN	IPLE			CORE
N/A 22. DISPOSITION OF HOLE	-+	N/A BACKFILLED	MC	N/A DNITOR	ING	OTHER	(SPE	CIFY)	23.5	SIGNA	URE O	FINSI	PECTO	ıR 🏄				
Backfill using bentonite		w/bentonite	е	N/A		N.	I/A		23. 8		Sui	21	ent	lo	ma			
pproximately										1 C C C C C C C C C C C C C C C C C C C	e ser							
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	eet)				SVP 1	MBER 122 FPS 4055	
Coldwater Creek	INSPECTOR:	6.N	entzln			SHEET 2 of 2	
Depth Description of Materials (ft bgs)	449 NAI	PID	Recovery	Analytical Sample	Blow Counts	Remarks	
Chay ay SILT, medum brown,  Trace little v. Sme sand,  Tow plant secty, the 1st - M.	3839	J	- SV	1437 It-7h Spec	5		
0.5 Clayer SIH, yellowish brown, w little v. fine sand, low plastscoty, moist _ m	3892		_	1440	-		
	59	_		VP1640 1442 Iso 76 games Spec	56		
3'	56 3955	_	-	rchivi 1445 Iso Th	e		
2.0 Brukole terminated				spec		Seil	
5							
6							
7 —	ym	N.	*				
8 =	2/241	Y.					
9 —							
10							

eter - Background  -9	cer / Chack F / hless Steel (ss) bow ss hand auger 3in ment sampler with	Andy #.	9 SURFA 10. DATE 15 DEP	FACTURE COORDIN 864	116 FPS (	77336 J	SHEET 1 0	<b>(4)</b>
NAME OF DRILLER: Phi/Mos Sizes and types of drilling D SAMPLING EQUIPMENT Stain With sedin eter - Background -9 F - 3.7 C	nless Steel (ss) bov ss hand auger 3in ment sampler with	vI, ss trowel, ID or ss	9 SURFA 10. DATE 15 DEP	STARTE	RS DESIGNATION OF ATES B74 N10 ATION N/A D: 2/25/14	77336 J		s/4
Stair with sedirectors of DRILLING DISAMPLING EQUIPMENT with sedirectors of DRILLING DISAMPLING EQUIPMENT with sedirectors of DRILLING PROPERTY.  STAIR DEPTH OF HOLE CONTROL OF DRILLED INTO ROCK: N/A  TOTAL DEPTH OF HOLE CONTROL OF DRILLED INTO ROCK: N/A  GEOTECHNICAL SAMPLES: N/A  SAMPLES FOR CHEMICAL ANALYSIS N/A	nless Steel (ss) bov ss hand auger 3in ment sampler with	vI, ss trowel, ID or ss	9 SURFA 10. DATE 15 DEP	STARTE	RS DESIGNATION OF ATES B74 N10 ATION N/A D: 2/25/14	77336 J		5/14
Stair with sedirectors of DRILLING DISAMPLING EQUIPMENT with sedirectors of DRILLING DISAMPLING EQUIPMENT with sedirectors of DRILLING PROPERTY.  STAIR DEPTH OF HOLE CONTROL OF DRILLED INTO ROCK: N/A  TOTAL DEPTH OF HOLE CONTROL OF DRILLED INTO ROCK: N/A  GEOTECHNICAL SAMPLES: N/A  SAMPLES FOR CHEMICAL ANALYSIS N/A	nless Steel (ss) bov ss hand auger 3in ment sampler with	vI, ss trowel, ID or ss	9 SURF, 10. DATE 15 DEP	8648 ACE ELEV	ATES 874 N 10 ATION N/A	77336 J	IMPLETED 3/3	5/14
eter - Background  -9	ft bge		9 SURF/ 10. DATE 15 DEP	STARTE	D: 2/25/14_	11. DATE CO	MPLETED 2/3	5/14
eter - Background  -9 F - 37 CFM  -10 C - 5065 CFM  OVERBURDEN THICKNESS N/A  DEPTH DRILLED INTO ROCK: N/A  TOTAL DEPTH OF HOLE 6.0  GEOTECHNICAL SAMPLES: N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A	ft bgo		9 SURF/ 10. DATE 15 DEP	STARTE	D: 2/25/14_	11. DATE CO	IMPLETED 2/2	5/14
OVERBURDEN THICKNESS N/A  DEPTH DRILLED INTO ROCK: N/A  TOTAL DEPTH OF HOLE 6.0  GEOTECHNICAL SAMPLES: N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A			10. DATE	STARTE	2/25/14		MPLETED 2/8	5/4
OVERBURDEN THICKNESS N/A  DEPTH DRILLED INTO ROCK: N/A  TOTAL DEPTH OF HOLE  GEOTECHNICAL SAMPLES: N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A			15 DEP				OMPLETED 2/1	5/4
DEPTH DRILLED INTO ROCK: N/A  TOTAL DEPTH OF HOLE 6.0  GEOTECHNICAL SAMPLES: N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A			16 DEPT	H GROUN	DWATER ENCOUNT	EDED NIA		
TOTAL DEPTH OF HOLE 6.0 CONTROL OF THE CONTROL OF T			-			EKEN-MIM		
GEOTECHNICAL SAMPLES: N/A SAMPLES FOR CHEMICAL ANALYSIS N/A			-	H TO WA	TER AND ELAPSED T	IME AFTER DRILL	LING COMPLETED	N/A
GEOTECHNICAL SAMPLES: N/A SAMPLES FOR CHEMICAL ANALYSIS N/A			1 17 OTH		R LEVEL MEASUREM			
SAMPLES FOR CHEMICAL ANALYSIS	DISTORBED	LINDIS	TURBED					
N/A	voc	METALS	RAD SAM		AL NUMBER OF COR	ARCHIVE SAM	MPLE 21 TOTA	L CORE
DISPOSITION OF HOLE	N/A	N/A	4		0		RECOVE	
ackfill using bentonite	w/bentonite,	MONITORING N/A	OTHER (SF		23 SIGNATURE OF	NSPECTOR		
	and a set		514		/ /		7	
OCATION SKETCH/COMMEN	Coc #: LI		1 d - 0	ы	SCAL	E: None	f	
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111			<del></del>			<u> </u>	<del>  </del>	
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\$45/FF99//////	116FP8		115FP3	4	, m / (m)	Gr. /////		LUPPS
•//////////////////////////////////////					900			
			<b>⊕</b> <sup>©</sup>	ф <sup>875</sup>	\$ DE TO 1			
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			11	$\top$				
corded By J. Newty				-				

Coldwate	er Creek	INSPECTOR	GIN	certeli	100		SHEET 2 of 2	
Depth (ft bgs)	Description of Materials	449 NAI	PID	Recovery	Analytical	Blow	Remarks	
0 –	Sile CLAN Land	56			Sample SVP 1644	Counts		
_	Sitty CLAY, brown true sand, low plasticity,	5496	_	<b>-</b> '	0809	-		
	Jana, rowplasticity,				Both of	lanna	pee	
	moist - CL	52	_		0811	7-12-0		
1 —		6496						=
' /=		13/			9 19/64 08/4	140		
		5703	-		13074 d g	Land Street	1	
				+	43014 4 9	Separate M.	foce	
=		55703		-	0816	-	- CHILD	E
2 —		-	<b>-</b>	<del>                                     </del>				
_		50	_		0819			
		75582						
		68			UP1146	41	1	
		5579	_				1	
3, 0	C !! Q! A:: 11			<del>-</del>	to Thillga	anna S	Pec	
_	> 1 My CLAY, grayish brown,	63/	_		0824			
	trace sand low plastical	5712					_	
	Sith, CLAY, grayish bown, trace sand, low plastical moist-CL	60/			0000			
		4735	1		0825			
4	1	-						
_		59	_	-	0828	-		
					VP164	10	+	
$\equiv$		62		_ '	0837	A-1		
5		5858			5-71.19	America, C	spec	
_	becomes most hed by	1					<i>y</i>	
	rust of dark brown	55/5931		_	0839			
	becomes most had by rust of dark brown below ~ 5 ft			<del> </del>	du lui		+	
_		59	-		10847		ML, To a	
6.0		6045		]	coth 9 9	distante de la	pec	_
_	Bonehole terminated				10			
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	I Tentling Date	2/25/14	1				Date 2:	

A LOCATION #   ZI FPS (Float Plain Systematic)  A LOCATION #   ZI FPS (Float Plain Systematic)  A MANUFACTURERS DESIGNATION OF DRILL N/A  B MANUFACTURERS DESIGNATION OF DRILL N/A  B HOLE COORDINATES  B 4 SI CAPA  OVERBURDEN THICKNESS N/A  DEPTH DRILLED INTO ROCK N/A  TOTAL DEPTH OF HOLE  A LOCATION B   ZI FPPS (Float Plain Systematic)  DISTURBED  UNDISTURBED  UNDISTU	COMPANY NAME: Leidos				2 DRILL	SUBCONTRACT	or Le	idos			SHEE	T 1 OF 2	
AMMURACTURERS DESIGNATION OF DRILL NA  Stainless Steel (ss) bowl, ss trowel, with sharld auger 3 in ID or ss sediment sampler with plastic sleeve with plastic sleeve steel plants are sediment sampler with plastic sleeve with plastic sleeve with plastic sl	PROJECT: Coldwater Cre	eek				4 LOC	TION :	# 12.1F	PS (F	bad Pla	Su	of	1.5
Stainless Steel (ss) bowl, ss trowel, with shand auger 3 in D or ss sediment sampler with plastic sleeve  ther - Background  S - 2 Ceth  10 C - 5015 cpm  10 D or started  10 D are started  10 Date started  10 Depth drulled into rock  NA  DEPTH DRULLED INTO ROCK  NA  DISTURBED  UNDISTURBED		4 4 -	1/2/	I. E. L.	· hai						7		1
with ss hand auger 3 in ID or ss sediment sampler with plastic sleve  ter - Background  9									TION OF L	NILL IVA			
9 SURFACE ELEVATION N/A  10. DATE STARTED: 2/5/M 11. DATE COMPLETED 2/5/M  10. DATE STARTED: 2/5/M 11. DATE COMPLETED N/A  15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A  18. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  19. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  10. DATE STARTED: 2/5/M 11. DATE COMPLETED N/A  12. DATE COMPLETED N/A  12. DATE COMPLETED N/A  13. DATE COMPLETED N/A  14. DATE COMPLETED N/A  15. DATE COMPLETED N/A  16. DATE C	D SAMPLING EQUIPMENT	with ss	hand auger	3in ID o	r ss				NIO	734/2			
OVERBURGEN THICKNESS N/A  15. DEPTH GROUNDWATER ENCOUNTERED: N/A  16. DEPTH DWATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A  GEOTECHNICAL SAMPLES N/A  DISTURBED  UNDISTURBED  UNDISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A  N/A  N/A  DISPOSITION OF HOLE  BACKFILLED  MONITORING  OTHER (SPECIFY):  N/A  OCATION SKETCH/COMMENTS  SCALE: None  11. DATE COMPLETED  12. SAMPLES DIM AFTER DRILLING COMPLETED N/A  15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A  BAMPLES FOR CHEMICAL ANALYSIS  VOC  METALS  RECOVERY: N/A  DISPOSITION OF HOLE  BACKFILLED  MONITORING  OTHER (SPECIFY)  23. SIGNIFURE OF HISPECTOR  SCALE: None  OTHER (SPECIFY)  ANALYSIS  SCALE: None  15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  N/A  N/A  N/A  N/A  N/A  OTHER (SPECIFY)  SCALE: None	eter - Background	Scalino	ne sumpler v	vitti pido							-		-
OVERBURDEN THICKNESS N/A  15. DEPTH GROUNDWATER ENCOUNTERED: N/A  16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED. N/A  17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A  GEOTECHNICAL SAMPLES N/A  DISTURBED  UNDISTURBED  UNDIS												_	,
DEPTH DRILLED INTO ROCK: N/A  16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  TOTAL DEPTH OF HOLE  17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A  SAMPLES FOR CHEMICAL ANALYSIS  VOC  METALS  RAD SAMPLES  QA/QC SAMPLES  QA/QC SAMPLES  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY, N/A  DISPOSITION OF HOLE  BACKFILLED  MONITORING  OTHER (SPECIFY)  22. SIGNIFULE DEPTH SPECIFY  DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A  SAMPLES FOR CHEMICAL ANALYSIS  VOC  METALS  RAD SAMPLES  QA/QC SAMPLES  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY, N/A  DISPOSITION OF HOLE  BACKFILLED  MONITORING  OTHER (SPECIFY)  23. SIGNIFULE DEPTH SPECIFY  CATION SKETCH/COMMENTS  SCALE: None  13. STATE  14. STATE  14. STATE  14. STATE  14. STATE  15. STATE  15. STATE  16. STATE  17.	5065 ept	<u> </u>				10. DA	E START	ED: 2/25	14	11. DATE CO	MPLETED	2/25	14
TOTAL DEPTH OF HOLE  GEOTECHNICAL SAMPLES N/A  DISTURBED  UNDISTURBED  UNDISTURBED  UNDISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A  N/A  N/A  N/A  N/A  N/A  N/A  N/	OVERBURDEN THICKNESS	N/A				15. DE	TH GROU	JNDWATER EN	ICOUNTER	ED: N/A			
GEOTECHNICAL SAMPLES N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A  DISTURBED  UNDISTURBED  UNDISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A  N/A  N/A  DISTURBED  UNDISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  ARCHIVE SAMPLE  ARCHIVE SAMPLE  PRECOVERY. N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  N/A  N/A  N/A  N/A  N/A  N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  PRECOVERY. N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  PRECOVERY. N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  N/A  N/A  N/A  N/A  N/A  N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  PRECOVERY. N/A  SCALE: None  OTAL STATE OF THE CORE RECOVERY. N/A  11. TOTAL CORE RECOVERY. N/A  11. TOTAL CORE RECOVERY. N/A  11. TOTAL CORE RECOVERY. N/A  12. TOTAL CORE RECOVERY. N/A  12. TOTAL CORE RECOVERY. N/A  12. TOTAL CORE RECOVERY. N/A  13. TOTAL CORE RECOVERY. N/A  14. TOTAL CORE RECOVERY. N/A  14. TOTAL CORE RECOVERY. N/A  15. TOTAL CORE RECOVERY. N/A  15. TOTAL CORE RECOVERY. N/A  16. TOTAL CORE RECOVERY. N/A  17. TOTAL CORE RECOVERY. N/A  18. TOTAL CORE RECOVERY. N/A  19. TOTAL CORE RECOVERY. N/A  19. TOTAL CORE RECOVERY. N/A  19. TOTAL CORE RECOVERY. N/A  10. TOTAL CORE	DEPTH DRILLED INTO ROCK	: N/A			-	16. DE	тн то w	ATER AND ELA	APSED TIM	E AFTER DRILL	ING COMP	LETED N	Α
GEOTECHNICAL SAMPLES N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A  DISTURBED  UNDISTURBED  UNDISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  SAMPLES FOR CHEMICAL ANALYSIS  N/A  N/A  N/A  DISTURBED  UNDISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  ARCHIVE SAMPLE  ARCHIVE SAMPLE  PRECOVERY. N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  N/A  N/A  N/A  N/A  N/A  N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  PRECOVERY. N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  PRECOVERY. N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  N/A  N/A  N/A  N/A  N/A  N/A  DISTURBED  19. TOTAL NUMBER OF CORE BOXES: N/A  ARCHIVE SAMPLE  21. TOTAL CORE RECOVERY. N/A  PRECOVERY. N/A  SCALE: None  OTAL STATE OF THE CORE RECOVERY. N/A  11. TOTAL CORE RECOVERY. N/A  11. TOTAL CORE RECOVERY. N/A  11. TOTAL CORE RECOVERY. N/A  12. TOTAL CORE RECOVERY. N/A  12. TOTAL CORE RECOVERY. N/A  12. TOTAL CORE RECOVERY. N/A  13. TOTAL CORE RECOVERY. N/A  14. TOTAL CORE RECOVERY. N/A  14. TOTAL CORE RECOVERY. N/A  15. TOTAL CORE RECOVERY. N/A  15. TOTAL CORE RECOVERY. N/A  16. TOTAL CORE RECOVERY. N/A  17. TOTAL CORE RECOVERY. N/A  18. TOTAL CORE RECOVERY. N/A  19. TOTAL CORE RECOVERY. N/A  19. TOTAL CORE RECOVERY. N/A  19. TOTAL CORE RECOVERY. N/A  10. TOTAL CORE	TOTAL DEPTH OF HOLE	6.0 A	hec			17. OT	IER WATE	ER LEVEL MEA	SUREMEN	TS (SPECIFY):	N/A		
SAMPLES FOR CHEMICAL ANALYSIS  N/A  N/A  N/A  DISPOSITION OF HOLE  BACKFILLED  MONITORING  CATION SKETCH/COMMENTS  SCALE: None  SCALE: None  NONITORING  DISPOSITION OF HOLE  BACKFILLED  MONITORING  N/A  N/A  N/A  N/A  N/A  N/A  N/A  N			100	BED	UNE	ISTURBED	19. TO	OTAL NUMBER	OF CORE	BOXES: N/A			
DISPOSITION OF HOLE  BACKFILLED  MONITORING  NIA  NIA  SCALE: None  SCALE: None  OTHER (SPECIFY)  DISPOSITION OF HOLE  BACKFILLED  MONITORING  NIA  NIA  SCALE: None  OTHER (SPECIFY)  DISPOSITION OF HOLE  SCALE: None  OTHER (SPECIFY)  DISPOSITION OF HOLE  BACKFILLED  MONITORING  NIA  NIA  SCALE: None  OTHER (SPECIFY)  DISPOSITION OF HOLE  SCALE: NONE  DISPOSITION OF HOLE  SCALE: NONE  DISPOSITION OF HOLE  SCALE:			VOC		METALS	RAD SA	MPLES		-	ARCHIVE SAN			
CATION SKETCH/COMMENTS  COCATION SKETCH/COMMENTS  COCATION SKETCH/COMMENTS  COCATION SKETCH/COMMENTS  SCALE: None  OTHER STATE OF THE S				M		OTHER (	PECIFY)			0	R	LOUVERY	AWA
Coc	ackfill using bentonite		w/bentonit	e /		N.		23. SIG	Sy /	lentel	neg.		
Coc	OCATION SKETCH/COL	MMENTS	and grass	plays	100				SCALE	None	0		
DOCUMENT OF THE PROPERTY OF TH	OCATION SKETCH/COI	MINICIALO					-02	H	OO/ILL.	None			
005E00													
005E00			7-15										
005 ELOI	N	9 5						3-7 (0.7)					
005 ELOI							21	115	7				
11/2FFS/ 11/	proximately	$\dashv \dashv$				11.0			1001				
11/2FFS/ 11/				11111	111111	111111	1111	11/1/1	7////	2)	100	1///	11//
11/2FFS/ 11/										CID . 90			
11/2FFS/ 11/										97			
005 EL01	146,179		,125FP8			124FP3			<b>©</b>	( <b>*</b> 600 €	A COS.		123FPS
005 EL01	V/////									* /			
005 EL01			//#X	Cin	Pask					901 <sub>40.</sub> 902			
	005.								(A) (28)				
120FFS 12	V//////								890	1 111			
		121FPS			120FP3				4	*	119FPS		
									real land	MAN			
								ф <sup>(a)</sup> (	ф <sup>884</sup> ,	<b>⊕</b> /			
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corded By J. Neutyluig Date 2/25/14 QA By Date 2-25. 4													

Coldwater Creek	INSPECTOR:	GINC	etaling			SHEET 2 of 2	
Depth Description of Materials (ft bgs)	449 NAI	PID	Recovery	Analytical Sample	Blow Counts	Remarks	
Sifty CLAY, brown, trace send, low plasticity, moist - CL	55930	_	- 3	0847 0847 50748a	51 	Collect aclas Soil samples.	7
moist - CL	49 5351	-	-	0944	-	SVP164051-1 SVP164051-2	
	59 5554	,	_	0852	-		
becomes light brown and slightly moist from approx 1/4 to 2/3	5957	_	-3	VP   6 46 08 56 00 73 4 90	52 mayon 5	powdery  modified  by lime?	E
16	62/5570	-	-	0858	_	powdery	
2.5 Sifty CLAY, boown not by brough form I great	60/5853		-	0902	_	solid clay begins mothing	
by brangish brown I grant trace sand, moderated plastio, moist - CL	7 60/5989	_	_	0903	-		
4	4118	_	- 1	OPIGA OPIS Sa Th S		Speo	
16	58	-	-	0910	-	more silty will little fine	
Clayey SILT, mothed bo	1 42/6067	-	_	09/3	-	Strogt.	E
Sand, low plasticity,	5977	-	-	0917	-		Ē,
6.0 Slightly moist - ML	5745	-	-	SUPPOSE OF 19 Teo Those		pen	Ē,
Bonehole terminate	d		*			Soil	
7 =							
8 —	MW 14						
	2						
9						-	
					1		
10					_		Ē

Pa

						HTRW DRIL	LING LOG (C	ontinuation S	heet)				SVP 6	ER /20 FPS
RW DRILLING LOG	DISTRICT: St.	Louis USACE			IOLE NUMBER	PROJECT Coldwate			INSPECTOR:	G. N.	entz los	8		SHEET 2 of 2
MPANY NAME: Leidos	a politi cunco	ONTRACTOR: Leido			SHEET 1 OF 2	USCS Depth (ft bgs)	· ·	ion of Materials	449 NAI	PID	Recovery	Analytical Sample	Counts	Remarks
	2. DRILL SUBCC						SIHY CLA	ly brown , tra	541		1	VP1C4	949	
DJECT Coldwater Creek				Flood Plain S	ystembre)		Sandy low	plasticity,	17.	_	-	0925	_	
ME OF DRILLER: Phil Moser / Chuck Finken		6 MANUFACTURERS		F DRILL N/A			moist -	GL	5806		-	Eso Th		
SAND TYPES OF DRILLING AMPLING EQUIPMENT  Stainless Steel (ss) bowl, with ss hand auger 3in ID sediment sampler with pla	or ss	8 HOLE COORDINAT		13462		05		н				apec		
er - Background		9 SURFACE ELEVAT				=			58	1	-	0931	_	
F - 37 cpm				_			3		5850	_				
C - 5015 epn.		10. DATE STARTED:	2/25/14	11. DATE COMPLET	ED 2/25/14		=							
/ERBURDEN THICKNESS N/A		15. DEPTH GROUND\	WATER ENCOUNT	ERED: N/A		2 =	3		1,		5	VP1640	50	
PTH DRILLED INTO ROCK N/A		16. DEPTH TO WATER	R AND ELAPSED T	TIME AFTER DRILLING CO	OMPLETED N/A	100 =	=		65/	-	-	0932	-	
TAL DEPTH OF HOLE 2.0 # bgs		-		ENTS (SPECIFY): N/A		0/10/14=			5633		1	Tso The		
OTECHNICAL SAMPLES: N/A DISTURBED	UNDISTUR	BED 19 TOTAL	NUMBER OF COR	RE BOXES: N/A		Man =	- 1	1 1			-	5,000		
MPLES FOR CHEMICAL ANALYSIS VOC		10 TOTAL	QA/QC SAMPLES	-	21. TOTAL CORE	1.5	orangest	provo	100		/	Archive	)	
N/A N/A	N/A	2	0		RECOVERY N/A		] '		62	_	-	0936	-	
SPOSITION OF HOLE BACKFILLED  (fill using bentonite w/bentonite	MONITORING C	N/A	23. SIGNATURE OF	Sun Pine					6035			IS074		
ATION SKETCH/COMMENTS W THE PLANT COC #: LE			1	E: None							6	2 spec	•	
N 121FP9 120FF9		\$ 550 \$ 150	## ## ## ## ## ## ## ## ## ## ## ## ##	11.0FS		5		ter minetal	ga ga	i.a.	*,			(Soil)
,116FPS*		⊕ III	10 47 s		1) 3FP	8 —			2/1	-				
						9 —								

TRW DRILLING	GLOG	DISTRICT St. Louis USACE	HOLE NUMBER	PROJECT: Coldwate	ING LOG (Continuation Si	INSPECTOR	G. N.	utaling	1 - 4. 1	64061 SHEET 2 of 2
			SVP164 061	Depth	Description of Materials	449	PID	Recove Analytical Sample	Blow	Remarks
COMPANY NAME: Leidos		2 DRILL SUBCONTRACTOR Leidos	SHEET 1 OF 8	Depth (ft bgs)	C. L. CLAV brown, tres.	NAI	FIU	Sample SVP16		Collect aclas
PROJECT: Coldwater Cr	eek	4 LOCATION # /25 FPS (F)	Tood Plain Sut. 1		Silly GLAY, brown, trease sand, low plasticaty,	59		0944		Soil sumple
NAME OF DRILLER: Phi	Moser/Chuck Frake	6 MANUFACTURERS DESIGNATION OF DRILL			moist - CL			Teath	-/	SVPILA-061-1
IZES AND TYPES OF DRILLING SAMPLING EQUIPMENT	Stainless Steel (ss) bowl, s with ss hand auger 3in ID o sediment sampler with plas	s trowel, by says the strong of the strong o	735/4	1 1 =	100131 - 01	5008		Spec	1	SVP164861-2 [Extra#1]
eter - Background				0.5		56		SVP164	062	0 f 13
9 F - 37 C	2m	9 SURFACE ELEVATION N/A		No art at		5528	_	_ 0955 Iso Th		1.
3 3 0 6 3		10 DATE STARTED <b>2/25/14</b>	DATE COMPLETED 2/25/14	196		97-0		Spec		
OVERBURDEN THICKNESS	N/A	15 DEPTH GROUNDWATER ENCOUNTERED		142						
DEPTH DRILLED INTO ROCK	c N/A	16 DEPTH TO WATER AND ELAPSED TIME AF	TER DRILLING COMPLETED N/A			50		_ 0957	-	
TOTAL DEPTH OF HOLE	zoft bas	17 OTHER WATER LEVEL MEASUREMENTS (	SPECIFY) N/A			5919	-			
GEOTECHNICAL SAMPLES:	N/A DISTURBED	UNDISTURBED 19 TOTAL NUMBER OF CORE BOX	ES N/A	3 -						-
SAMPLES FOR CHEMICAL A		METALS RAD SAMPLES QA/QC SAMPLES AR	CHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A	1.5		10 =	-	Archi	-	
DISPOSITION OF HOLE	N/A BACKFILLED M	N/A 2 /Set of 2 ONITORING OTHER (SPECIFY) 23 SIGNATURE OF INSPE				49	_	- 1009 Iso Th	_	
ckfill using bentonite	w/bentonite	ONITORING OTHER (SPECIFY)  N/A N/A  23 SIGNATURE OF INSPE	withing			15679		gamy	9	
CATION SKETCH/CO	MMENTS Wigras plus	SCALE: No	ine	K	Bunchels terminated			spec		
		LE02252014-02H		2.0	Purulose Terminasas					(Soil)
										(301)
N		<del>                                     </del>		5 =						
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roximately			м	-					1	
			122///////	6 =						
		102 012	911	-			7			
144,174	125FPS	124FPS	123FPS							
				7						_
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orded By	this 2.2	25/14 QA By	Date 2-26, 14		1			0		

TRW DRILLING LOG	DISTRICT: St. Louis USACE	HOLE NUMBER	HTRW DRILLING LOG (Continu		HOLE NUMBER [29] SVP  64671	
TRW DRILLING LOG		SVP 164071	Depth Description of Material	INSPECTOR: G. News		of 2
OMPANY NAME: Leidos	2 DRILL SUBCONTRACTOR Leidos	SHEET 1 OF 2	(it bgs)	NAI PID Rec	Sample Counts	rks
ROJECT: Coldwater Creek	4 LOCATION # 129 FPS (	Flood Plain Systemates	Claney SILT, be little to some v. sand, low plast wist - ML	Fine 53/	SVP164071 Collect	290
NAME OF DRILLER: Phi Moser/Chack Finker		N/A	Sand, low plast	city, 5992 -	T50 Th SVP164	W
SIZES AND TYPES OF DRILLING ID SAMPLING EQUIPMENT  Stainless Steel (ss) bowl, ss with ss hand auger 3in ID or sediment sampler with plasti	SS	4	D.B moist - ML	77 3716	gamme spec EVP1640	
eter - Background	9 SURFACE ELEVATION N/A			64	(of J:	3 Y
-10 C - 5065 epm	10. DATE STARTED: 2/25/14 11 E	ATE COMPLETED 2/25/14	11/1/25/14	5528	Cel	
OVERBURDEN THICKNESS N/A	15 DEPTH GROUNDWATER ENCOUNTERED N	'A	100			
B. DEPTH DRILLED INTO ROCK N/A	16 DEPTH TO WATER AND ELAPSED TIME AFTE	ER DRILLING COMPLETED: N/A		53	1020 _	
TOTAL DEPTH OF HOLE 2.0 ft bas	17 OTHER WATER LEVEL MEASUREMENTS (SP	ECIFY): N/A		6041 -		
GEOTECHNICAL SAMPLES: N/A DISTURBED	UNDISTURBED 19 TOTAL NUMBER OF CORE BOXES	The second secon	85			
	METALS RAD SAMPLES QAVQC SAMPLES ARCH	RECOVERY: N/A	1.5	71/	SVP164072	
2. DISPOSITION OF HOLE BACKFILLED MO	NITORING OTHER (SPECIFY) 23 SIGNATURE OF INSPEC				- 1023 -	F
	N/A N/A N/A N/A		1   3	5875	Iso 16 gamas spec	
OCATION SKETCH/COMMENTS	SCALE: None	9 · 5	2.0 Bonchoke ten	winted	- June	_
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ecorded By Muthing Date 2	25/14 QA BY					100

HTRW DRILLIN	G LOG	<b>}</b>			DISTR	ICT: St.	Louis	USACE							NUMBE 64c	
COMPANY NAME: Leidos					2. DRI	LL SUBCO		TOR: Le		·				SHEET	1 OF	2
PROJECT: Coldwater C	reek						4 LOC	ATION #	# 12 !	FP	s (F	-lood	Plain	, 5	ust.	-
NAME OF DRILLER: Phi	Mosar	/Chm	& Fi	inkon	bein			NUFACTUR							1-1-	
. SIZES AND TYPES OF DRILLING ND SAMPLING EQUIPMENT	Stainle	ess Steel	(ss) bo	wi, ss	trowel,			E COORDI								
		ent samp				re	_ {	864	932	NIO	736	64				
Meter - Background								RFACE ELE								
4-10 C - 5065 C	1221						10. DA	TE STARTE	ED: 4 /4	15/14	,	11 DATE	COMPLE	TED:	he	1.4
						/				7				-	100/	14
2. OVERBURDEN THICKNESS	N/A						15 DE	PTH GROU	INDWATE	RENCOU	INTERE	D: N/A			-	
3. DEPTH DRILLED INTO ROC		•					16 DE	PTH TO W	ATER ANI	DELAPSE	D TIME	AFTER D	RILLING C	OMPLE	ETED:	N/A
4. TOTAL DEPTH OF HOLE	2.5 6	t bgs	<u> </u>		Т		17. OT	HER WATE	R LEVEL	MEASUR	EMENT	S (SPECIF	Y): N/A			
8. GEOTECHNICAL SAMPLES		<del>                                     </del>	STURBED		<u></u>	NDISTUR			_	BER OF C						-0.5
0. SAMPLES FOR CHEMICAL A	NALYSIS	VO N/A	_	ħ	N/A		RAD S	AMPLES	QA/Q	C SAMPLE	S /	ARCHIVE	SAMPLE		COVERY	
2. DISPOSITION OF HOLE		BACKF	ILLED	MOI	NITORING	3 (		SPECIFY)	23 SI	GN JURE	OF INS	PECTOR	-1.			
Backfill using bentonite	22410	w/bent			N/A	l.4	N	/A	_	Nary	1	sock	Bong	_		-
OCATION SKETCH/CO	MMENT	S	C #	7/	A STA	225	201	4-0	211	SČ	ALE: N	None				
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HTRW DRILLING LOG (C	Continuation Sheet)	===- </th <th></th> <th></th> <th>HOLE NUM</th> <th></th> <th>=</th>			HOLE NUM		=
PROJECT Coldwater Creek	INSPEC	TOR: GN	utiline			SHEET 2 of 2	•
(ft bas)	tion of Materials 449	NAI PID	Recovery	Analytical Sample	Blow Counts	Remarks	
Siffy CLAY trace same moret	nedun brown, 62, 62, 62, 62	/ _	_	1036 1036		Collect QC/QA soil samples svP164069-1 svP164069-2	0
Silty CLAY V. fine sa moist	brown, little 49	41	_	1029			0.5 1111 2121
Siky CZA	by, bonon mottles 58	14 -	-	1831	-	stat of mother gr colorang	1
Some 4. F	derk brown, 58 in sand, 58 in sand, 58 in 58	68	_	1033 Pso Th	070	on brown	1.5
2	56	147		Archin 1044 so th	-		2
	le terminated				,	Soil	2.5
6			3.				6
7	14	10 May					7
8	12	25/14		.comp.			8
9 —							9
/10 —					1		10

Recorded By H. Mutz Umg Date 2/25/14 QA By Date 2-26-4

HTRW DRILLING LOG (Continuation Sheet) SVP 163693 HTRW DRILLING LOG DISTRICT: St. Louis USACE ROJECT: Coldwater Creek G. Newtzling HOLE'NUMBER INSPECTOR: SHEET 2 of 2 SVP 43693 Analytical Sample best gitty CLAY, brown, trace to little sand low plastooth, mist 1. COMPANY NAME: Leidos 2. DRILL SUBCONTRACTOR Leidos SHEET 1 OF 2 SYP163693 Catch besin 4 LOCATION # 40 FP (Brased FP) 3. PROJECT: Coldwater Creek 1427 5. NAME OF DRILLER: Phil Moser / Chuck Finken bein 6 MANUFACTURERS DESIGNATION OF DRILL: N/A Is Th 6762 Stainless Steel (ss) bowl, ss trowel, 7. SIZES AND TYPES OF DRILLING 8 HOLE COORDINATES 03 12-15-14 with ss hand auger 3in ID or ss E 8649389 N1073707 sediment sampler with plastic sleeve Meter - Background 60 1430 9 SURFACE ELEVATION N/A 44-9 6672 44-10 C -Is- 74 11. DATE COMPLETED: 2/25/14 Sitty Clay, bomm, trace sand, moderately. plastio, most - CL 12. OVERBURDEN THICKNESS N/A 15. DEPTH GROUNDWATER ENCOUNTERED: N/A 13. DEPTH DRILLED INTO ROCK: N/A 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A 6344 14. TOTAL DEPTH OF HOLE 2.0 ff 695 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A DISTURBED UNDISTURBED 18. GEOTECHNICAL SAMPLES N/A 19. TOTAL NUMBER OF CORE BOXES: N/A 20. SAMPLES FOR CHEMICAL ANALYSIS FRCHIN VOC METALS RAD SAMPLES QA/QC SAMPLES ARCHIVE SAMPLE 21. TOTAL CORE N/A N/A RECOVERY: N/A 1434 22. DISPOSITION OF HOLE BACKFILLED MONITORING OTHER (SPECIFY) Ts.Th Backfill using bentonite w/bentonite 6557 COC #: LE 02262014-024 LOCATION SKETCH/COMMENTS SCALE: None Borspolo terminated Soil Ņ Approximately rip-rap, pipes, etc.) are approximate. 10 Recorded By H. Meuthing Date 2/25/14 QA By Recorded By Mentsley Date 2/25/14 QA By

40FP

HOLE NUMBER

							HTF	RW DRILI	LING LOG (Cor	ntinuation Sh	neet)				HOLE NUMBE	R 124 F PS
HTRW DRILLING	LOG	DISTRICT: St	. Louis USACE			HOLE NUMBER	PROJE	ст: Coldwate			INSPECTOR:	G. New	etaling			SHEET 2 of 2
1. COMPANY NAME: Leidos		2. DRILL SUBC	ONTRACTOR: Leido			SVP 144054 SHEET 1 OF 2	USCS	(It bgs/	Description of		449 NAI	PID	Recovery	Analytical Sample	Blow Counts	Remarks
3. PROJECT: Coldwater Cree	ek				(Flood Plan	in Systamotic)			Siffy CLAY, v. fine sand moist -CL	brown, little	59			SVPICA C		v. silty
5. NAME OF DRILLER: Phil A	Moser/Chuck Finken	boin	6 MANUFACTURERS			(3			moist -CL	pro long	,,,,,		-	Iso Th		V. 5117
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Stainless Steel (ss) bowl with ss hand auger 3in II sediment sampler with p	ss trowel, or ss	8 HOLE COORDINAT	190 N	1071563			1/5			6472			990cc VP1640		
Meter - Background			9 SURFACE ELEVAT								66	-	_	1442	-	
44-9 F - 43 cpm 44-10 C - 6030 cp	ng		10. DATE STARTED:	2/25/14	11. DATE COMP	LETED 2/25/14					6366			Tso The	<b>.</b>	
12. OVERBURDEN THICKNESS N	I/A		15. DEPTH GROUND	WATER ENCOUNT	ERED: N/A				Soly CLAY, 6	rown, little	10					
13. DEPTH DRILLED INTO ROCK:					TIME AFTER DRILLING		1 1	1	Soly CLAY, b sand, mode most-cu	matu plastice	49	_		1444	-	
14. TOTAL DEPTH OF HOLE 2	1 4		17. OTHER WATER LI			/A		185	******* CC		16442					
<ul><li>18. GEOTECHNICAL SAMPLES: N</li><li>20. SAMPLES FOR CHEMICAL ANA</li></ul>		UNDISTUR	19, TOTAL	NUMBER OF COR	<del></del>			1.5			10			Archive		
N/A 22. DISPOSITION OF HOLE	N/A BACKFILLED	N/A MONITORING	OTHER (SPECIFY)	23 SIGNALIRE OF	EJNSPECTOR A	RECOVERY: N/A					49			1446		
Backfill using bentonite	w/bentonite	N/A	N/A	1	Hentzlen				-		6393			Iso The	pee	
LOCATION SKETCH/COM	IMENTS AND PARTY OF	#: LEO	2262014-02		.E: None			2.0	Bornhole	ferministe	1					
									,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							(soil)
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Approximately									,							
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				<b>40</b> m	ф <sup>00</sup> Ф <sup>01</sup>			7 =				11/1/11				
	,125FP8	]24FP\$		⊕ <sub>1803</sub> ⊕ <sub>180</sub>	<b>⊕</b>	123FPS						125	TA.			
				// +								" N				
				<b>⊕</b> <sup>901</sup>	<b>*</b>			8				-				
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Recorded By A.M.	utiling Date	2/25/14 0	A By		Date _2	2-27-14		10 —	9 m +1					3		

HTRW DRILLING LOG  DISTRICT: St. Louis USAGE  SPECED TO 2  1. COMPANY NAME Loidos  2 DRILL SUBCONTRACTOR Loidos  SINCE TO COLOWater Creek  4. LOCATION # 132 FPS Float Plain Subtantible  S. NAME OF DRILLER PLAN MASSES AND SUBTANCE STREET DRISONATION OF DRILL INA  NO SAMPACE CONTRACTOR  S. SAMPACE STREET DRISONATION OF DRILL INA  10 DATE STARTED 2/25/4 11 DATE COMPLETED 2/25/4  11 DATE COMPLETED NA  12 DEPTH OROLLOW INTO CONC. NIA  13 DEPTH OROLLOW INTO CONC. NIA  14 TOTAL DEPTH OR HOLE Z. OF Bas  NA  15 DEPTH OROLLOW INTO CONC. NIA  16 DEPTH OROLLOW INTO CONC. NIA  17 OTHER WATER LIVEL MASSES THE REPORTING  NA  20 DEPTH OROLLOW INTO CONC. NIA  20 DEPTH OROLLOW INTO CONC. NIA  21 DEPTH OROLLOW INTO CONC. NIA  22 DEPTH OROLLOW INTO CONC. NIA  23 DEPTH OROLLOW INTO CONC. NIA  24 DEPTH OROLLOW INTO CONC. NIA  25 DEPTH OROLLOW INTO CONC. NIA  26 DEPTH OROLLOW INTO CONC. NIA  27 OTHER WATER LIVEL MASSES THE REPORT INTO COMPLETED NIA  28 DEPTH OROLLOW INTO CONC. NIA  29 DEPTH OROLLOW INTO CONC. NIA  20 DEPTH OROLLOW INTO CONC. NIA  21 DEPTH OROLLOW INTO CONC. NIA  22 DEPTH OROLLOW INTO CONC. NIA  23 DEPTH OROLLOW INTO CONC. NIA  24 DEPTH OROLLOW INTO CONC. NIA  25 DEPTH OROLLOW INTO CONC. NIA  26 DEPTH OROLLOW INTO CONC. NIA  27 OTHER WATER LIVEL MASSES OF CORD INTO NIA  28 DEPTH OROLLOW INTO CONC. NIA  29 DEPTH OROLLOW INTO CONC. NIA  20 DEPTH OROLLOW INTO CONC. NIA  21 DEPTH OROLLOW INTO CONC. NIA  22 DEPTH OROLLOW INTO CONC. NIA  23 DEPTH OROLLOW INTO CONC. NIA  24 DEPTH OROLLOW INTO CONC. NIA  25 DEPTH OROLLOW INTO CONC. NIA  26 DEPTH OROLLOW INTO CONC. NIA  27 OTHER WATER LIVEL MASSES OF CORD INTO CONC. NIA  28 DEPTH OROLLOW INTO CONC. NIA  29 DEPTH OROLLOW INTO CONC. NIA  20 DEPTH OROLLOW INTO CONC. NIA  21 TOTAL CORD.  27 TOTAL CORD.  28 D	46 6325 57 6175	PID		Analytical	Blow Counts Counts Counts Counts	SHEET 2 of 2 Remarks  I-bla V. fine Sal.  Soil
COMPANY NAME Leidos  2 DRILL SUBCONTRACTOR Leidos  SHEET 1 OF 2  PROJECT: Coldwater Creek  4 LOCATION # 132 FPS (Fload Plain's Systematics)  6 MANUFACTURERS DESIGNATION OF DRILL N/A  8 MANUFACTURERS DESIGNATION OF DRILL N/A  8 HOLE COORDINATES  9 SUBFACE ELEVATION N/A  10 DATE STRIPE OF COORDINATES  10 DATE STRIPE OF COORDINAT	6ino 44 6ino 6454 6681 46 6325 57 6175			Sample SUPICA 1449 Both Spece SUPICA 1450 Isoth 1452 Archin 1453 Tsoth	Counts 30 79 4080	I.ble Vi fine Sd.
ROJECT: Coldwater Creek  A LOCATION # 132 EPS (Flood Plain Systems)  MANDE OF DRILLER  Phi Mose Chart Timber be a Dealthon  Statinides Steel (se) bowl, as trowel, with spharod august int 10 or se sediment sampler with plastic sleeva  Steer - Background  9 S SURFACE ELEVATION N/A  10 C - 63 Depth  10 C - 63 Depth  10 C - 63 Depth  10 C - 64 Depth  10 Depth DRILLED NTO ROCK N/A  10 DEPTH DRILLED NOT ROCK N/A  10 DEPTH DRILLED NOT ROCK N/A  10 DEPTH DRILLED N/A  10 DEP	46 6325 57 6175		1 3	1449 Bo Th  Spece SVP164 1450 Iso Th  1452  Archim 1453 Iso Th	4080	sm v.fme sel.
ter - Background  a F - 4 CPM  10 DATE STARTED 2/25//4 11 DATE COMPLETED 125//4  10 DATE STARTED 2/25//4 11 DATE COMPLETED 125//4  10 DATE STARTED 2/25//4 11 DATE COMPLETED 125//4  10 DATE STARTED 2/25//4 11 DATE COMPLETED 1/25//4  11 DATE COMPLETED 1/25//4 11 DATE COMPLETED 1/25//4  12 DEPTH OF HOLE 2.0 1 DATE COMPLETED 1/2 1 DATE COMPLETE	46 6325 57 6175		1 3	Speces VPICA 1450 Iso 8h 1452 Archin 1453 Iso 7h	4080	sm v.fme sel.
ter - Background  9 SURFACE ELEVATION NIA  10 DATE STARTED  11 DATE COMPLETED  125/M  15 DEPTH GROUNDWATER ENCOUNTERED NIA  16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NIA  17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NIA  18 DEPTH TO HOLE Z.O L bs  19 TOTAL NUMBER OF CORE BOXES NIA  NIA NIA NIA NIA NIA NIA NIA NIA NIA NIA	46 6325 57 6175		1 3	1450 Iso 8h 1452  Archin 1453  Tro 7h	4080 1080	sm v.fme sel.
9 SURFACE ELEVATION N/A  9 SURFACE ELEVATION N/A  10 C 63 sepm	6681 46 6325 57 6175		1	1450 1452 1452 Archive 1453 Tao Th	Spece -	
10. DATE STARTED 2/25/M  10. DATE STARTED 3/25/M  10. DATE STARTED 2/25/M  10. DATE STARTED 2/25	46 6325 57 6175		_	Iso 8h  games  1452  Archiv  1453  Tso 7h	soci	
DOERBURDEN THICKNESS NI/A  15 DEPTH GRUINDWATER ENCOUNTERED NI/A  16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NI/A  TOTAL DEPTH OF HOLE Z.O. 15 DS  17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NI/A  GEOTECHNICAL SAMPLES NI/A  DISTURBED  UNDISTURBED  UNDISTURBED  UNDISTURBED  UNDISTURBED  19 TOTAL NUMBER OF CORE BOXES NI/A  SAMPLES FOR CHEMICAL ANALYSIS  VOC METALS  NI/A  NI/A  NI/A  NI/A  NI/A  DISTORDED  OTHER (SPECIFY)  23 SIGNATURE OF INSPECTOR  WIGHTH UNDISTURBED  OTHER (SPECIFY)  SCALE: None  MO-East State Plane (NAD 83, Feet)	6325 57 6175		_	1452 Archin 1453 Tao Th	-	
TOTAL DEPTH OF HOLE Z.0 \$\frac{1}{2} \frac{1}{2} \frac	6325 57 6175		_	Archiv	ine _	
GEOTECHNICAL SAMPLES: N/A DISTURBED UNDISTURBED 19 TOTAL NUMBER OF CORE BOXES N/A  SAMPLES FOR CHEMICAL ANALYSIS VOC METALS RAD SAMPLES QAQC SAMPLES ARCHIVE SAMPLE 21. TOTAL CORE RECOVERY: N/A  DISPOSITION OF HOLE BACKFILLED MONITORING OTHER (SPECIFY)  DICATION SKETCH/COMMENTS  CATION SKETCH/COMMENTS  DICATION SKETCH/COMMENTS  MO-East State Plane (NAD 83, Feet)	6175		-	1453 Iso Th	-	
SAMPLES FOR CHEMICAL ANALYSIS VOC METALS RAD SAMPLES QA/QC SAMPLES ARCHIVE SAMPLE 21 TOTAL CORE RECOVERY: N/A N/A N/A N/A DISPOSITION OF HOLE BACKFILLED MONITORING OTHER (SPECIFY) 23 SIGNATURE OF INSPECTOR ACKFILL USing bentonite W/bentonite N/A N/A SCALE: None  SCALE: None  Bonchole forminal  SCALE: None  MO-East State Plane (NAD 83, Feet)	6175		5	1453 Iso Th	-	Soil
NIA	6175	-	-	1453 Iso Th	-	Soil
Ackfill using bentonite wibentonite when the plane (NAD 83, Feet)  MO-East State Plane (NAD 83, Feet)				Iso Th		Soil
OCATION SKETCH/COMMENTS and space plug 1/25   SCALE: None  SCALE: None  Bonchole forminate  SCALE: None  No. East State Plane (NAD 83, Feet)				Spac		Soil
MO-East State Plane (NAD 83, Feet)	To d					Soil
MO-East State Plane (NAD 83, Feet)			-			(soil)
MO-East State Plane (NAD 83, Feet)						_
MO-East State Plane (NAD 83, Feet)						
MO-East State Plane (NAD 83, Feet)						
MO-East State Plane (NAD 83, Feet)						
MO-East State Plane (NAD 83, Feet)						
(NAD 83, Feet)		-			-	4 \ 1 2
50 100 Feet //////////////////////////////////	1					13
	Pen	MM	48			1 7
	The state of the s	125 14				3
ote: CWC features depicted as a result	12	1	\			*
field reconnaissance (i.e., depositional eas, drainages, areas of concrete and			1			
-rap, pipes, etc.) are approximate.			1	1		
		8		1		
Litter Litters				1	1	
			4		1	
			4		1	1
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						( -
<del>                                     </del>		+	+	+	-	-
				-		
ecorded By H. Neutrling Date 2/25/14 QA By Date 2-27-14						1

HTRW DRILLING LO	G	DISTRICT S	St. Louis USACE			HOLE NUMBER SVP   64063
COMPANY NAME Leidos		2 DRILL SUB	CONTRACTOR Lei	dos		SHEET 1 OF 2
PROJECT Coldwater Creek			4 LOCATION #	126 FPS (F	las Place	Cod IN
NAME OF DRILLER Phil Mose	Chuck Finker	bein		ERS DESIGNATION OF		Aslamatic)
7. SIZES AND TYPES OF DRILLING Stair	less Steel (ss) bowl,	, ss trowel,	8 HOLE COORDIN			
AND SAMPLING EQUIPMENT with sedii	ss hand auger 3in ID nent sampler with pl	or ss lastic sleeve		15-861 NIO7		
Meter - Background	1		9 SURFACE ELEV			
44-9 F - 43 cam						1000
G (00310 C)			10. DATE STARTE	D: 2/25/14	11. DATE COMP	PLETED 2/25/14
12. OVERBURDEN THICKNESS N/A			15. DEPTH GROUI	NDWATER ENCOUNTER		
13. DEPTH DRILLED INTO ROCK N/A			16. DEPTH TO WA	TER AND ELAPSED TIN	ME AFTER DRILLIN	G COMPLETED: N/A
14. TOTAL DEPTH OF HOLE	ft bgs			R LEVEL MEASUREMEN		
18. GEOTECHNICAL SAMPLES: N/A	DISTURBED	UNDISTL				
20. SAMPLES FOR CHEMICAL ANALYSIS	Voc	METALS	RAD SAMPLES	TAL NUMBER OF CORE	ARCHIVE SAMPI	LE 21. TOTAL CORE
N/A	N/A	N/A	4	0	0	RECOVERY: N/A
22. DISPOSITION OF HOLE  Backfill using bentonite	BACKFILLED w/bentonite	MONITORING N/A	OTHER (SPECIFY)	23. SIQUATURE OF I	NSPECTOR	
LOCATION SKETCH/COMMENT	and an add	11001-5/10	1071	7.	00	
ECOATION SKETCH/COMMEN		LE0226	2014-021	SCALE	: None	
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			1			
pproximately					1 1	
VIIIIIIIII	111111111111111111111111111111111111111	111111111	111111111	111111111111111111111111111111111111111		VA IIII
					<b>9</b> 12 ⊕ 110	<u>a</u>
		///////////	///////////////////////////////////////			
156.75	,125F93		124FP8		<b>P</b> → <sup>907</sup>	, tiper
184.79	,13FF3*		12478		<b>P</b> → <sup>907</sup>	, lim
	,13FF9		124FB		<b>P</b> → <sup>907</sup>	, time
36,793	,135FPP	v Davie	124793			
005 £2.0	, 13F5	r Paris	124FB		<b>P</b> → <sup>907</sup>	255
0557.01	LISTER TO A	v Davie	124FB	<b>*</b>	<b>P</b> → <sup>907</sup>	1137F
005 ELO1	,13F9	120579	11476		<b>P</b> → <sup>907</sup>	899 892
05 ELOI		13075	124793	<b>*</b>	<b>P</b> → <sup>907</sup>	1137F3
005 ELOI	113F9	13025	12478	<b>*</b>	<b>P</b> ⊕ <sup>907</sup>	899 899 119FPS
005 ££.01	11575	120179	124793	<b>*</b>	<b>P</b> ⊕ <sup>907</sup>	899 899 119FPS
005 ELOI	113F5	1200-50	12478	<b>*</b>	<b>P</b> ⊕ <sup>907</sup>	1999 119FPS
005 ££.01	113779	120179	124793	<b>*</b>	<b>P</b> ⊕ <sup>907</sup>	103 11979 11979
005 ELOI	113F5	1 Danie	124785	<b>*</b>	<b>P</b> ⊕ <sup>907</sup>	999 119FPS
005 ££.01	113779	120179	124793	<b>*</b>	<b>P</b> ⊕ <sup>907</sup>	119FPS
005 ELOI		1 Description of the second of	124785	<b>*</b>	<b>P</b> ⊕ <sup>907</sup>	107°FS

Coldwater	ING LOG (Continuation Shorter	INSPECTOR:	( 1)	uth		SVP 6	SHEET 2 of 2
Coldwater	Description of Materials	449 449	Ì	Recovery	Analytical	Blow	Remarks
(ft bgs)	·	NAI	PID	,	Sample VPI64 04	Counts	Nomana
	Clayer SILT, brown, lattle V. Fine sand, loseplasticity moist - Me	45	_		1502	_	
	V. Fine sand, low plasticity	-6261			Isothe	-mar 50.	e
=	moist - FF	52	_	-	1504	_	
, =		6320					
=		57			1506		
=	,	6425					
	become mothed by gray	59		5	1508	64	
1.8		645			1306 1149	Prince	Clay
2	Sily CLAY, medium boom	00/					Per
	mothled by orangesh bown, gray, and dank brown	55/631	_	_	1512	-	97.5
-		1			<del> </del>		†
	trace sand, moderately plastic, moist - CL	67/141	-	_	1514	_	
3 =	,		-				•
		59/6575	-	_	1516	_	
		10575			A	A #	
		71/		- 1	1510	065	
		-6176		- 3	To Ba	<del>anad</del>	spec
4 =	becomes matted by rust color below 4'	60/			1	,	
	THET COINT DEPONE "4"	/6337			1521		
150		12 -			15-		
_ =		76395	-		1523	-	
5							more most
		68,454	_	-	1525	-	Cobr
-		- 6434		+	TVP16-	0/4	-
		6333			1527	-	
6.0		-6333	-		20.74 9	printput.	spes
	Bonehole terminated						
=	,						(Soil)
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	· ·		HTRW DRILL	LING LOG (Continuation Sh	eet)			HO	DLE NUMBER (35 FPS VP 164085
ITRW DRILLING LOG	DISTRICT: St. Louis USACE	HOLE NUMBER SVP164085	PROJECT: Coldwate	r Creek	INSPECTOR:	G.1	Vental		SHEET 2 of 2
COMPANY NAME: Leidos	2. DRILL SUBCONTRACTOR: Leidos	SHEET 1 OF 2	USCS Depth (ft bgs)	Description of Materials	449 NAI	PID		Arreflytical	Blow Remarks
PROJECT: Coldwater Creek	4. LOCATION: # 135 FPS (Fla		0	SILT, brown, lattle clay lattle Vibras sand, low plasticity, moist ML			- 1	P164085	Called aclas
NAME OF DRILLER: Phil Moser / Charle Fink				little V. Fine sand, low	57	_	_	1535	- Soil samples - SUP164085-1
SIZES AND TYPES OF DRILLING ND SAMPLING EQUIPMENT  Stainless Steel (ss) bowl, so with ss hand auger 3in ID o sediment sampler with plas	s trowel, 15 strowel, 16 strowel, 17 strowel, 18 hole coordinates 17 column   1 column			Plasticity, moist ML	5444	239	4		SVP164085-2 3 of 13 Extra
eter - Background	9 SURFACE ELEVATION N/A		0.3		58			1537 .	
10 C - 6030 cpm	10. DATE STARTED: 2/25/14	11. DATE COMPLETED 2/25/14	Jum =		6374				
OVERBURDEN THICKNESS N/A	15. DEPTH GROUNDWATER ENCOUNTERED	o: N/A	477	W some chay before					mer eday og
DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME A	AFTER DRILLING COMPLETED: N/A		2/4	//	•	-	1539 _	. transition
TOTAL DEPTH OF HOLE 2.0 ft bgs	17. OTHER WATER LEVEL MEASUREMENTS	(SPECIFY): N/A	14		6457				
GEOTECHNICAL SAMPLES: N/A DISTURBED  SAMPLES FOR CHEMICAL ANALYSIS VOC	UNDISTURBED 19. TOTAL NUMBER OF CORE BO  METALS RAD SAMPLES QA/QC SAMPLES A		8 =	Sifty CLAY, brown matter by rust and dock brown	1			VPICADS	
N/A N/A	N/A  ONITORING ONITORING ONITORING ONITORING OTHER (SPECIFY) N/A  N/A  N/A  N/A  ONITORING OTHER (SPECIFY)  N/A  ONITORING OTHER (SPECIFY)  N/A  ONITORING OTHER (SPECIFY)	RECOVERY: N/A	18 =	plastic, most	62	-	_	1541 _ 30 M	sicl
OCATION SKETCH/COMMENTS and grass play	SCALE: N	0 //			4,			gel	
COC #: LE 02 26 2014 - 021	<b>,</b>		2.0	Boreholo terminated					
<del>                                      </del>									(Soil)
N I I I I I I I I I I I I I I I I I I I			5						
							-		
proximately								1	
		2000		-1					
	38998		6						
	<b>♦</b> 931 <b>♦</b> 932	953//////////						3	
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MO-East State Plane	\$ SAR \$ \$40 \$	V/////////////////////////////////////			1.	./			
(NAD 83, Feet) 50 100 Feet			/ =	*	LW	N.			
		* 15/1//// 15/FF9			21	5/14			
CWC features depicted as a result		940			12	1			
d reconnaissance (i.e., depositional drainages, areas of concrete and			8 =			1			
		3					1		E
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			9 —					1	=
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ecorded By A. Neutsling Date	a larla a se	0 22 .//							
corded By // // Date	425/14 QA By	Date _ <del>\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ </del>	-	S. Mentaling Date	_/_/.			K.	
	,		Recorded By	S. Lutz ling Date	425/14	QA By	11.		Date 2-27

				HTRW DRIL	LING LOG (Continuation SI	neet)				HOLE NUM	BER 34 FPS
HTRW DRILLING LOG	DISTRICT: S	t. Louis USACE	HOLE NUMBER SVP 64083	PROJECT: Coldwat	er Creek	INSPECTOR:	G.N	Ventzli	ne		SHEET 2 of 2
1. COMPANY NAME: <b>Leidos</b>	2 DRIII SIIRO	CONTRACTOR Leidos	SHEET 1 OF 2	USCS Depth (ft bgs)	Description of Materials	449 NAI	PID		Analytical Sample	Blow Counts	Remarks
PROJECT: Coldwater Creek	2 STATE GODG	4 LOCATION # 134 FPS (Flood			Clayery SILT, brown, little sand, low plastic moist - ML	101		1	VP16	1083	
NAME OF DRILLER: Phil Moser / Church Fu	kanhair	6 MANUFACTURERS DESIGNATION OF DRILL: N			little sand, low plasho		-	-	1547 Iso Th	-	
7. SIZES AND TYPES OF DRILLING Stainless Steel (ss) bow	l, ss trowel,	8 HOLE COORDINATES		= =	moist - ML	6425		J	3000	•	
sediment sampler with p	D or ss plastic sleeve	E 865048 N10738	26	105	becomes mattheal by				7		
Meter - Background 44-9 <b>E - 43 com</b>		9 SURFACE ELEVATION N/A		1, 11	becomes mottled by rust of drk brn.	59		-	1548	_	
44-10 С - 6030 сры		10. DATE STARTED: 2/25/14 11. DAT	E COMPLETED 2/15/#	1/5/14		5286					
2. OVERBURDEN THICKNESS N/A		15. DEPTH GROUNDWATER ENCOUNTERED: N/A		112 -					VP164	084	
13. DEPTH DRILLED INTO ROCK: N/A		16. DEPTH TO WATER AND ELAPSED TIME AFTER	DRILLING COMPLETED N/A			63/			1544		
4. TOTAL DEPTH OF HOLE 2.0 ft bas		17. OTHER WATER LEVEL MEASUREMENTS (SPEC		1.3	Sike CLAN well sill				Teu Th		1/ 1/ 1/ 1/
8. GEOTECHNICAL SAMPLES: N/A DISTURBED	UNDISTU	IRBED 19. TOTAL NUMBER OF CORE BOXES: I	N/A	8-	Silly CLAY, yellowish byon modeled by rust, little & finds sand, low plasticity, mon	*	1	1	good		V.s. HyCLAY
20. SAMPLES FOR CHEMICAL ANALYSIS VOC  N/A  N/A	METALS N/A	RAD SAMPLES QA/QC SAMPLES ARCHIVI	SAMPLE 21 TOTAL CORE RECOVERY N/A	= دما	sand, low plasticity, mon	50		1	trepni	<b>)</b>	
22. DISPOSITION OF HOLE BACKFILLED	MONITORING	OTHER (SPECIFY) 23. SIGNATURE OF INSPECTO	9.		- C4	1/			1552	-	
Backfill using bentonite w/bentonite LOCATION SKETCH/COMMENTS	10/A 2 25 14		0	<b>I</b>		6104	V		Eso Th	4 Spen	
LOCATION SKETCH/COMMENTS  COC#: LEOL26201402		6CALE: None		2.0	Borchole terminated					7	
											(soil)
N				5			-				
pproximately											
(////)	(38668/										
Ĭ VIII	1//////			6 _=							
*** V////>											•
MO-East State Plane	CANDO	\$ 54E \$ 949 \$ 950		_	1		*	1	3 -		
(NAD 83, Feet) 50 100 Feet				7 =			,				
135793		/134PS	945			MILL	1				
te: CWC features depicted as a result		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(srb////////////////////////////////////		3	AKI	1.4				
field reconnaissance (i.e., depositional as, drainages, areas of concrete and		***************************************				\ \[ \sqrt{\sq}\sqrt{\sq}}}}}}}}}}}\signt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}	1,				3
rap, pipes, etc.) are approximate.		(915) + 916 +		8 —		10	'\				
					3.						)
egaçtı,	jaiks)	\$ 994 \$ 992	1,110FPS-777777777777777777777777777777777777								
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	//////////	//////////////////////////////////////						1-1		, .	
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				10 —						$\longrightarrow$	
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ecorded By A. Meutzling Date	2/06/14	A DURANT	ate 2-27-14		1 1	11					
ecorded by the flant of Date	e 427/14 C	AN DY	ate d-d 1-1-1	Recorded By	I Neutrling Date	225/14	OA B	5	<-		Date 2-27
				ccolded by	Date	7-7	WA DY			-	Date <u>&lt; &lt; / / / / / / / / / / / / / / / / / </u>

							ING LOG (Continuation S	_				SVP 6	MBER 127 FP.
HTRW DRILLING LOG	DISTRICT: S	t. Louis USACE			HOLE NUMBER SVP164667	PROJECT: Coldwater	Creek  Description of Materials	INSPECTOR:	6.11		N. A.	Plan	SHEET 2 of 2
. COMPANY NAME: Leidos	2. DRILL SUBO	CONTRACTOR: Le	dos		SHEET 1 OF 2	USCS Depth (ft bgs)		NAI NAI	PID	Recovery	Sample	Blow Counts	Remarks
PROJECT: Coldwater Creek				Flord Plan	in Systametic)	Name .	SIHY CLAY, brown,	67			SVP1640	67	
NAME OF DRILLER: Phil Mosey/Church Fin	kenbern		ERS DESIGNATION O	•	15,000	7.34 <u>-</u>	little to some V. fine			L V	TS0 74		/
SIZES AND TYPES OF DRILLING Stainless Steel (SS) be	wl, ss trowel,	8. HOLE COORDI					Sand, low plasticity,	6504			Spec	4	
ND SAMPLING EQUIPMENT with ss hand auger 3i sediment sampler with			5048 N	11073664	4	7.5	moist - EL				77-60		-
leter - Background								76/			1559		
-9 F - 43 cpm		9 SURFACE ELE		-		MW. 14					1004		
10 С 16030 арм		10. DATE STARTE	D: 2/25/14	11 DATE COM	PLETED 2/25/4	7 2 3		6385					
OVERBURDEN THICKNESS N/A		15. DEPTH GROU	NDWATER ENCOUNT	ERED N/A									
DEPTH DRILLED INTO ROCK: N/A		16 DEPTH TO W	ATER AND ELAPSED	TIME AFTER DRILLIN	G COMPLETED: N/A			57/		_	1601	_	
TOTAL DEPTH OF HOLE 2.6 ft bgs		-	R LEVEL MEASUREM					6266	_				
GEOTECHNICAL SAMPLES: N/A DISTURBE	UNDISTU		TAL NUMBER OF CO			<b>8</b> =							_
. SAMPLES FOR CHEMICAL ANALYSIS VOC	METALS	RAD SAMPLES	QA/QC SAMPLES	ARCHIVE SAMP		1,5		-			SVP164	068	
N/A N/A 2. DISPOSITION OF HOLE BACKFILLED	N/A MONITORING	OTHER (SPECIEVA		A	RECOVERY: N/A			74		_	1603	_	
2. DISPOSITION OF HOLE BACKFILLED  ackfill using bentonite w/bentonite	N/A	OTHER (SPECIFY) N/A	23 SUMMATURE O	INSPECTOR				6544			250 14		
OCATION SKETCH/COMMENTS	7 2136 14		1 / 6	E: None		A.					Spec		
co	# ! LEOZ	26 2014-6	2H			2.0	Borehole terminates	/			1500		7
													(Soi/)
Ŋ						5		-	-				-
proximately													
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ecorded By A. Newtzfing			$\supset$									1	
11100 11	/ .1 .				2-27-14		9. Neutsting Dar	1000		1			1

HTRW DRILLING L	.OG	DISTRICT: S	st. Louis USACE			HOLE NUMBER
1. COMPANY NAME: Leidos		2. DRILL SUB	CONTRACTOR: Lei			SHEET 1 OF 2
3. PROJECT: Coldwater Creek			4 LOCATION #	144 FPS FIL	and Plain &	ystemetic)
5. NAME OF DRILLER: Andy He	Hkama /Jaarsh	Ivarado Adama				1
7. SIZES AND TYPES OF DRILLING SAND SAMPLING EQUIPMENT	tainless Steel (ss) bo vith ss hand auger 3i ediment sampler wit	owl, ss trowel, n ID or ss	8 HOLE COORDIN			
Meter - Background			9 SURFACE ELEV	_		Man
44-10 C - 5216 cpm			10 DATE STARTE	2/26/14	11_DATE COMPL	ETED 2/24/14
12 OVERBURDEN THICKNESS N/A			15. DEPTH GROU	NDWATER ENCOUNTE	RED N/A	•
3. DEPTH DRILLED INTO ROCK: N	//A		16 DEPTH TO WA	TER AND ELAPSED TII	ME AFTER DRILLING	COMPLETED N/A
4. TOTAL DEPTH OF HOLE 2.6			-	R LEVEL MEASUREME		
8. GEOTECHNICAL SAMPLES: N/	3	D UNDISTU		TAL NUMBER OF CORE		
20 SAMPLES FOR CHEMICAL ANALY		METALS	RAD SAMPLES	QA/QC SAMPLES	ARCHIVE SAMPLE	
N/A 22 DISPOSITION OF HOLE	N/A BACKFILLED	N/A MONITORING	OTHER (SPECIFY)	1set of 2	/	RECOVERY N/
Sackfill using bentonite	w/bentonite	N/A N/A	N/A	23. SIGNATURE OF	Jechslong	
pproximately  BALM DR			146FFS	995 + VIL		
- - -		St Cin No		<b>⊕</b> 969	<b>.</b>	
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HOLE NUMBER /44 FPS SVP /44 107 HTRW DRILLING LOG (Continuation Sheet) 92 G. Newtzling PROJECT: Coldwater Creek INSPECTOR: SHEET 2 of 2 Recovery Analytical Sample USCS PID NAI Sitty CLAY, brown, some V fine sand, low plasticity, moist \_ CL Collect aclas Soil samples SVP164107 60 1020 SUP164 107-1 SUP164 107-2 Iso Th 5624 Spec Extra # 40413) 48 1622 trace v. fine sand, low to moderate plasticity moist - CL 5723 SVP164108 51/ 1024 6065 Iso Th Archine 1024 Iso Th 6073 Spec Bruhole terminated Soil 10 Date 2/24/14 QA By Date 2-27-14 Recorded By \_

HTRW DRILLING LOG	i	DISTRICT: St	. Louis USAC	<b>E</b>		SVP 64099
COMPANY NAME: Leidos		2. DRILL SUBC	ONTRACTOR: L	eidos		SHEET 1 OF 2
PROJECT: Coldwater Creek			4 LOCATION	# 141FPS (	Flood Plain	Sustant.
NAME OF DRILLER: And Holtke	Adam Queen	Phil Rence		RERS DESIGNATION OF		/
SIZES AND TYPES OF DRILLING Stainle with ss	ess Steel (ss) bowl, ss s hand auger 3in ID or ent sampler with plast	trowel, ss	8 HOLE COORI			- 3
Weter - Background	The Sampler With plast	io siceve	9 SURFACE EL	····		
14-9 E - 31 cpm 14-10 C - 5216 cpm					_	
240 600			10. DATE STAR	TED 2/24/14	11 DATE COMP	PLETED 2/24/14
2. OVERBURDEN THICKNESS N/A			15. DEPTH GRO	UNDWATER ENCOUNTE	RED: N/A	
3. DEPTH DRILLED INTO ROCK: N/A			16. DEPTH TO V	VATER AND ELAPSED TI	ME AFTER DRILLIN	G COMPLETED: N/A
4. TOTAL DEPTH OF HOLE 6.6 F	bec			TER LEVEL MEASUREME		
8. GEOTECHNICAL SAMPLES: N/A	DISTURBED	UNDISTUR		OTAL NUMBER OF COR	*	
0. SAMPLES FOR CHEMICAL ANALYSIS		METALS	RAD SAMPLES	QA/QC SAMPLES	ARCHIVE SAMPL	E 21 TOTAL CORE
N/A	N/A	N/A NITORING	4	0,	1	RECOVERY. N/A
22. DISPOSITION OF HOLE  Backfill using bentonite	BACKFILLED MO w/bentonite	N/A	OTHER (SPECIFY)	23. SIGNATURE OF		
LOCATION SKETCH/COMMENTS		2/24/14		ACAL F	: None	
COC #: LE 0227				JOOALL	None	
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pproximately						
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or Cald	entar Crook	INSPECTOR	6 M	. 41.		SVP/64		-
	ater Creek	INSPECTOR:	G.Ne	MISHIN		DI-	SHEET 2 of 2	
Depth (ft bgs)	Description of Materials	449 NAI	PID	Recovery	Analytical Sample	Blow Counts	Remarks	
	SIHy CLAY, brown, Some		10.00	5	VP1640	99		
	- to little V. time said low	20 /24	5	14 7	1036		piecesof	
-	plasticity, moist -CL	1/31	12/2	-	1040	1	ee yellow by	100
		1591.5		1	1039		Freger	
4	_ ′	5	813					
1 -		15		9	P/64A	0		
		5996	-		1041	-	(a).	
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	becomes mothed by	61		_	1043			
	- gray 7 oranges h brown	5779			70.0			
2 -	becomes mostled by gray forangesh brown below approx. 1/2. ft.	54			4 4-			
		74/	-		1047	-		
1		15901						
		46/			1000	_		
1 4		5871			1044			
3 -				<del>                                     </del>			•	
	· ·	60		-	1051	-	. 4	
		-5947			<u> </u>			
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		5792		- 2	a Dag		Charle	
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5 _	Sune sitt, trace sand, moderation plastic	4 6052					LL poid to	
	_ some sitt, trace sand,	100					Upper for	_
	- moderation plasticy	26108			1107	-	177	
-	most-/ch		Charle.		land o		1	-
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	y A. Neutzlung Da	ate <b>2/24/14</b>		1,	<		Date <u>2-2</u>	_
orded E	V Ch // AssTa Visco	ate 2/24/14	() A Ri7	-61		the same of the sa	12to =/ == 1	

The same of the sa					HTRW DRILLING	LOG (Continuation S	heet)				HOLE NUM	BER 138 FP8
THRAY BRIELING EGG		t. Louis USACE		HOLE NUMBER	PROJECT: Coldwater Cree	INSPECTOR:	INSPECTOR: G. Neutzling				SHEET 2 of 2	
		CONTRACTOR Laid	***		USCS Depth (ft bgs)	Description of Materials	449 NAI	PID	Recovery	Analytical Sample	Blow Counts	Remarks
1. COMPANY NAME LEIGOS 3. PROJECT: Coldwater Creek	Z. DRILL SUB	4 LOCATION # 138 FPS	(FL 1 DL :	SHEET 1 OF 2	9 = 5,,	h, CLAY, brown, gome little Yary fine sand,	54/		5	/P1640	93	
5 NAME OF DRILLER Andy Holthamy Adams	/ Shil Alaca.			- systomens)		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		-		1116	_	frozen
7. SIZES AND TYPES OF DRILLING  Stainless Steel (ss.)	bowl, ss trowel,	6 MANUFACTURERS DESIGNATION  8 HOLE COORDINATES	ON OF DRILL: N/A			rplasticity, moist -CL	5864		1	Iso The		
AND SAMPLING EQUIPMENT with ss hand auger sediment sampler	3in ID or ss	E864990	N10739	767	6.5				-	Spec 191640		l.
Meter - Background	Ten places closes	9 SURFACE ELEVATION N/A					54	_	_ ''	1117	79	
44-9 E - 3/Gpm 44-10 C - 5210 Cam					yam -					Tso Th		
340 974		10. DATE STARTED: 2/26/14	11. DATE CON	MPLETED 2/26/14	126		5891			Spec		
12. OVERBURDEN THICKNESS N/A		15. DEPTH GROUNDWATER ENCO	DUNTERED N/A		7 =		10/					
13. DEPTH DRILLED INTO ROCK: N/A		16. DEPTH TO WATER AND ELAPS	SED TIME AFTER DRILL	ING COMPLETED N/A			44		_	1119		
14. TOTAL DEPTH OF HOLE 2.0 ft bgs		17. OTHER WATER LEVEL MEASU	JREMENTS (SPECIFY)	N/A			15994					
18. GEOTECHNICAL SAMPLES: N/A DISTUR		10 TO THE HOMBER OF			8					4. / .		
20. SAMPLES FOR CHEMICAL ANALYSIS VOC  N/A N/A	METALS N/A	RAD SAMPLES QA/QC SAMP	PLES ARCHIVE SAM	MPLE 21. TOTAL CORE RECOVERY. N/A	15		45		1	Archir.		
22. DISPOSITION OF HOLE BACKFILLED	MONITORING		RE OF INSPECTOR				6184			[]2] [so Th		
Backfill using bentonite w/bentonite		N/A Day	. 0 11	-				,	J	Acres 6		
LOCATION SKETCH/COMMENTS and grass COC#: LE02272014-01	المداء بدا المداء	/ 50	CALE: None		2. 3	onchola terminate	1			1		
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			<b>♦</b> 955 ♦	**************************************			97		1 -		_	
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	LOG			DISTRICT:	St. Louis U	SACE			HOLE NUMBER SVP164675
COMPANY NAME Leidos				2 DRILL SUI	BCONTRACTO	R <b>Lei</b>	dos		SHEET 1 OF 2
PROJECT: Coldwater Cre	ek			-	4 LOCA	ION #	13  FPS (#	ood Plain	Systemeti)
NAME OF DRILLER Andy	leftern	1 Adam	Onem	Phil Mac			ERS DESIGNATION OF		
SIZES AND TYPES OF DRILLING D SAMPLING EQUIPMENT	Stainles: with ss l	s Steel (ss hand auge	) bowl, ss r 3in ID or with plasti	trowel, ss	8 HOLE	COORDI			10
eter - Background					9 SURF	CE ELEV	ATION: N/A		
-9 E - 3 Cam	<u>.</u>				40 DATE	STARTS	02/26/14	11. DATE COMP	HETED Place
3240 5711					10. DATE	SIARIE	426/14	TI DATE COM	426/14
OVERBURDEN THICKNESS I	N/A				15 DEP	H GROU	NDWATER ENCOUNTE	RED. N/A	
DEPTH DRILLED INTO ROCK	: N/A				16 DEP	H TO WA	ATER AND ELAPSED TIE	ME AFTER DRILLIN	G COMPLETED N/A
TOTAL DEPTH OF HOLE	.5 4	bes			17 OTH	R WATE	R LEVEL MEASUREME	NTS (SPECIFY) N	/A
GEOTECHNICAL SAMPLES:		J DISTUI	RBED	UNDIST	URBED	19. TO	TAL NUMBER OF CORE	BOXES N/A	
SAMPLES FOR CHEMICAL AN	NALYSIS	VOC	N	METALS	RAD SAM	PLES	QA/QC SAMPLES	ARCHIVE SAMPI	E 21. TOTAL CORE
N/A . DISPOSITION OF HOLE	-+	N/A BACKFILLE	D MOI	N/A NITORING	OTHER (SI	ECIFY)	23 SIGNATURE OF	INSPECTOR	1 .
ackfill using bentonite		w/bentoni	MELL		N/A	OTHER (SPECIFY) 23. SIGNATURE OF N/A		neutze	sug.
COC #: L	WMENTS	7201.	4-014	2/26/14			SCALE	: None	V
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50 100	Feet	135FP8			134FPS	10	<b>♦</b> EII <b>♦</b> EII		1336
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	LING LOG (Continuation S			ABER /3/ FPS				
T Coldwate	er Creek	INSPECTOR:	a. New taling				SHEET 2 of 2	
Depth (ft bgs)	Description of Materials	449 NAI	PID	Recovery	Analytical Sample	Blow Counts	Remarks	1
	SILT, brown, some vmy fine sand, little clay, low plasticity, moist	5/5638	-	-	4716407 1127 Whdga		5,74	
1 =	low plasticity, moist	53/5726	_	_	//29	_		E 1
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orded By	Mentitung. Da	te 2/26/14	QA BV	5	3		Date <u>2-1</u>	17. 14