2014 SITE MANAGEMENT PLAN

Defense Depot Memphis, Tennessee

Prepared for:

Department of the Army

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USACE Contract No. W90FYQ-09-D-0005
Task Order No. DS01

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Prepared for:

U.S. Army Corps of Engineers, Tulsa District
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LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
AS/SVE	air sparging with soil vapor extraction
bgs	below ground surface
BRAC	Base Realignment and Closure
cDCE	cis-1,2-dichloroethene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	chloroform
COC	chemical of concern
CT	carbon tetrachloride
CVOC	chlorinated volatile organic compound
CWM	chemical warfare material
CY	cubic yard
DDMT	Defense Depot Memphis, Tennessee
DERP	Defense Environmental Restoration Program
DLA	Defense Logistics Agency
DO	dissolved oxygen
DoD	Department of Defense
e^2M	engineering-environmental Management, Inc.
EBT	enhanced bioremediation treatment
EE/CA	engineering evaluation and cost analysis
EISR	Early Implementation of Selected Remedy
ET&D	excavation, transportation and disposal
FFA	Federal Facilities Agreement
FOST	Findings of Suitability to Transfer
FSVE	Fluvial soil vapor extraction
FU	functional unit
HRS	Hazard Ranking System
HSWA	Hazardous and Solid Waste Amendment
IAQ	intermediate aquifer
IC	institutional control
IRA	interim remedial action
IRACR	Interim Remedial Action Completion Report
IW	injection well

LIST OF ACRONYMS AND ABBREVIATIONS
CONTINUED

LTM	long-term monitoring
LUC	land use control
LUCIP	land use control implementation plan
MACTEC	MACTEC Engineering and Consulting, Inc.
MAQ	Memphis aquifer
MCL	maximum contaminant level
MI	Main Installation
MLGW	Memphis Light Gas & Water
MNA	monitored natural attenuation
MSCHD	Memphis Shelby County Health Department
MW	monitoring well
NPL	National Priorities List
ODB	Office of the Assistant Chief of Staff for Installation Management, Base Realignment and Closure Division
O&M	operations and maintenance
OPS	Operating Properly and Successfully
ORP	oxygen reduction potential
OU	Operable Unit
PCB	polychlorinated biphenyls
PCE	tetrachloroethene
PCP	pentachlorophenol
PID	photoionization detector
PMW	performance monitoring well
POL	petroleum/oil/lubricants
ppm	parts per million
PRB	permeable reactive barrier
RA	remedial action
RAO	remedial action objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment

LIST OF ACRONYMS AND ABBREVIATIONS

CONTINUED

RG	remediation goal
RI	remedial investigation
RL	reporting limit
ROD	Record of Decision
RW	recovery well
SMP	Site Management Plan
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
SWMU	Solid Waste Management Unit
TA	treatment area
TC	target concentration
TCE	trichloroethene
TDEC	Tennessee Department of Environment and Conservation
TeCA	1,1,2,2-tetrachloroethane
TOC	total organic carbon
TSVE	thermal soil vapor extraction
TTA	target treatment area
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VMP	vapor monitoring point
VOC	volatile organic compound
ZVI	zero valent iron
µg/L	micrograms per liter

1.0 INTRODUCTION

HDR has prepared this 2014 Site Management Plan (SMP) for Defense Depot Memphis, Tennessee (DDMT) under Contract W90FYQ-09-D-0005, Task Order DS01 to the United States Army Corps of Engineers (USACE), Tulsa District. The environmental restoration program at DDMT is directed by the Department of the Army, Office of the Assistant Chief of Staff for Installation Management, Base Realignment and Closure (BRAC) Division (ODB).

This SMP has been prepared in accordance with *Department of Defense (DoD) Manual Number 4715.20, Defense Environmental Restoration Program [DERP] Guidance* (DoD, 2012) and fulfills a requirement of the *Federal Facilities Agreement at the Defense Distribution Depot Memphis* (FFA), which was signed by United States Defense Logistics Agency (DLA), United States Environmental Protection Agency (USEPA) and Tennessee Department of Environment and Conservation (TDEC) in 1995.

In accordance with the DERP Guidance, the SMP describes a coordinated approach for environmental restoration activities and includes all required activities by year until the expected completion of environmental restoration at DDMT. The SMP will be updated annually, made available for public review in the information repository and included in the Administrative Record. The 2014 SMP is updated with information available as of 1 October 2013.

2.0 SUMMARY OF SITE CONDITIONS

2.1 SITE LOCATION AND DESCRIPTION

DDMT is located in southeastern Memphis, Shelby County, Tennessee approximately 5 miles east of the Mississippi River and just northeast of Interstate 240 (Figure 1). DDMT originated as a military facility in the early 1940s to provide stock control, material storage, and maintenance services for the U.S. Army. In 1995, DDMT was placed on the list of DoD facilities to be closed under BRAC. Storage and distribution activities continued until DDMT closed in September 1997.

DDMT covers approximately 632 acres and includes the Main Installation (MI) and Dunn Field. The MI contains approximately 567 acres with open storage areas, warehouses, former military family housing, and outdoor recreational areas. Dunn Field, which is located across Dunn Avenue from the north-northwest portion of the MI, contains approximately 65 acres and includes former mineral storage and waste disposal areas.

2.2 REGULATORY STATUS

The Depot was a Resource Conservation and Recovery Act (RCRA) hazardous waste generator, TN 4210020570. The majority of hazardous wastes generated by the Depot consisted of hazardous substances that reached shelf-life expiration dates and could no longer be used by the military services and vehicle maintenance wastes. The Depot also generated hazardous wastes from the cleanup of small hazardous substance spills.

On 28 September 1990, USEPA Region 4 and TDEC issued the Depot a RCRA Part B permit for storage of hazardous waste. The Hazardous and Solid Waste Amendment (HSWA) portion of the permit issued by USEPA included requirements for the identification and, if necessary, corrective action of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs). A RCRA Facility Assessment (RFA) completed in 1990 identified 49 SWMUs and 8 AOCs.

Subsequent to issuing the RCRA permit, USEPA prepared a final Hazard Ranking System (HRS) Scoring Package for the facility. On 14 October 1992, based on the final HRS score of 58.06, USEPA added the Depot to the National Priorities List (NPL) (57 Federal Register 47180 No. 199). On 6 March 1995, USEPA, TDEC, and the Depot entered into a FFA (USEPA, 1995) under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 120, and RCRA, Sections 3008(h) and 3004(u) and (v). The FFA outlines the process for investigation and cleanup of the Depot sites under

CERCLA. The parties agreed that investigation and cleanup of releases from the sites (including formerly identified SWMUs/AOCs) would satisfy any RCRA corrective action obligation.

The RCRA Part B permit for hazardous waste storage was terminated by TDEC in October 1998 upon request of DDMT because the storage unit was not constructed. The HSWA portion of the permit for corrective action remained in effect. DDMT submitted a corrective action permit renewal application in March 2004. In January 2005, TDEC issued a Denial to Reissue the Hazardous Waste Corrective Action Permit, which terminated the requirement to perform corrective action under RCRA, and noted that all corrective action activities shall continue to be performed under CERCLA authority.

2.3 SITE DESIGNATIONS

Site designations were developed for overlapping environmental programs and for facility reuse. Environmental restoration sites were first identified during the 1990 RFA, and additional sites were added over time. During FFA negotiations after DDMT was placed on the NPL, the Depot was divided into four Operable Units (OUs): Dunn Field, OU 1; Southwest Quadrant MI, OU 2; Southeastern Watershed and Golf Course, OU 3; and North-Central Area MI, OU 4.

During preparation of the environmental baseline survey after DDMT was selected for closure under BRAC, the property was divided into 36 parcels based on planned reuse. Areas of environmental concern within each parcel were broken into subparcels representing buildings, spill locations, burial locations, former pistol ranges, open land areas, and other sites. This system allowed investigation results to be compared directly to BRAC parcels for reuse purposes and facilitating sampling/analysis and decisions regarding environmental condition of property for leasing and transfer.

During the MI remedial investigation (RI), the parcels were combined in functional units (FUs) in order to evaluate risk to human health and the environment. Each FU represented an area where human health exposure was generally uniform based on operational history, expected use and location. The MI was divided into six FUs with groundwater under the MI being FU 7. Dunn Field was divided into three areas for conducting baseline risk assessments based on similar historical use and proposed reuse: Northeast Open Area, Stockpile Area, and Disposal Area. The FUs/Areas are described on Table 1 and the boundaries are shown on Figure 2 for the MI and Figure 3 for Dunn Field.

Environmental restoration sites were first identified during the 1990 RFA, and additional sites were added over time. The 1990 RFA identified 57 SWMUs and AOCs. An appendix to the FFA increased the number of sites to 89 based on additional site investigations. Two of the 89 sites consisted of multiple disposal

locations that were later separated, bringing the number of sites to 93. The environmental restoration sites within each OU are listed on Table 2 and the sites are shown on Figures 4, 5, 6 and 7.

2.4 GEOLOGY AND HYDROGEOLOGY

The geologic units of interest at Dunn Field are (from youngest to oldest): loess, including surface soil; fluvial deposits; Jackson Formation/Upper Claiborne Group; and Memphis Sand.

The loess consists of wind-blown and deposited, brown to reddish-brown, low plasticity clayey silt to silty clay. The loess deposits are about 20 to 30 feet thick and are continuous throughout the Dunn Field area.

The fluvial (terrace) deposits consist of two general layers. The upper layer is a silty, sandy clay that transitions to a clayey sand and ranges from about 10 to 36 feet thick. The lower layer is composed of interlayered sand, sandy gravel, and gravelly sand, and has an average thickness of approximately 40 feet. The uppermost aquifer is the unconfined fluvial aquifer, consisting of saturated sands and gravelly sands in the lower portion of the deposits. The saturated thickness of the fluvial aquifer ranges from 0 to 50 feet and is controlled by the configuration of the uppermost clay in the Jackson Formation/Upper Claiborne Group. The groundwater in the fluvial aquifer is not a drinking water source for area residents.

The Jackson Formation/Upper Claiborne Group consists of clays, silts, and sands. The uppermost clay unit appears to be continuous at DDMT, except in the southwestern area of Dunn Field and the adjacent portion of the MI. Off site, to the west and northwest of Dunn Field, there are possible gaps in the clay. Where present, these gaps create connections to the underlying intermediate aquifer (IAQ) from the fluvial deposits. The IAQ is locally developed in deposits of the Jackson Formation/Upper Claiborne Group.

The Memphis Sand primarily consists of thick bedded, white to brown or gray, very fine grained to gravelly, partly argillaceous and micaceous sand. The Memphis Sand ranges from 500 to 890 feet in thickness, and begins at a depth below ground surface (bgs) of approximately 120 to 300 feet. The top of the Memphis Sand was identified at 255 feet bgs (elevation of 21 feet above mean sea level) in monitoring well (MW)-67, the first monitoring well completed in the Memphis Sand at DDMT. The Memphis aquifer (MAQ) is confined by overlying clays and silts in the Cook Mountain Formation (part of the Jackson/Upper Claiborne Group) and contains groundwater under artesian (confined) conditions regionally. The City of Memphis obtains the majority of its drinking water from this unit. The Allen Well Field, which is operated by Memphis Light Gas & Water (MLGW), is located approximately two miles west of Dunn Field.

3.0 ENVIRONMENTAL PROGRAM STATUS

The decision documents for DDMT are complete and the selected remedies have been implemented. The *Preliminary Close Out Report* (USEPA, 2010a) was approved in May 2010, and the DDMT NPL site status was revised to Construction Complete. Interim remedial action completion reports (IRACRs) have been approved for all actions. USEPA has concurred with operating properly and successfully (OPS) determinations for the remedies implemented on Federal property.

3.1 MAIN INSTALLATION (OU-2, 3 AND 4)

The MI contains approximately 567 acres with open storage areas, warehouses, former military family housing, and outdoor recreational areas. Investigations from 1989 to 2001 identified contamination in surface soil and ground water. Surface soil contamination requiring response consisted primarily of metals, polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), and a pesticide, dieldrin. Groundwater contamination requiring response was limited to chlorinated volatile organic compounds (CVOCs) primarily tetrachloroethene (PCE), trichloroethene (TCE), carbon tetrachloride (CT), and chloroform (CF). The site investigations and evaluation of remedial alternatives are described in the *Main Installation Remedial Investigation Report, Volumes I through IV* (CH2M HILL, 2000a), the *Final Main Installation Groundwater Feasibility Study Report* (CH2M HILL, 2000b), and the *Final Main Installation Soils Feasibility Study Report* (CH2M HILL, 2000c).

3.1.1 Prior Removal Activities

The following actions were taken on the MI prior to the Record of Decision (ROD). The locations are shown on Figure 2.

- Approximately 602 cubic yards (CY) of surface and subsurface soil was removed from the pentachlorophenol (PCP) dip vat area (Building 737) because of elevated levels of PCP (completed in 1985).
- Approximately 60,000 gallons of hazardous and petroleum/oil/lubricants materials from damaged drums were reclaimed and repackaged at Building 873 in 1985. Approximately 800 55-gallon drums were recouped in this open storage area and then returned to their original location for storage and distribution.
- Approximately 5,000 tons (3,700 CY) of surface soil in the Housing Area was removed because of the presence of dieldrin (began in June 1998; completed in October 1998). The Housing Area

is an exception to the overall industrial land use for MI and remediation levels were based on residential reuse.

- Approximately 530 tons (400 CY) of surface soil surrounding the cafeteria (Building 274) was removed because of elevated levels of PCBs (began in October 1998; completed in November 1998).
- Approximately 980 CY of surface and subsurface soil from near Buildings 1084, 1085, 1087, 1088, 1089 and 1090 was removed because of elevated levels of metals and polyaromatic hydrocarbons (began in May 2000; completed in August 2000).

3.1.2 Record of Decision

The *Memphis Depot Main Installation Record of Decision* (MI ROD) (CH2M HILL, 2001) received final approval in September 2001. The MI ROD specified the remedial action objectives (RAOs) that the selected remedy was expected to meet in order to protect human health and the environment. The RAOs were developed to allow the lease and later transfer of the MI for its intended land use (industrial and recreational).

The RAOs are:

Surface Soil

- to prevent direct contact/ ingestion of surface soils contaminated with lead in excess of industrial worker risk-based criteria.
- to prevent direct contact/ ingestion of surface soils contaminated with dieldrin and arsenic in excess of human health risk assessment criteria for residents.
- to prevent direct contact/ ingestion of surface soils contaminated with lead in excess of risk-based criteria for protection of residential children.

Groundwater

- to prevent human ingestion of water contaminated with volatile organic compounds (VOCs) in excess of maximum contaminant levels (MCLs) from potential future onsite wells.
- to reduce concentrations of chemicals of concern (COCs) to MCLs or lower.
- to prevent horizontal and vertical offsite migration of groundwater contaminants in excess of MCLs. The MCLs are 5 micrograms per liter (µg/L) for PCE, TCE, and CT; 70 µg/L for cis-1,2-

dichloroethene, and 2 µg/L for vinyl chloride (VC). The MCL for total trihalomethanes, which includes CF, is 80 µg/L.

The selected remedy presented in the MI ROD contained the following components:

- Excavation, transport and offsite disposal of lead contaminated surface soil near Building 949.
- Deed restrictions and site controls in the form of land use controls (LUCs) to prevent residential land use on the MI, except at the existing housing area; daycare restriction controls; production/consumptive use groundwater controls for the fluvial aquifer and for drilling into deeper aquifers on the MI; and elimination of casual access through maintenance of a boundary fence around the golf course.
- Enhanced bioremediation treatment (EBT) of CVOCs in the most contaminated part of the groundwater plume.
- Long-term groundwater monitoring to document changes in plume concentrations and to detect potential plume migration to off-site areas or into deeper aquifers.
- Five-year reviews of the selected remedy.

The area of lead contamination in soil near Building 949 (approximately 300 CY) was excavated and disposed off-site prior to final execution of the ROD. The action was taken under DLA's removal authority under CERCLA Section 104 in order to accommodate the economic redevelopment of the site. The action was documented in *Remediation Report, Removal Action at Building 949* (Jacobs Federal Programs, 2002) and noted as a significant change in the ROD.

3.1.3 Remedial Action

The EBT system was constructed from May to August 2006. Construction included installation of 49 injection wells (IWs) and 30 performance monitoring wells (PMWs), construction of the lactate-storage and transfer facility, construction of two trailer-mounted injection systems, and baseline groundwater sampling and analysis. Construction was performed in accordance with the *Main Installation Final Remedial Design, Revision 1* (MI RD) (CH2M HILL, 2004a) and the *Main Installation Remedial Action Work Plan* (MI RAWP) (MACTEC Engineering and Consulting, Inc. [MACTEC], 2005a).

Sodium lactate was injected biweekly during Year One (September 2006 through August 2007) and monthly during Year Two (September 2007 through February 2009). Changes to injection procedures were made based on field observations and measurements. Performance monitoring was performed quarterly from October 2006 through March 2009. System operations and monitoring results were

described in annual reports. CVOC concentrations for parent compounds (PCE, TCE, CT and CF) were reduced over 90 percent in injection wells and over 80 percent in monitoring wells at locations with baseline concentrations above 100 µg/L.

The *Main Installation Interim Remedial Action Completion Report, Revision 1* (MI IRACR) (HDR|engineering environmental Management, Inc. [e^2M], 2010), including an OPS determination, was submitted to USEPA and TDEC in February 2010. Although EBT did not achieve the goal of reducing concentrations below MCLs, additional field investigation, groundwater modeling and trend analysis presented in the MI IRACR indicated that additional remedial action (RA) was not necessary. The OPS determination and the MI IRACR were approved by USEPA in March 2010. Additional monitoring wells installed in the IAQ and the upper portion of the MAQ supported the groundwater model results.

EBT components were planned to be removed following a period of monitoring after the last injection in February 2009. However, system removal and well abandonment was delayed because of rebound in CVOC concentrations observed in long-term monitoring (LTM) samples. New baseline groundwater samples were collected from IWs and PMWs in December 2011. The sample results confirmed rebound in concentrations of parent compounds in the target treatment areas (TTAs), and additional EBT was recommended utilizing some of the existing IWs and PMWs. Following consultation with USEPA and TDEC, 20 IWs and 11 PMWs not needed for the additional EBT were abandoned in June 2012.

The *Main Installation Remedial Action Work Plan Addendum, Revision 0* (MI RAWP Addendum) (HDR, 2012b) describing procedures for the new round of EBT was submitted to USEPA and TDEC in November 2012 and was approved in January 2013. EBT is being used in five areas where individual CVOC concentrations of parent compounds (PCE, TCE and CT) exceed 100 µg/L: TTA-1N, TTA-1S, TTA-2, the West-Central plume and the Building 835 plume. EBT is implemented through quarterly injections of a sodium lactate solution into the fluvial aquifer. There are 30 4-inch IWs. In order to expand the treatment areas, 15 2-inch wells are also used for injections. In addition, 13 2-inch wells are being used as PMWs. The EBT wells are listed on Table 3 and the well locations are shown on Figure 8.

Performance monitoring is used to evaluate success in expanding anaerobic conditions within the fluvial aquifer in the EBT zones and in decreasing CVOC concentrations through reductive dechlorination. EBT performance monitoring includes field measurements of water quality and groundwater sampling at the IWs and PMWs. Water quality parameters are dissolved oxygen (DO), oxygen reduction potential (ORP), pH, temperature, and conductivity. Groundwater samples are analyzed for VOCs, total organic carbon (TOC), metabolic fatty acids and dissolved gases.

Quarterly injections were made in November 2012 and February, May and August 2013; quarterly performance monitoring was conducted prior to injections in February, May and August 2013. During each quarterly injection event, field water quality measurements and groundwater samples are collected at all IWs and PMWs. The sodium lactate injection fluid is then mixed in a trailer-mounted, 500-gallon storage tank for transport to the IWs. The injection solution is prepared for each IW based on review of ORP measurements from the current and previous events, the previous analytical results for TOC and VOCs, and the volume of lactate concentrate injected in the previous event. The target volume of injection solution is 350 to 500 gallons per well, the volume of lactate concentrate ranges from 30 to 80 gallons per well and the lactate concentration ranges from 6 to 12 percent.

Monitoring results through August 2013 show significant reductions in CVOC concentrations at the IWs and less response at the PMWs in most areas. The CVOC concentrations from the December 2011 baseline samples were compared to the August 2013 sample results for the CVOCs detected at the highest concentration in each treatment area: TTA-1N, PCE; TTA-1S, PCE and TCE; TTA-2, PCE and CT; West-Central, PCE; and Building 835, TCE.

- Concentrations of PCE in TTA-1N, TTA-1S, TTA-2 and the West-Central area decreased 77% on average for IWs and 20% for PMWs. The decrease in PMWs was affected by a 10% increase in TTA-1N; a TTA-1N injection location was changed in August 2013 to address the increase.
- Concentrations of TCE in TTA-1S decreased 90% on average for IWs and 17% for PMWs. In the Building 835 area, TCE concentrations decreased by approximately 15% in both IWs and PMWs.
- Concentrations of CT in TTA-2 decreased 72% on average for IWs and 59% for PMWs.

Progress in meeting RAOs will be reviewed in more detail in the annual report to be prepared following November 2013 performance monitoring.

3.1.4 Long Term Monitoring

MI LTM is conducted to evaluate progress, through EBT in targeted treatment areas and natural attenuation processes elsewhere in the fluvial aquifer, in meeting RAOs to restore groundwater to concentrations at or less than MCLs. LTM is also conducted to monitor horizontal and vertical contaminant migration offsite at concentrations in excess of MCLs. LTM has been performed since 2004 in accordance with the LTM Plan in Appendix B of the MI RD. Recommendations for LTM optimization, including new well locations, well abandonment, and changes to well classification, sample frequency, analytical parameters and sampling procedures are made in the annual LTM reports.

MI LTM wells are classified in four categories:

- Background – wells screened in the fluvial aquifer located along or outside the MI boundary; wells upgradient of or at a distance from groundwater plumes on the MI and Dunn Field; and wells with no, or low, previous detections of site constituents.
- Boundary – wells screened in the fluvial aquifer located along or outside the MI boundary to monitor constituent migration from off-site sources.
- Sentinel – wells screened within either the fluvial or intermediate aquifer adjacent to or within the window to the IAQ.
- Performance – wells screened in the fluvial aquifer and within the limits of known groundwater plumes.

The latest report, *Annual Long-Term Monitoring Report-2012, Revision 0* (HDR, 2013a), was approved by TDEC in April 2013. In 2012, there were 112 MI LTM wells classified as background (6 wells), boundary (7 wells), performance (72 wells) and sentinel (24 wells); three wells installed in March 2012 had not been classified. Samples were collected from 71 wells in April and 112 wells in October 2012. Analytical results and isopleths were generally similar to those from previous LTM sampling events, with additional information provided by the new wells (MW-258 to MW-260). Significant findings from the LTM report are provided below.

Primary CVOCs were detected above reporting limits in 19 of 24 sentinel wells and exceeded MCLs for PCE and/or TCE in 9 sentinel wells. The PCE plume in the IAQ extended to the northwest property boundary based on concentrations in IAQ well MW-256 up to 39.5 µg/L; TCE was present at concentrations up to 13.7 µg/L. The nearby MAQ wells, MW-254 and MW-255, did not have PCE above the reporting limit (RL), but TCE has been detected from below the RL to 3.1 µg/L.

The primary CVOC results for the biennial sample event in October 2012 are summarized for LTM wells on Table 4; the CVOCs most often detected above MCLs and the maximum concentrations reported were: PCE, 186 µg/L; TCE, 165 µg/L; and CT 196 µg/L. Increasing TCE concentrations were observed at MW-97 and at MW-258; both wells are outside the current EBT areas. TCE concentrations at MW-97, located about 1,000 feet east of TTA-1S, increased from <1 µg/L in November 2001 to 62 µg/L in October 2012. An upgradient well, MW-216, installed in 2007 has not had CVOCs above RLs, except for a possibly mislabeled sample collected in 2008. MW-258 was installed in March 2012 about 600 feet upgradient of MW-214A/B to evaluate increasing concentrations observed at MW-107 and MW-214A/B in 2011; PCE and TCE were reported in MW-258 at 22.1 µg/L and 93 µg/L, respectively, in October

2012. The 2012 LTM results were discussed during a project review meeting with USEPA and TDEC in February 2013. Based on the increasing concentrations at MW-97 and MW-258, two additional monitoring wells were proposed with one downgradient of MW-97 and the other upgradient of MW-258. The well locations were approved in June; the two wells, MW-260 and MW-261, were installed in July 2013. The findings from the new wells and recommendations for additional actions in 2014 will be provided in the 2013 LTM report.

The recommendations for 2013 MI LTM and the actions taken are summarized below:

- MW-253 was recommended for abandonment due to CVOCs not being detected above RLs in 2012 and the location being side-gradient to the 'window'. MW-253 was retained for LTM in 2013 and its use will be reviewed again in the 2013 annual report.
- Twenty LTM wells were selected for use in EBT injections or performance monitoring beginning November 2012. These wells will be sampled during EBT and therefore omitted from MI LTM: MW-21, MW-62, MW-85, MW-113, MW-197A/B, MW-203A/B, MW-212, MW-213, PMW85-05, PMW92-03, PMW101-04A/B, DR1-5/5A, DR1-6/6A, DR2-2 and DR2-5. Five former EBT performance MWs that were not selected for abandonment were incorporated into LTM in 2013: PMW92-02, PMW101-03A/B and PMW101-6A/B.

For 2013, there are 99 MI LTM wells classified as background (6 wells), boundary (7 wells), performance (57 wells) and sentinel (24 wells); three wells installed in March 2012 and two wells installed in July 2013 have not been classified. The sample frequency for the new wells will be determined after four semiannual sample events. The remaining 94 wells have the following sample frequency: biennial (15), annual (26) and semiannual (53). The 2013 MI LTM wells are listed on Table 5 and the locations are shown on Figure 9.

There are 52 LTM performance wells, including one piezometer, screened in the fluvial aquifer and within the limits of designated groundwater plumes: TTA-1 North (MW-21 Area), TTA-1 South (MW-101 Area), TTA-2, West Central, Building 835 and North Central. The designated plumes, primary CVOCs and associated LTM wells are listed below.

Plume	CVOC	LTM Wells
TTA-1 North	PCE	DR1-2, DR1-7, DR1-8, MW-100B, PMW21-03, PMW21-05
TTA-1 South	PCE, TCE	DR1-1/1A, DR1-3, DR1-4, MW-101, PMW101-03A/B, PMW101-06A/B
TTA-2	PCE, CT, CF	DR2-1, DR2-3, DR2-4, DR2-6, MW-26, MW-64, MW-88, MW-92, MW-96, MW-217, MW-218, PMW92-02
West-Central	PCE	MW-39/39A, MW-94A, MW-98, MW-200, MW-204A/B, MW-205A/B, MW-206A/B, MW-208A/B, MW-210B, MW-214A/B, MW-215A/B, PZ-03
Bldg 835	TCE	MW-142, MW-198, MW199B, MW-209B
North-Central	TCE	MW-103, MW-104

There are four isolated LTM performance wells outside the designated plumes (MW-25A, MW-52, MW-97 and MW-216).

Concentrations and isopleths for PCE and TCE for the April 2013 LTM event, and including results from the May 2013 EBT performance monitoring, are shown on Figures 10 and 11. PCE and TCE concentrations for the April 2013 LTM event in IAQ and MAQ sentinel wells within the window are shown on the cross-section in Figure 12.

3.1.5 Land Use Controls

LUCs prevent residential use of the majority of the MI and production or consumptive use of groundwater or drilling of groundwater supply wells on the MI. The LUCs consist of institutional controls (ICs) in the form of lease restrictions, deed restrictions, notice of land use restrictions, zoning restrictions and groundwater well restrictions. The LUCs will remain in place until concentrations of COCs have been reduced to levels that allow for unlimited exposure and unrestricted use. The land use control implementation plan (LUCIP) was included as Appendix C of the MI RD. An annual inspection is conducted to determine whether the required LUCs remain effective and that land use restrictions are being achieved.

The LUCs have been implemented in accordance with the LUCIP. The Notice of Land Use Restrictions for the MI was recorded at the City of Memphis/Shelby County Register of Deeds on January 26, 2005. Deed restrictions have been included in property transfers. Annual inspections have been performed since 2005 and reports have been distributed in accordance with the LUCIP. One minor deficiency regarding perimeter fencing was identified and corrected in 2005. No other deficiencies or violations have been identified.

3.2 DUNN FIELD (OU-1)

Dunn Field, which is located across Dunn Avenue from the MI, contains approximately 65 acres and includes former mineral storage and waste disposal areas. Records indicate that chemical warfare material (CWM), chlorinated lime, super tropical bleach, and calcium hypochlorite, food stocks, paints/thinners, petroleum/oil/lubricants (POL), acids, herbicides, mixed chemicals, and medical waste were destroyed or buried in pits and trenches at the Dunn Field disposal sites.

Soil samples collected for the RI showed significant levels of CVOCs: 1,1,2,2-tetrachloroethane (TeCA); 1,2-dichloroethane; total 1,2-dichloroethene; CT; CF; methylene chloride; PCE; TCE; and VC. TCE and TeCA were the CVOCs most frequently detected in soil samples at elevated concentrations. Three contaminant plumes in the fluvial aquifer were identified at Dunn Field. The CVOCs detected in soil samples were also detected most frequently in groundwater sampling events. The individual VOCs with the highest concentrations were TeCA and TCE. The site investigations and evaluation of remedial alternatives are described in the *Dunn Field Remedial Investigation Report* (CH2M HILL, 2002) and *Final Dunn Field Feasibility Study Report* (CH2M HILL, 2003a).

3.2.1 Prior Removal and Remedial Activities

The *Record of Decision for Interim Remedial Action of the Groundwater at Dunn Field (OU-1)* (CH2M HILL, 1996) was signed in April 1996, with the objective of hydraulic containment to prevent further contaminant plume migration and reduce contaminant mass in groundwater. The interim remedial action (IRA) groundwater recovery system included 11 recovery wells (RWs) screened in the fluvial aquifer and located along the western boundary of Dunn Field. The system began operation in November 1998 with groundwater discharge to the city sewer system without treatment under an industrial discharge agreement. Based on reduction of CVOC concentrations in groundwater following implementation of the Source Areas RA, the final RWs were shutdown in January 2009. Approximately 918 pounds of total VOCs, including 369 pounds of TCE, were discharged by the IRA in just over 10 years of operation. The IRA system was removed and the RWs abandoned in July 2010. The final year of IRA groundwater monitoring and closure activities were described in the *Dunn Field Groundwater Interim Remedial Action 2009 Operations and Closure Report* (HDR, 2010).

Following completion of an engineering evaluation and cost analysis (EE/CA), a non-time critical removal action was conducted to reduce or eliminate the potential risk posed by CWM wastes at Sites 1, 24-A, and 24-B. The removal action was completed in March 2001 and documented in the *Final Chemical Warfare Materiel Investigation/Removal Action Report* (UXB International, Inc., 2001).

Approximately 914 CY of soil contaminated with mustard degradation by-products, and 19 CY of mustard-contaminated soil were excavated, transported, and disposed offsite. Twenty-nine bomb casings were recovered from Site 24-A.

A non-time critical removal action to address lead contaminated surface soil at Site 60, a former pistol range in the Northeast Open Area, was completed in March 2003, pursuant to an EE/CA completed in July 2002. Approximately 930 CY of lead contaminated surface soil was excavated, transported, and disposed offsite at an approved, permitted landfill.

Locations of the IRA and the pre-ROD response actions are shown on Figure 3.

3.2.2 Record of Decision and ROD Amendment

The *Memphis Depot Dunn Field Record of Decision* (Dunn Field ROD) (CH2M HILL, 2004b) was approved in April 2004 and the *Dunn Field Record of Decision Amendment, Revision 3* (ROD Amendment) (e^2M, 2009a) was approved in March 2009.

The RAOs are:

Surface Soil

- Limit use of the surface soil in the Disposal Area to activities consistent with light industrial land use and prevent residential use through land controls

Disposal Sites

- Prevent groundwater impacts from a release of buried containerized hazardous liquids and the leaching of contaminants from buried hazardous solids
- Prevent unacceptable risk of direct contact with buried hazardous liquids and/or solids due to intrusive activities during future land use or site development

Subsurface Soil Impacted with VOCs

- Prevent direct inhalation of indoor air vapors from subsurface soils in excess of industrial worker criteria
- Reduce or eliminate further impacts to the shallow fluvial aquifer from VOCs in the subsurface soil

Groundwater

- Prevent human exposure to contaminated groundwater (i.e., exceeding protective target concentrations [TCs])
- Prevent further off-site migration of VOCs in excess of protective target levels
- Remediate fluvial aquifer groundwater to drinking water quality to be protective of the deeper MAQ

The components of the selected remedy from the Dunn Field ROD are:

- Excavation, transportation, and disposal (ET&D) of soil and material contained within disposal sites based upon results from a pre-design investigation
- Soil vapor extraction (SVE) to reduce VOC concentrations in subsurface soils to levels that are protective of the intended land use and groundwater
- Injection of zero valent iron (ZVI) within Dunn Field to treat CVOCs in the most contaminated part of the groundwater plume, and installation of a permeable reactive barrier (PRB) to remediate CVOCs within the off-site areas of the groundwater plume
- Monitored natural attenuation (MNA) and LTM of groundwater to document changes in plume concentrations, detect potential plume migration to off-site areas or into deeper aquifers, and track progress toward remediation goals (RGs)
- Implementation of LUCs, which consist of the following ICs: Deed and/or lease restrictions; Notice of Land Use Restrictions; City of Memphis/Shelby County zoning restrictions and the Memphis and Shelby County Health Department (MSCHD) groundwater well restrictions.

The fundamental change in the ROD Amendment was the use of air sparging with soil vapor extraction (AS/SVE) instead of a PRB for the Off Depot groundwater plume. The ROD Amendment also revised the criteria for extent of the AS/SVE system and clarified the treatment objective. The AS/SVE system was selected to cross the core of the plume near the downgradient end and to reduce the individual CVOC concentrations in groundwater to 50 µg/L or less. Groundwater modeling results indicated that the AS/SVE system in combination with natural attenuation processes would reduce groundwater concentrations to MCLs in accordance with the RAOs within a reasonable period of time. The RGs for the contaminants of concern, shown on Table 6, were not changed from the Dunn Field ROD.

3.2.3 Remedial Actions

Three RAs were performed to implement the selected remedies for OU 1, Dunn Field: Disposal Sites RA (ET&D); Source Areas RA (SVE, ZVI injections and LUCs); and Off-Depot Groundwater RA (AS/SVE, MNA, and LTM). Upon completion of the AS/SVE system for Off Depot groundwater in 2009, construction of the selected remedies for DDMT was complete. Locations of the Disposal Sites, Source Areas and Off-Depot Groundwater RAs are shown on Figure 13.

3.2.3.1 Disposal Sites Remedial Action

Soil and debris including potential principal threat wastes (primarily drums and glass bottles) from five disposal sites were excavated and transported for offsite disposal in accordance with the *Dunn Field Disposal Sites Final Remedial Design, Revision 1* (CH2M HILL, 2004c), *Dunn Field Disposal Sites Remedial Action Work Plan, Revision 1* (MACTEC, 2004), and *Dunn Field Disposal Sites Remedial Action Work Plan Addendum 1, Revision 1* (MACTEC, 2006a). The five sites were:

- Disposal Site 3 – Mixed chemical burial site (ortho-toluidine dihydrochloride)
- Disposal Site 4.1 – POL Burial Site (32 55-gallon drums of oil, grease, and paint)
- Disposal Site 10 – Solid Waste Burial Site (metal, glass, and trash)
- Disposal Site 13 – Mixed Chemical Burial (900 pounds of unnamed acid, and 8,100 pounds of unnamed solids)
- Disposal Site 31 – covered by the bauxite storage pile (Site 64), used for burning/disposal of smoke pots, tear gas grenades, and souvenir ordnance

The Disposal Sites RA was performed during two separate mobilizations. During the first mobilization from March 2005 to May 2005, excavations at Sites 4.1, 13, 31, and the majority of Site 10 were completed. Site 3 and the remaining materials from Site 10 were completed during the second mobilization in February and March 2006. Approximately 2,700 CY of non-hazardous materials were transported off-site and disposed of at the BFI South Shelby County Landfill. Approximately 234 CY of hazardous materials from Disposal Site 3 was disposed at the Clean Harbors Lambton Secure Landfill in Canada. The confirmation samples met the RGs at each site. The *Dunn Field Disposal Sites Remedial Action Completion Report, Revision 1* (MACTEC, 2006b) was approved by USEPA in August 2006.

3.2.3.2 Early Implementation of Selected Remedy

An Early Implementation of Selected Remedy (EISR) using ZVI was performed to reduce contaminant mass downgradient of the planned PRB location in order to ensure that the portion of the plume slated for

MNA in the ROD was not unduly extensive or high in concentration. ZVI injections were made November 2004 to January 2005. Injections were made in 14 borings at 2-foot intervals over the fluvial aquifer thickness, which averaged 21 feet; the injection locations were spaced approximately 60 to 80 feet apart. The depth of injection ranged from approximately 70 to 100 feet bgs. The total mass of ZVI injected was approximately 192,500 pounds. The *EISR Interim Remedial Action Completion Report, Revision 1* (MACTEC, 2005b) noted that the injections did not achieve the goal of 90 percent or greater reduction of TCE and TeCA and the report included recommendations for decreased spacing between injection locations to achieve increased reduction in CVOCs. The report was approved by USEPA on 22 September 2005.

3.2.3.3 Source Areas Remedial Action

The Source Areas RA included conventional SVE in the coarse-grained fluvial soils; ET&D for two shallow areas containing waste materials (TA-1F) and buried drums containing petroleum hydrocarbons (TA-3); thermal SVE (TSVE) (in situ thermal desorption) in the fine grained loess; and ZVI injection in the fluvial aquifer. The RA was performed in accordance with the *Memphis Depot Dunn Field Source Areas Final Remedial Design* (Dunn Field RD) (CH2M HILL, 2007); the *Dunn Field Source Areas Fluvial Soil Vapor Extraction Remedial Action Work Plan, Revision 1* (FSVE RAWP) (e²M, 2007a); and the *Dunn Field Source Areas Loess/Groundwater Remedial Action Work Plan, Revision 1* (Loess/Groundwater RAWP) (e^2M, 2007b).

The Fluvial SVE (FSVE) system was installed to remove CVOCs from the fluvial sands at Dunn Field. The system consists of two blowers connected to seven SVE wells with screened intervals at approximately 30 to 70 feet bgs, 20 vapor monitoring points (VMPs) located 15 to 80 feet from the SVE wells and an equipment building for the blowers, heat exchangers and controls. Ten additional SVE wells were installed in borings for confirmation soil samples in November 2010. The FSVE system layout is shown on Figure 14.

System operations began in July 2007 and approximately 4,049 pounds of VOCs were removed through July 2012. The VOC concentration in the extracted vapor decreased asymptotically to less than 1 part per million (ppm). The FSVE system was shutdown on 24 July 2012 based on confirmation soil sample results demonstrating that RAOs had been met. The final year of FSVE operations and monitoring was described in *Dunn Field Source Areas Fluvial Soil Vapor Extraction System Annual Operations Report, Year Five, Revision 0* (HDR, 2012c), which was approved by USEPA and TDEC in December 2012.

The initial excavations at TA-1F and TA-3 were performed October 2007 to January 2008. Further excavation was delayed in order to proceed with construction and operation of the TSVE system. The

excavations were completed February to June 2009. Approximately 7,400 CY of waste material were disposed as non-hazardous waste at the Waste Management, Inc. landfill in Tunica MS, a CERCLA-approved facility. Soil confirmation samples met RGs in both areas.

TSVE treatment was performed in four areas with a total area of about 1.25 acres and a treatment interval of approximately 5 to 30 feet bgs. System components included 367 heater-only wells; 68 vapor extraction wells, 62 multi-level temperature monitoring points, 25 pressure monitoring points and a Shotcrete surface cover to limit water infiltration and improve vapor capture. The system operated continuously from 27 May until the heaters were shutdown on 20 November 2008. The vapor extraction system was shut down on 4 December. Approximately 12,500 pounds of VOCs were removed during treatment. Confirmation soil samples, collected at various depths from 35 soil borings, demonstrated that clean-up standards were met; the average concentration for CVOCs in each TA was below the RG and none of the final samples exceeded an RG by a factor of 10 or more.

ZVI injections were not required because groundwater objectives for the Source Areas remedy were achieved through the subsurface soil remedies.

The memorandum, *Dunn Field Operating Properly and Successfully Demonstration, Source Areas Remedial Action* (e^2M, 2009b), was approved by USEPA in October 2009. The *Dunn Field Source Areas Interim Remedial Action Completion Report, Revision 1* (HDR|e^2M, 2009) was approved by USEPA and TDEC in November 2009.

CVOC concentrations in ground water began to decrease significantly soon after FSVE operations began, indicating that capture zones of the SVE wells encompassed the contaminated areas. The reduction in ground water concentrations also indicated the ground water plumes resulted from continuing vertical migration of CVOCs from the vadose zone and that continuing sources of contamination, such as pockets of free product below the water table, are not present. Reduction in CVOC concentrations is shown in total CVOC plume maps for April 2007, April 2009, April 2011, and April 2013 on Figure 15.

3.2.3.4 Off Depot Groundwater Remedial Action

The Off Depot RA included installation of an AS/SVE system across the core of the plume near the downgradient end; MNA and long-term groundwater monitoring to document remedy performance and/or changes in the lateral or vertical extent of the CVOC plume; and ICs to prevent access to contaminated groundwater. The RA was performed in accordance with the *Memphis Depot Dunn Field Off Depot Groundwater Final Remedial Design, Revision 1* (Off Depot RD) (CH2M HILL, 2008); and the *Dunn Field Off Depot Groundwater Remedial Action Work Plan, Revision 2* (Off Depot RAWP) (e^2M, 2009c).

The *Off Depot Groundwater Interim Remedial Action Completion Report, Revision 1* (HDR, 2011) was approved by USEPA in August 2011.

The AS/SVE system consists of 90 AS points, 12 SVE wells, 10 pairs of VMPs and control buildings for the AS compressor, SVE blowers and system controls. AS/SVE operations began 21 December 2009 and approximately 81 pounds of VOCs were removed through June 2013. The latest annual report, *Off Depot Air Sparge-Soil Vapor Extraction System Annual Operations Report, Year Three, Revision 0* (HDR, 2013b), was approved by USEPA and TDEC in May 2013.

The AS/SVE system was designed to operate with up to $^{1}/_{3}$ of the 90 AS points operating at any time. The AS points are individually programmed for daily operation in 2 hour blocks and are set to operate in three groups (A: AS-1, AS-4, AS-7...; B: AS-2, AS-5, AS-8...; and C: AS-3, AS-6, AS-9...). System operations have been adjusted periodically to reduce potential for plume diversion. At present, the AS system operates12 hours per day with 48 AS points open 4 hours per day (full-time), 18 AS points open 2 hours per day (half-time) and 24 AS points closed. One SVE blower operates 24 hours per day with all 12 SVE wells open. The AS/SVE system layout is shown on Figure 16.

AS/SVE system performance is evaluated based on results of LTM analyses. The goal for groundwater remediation at Dunn Field is to reduce CVOC concentrations to below 50 µg/L for each CVOC constituent, with MNA expected to achieve the RGs for groundwater over time. CVOC concentrations in most PMWs, including all wells downgradient of the TA, were reduced below 50 µg/L for individual CVOCs as of December 2010. The AS/SVE system will continue to operate until the upgradient concentrations from the Dunn Field plume do not exceed 50 µg/L for individual CVOCs for 12 months. Only one well exceeded the treatment goal in April 2013; TCE was reported at 181 µg/L in MW-159.

3.2.4 Long Term Monitoring

Dunn Field LTM is conducted to evaluate progress in meeting RAOs to prevent further offsite migration of VOCs in groundwater in excess of protective target levels and restore fluvial aquifer groundwater to drinking water quality to be protective of the deeper MAQ. IRA groundwater samples were collected regularly since 1999 to evaluate system effectiveness in restricting plume migration. Since 2010, groundwater monitoring has been conducted in accordance with the LTM Plan in Appendix C of the Off Depot RD, and the Off Depot RAWP. Groundwater monitoring in Years 1 and 2 of the Off Depot Groundwater RA (2010 and 2011) included performance monitoring near the AS/SVE system and LTM in the remainder of the plume. Performance monitoring wells were incorporated into LTM in 2012. Recommendations for LTM optimization are made in the annual LTM reports.

Dunn Field LTM wells are classified in three categories:

- Background – wells screened in the fluvial aquifer located along or outside of the Dunn Field boundary; located upgradient to or at a distance from contaminant plumes on Dunn Field; no (or only low-level) previous detections of site contaminants in well samples.
- Sentinel – wells screened within either the fluvial or intermediate aquifers adjacent to or within the window to the IAQ.
- Performance – wells screened in the fluvial aquifer; located within the limits of known contaminant plumes; or repeatedly have contaminants in samples; located in areas targeted for treatment during the RA.

The latest report, *Annual Long-Term Monitoring Report-2012, Revision 0* (HDR, 2013a), was approved by TDEC in April 2013. In 2012, there were 87 Dunn Field LTM wells classified as background (13 wells), sentinel (9 wells) and performance (65 wells). Samples were collected from 74 wells in April and 41 wells in October 2012. Analytical results for 2012 LTM samples were generally similar to previous results and showed continued reduction in CVOC concentrations from the RAs at Dunn Field and the Off Depot area. Total CVOC concentrations decreased in the majority of performance wells at Dunn Field and the Off Depot area, and the overall extent of the plume originating on Dunn Field continued to decrease. Several wells in the northern area of Dunn Field showed contaminant migration on to Dunn Field from an off-site source, which is being investigated by TDEC. The primary CVOC results for the annual sample event in April 2012 are summarized on Table 7; the CVOCs most often detected above the target concentrations in the Dunn Field ROD, and the maximum concentrations reported, were: TeCA, 37.9 µg/L and TCE, 275 µg/L.

The only recommendations made for 2013 Dunn Field LTM were changes to sample frequency in a few wells: MW-04, MW-08, MW-80, MW-126 and MW-184; the changes were implemented. In addition, the 2011 LTM report recommended 27 wells be removed from LTM in 2012 and abandoned; these wells and MW-32, which had been damaged and could not be repaired, were abandoned in March 2013.

For 2013, Dunn Field LTM included 86 wells classified as background (8), background-NE (5), performance (50), performance-FSVE (14) or sentinel (9) wells. The background-NE wells are located on or bordering the northeast section of Dunn Field and have CVOC concentrations from an off-site source(s) upgradient of Dunn. The performance-FSVE wells were selected for rebound monitoring after shutdown of the FSVE system in July 2012. The wells have the following sample frequency: semiannual (42), annual (29) or biennial (15). The 2013 Dunn Field LTM wells are listed on Table 8 and the well

locations are shown on Figure 17. Concentrations and isopleths for total CVOCs, TeCA and TCE for the April 2013 LTM event are shown on Figures 18, 19 and 20.

3.2.5 Land Use Controls

LUCs for Dunn Field are described in the LUCIP in Appendix A of the Off Depot RD: deed and/or lease restrictions, Notice of Land Use Restrictions, City of Memphis/Shelby County zoning restrictions, the MSCHD groundwater well restrictions, fencing and the Dunn Field LUC protocol. The LUCs limit use of the Disposal Area to light industrial land uses, prevent residential use of Dunn Field, and prevent exposure to contaminated groundwater. The LUCs will remain in place until concentrations of contaminants of concern have been reduced to levels that allow for unlimited exposure and unrestricted use. An annual inspection is conducted to determine whether the required LUCs remain effective and that land use restrictions are being achieved.

The LUCs have been implemented in accordance with the LUCIP. The Notice of Land Use Restrictions for Dunn Field was recorded at the City of Memphis/Shelby County Register of Deeds on 11 June 2009. Annual inspections have been performed since 2009 and reports have been distributed in accordance with the LUCIP. No deficiencies have been identified.

3.3 PROPERTY TRANSFER

Six Findings of Suitability to Transfer (FOSTs) have been completed including all property within DDMT. The area covered by each FOST is shown on Figure 21. Following approval of FOST 6, USEPA issued the *Superfund Property Reuse Evaluation Checklist for Reporting the Site Wide Ready for Anticipated Use Measure* (USEPA, 2010b) documenting that all cleanup goals affecting current and reasonably anticipated future land uses have been achieved, so there are no unacceptable risks; and all institutional or other controls required in the RODs have been put in place.

Property transfers through deed or letter of assignment have been completed for all FOSTs, except FOST 5. The acreage, type of conveyance, type of transfer, receiving party and date of transfer are listed on Table 9. ODB plans to transfer the remaining 24.5 acres on FOST 5 through a competitive public sale in 2014. The transfer could be delayed due to economic conditions, impediments to site development from remediation equipment and monitoring wells on-site, or the presence of groundwater contamination from an off-site source migrating on to the property.

4.0 ACTIVITIES REQUIRED FOR SITE COMPLETION

FSVE operations were shut down in July 2012. AS/SVE in the off depot area and EBT at the MI are continuing. LTM is continuing at the MI and Dunn Field.

4.1 REMEDIAL ACTION OPERATIONS

4.1.1 Fluvial SVE Operations

The FSVE system was shut down on 24 July 2012 based on confirmation soil samples meeting the RAO and system influent asymptotically decreasing below 1 ppm. The conveyance lines were closed and the wells were opened for passive venting. The hoses used to connect SVE wells in each area to the conveyance lines were rolled up, labeled and stored. The air intakes and exhausts for the blowers were sealed on 2 August. Power at the equipment compound was switched off by HDR on 9 August; the MLGW connection remains in place for use during maintenance.

BaroBall™ caps were installed on 11 SVE wells for increased efficiency during passive venting, as recommended by the USEPA project manager. The caps have a control valve which utilizes the natural fluctuation of atmospheric pressure to allow soil gas to flow out of the well while restricting air flow from the surface into the well.

4.1.2 AS-SVE Operations

The AS/SVE system consists of 90 AS points, 12 SVE wells, 10 pairs of VMPs and control buildings for the AS compressor, SVE blowers and system controls. The vapor stream passes through the air/water separator tank to remove entrained vapor and debris from the air stream. No other treatment is performed prior to discharge. AS/SVE operations were incorporated in MSCHD Permit #01030-01P issued for the FSVE with permit conditions applicable to the combined operations. The AS/SVE system layout is shown on Figure 16.

AS/SVE operations include:

- System inspections with repair or replacement of components, as required.
- Readings at AS compressor, SVE wells and system effluent for flow rate, vacuum, temperature, and operating hours.
- Photoionization detector (PID) measurements at SVE wells and system effluent.
- PID and vacuum measurements at VMPs.

- Laboratory samples from system effluent analyzed for VOCs.
- Quarterly reports to describe operations and maintenance (O&M) activities, system status, performance and monitoring results.
- Annual operations report to summarize system operations and monitoring results with data validation and to provide recommendations for optimization of operations.

Inspections include a visual review of the equipment compound (exterior and interior) and major system components. The operator records system flow rates and other operating parameters on field records provided in the O&M manual. Flow rates and operating parameters are read from one of the system computer display screens or directly from gauges and meters located within the equipment room. Original field sheets are maintained onsite in the project file. General maintenance of AS/SVE system components is required to allow for longevity of system components and is performed based on field observations and manufacturer requirements.

Vapor samples for laboratory analysis are limited to the system effluent and are collected quarterly for VOC analysis. The PID readings at SVE wells and system effluent and the effluent sampling results are used to assess VOC capture effectiveness, and the effluent sampling results are used to verify compliance with MSCHD air regulations.

Monthly field screening at the VMPs is performed to assess the vacuum radius of influence and vapor extraction effectiveness. Screening includes vacuum measurements and PID measurements for semi-quantitative VOC data.

Overall effectiveness of the AS/SVE system is evaluated through groundwater samples during LTM. Shutdown of the AS/SVE system will be considered when groundwater samples collected upgradient and downgradient of the AS barrier show individual CVOC concentrations at or below 50 µg/L for 12 months. Isolated upgradient outliers may be excluded from consideration if surrounding wells show statistically significant decreasing trends based on the nonparametric Mann-Kendall test.

LTM wells in the Source Areas on Dunn Field remain below MCLs. Only well MW-159 in the Off Depot area exceeds the treatment goal and only for TCE (181 µg/L in April 2013).

4.1.3 EBT

EBT was initially performed from September 2006 through March 2009; EBT was restarted with expanded treatment areas in November 2012 in response to rebound in CVOC concentrations in the fluvial aquifer and increasing CVOC concentrations in some IAQ wells, particularly MW-256 near the

northwest corner of the MI. Year 2 of additional EBT will conclude with the August 2014 injections and November 2014 performance monitoring. EBT activities are described in the MI RAWP Addendum. EBT is being used in five areas where individual CVOC concentrations of parent compounds (PCE, TCE and CT) exceed 100 µg/L: TTA-1N, TTA-1S, TTA-2, the West-Central plume and the Building 835 plume. EBT is implemented through quarterly injections of a sodium lactate solution into the fluvial aquifer. There are 30 4-inch IWs. In order to expand the treatment areas, 15 2-inch wells are also used for injections. In addition, 13 2-inch wells are being used as PMWs. The EBT wells are listed on Table 3 and the well locations are shown on Figure 8.

Each injection event includes the following activities:

- Clear access to injection and performance monitoring well locations.
- Measure water quality and collect groundwater samples at all injection and performance monitoring wells prior to injections (except the initial injection event).
- Prepare sodium lactate injection fluid in the trailer-mounted, 500-gallon storage tank.
- Inject sodium lactate solution at designated wells.
- Rinse injection trailer components with potable Alconox/water solution to prevent biological growth between injection events.

Performance monitoring, including field measurements and sampling for laboratory analyses, is used to evaluate success through expanding anaerobic conditions within the fluvial aquifer in the EBT zones and decreases in CVOC concentrations through reductive dechlorination.

As described in Section 3.1.3, monitoring results through August 2013 show significant reductions in CVOC concentrations at the IWs and less response at the PMWs in most areas. The number of EBT wells with concentrations above MCLs in December 2011 and August 2013 are shown below.

Concentrations Above MCLs		December 2011	August 2013
PCE (5 µg/L)	IW	40	15
	PMW	11	10
TCE (5 µg/L)	IW	23	9
	PMW	9	7
CT (5 µg/L)	IW	5	1
	PMW	3	2
CF (80 µg/L)	IW	0	0
	PMW	0	0
VC (2 µg/L)	IW	1	1
	PMW	0	0

While there has been progress since re-starting EBT in November 2012, significant work remains in order to meet the RAOs. In August 2013, 34 of 58 EBT wells (23 IWs and 11 PMWs) exceeded MCLs for one or more primary CVOCs, mainly PCE, TCE and cis-1,2-dichloroethene (cDCE). The ROD estimated that 10 years would be required for the selected remedy to meet RAOs and the current schedule has RA completion for the MI in 2017. Progress toward RAOs during Year 1 of additional EBT will be evaluated in the annual report to be submitted in March 2014.

4.2 LONG TERM MONITORING

LTM at DDMT is performed to monitor contaminant migration horizontally and vertically and to evaluate progress toward restoring groundwater to concentrations at or less than MCLs. LTM will continue until CVOC concentrations are at or below MCLs, after which compliance monitoring will be implemented. Compliance monitoring will be performed in accordance with the RODs. Once compliance with RAOs is demonstrated, groundwater monitoring will cease and wells will be proposed for abandonment.

4.2.1 MI LTM

MI LTM is performed in accordance with the MI LTM Plan with recommendations for changes made in annual LTM reports. The current status of MI LTM was described in Section 3.1.4.

There are currently 99 MI LTM wells; five well were installed since 2012 and will be classified and assigned a sample frequency following four semiannual sample events. The remaining 94 wells are classified as background (7), boundary (7), performance (56) and sentinel (24) wells and have the following sample frequency: biennial (15), annual (26) and semiannual (53). The MI LTM wells are listed on Table 5 and the well locations are shown on Figure 9.

In April 2013, 56 MI LTM wells were sampled and 49 wells exceeded the MCL for PCE, TCE and/or cDCE; at some of these wells, MCLs were also exceeded for CT or VC. The LTM wells exceeding MCLs include wells in the fluvial aquifer but not downgradient of EBT treatment areas and sentinel wells screened in the IAQ. These fluvial aquifer wells have generally shown stable concentrations over time, but concentrations have increased at some locations (e.g. MW-97 and MW-258). Additional wells were installed in these two areas in July 2013 and sampled during the October LTM event. One additional well with a relatively high PCE concentration (MW-219) is located along the site boundary and indicates potential contaminant migration on to the MI. Some of the sentinel wells (e.g. MW-210A) have decreasing CVOC concentrations, but other sentinel wells have increasing concentrations (e.g. MW-256).

Annual sampling of MI LTM wells was conducted in October 2013. Recommendations for additional investigation, remedial action or changes for 2014 MI LTM will be included in the 2013 annual report, as appropriate.

4.2.2 Dunn Field LTM

Dunn Field LTM is conducted in accordance with the Off Depot LTM Plan with recommendations for changes made in annual LTM reports. The current status of Dunn Field LTM was described in Section 3.2.4.

The 86 wells used for Dunn Field LTM in 2013 are classified as background (8), background-NE (5), performance (50), performance-FSVE (14) or sentinel (9) wells. The background-NE wells are located on or bordering the northeast section of Dunn Field and have CVOC concentrations from an off-site source(s) upgradient of Dunn. The performance-FSVE wells were selected for rebound monitoring following FSVE system shut down. The LTM wells have the following sample frequency: semiannual (42), annual (29) or biennial (15). The Dunn Field LTM wells are listed on Table 8 and the well locations are shown on Figure 17.

In April 2013, 13 Dunn Field LTM wells exceeded the MCL for TCE, excluding the 5 Background-NE wells; at some of these wells, MCLs were also exceeded for PCE or VC and the TC was exceeded for TeCA. Semi-annual sampling of Dunn Field LTM wells was conducted in October 2013. Recommended changes for 2014 Dunn Field LTM will be included in the 2013 annual report, as appropriate.

4.3 LAND USE CONTROLS

The LUCs applicable to the MI and Dunn Field are described in the LUCIPs in the MI RD and Off Depot Groundwater RD. LUCs will remain in place until concentrations of contaminants of concern have been reduced to levels that allow for unlimited exposure and unrestricted use. An annual inspection is conducted to determine whether the required LUCs remain effective and that land use restrictions are being achieved.

The continued effectiveness of the remedy, including all LUCs implemented at the site, will be evaluated in the CERCLA Five-Year review. The report will include the information contained in the site inspection forms and an evaluation of the need to modify the LUCs.

4.4 FIVE YEAR REVIEWS

Hazardous substances will remain at the site above levels that allow for unrestricted use and unlimited exposure after completion of the RA. Under CERCLA section 121, ODB must conduct a statutory five-year review. Because the final remedies for both the MI and Dunn Field include LUCs in perpetuity, the period in which five-year reviews will be needed is indefinite.

The initial statutory review, *Memphis Depot, Dunn Field Five Year Review* (CH2M HILL, 2003b), was triggered by initiation of the IRA groundwater recovery system at Dunn Field on DDMT in 1998. The second review was conducted in 2007 and the report, *Second Five-Year Review, Revision 1* (e^2M, 2007c), was approved in January 2008.

The third five-year review was conducted in 2012 in accordance with *Comprehensive Five-Year Review Guidance* (USEPA, 2001). The *Third Five-Year Review, Revision 1* (HDR, 2012d) was approved by USEPA on 23 January 2013. The notice announcing availability of the report was published in the Memphis *Commercial Appeal* on 6 February 2013.

Two issues were identified, both related to the MI: rebound in CVOC concentrations and the time required to achieve groundwater RAOs. The issues do not affect current protectiveness because there is no current exposure to COCs in groundwater and do not affect future protectiveness because the remedy was shown to be effective in the IRACR. Follow-up actions were recommended: restart EBT on the MI and re-evaluate the time required to achieve RAOs after the first year of EBT. The issues, recommended actions, schedule and status are shown on Table 10.

The remedies at Dunn Field (OU 1) and the MI (OUs 2, 3 and 4) were found to be protective of human health and the environment, and because the RAs at all OUs for DDMT are protective, the site is protective of human health and the environment. The next five-year review for DDMT is required by 23 January 2018.

4.5 SITE COMPLETION

Selected remedies for DDMT have been implemented in accordance with the MI and Dunn Field RODs, and the IRACRs have been approved by USEPA and TDEC. The Preliminary Closeout Report has also been approved by USEPA, and the NPL site status is Construction Complete.

Soil cleanup standards have been met where applicable. The remaining requirement for site closure is that groundwater concentrations for the CVOCs, which are the contaminants of concern, are below MCLs. Maximum CVOC concentrations in groundwater have decreased due to RAs but remain above MCLs.

The maximum concentrations for the primary CVOCs in the August 2013 MI EBT event were PCE at 279 µg/L, TCE at 132 µg/L, CT at 78.6 µg/L, CF at 48.3 µg/L and VC at 2.66 µg/L. The maximum concentration for the primary CVOC in the April 2013 Dunn Field LTM event was TCE at 181 µg/L.

The current timeline for site closure includes the following:

- Main Installation
  - Additional EBT through November 2014.
  - MI LTM through 2015, with final quarterly compliance monitoring in 2016.
  - MI Remedial Action Completion Report in 2017.
- Dunn Field
  - Off Depot AS/SVE operates through December 2014.
  - Off Depot LTM through 2019, with final quarterly compliance monitoring in 2020.
  - Dunn Field Remedial Action Completion Report in 2021.
- Final Closeout Report in 2021

The Dunn Field RAs are progressing well with continued reduction in groundwater concentrations and are currently expected to meet cleanup levels by or before 2021. All 86 Dunn Field LTM wells were sampled in April 2013 and, with the exception of the five Background-NE wells impacted by the plume migrating on to Dunn Field, only one LTM well exceeded the goal of 50 µg/L for individual CVOCs to be met through active remediation and 16 wells exceeded MCLs or the TC for TeCA. Of those 16 wells, individual CVOC concentrations did not exceed 10 µg/L in 11 of the wells.

Groundwater concentrations on the MI are generally stable, and EBT has been re-started to address rebound and improve progress toward RAOs. However, 34 of 58 EBT wells exceeded MCLs in August 2013 and 49 of the 56 LTM wells sampled exceeded MCLs in April 2013. The selected remedy included EBT in the most contaminated areas and assumed that “untreated parts of the groundwater plume would degrade under natural attenuation” based on previous studies. The MI RD used concentrations of 100 µg/L for PCE and TCE to delineate the initial treatment areas and this criterion was also used for the additional EBT treatment areas. The ROD estimated that 10 years would be required for the selected remedy to meet RAOs and the current schedule has RA completion for the MI in 2017.

The timeline to meet MCLs on the MI will be re-evaluated in the annual EBT report per the recommendation in the third five-year review, as noted in Table 10. This will require consideration of the

CVOC concentration in the fluvial aquifer that requires active treatment versus natural attenuation, the need for remedial action in the IAQ, the continued use of EBT versus other remedial actions and the potential impact from off-site locations.

5.0 SCHEDULE AND FISCAL YEAR REQUIREMENTS

5.1 RESPONSE SCHEDULES

The environmental restoration activities currently planned for the next three fiscal years are summarized below:

FY14

- Off-Depot AS/SVE – Perform Year 5 System Operations and Monitoring.
- Off-Depot LTM – Perform required groundwater monitoring in accordance with LTM plan; additional focus on groundwater rebound at Dunn Field.
- MI EBT – Perform EBT within areas of the highest concentrations in accordance with the revised MI RAWP; final scheduled EBT injection in August 2014.
- MI LTM – Perform required groundwater monitoring in accordance with LTM plan.
- Site Management and Community Relations – Conduct annual LUC inspections in July and activities required by community relations plan; prepare SMP Update.

FY15

- Off Depot AS/SVE – Complete Year 5 System Operations and Monitoring in December 2014; remove AS/SVE and FSVE equipment and abandon AS points, SVE wells and VMPs.
- Off Depot LTM – Perform required groundwater monitoring in accordance with LTM plan.
- MI LTM – Perform required groundwater monitoring in accordance with LTM plan.
- Site Management and Community Relations – Conduct annual LUC inspections in July and activities required by community relations plan; prepare SMP Update.

FY16

- Off Depot LTM – Perform required groundwater monitoring in accordance with LTM plan.
- MI LTM – Perform required groundwater monitoring in accordance with LTM plan.
- Site Management and Community Relations – Conduct annual LUC inspections in July and activities required by community relations plan; prepare SMP Update.

The master schedule for MI, Dunn Field and site-wide activities through planned site completion in 2021 is shown on Figure 22. Table 11 provides major milestones for the DDMT environmental restoration program through FY16 for use as a quick reference for upcoming document reviews.

5.2 REQUIREMENTS BY FISCAL YEAR

The financial requirements by fiscal year for the environmental program at DDMT are summarized in Table 12, which lists estimated annual costs by site category: Dunn Field Land Use Control Sites, Dunn Field Remedial Action Sites, and Main Installation Remedial Action Sites. These requirements will be further refined to reflect periodic updates to the cost-to-complete database that tracks funding requirements by site and is maintained by ODB for DDMT.

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TABLES

TABLE 1
FUNCTIONAL UNIT AND AREA DESCRIPTIONS
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Main Installation

Functional Unit	Name	Size[1] (Acres)	Common Past Land Use	Description
1	Twenty Typical Warehouses	89	Transportation to and storage in closed warehouses	Located in the northeastern area of the MI, consisting of about 20 large warehouses, with interspersed roadways and railroad tracks.
2	Southeast Golf Course/ Recreational Area	53	Golf, other recreation	Located in the southeastern corner of the MI1, consisting of golf course (Parcel 3). This FU also includes a baseball field and a small playground in the southeastern corner. This FU includes two constructed ponds and two concrete-lined drainage ditches from the ponds leading to the off-site area.
3	Southwest Open Area	92	Transportation to and storage in open-sided warehouses, painting and sandblasting, open storage	Located in the southwestern corner of the MI, consisting of varied type of parcels and sites.
4	Northern and Open Areas	193	Open storage, and transportation to and storage in closed warehouses	Located in the north-central to northwest area of the MI, covering a large area.
5	Newer Warehouses	109	Transportation to and storage in closed warehouses	Located in the south-central area of the MI and includes 10 large warehouse buildings.
6	Administrative and Residential Areas	33	Offices, equipment storage and maintenance, on-base housing	Located along the property boundary of the Depot along the Airways Boulevard. This FU includes the old Residential Unit Area, parking lots, and other asphalt-paved areas.

Dunn Field

Area	Size[1] (Acres)	Description
Northeast Open Area	20	Land in the northeast quadrant of Dunn Field, mostly grass covered with some lightly wooded areas.
Disposal Area	14	Open land in the northwest quadrant of Dunn Field, where the majority of disposal sites are located.
Stockpile Area	30	Open land in the southern half of Dunn Field. Area of former bauxite and fluorspar stockpiles (removed in 1999) and burial areas in the eastern and southwestern portions of Dunn Field.

Notes:
1) Acreage is approximate
FU: Functional Unit
MI: Main Installation

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Site No.	Parcel No.	Description	Site Status
Operable Unit 1: Dunn Field			
1	36.16	Mustard and Lewisite Training Sets (9 sets) Burial Site (1955)	A CERCLA Removal Action took place for this area in 2000-2001. No further remedial action is required for this site.
2	36.1	Ammonia Hydroxide (7 pounds) and Acetic Acid (1 gallon) Burial (1955)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
3	36.2	Mixed Chemical Burial Site (orthotoluidine dihydrochloride) (1955)	The selected CERCLA remedy includes excavation of contaminated soils/waste materials and off-site disposal. Excavation of this site began in March 2005 and was completed in 2006. USEPA approved the RACR in August 2006. This is also one of 21 sites associated with Dunn Field land use controls for administrative purposes.
4	36.3	POL Burial Site (thirteen 55-gallon drums of oil, grease, and paint)	No further action is required for this site. This is one of five sites associated with Dunn Field groundwater remediation for administrative purposes. Soil vapor extraction system in fluvial deposits operated from July 2007 to July 2012. Thermal-enhanced soil vapor extraction system in loess deposits operated from May until December 2008. USEPA approved the Source Areas OPS determination in October 2009 and the Source Areas IRACR in November 2009. The off-depot groundwater air sparging/soil vapor extraction system began operating in December 2009 and is scheduled to operate through 2014. USEPA approved the Off Depot IRACR in August 2011.
5	36.4	Methyl Bromide Burial Site A (3 cubic feet) (1955)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
6	36.2	40,037 units ointment (eye) Burial Site (1955)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
7	36.5	Nitric Acid Burial Site (1,700 quart bottles) (1954)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
8	36.6	Methyl Bromide Burial Site B (3,768 1-gallon cans) (1954)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
9	36.17	Ashes and Metal Burial Site (burning pit refuse) (1955)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
10	36.21	Solid Waste Burial Site (near MW-10) (metal, glass, trash, etc.)	The selected CERCLA remedy includes excavation of contaminated soils/waste materials and off-site disposal. Excavation of this site began in March 2005 and was completed in 2006. USEPA approved the RACR in August 2006. This is also one of 21 sites associated with Dunn Field land use controls for administrative purposes.
11	36.7	Trichloroacetic Acid Burial (1,433 1-ounce bottles) (1965)	No further action is required for this site. This is one of five sites associated with Dunn Field groundwater remediation for administrative purposes. Soil vapor extraction system in fluvial deposits operated from July 2007 to July 2012. Thermal-enhanced soil vapor extraction system in loess deposits operated from May until December 2008. USEPA approved the Source Areas OPS determination in October 2009 and the Source Areas IRACR in November 2009. The off-depot groundwater air sparging/soil vapor extraction system began operating in December 2009 and is scheduled to operate through 2014. USEPA approved the Off Depot IRACR in August 2011.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Site No.	Parcel No.	Description	Site Status
12	36.8	Sulfuric and Hydrochloric Acid Burial (1965)	No further action is required for this site. This is one of five sites associated with Dunn Field groundwater remediation for administrative purposes. Soil vapor extraction system in fluvial deposits operated from July 2007 to July 2012. Thermal-enhanced soil vapor extraction system in loess deposits operated from May until December 2008. USEPA approved the Source Areas OPS determination in October 2009 and the Source Areas IRACR in November 2009. The off-depot groundwater air sparging/soil vapor extraction system began operating in December 2009 and is scheduled to operate through 2014. USEPA approved the Off Depot IRACR in August 2011.
13	36.9	Mixed Chemical Burial (Acid, 900 pounds; unnamed solids, 8,100 pounds)	The selected CERCLA remedy includes excavation of contaminated soils/waste materials and off-site disposal. Excavation of this site was completed in March 2005. USEPA approved the RACR in August 2006. This is also one of 21 sites associated with Dunn Field land use controls for administrative purposes.
14	36.22	Municipal Waste Burial Site B (near MW-12) (food, paper products)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
15	36.23	Sodium Burial Sites (1968)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
16	36.1	Unknown Acid Burial Site (1969)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
17	36.11	Mixed Chemical Burial Site C (1969)	No further action is required for this site. This is one of five sites associated with Dunn Field groundwater remediation for administrative purposes. Soil vapor extraction system in fluvial deposits operated from July 2007 to July 2012. Thermal-enhanced soil vapor extraction system in loess deposits operated from May until December 2008. USEPA approved the Source Areas OPS determination in October 2009 and the Source Areas IRACR in November 2009. The off-depot groundwater air sparging/soil vapor extraction system began operating in December 2009 and is scheduled to operate through 2014. USEPA approved the Off Depot IRACR in August 2011.
18	36.15	Plane Crash Residue (Dunn Field)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
19	36.24	Former Tear Gas Canister Burn Site (Dunn Field)	No further action is required at this site.
20	36.25	Probable Asphalt Burial Site (Dunn Field)	No further action is required at this site.
21	36.26	XXCC-3 Burial Site (Dunn Field)	No further action is required at this site.
22	36.15	Hardware Burial Site (nuts and bolts) (Dunn Field)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
23	36.29	Construction Debris and Food Burial Site (Dunn Field)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
24	36.29	Former Burial/Burn Site and Neutralization Pit	Beginning in August 2000 all 29 bomb casings were recovered from the burial site and 900 cubic yards of soil contaminated with mustard degradation by-products were excavated and disposed offsite. Beginning in November 2000, 33 cubic yards of soil contaminated with mustard and degradation by-products were excavated from the neutralization pit and disposed offsite. In March 2001, the CERCLA Removal Action was complete. No further action is required for this site.
50	36.27	Dunn Field Northeastern Quadrant Drainage Ditch	No further action is required at this site.
60	36.14	Pistol Range Impact Area/Bullet Stop	A CERCLA Removal Action for lead in surface soil was conducted in 2003. No further action is required at this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Site No.	Parcel No.	Description	Site Status
61	36.28	Buried Drain Pipe (Northwestern Quadrant of Dunn Field)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
62	36.12/36.13	Bauxite Storage (Northeastern Quadrant of Dunn Field)	No further action is required at this site.
63	36.29/36.30	Fluorspar Storage (10 mounds in Southeastern Quadrant of Dunn Field, 1 mound in Southwestern Quadrant of Dunn Field) All mounds removed by 1999	No further action is required at this site.
64	36.29	Bauxite Storage (Southwestern Quadrant of Dunn Field Removed in 1972), CC-2 Burial Site, IA Site 31 (smoke pot burn/disposal area)	The selected CERCLA remedy for IA Site 31 includes excavation of contaminated soils/waste materials and off-site disposal. For the remaining portions of the site no further action is required. Excavation of this site was completed in March 2005. USEPA approved the RACR in August 2006. This is also one of 21 sites associated with Dunn Field land use controls for administrative purposes.
85	36.14	Old Pistol Range Building 1184/Temporary Pesticide Storage	A CERCLA Removal Action for lead in surface soil was conducted in 2003. No further action is required at this site.
86	36.18/36.19	Food Supplies (Dunn Field)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
90	36.3	POL Burial Site (thirty-two 55-gallon drums of oil, grease, and thinner) (1955)	The selected CERCLA remedy includes excavation of contaminated soils/waste materials and off-site disposal. Excavation and off-site disposal of this site was completed in March 2005. USEPA approved the RACR in August 2006. This is also one of five sites associated with Dunn Field groundwater remediation for administrative purposes. Soil vapor extraction system in fluvial deposits operated from July 2007 to July 2012. Thermal-enhanced soil vapor extraction system in loess deposits operated from May until December 2008. USEPA approved the Source Areas OPS determination in October 2009 and the Source Areas IRACR in November 2009. The off-depot groundwater air sparging/soil vapor extraction system began operating in December 2009 and is scheduled to operate through 2014. USEPA approved the Off Depot IRACR in August 2011.
91	36.23	Sodium Phosphate Burial (1968)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
92	36.23	14 Burial Pits: Na_2PO_4, sodium, acid, medical supplies, and chlorinated lime (1969)	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.
93	36.1	Acid Burial Site	No further action is required for this site. This is one of 21 sites associated with Dunn Field land use controls for administrative purposes.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Site No.	Parcel No.	Description	Site Status
Operable Unit 2: Southwestern Quadrant, MI			
27	24.1	Former Recoupment Area (Building 873)	Contaminated soil removed in 1985 as part of pre-Remedial Investigation activities. No further action is required for this site.
29	35.2	Former Underground Waste Oil Storage Tank	The tank was located and removed during a CERCLA Removal Action in 2000; the contaminated soils were disposed as special waste and the tank contents were disposed as RCRA hazardous waste. This site is associated with MI groundwater remediation for administrative purposes; enhanced bioremediation was selected as the CERCLA groundwater remedy. The enhanced bioremediation treatment (EBT) system operated from May 2006 until February 2009. USEPA approved the MI OPS determination in March 2010. EBT was restarted in November 2012 and is expected to continue until August 2014.
30	24.3/35.3	Paint Spray Booths (2 of 3 total; Buildings 770 and 1086)	No further action is required for this site.
31	35.4	Former Paint Spray Booth (Building 1087)	Building 1087 was decontaminated by vacuuming to remove free dust and pressure washing. The surface soil outside the building was excavated to a depth of one foot and replaced with clean backfill. The excavated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
32	35.5	Sandblasting Waste Accumulation Area	Building 1088 was decontaminated by vacuuming to remove free dust and pressure washing. The surface soil outside the building was excavated to a depth of one foot and replaced with clean backfill. The excavated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
33	35.4	Sandblasting Waste Drum Storage Area (metal shed south of Building 1088)	The surface soil in this area was excavated to a depth of one foot and replaced with clean backfill. The excavated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
34	24.3	Building 770 Underground Oil Storage Tanks	The underground storage tanks were removed in 1989. No further action is required for this site.
40	24.3	Safety Kleen Units - 5 of 9 total (all located in Building 770)	No further action is required for this site.
41	24.3	Satellite Drum Accumulation Areas - 1 of 4 total (vicinity Building 770)	No further action is required for this site.
71	Multiple	Herbicide (All railroad tracks) (used to clear tracks)	No further action is required for this site.
82	23.7/23.8	Flammables (Buildings 783 and 793)	No further action is required for this site.
84	27.2	Flammables, Solvents, Waste Oil, etc. (Building 972)	No further action is required for this site.
87	35.2	DDT, banned pesticides (Building 1084)	Building 1084 was demolished and the debris was disposed off-site at a solid waste landfill. A concrete sump beneath the building was excavated; the contaminated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
88	35.2	POL (Building 1085)	The concrete slab and hydraulic lift were removed during a CERCLA Removal Action in 2000; the contaminated soils were disposed offsite as special waste and the lift and cylinders were cleaned and disposed as scrap metal. The concrete debris was disposed offsite as construction debris. No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Site No.	Parcel No.	Description	Site Status
89	28.2	Acids (Building 1089)	Building 1089 was decontaminated by vacuuming to remove free dust and pressure washing. The surface soil in areas outside the southern end of the building were excavated to a depth of one foot and replaced with clean backfill. The excavated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
Operable Unit 3: Southeastern Watershed And Golf Course, MI			
25	3.8	Golf Course Pond	No further action is required for this site.
26	3.6	Lake Danielson	No further action is required for this site.
30	4.4	Paint Spray Booths (1 of 3 total - Building 260)	No further action is required for this site.
40	4, 19, and 21	Safety Kleen Units - 4 of 9 total units (Buildings 253, 469, 490, and 689)	No further action is required for these sites.
41	4 and 19	Satellite Drum Accumulation Areas - 2 of 4 total areas (Buildings 260 and 469)	No further action is required for this site.
48	5.2	Former PCB Transformer Storage Area	Site remediation by removal of surface soil was completed in 1998. No further action is required for this site.
49	17.3	Medical Waste Storage Area	No further action is required for this site.
51	3.7	Lake Danielson Outlet Ditch	No further action is required for this site.
52	3.9	Golf Course Pond Outlet Ditch	No further action is required for this site.
58	4.9	Pesticides, Herbicides (Pad 267)	No further action is required for this site.
59	4.1	Pesticides, Cleaners (Building 273)	No further action is required for this site.
65	7.2	XXCC-3 (Building 249)	No further action is required for this site.
66	4.11	POL (Building 253)	No further action is required for this site.
67	4.7	MOGAS (Building 257	No further action is required for this site.
68	4.8	POL (Building 263) (20 by 40 feet)	No further action is required for this site.
69	3.11	2,4-D, M2A1, and M4 Flamethrower Liquid Fuels (surface application)	No further action is required for this site.
73	Multiple	2,4-Dichlorophenoxyacetic Acid (all grassed areas)	No further action is required for this site.
75	21.5	Unknown Wastes near Building 689	No further action is required for this site.
76	21.5	Unknown Wastes near Building 690	No further action is required for this site.
77	22.2	Unknown Wastes near Buildings 689 and 690	No further action is required for this site.
78	21.3	Alcohol, Acetone, Toluene, Naphtha; Hydrofluoric Acid Spill	No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Site No.	Parcel No.	Description	Site Status
Operable Unit 4: North-Central Area, MI			
28	32.3	Recoupment Area (Building 865)	No further action is required for this site.
35	15.2	DRMO Building S308 - Hazardous Waste Storage	site was decontaminated and certified clean November 2001 in accordance with the RCRA Closure Plan (Permit TNHW-053). No further action is required for this site.
36	15.5	DRMO Hazardous Waste Concrete Storage Pad	No further action is required for this site.
37	15.5	DRMO Hazardous Waste Gravel Storage Pad	No further action is required for this site.
38	15.5	DRMO Damaged/Empty Hazardous Materials Drum Storage Area	No further action is required for this site.
39	15.5	DRMO Damaged/Empty Lubricant Container Area	No further action is required for this site.
41	13.4	Satellite Drum Accumulation Area (1 of 4 total - Building 210)	No further action is required for this site.
42	33.9	Former pentachlorophenol Dip Vat Area	In 1986, the dip vat was removed and the soil was excavated to a depth of 10 feet. Soil with PCP concentrations greater than 200 ppb remained beneath the excavated area. The excavation was backfilled with clean soil and with gravel or concrete placed on top of the fill. No further remedial action is required for this site.
43	33.9	Former Underground pentachlorophenol Tank Area	The tank was brought above ground in 1986 and drained into drums. The soil around the site was excavated to a depth of 10 to 15 feet, 20 feet wide and 22 feet long. The pumps and lines were also removed. The excavation was backfilled with clean soil and with gravel or concrete placed on top of the clean fill. No further remedial action is required for this site.
44	33.6	Former Wastewater Treatment Unit Area	No further action is required for this site.
45	33.9	Former Contaminated Soil Staging Area	No further action is required for this site.
46	33.9	Former pentachlorophenol Pallet Drying Area	No further action is required for this site.
47	33.9	Former Contaminated Soil Drum Storage Area (removed 1988)	No further action is required for this site.
53	30.2	X-25 Flammable Solvents Storage Area (near Building 925)	No further action is required for this site.
54	15.6	MI - DRMO East Stormwater Runoff Canal	No further action is required for this site.
55	15.6	MI - DRMO North Stormwater Runoff Canal	No further action is required for this site.
56	29.3	MI - West Stormwater Drainage Canal	No further action is required for this site.
57	12.1	Building 629 Spill Area	No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Site No.	Parcel No.	Description	Site Status
70	Multiple	POL, Various Chemical Leaks (railroad tracks 1, 2, 3, 4, 5, and 6)	No further action is required for this site.
71	Multiple	Herbicide (all railroad tracks) (used to clear tracks)	No further action is required for this site.
72	15.5/15.6	Waste Oil (DRMO yard) (surface application for dust control)	No further action is required for this site.
73	Multiple	2,4-Dichlorophenoxyacetic Acid (all grassed areas)	No further action is required for this site.
74	15.3	Flammables, Toxics (West End - Building 319)	No further action is required for this site.
79	15.6	Fuels, Miscellaneous Liquids, Wood, and Paper (Vicinity S702)	No further action is required for this site.
80	33.13	Fuel and Cleaners Dispensing (Building 720)	No further action is required for this site.
81	33.7	Fuel Oil AST (Building 765 – removed in 1994)	No further action is required for this site.
83	30.5	Disposal of Dried Paint Residues - South of Building 949	Lead contaminated soil was removed from an area of approximately 7,200 square feet. The CERCLA Removal Action was completed in 2001. No further action is required for this site.

Notes:
AOC: Area of Concern
AST: Aboveground Storage Tank
CWM: Chemical Warfare material
CWMP: Chemical Warfare Management Plan
DDT: 4,4′-Dichlorodiphenyltrichloroethane
DRMO: Defense and Reutilization Marketing Office
FU: Functional Unit
IRACR: Interim Remedial Action Completion Report
MI: Main Installation
MOGAS: Motor gasoline
Na: Sodium
OPS: Operating Properly and Successfully
PCB: Polychlorinated biphenyl
PO_4: Phosphate
POL: Petroleum, oil, and lubricants

a. Source: DLA correspondence dated September 24, 2004, RE: Corrective Action Permit Application and Attachment 1 Summary of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) Defense Depot Memphis, Tennessee

TABLE 3
MAIN INSTALLATION EBT WELLS
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Area	Type	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
IW21-01A	TTA-1N	IW	276504.77	800599.88	294.34	294.99	98.7	10	108.7
IW21-01B	TTA-1N	IW	276500.95	800605.89	294.61	294.85	89.9	10	99.9
IW21-02A	TTA-1N	IW	276464.81	800594.24	294.62	295.25	100.2	10	110.2
IW21-02B	TTA-1N	IW	276462.20	800598.51	294.65	295.12	91.7	10	101.7
IW21-03A	TTA-1N	IW	276551.96	800698.20	292.81	293.23	99.7	10	109.7
IW21-03B	TTA-1N	IW	276549.21	800705.08	292.50	293.12	89.8	10	99.8
IW21-04A	TTA-1N	IW	276518.82	800711.10	292.69	293.20	99.9	10	109.9
IW21-04B	TTA-1N	IW	276515.66	800715.39	292.79	293.30	89.7	10	99.7
MW-21[2]	TTA-1N	IW	276473.36	800602.47	295.00	295.30	92.1	15	107.1
PMW21-01[1,2]	TTA-1N	IW	276533.14	800600.14	294.76	295.00	88.4	20	108.4
PMW21-02	TTA-1N	PMW	276574.64	800701.00	292.98	293.19	91.3	20	111.3
PMW21-04[1]	TTA-1N	PMW	276601.83	800771.56	291.87	292.20	89.0	20	109.0
IW101-02A	TTA-1S	IW	276198.80	801107.92	291.12	291.60	124.0	15	139.0
IW101-02B	TTA-1S	IW	276200.62	801111.95	291.14	291.72	110.1	15	125.1
IW101-02C	TTA-1S	IW	276203.32	801116.22	291.53	291.74	93.7	15	108.7
IW101-03A	TTA-1S	IW	276164.62	801104.58	291.94	292.36	125.2	15	140.2
IW101-03B	TTA-1S	IW	276161.58	801106.45	291.91	292.51	109.4	15	124.4
IW101-03C	TTA-1S	IW	276158.05	801108.62	292.04	292.54	93.6	15	108.6
IW101-04A	TTA-1S	IW	276249.13	801142.39	291.72	292.18	123.4	15	138.4
IW101-04B	TTA-1S	IW	276252.94	801142.79	291.59	292.08	107.0	15	122.0
IW101-04C	TTA-1S	IW	276257.10	801143.03	291.47	292.05	92.3	15	107.3
IW101-05A	TTA-1S	IW	276214.93	801126.64	291.52	292.12	121.4	15	136.4
IW101-05B	TTA-1S	IW	276218.44	801125.04	291.41	292.06	107.8	15	122.8
IW101-05C	TTA-1S	IW	276221.88	801122.88	291.27	291.89	92.2	15	107.2
IW101-07A	TTA-1S	IW	276125.77	801099.90	292.83	293.13	123.0	15	138.0
IW101-07B	TTA-1S	IW	276123.62	801102.61	292.81	293.15	106.6	15	121.6
IW101-07C	TTA-1S	IW	276121.28	801105.60	292.78	293.08	93.3	15	108.3
DR1-5[2]	TTA-1S	IW	276080.00	800828.43	294.46	294.86	124.7	20	144.7
DR1-5A[2]	TTA-1S	IW	276087.00	800835.01	294.51	294.87	90.0	20	110.0
DR1-6[2]	TTA-1S	IW	276043.88	801103.40	293.17	293.50	114.4	20	134.4
DR1-6A[2]	TTA-1S	IW	276035.02	801103.61	293.28	293.58	90.9	20	110.9
PMW101-02A[2]	TTA-1S	IW	276281.93	801144.78	292.00	292.29	117.7	20	137.7
PMW101-02B[2]	TTA-1S	IW	276286.33	801145.41	291.98	292.24	97.8	20	117.8
PMW101-04A	TTA-1S	PMW	276299.41	801182.12	291.07	291.43	117.9	20	137.9
PMW101-04B	TTA-1S	PMW	276296.40	801186.86	291.47	291.75	98.6	20	118.6
PMW101-07A	TTA-1S	PMW	276143.43	801171.78	292.20	292.52	117.9	20	137.9
PMW101-07B	TTA-1S	PMW	276141.84	801176.74	292.36	292.70	98.0	20	118.0
IW85-05	TTA-2	IW	276815.58	806162.75	304.73	305.30	92.4	10	102.4
IW85-06	TTA-2	IW	276779.47	806183.37	304.81	305.45	95.5	10	105.5
IW92-01	TTA-2	IW	276769.42	806506.97	304.51	304.88	80.4	10	90.4
IW92-02	TTA-2	IW	276719.57	806513.90	304.05	304.87	79.5	10	89.5
IW92-03	TTA-2	IW	276669.17	806511.19	304.20	304.72	83.5	10	93.5
IW92-07	TTA-2	IW	276725.81	806366.98	303.78	304.31	87.8	10	97.8
IW92-08	TTA-2	IW	276784.63	806289.19	304.55	304.93	85.3	10	95.3
DR2-2[2]	TTA-2	IW	276770.85	806658.86	304.30	304.67	78.4	15	93.4
DR2-5[2]	TTA-2	IW	276830.98	806180.40	305.41	305.72	84.5	15	99.5
PMW92-03[1]	TTA-2	IW	276678.91	806438.66	303.91	304.17	92.5	10	102.5
MW-113[1]	TTA-2	PMW	276685.34	806279.10	304.81	304.92	96.0	10	106.0
PMW85-01	TTA-2	PMW	276802.18	806146.13	305.08	305.39	93.2	10	103.2
PMW85-05	TTA-2	PMW	276752.08	806222.46	305.12	305.32	93.2	10	103.2
MW-85	TTA-2	PMW	276704.14	806064.51	304.13	304.50	95.9	15	110.9

TABLE 3
MAIN INSTALLATION EBT WELLS
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Area	Type	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-62[2]	B-835	IW	278289.65	801857.92	293.71	293.90	86.1	10	96.1
MW-213[2]	B-835	IW	278427.08	801669.11	294.22	294.20	77.3	15	92.3
MW-212	B-835	PMW	278028.36	802225.40	295.34	295.68	85.3	15	100.3
MW-203A[2]	W-C	IW	276841.76	801740.43	290.70	290.80	142.9	15	162.9
MW-203B[2]	W-C	IW	276821.40	801741.59	290.87	291.10	93.0	15	113.0
MW-197A	W-C	PMW	276975.42	802042.30	291.26	291.54	161.7	15	176.7
MW-197B	W-C	PMW	276973.14	802036.92	291.03	291.43	93.8	15	108.8

Notes:

1) PMW21-04 and MW-113 changed to PMWs, PMW21-01 and PMW92-03 to IWs in August 2013.
2) Wells re-surveyed after wellhead modifications in July 2013

bgs: below ground surface
btoc: below top of casing
ft: feet
msl: mean sea level

TABLE 4
MAIN INSTALLATION PRIMARY CVOC RESULTS, OCTOBER 2012
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

VOC Analyte	MCL (µg/L)	Number of Locations with Analyte Above RL	Maximum Concentrations (µg/L)	Location of Maximum Concentration	Number of Locations with Analyte Above MCL
Carbon tetrachloride	5	23	196	DR2-5	11
Chloroform	80	42	56.1	DR2-5	0
cis-1,2-Dichloroethene	70	35	101	PMW85-05	2
Tetrachloroethene	5	78	186	DR1-6	64
trans-1,2-Dichloroethene	100	1	1.27	MW-100B	0
Trichloroethene	5	82	165	DR1-6A	44
Vinyl chloride	2	5	164	MW-100B	1

Notes:
µg/L micrograms per liter
--: Not Listed
RL: reporting limit
MCL: Maximum Contaminant Level

TABLE 5
MAIN INSTALLATION LTM WELLS
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-16	Fluvial	Background	Biennial	278837.83	807099.66	299.86	300.19	57.6	15	72.6
MW-19	Fluvial	Background	Biennial	278945.87	800782.26	290.57	290.86	83.1	10	93.1
MW-22	Fluvial	Boundary	Biennial	275912.38	800702.16	298.04	298.49	95.4	10	105.4
MW-23	Fluvial	Boundary	Biennial	275791.02	801817.13	298.99	299.24	101.2	10	111.2
MW-24	Fluvial	Boundary	Biennial	275616.05	803538.81	299.51	299.81	97.3	15	112.3
MW-25A	Fluvial	Performance	Annual	275975.11	805521.27	269.88	270.13	73.0	10	83.0
MW-26	Fluvial	Performance	Semiannual	276508.16	805962.09	303.69	303.89	97.6	10	107.6
MW-34	Intermediate	Sentinel	Biennial	279411.21	801917.96	299.97	300.80	136.6	20	156.6
MW-38	Intermediate	Sentinel	Biennial	279141.38	802450.43	307.45	308.45	139.9	15	154.9
MW-39	Fluvial	Performance	Semiannual	277280.67	802598.11	296.28	296.58	95.5	20	115.5
MW-39A[1]	Fluvial	Performance	Semiannual	277278.11	802607.66	298.61	298.70	148.1	20	168.1
MW-50	Fluvial	Boundary	Biennial	276455.81	807065.28	298.82	299.32	115.0	10	125.0
MW-52	Fluvial	Performance	Annual	275371.97	805897.36	279.26	279.71	94.0	10	104.0
MW-53	Fluvial	Background	Biennial	279176.66	805136.05	306.38	305.58	72.5	10	82.5
MW-55	Fluvial	Background	Biennial	279301.05	801204.62	292.08	292.48	64.0	10	74.0
MW-63A	Fluvial/Intermediate	Sentinel	Annual	278200.31	803572.83	305.96	306.33	140.0	10	150.0
MW-63B	Fluvial/Intermediate	Sentinel	Annual	278201.32	803557.77	305.78	306.22	115.0	10	125.0
MW-64	Fluvial	Performance	Semiannual	276951.52	805005.97	304.21	304.46	102.0	10	112.0
MW-66A	Fluvial	Background	Biennial	276626.02	799792.63	284.22	284.34	74.6	20	94.6
MW-88	Fluvial	Performance	Semiannual	276879.05	806512.88	305.15	305.47	82.0	15	97.0
MW-89	Intermediate	Sentinel	Annual	278286.97	802555.25	303.98	304.38	147.0	30	177.0
MW-90	Intermediate	Sentinel	Semiannual	278283.60	802539.51	304.19	304.64	115.0	30	145.0
MW-92	Fluvial	Performance	Semiannual	276614.20	806489.66	304.41	304.78	93.0	15	108.0
MW-93	Fluvial	Boundary	Biennial	275542.22	804440.10	294.08	294.31	92.0	15	107.0
MW-94A	Fluvial	Performance	Semiannual	276805.80	803085.80	303.00	303.23	109.6	10	119.6
MW-96	Fluvial	Performance	Annual	276310.14	806320.24	289.02	289.67	75.5	20	95.5
MW-97	Fluvial	Performance	Semiannual	276074.23	802139.23	297.44	297.70	97.5	20	117.5
MW-98	Fluvial	Performance	Semiannual	276891.37	802572.77	294.43	294.93	137.0	10	147.0
MW-99	Fluvial	Background	Biennial	277443.37	801114.53	285.33	285.69	91.5	20	111.5
MW-100B[1]	Fluvial	Performance	Semiannual	276600.61	800854.26	290.92	291.47	107.4	20	127.4
MW-101[1]	Fluvial	Performance	Semiannual	276204.09	801110.27	291.74	291.98	89.0	15	104.0
MW-102B	Fluvial	Boundary	Biennial	275760.59	800707.72	311.40	312.07	120.5	20	140.5
MW-103	Fluvial	Performance	Annual	278690.88	805159.83	301.37	301.89	70.0	20	90.0
MW-104	Fluvial	Performance	Annual	278676.47	805417.03	291.98	292.18	70.5	20	90.5
MW-107	Fluvial/Intermediate	Sentinel	Semiannual	278419.07	803009.93	304.92	305.18	128.0	15	143.0
MW-108	Fluvial/Intermediate	Sentinel	Semiannual	277658.02	802985.53	303.07	303.25	160.0	10	170.0
MW-140	Intermediate	Sentinel	Annual	279061.29	801715.68	298.12	298.16	224.6	20	244.6
MW-141	Intermediate	Sentinel	Semiannual	278019.19	802571.25	303.71	303.70	148.7	20	168.7
MW-142	Fluvial	Performance	Annual	278056.03	801629.12	291.18	291.49	85.0	20	105.0
MW-143[1]	Fluvial	Performance	Semiannual	278301.35	801201.48	290.66	290.90	78.6	20	98.6
MW-198[1]	Fluvial	Performance	Annual	277775.91	802142.37	291.78	292.20	90.3	15	105.3
MW-199A	Intermediate	Sentinel	Annual	277756.40	802573.52	301.53	301.84	146.1	15	161.1
MW-199B	Fluvial	Performance	Semiannual	277751.74	802575.66	301.73	302.07	104.6	15	119.6
MW-200	Fluvial	Performance	Semiannual	277006.10	802859.39	300.18	300.51	102.9	15	117.9
MW-202A	Intermediate	Sentinel	Annual	278685.74	802111.27	299.23	299.69	176.2	15	191.2
MW-202B	Intermediate	Sentinel	Semiannual	278692.79	802112.04	299.51	299.74	118.8	15	133.8
MW-204A	Fluvial	Performance	Semiannual	276724.66	802168.25	292.21	292.49	133.3	15	148.3
MW-204B[1]	Fluvial	Performance	Semiannual	276707.81	802167.07	292.71	293.00	94.9	15	109.9
MW-205A[1]	Fluvial	Performance	Semiannual	277157.18	802277.24	292.30	292.40	141.3	15	156.3
MW-205B[1]	Fluvial	Performance	Semiannual	277173.05	802277.84	292.16	292.30	97.3	15	112.3
MW-206A	Fluvial	Performance	Semiannual	277219.28	802792.28	299.92	300.35	127.3	15	142.4
MW-206B	Fluvial	Performance	Semiannual	277200.85	802794.78	299.90	300.12	96.7	15	111.7
MW-207A[1]	Fluvial	Sentinel	Semiannual	277652.76	803192.01	304.05	304.45	149.9	15	164.9
MW-207B[1]	Fluvial	Sentinel	Semiannual	277665.02	803193.27	304.06	304.42	108.5	15	123.5
MW-208A[1]	Fluvial	Performance	Semiannual	277382.22	802799.08	302.21	302.40	184.2	15	199.2
MW-208B	Fluvial	Performance	Semiannual	277396.90	802814.96	301.79	302.08	106.7	15	121.7
MW-209A	Intermediate	Sentinel	Annual	277574.28	802507.10	298.05	298.36	189.0	15	204.0
MW-209B	Fluvial	Performance	Semiannual	277581.50	802520.13	298.49	298.72	102.3	15	117.3
MW-210A[1]	Intermediate	Sentinel	Semiannual	277238.57	801958.11	289.61	289.70	177.0	15	192.0

TABLE 5
MAIN INSTALLATION LTM WELLS
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-210B	Fluvial	Performance	Semiannual	277228.18	801951.94	289.29	289.53	97.0	15	112.0
MW-211	Intermediate	Sentinel	Annual	278000.59	802973.69	303.74	304.09	166.3	15	181.3
MW-214A	Fluvial	Performance	Semiannual	277877.62	803906.94	303.61	303.96	119.1	15	134.1
MW-214B	Fluvial	Performance	Semiannual	277875.84	803922.20	303.70	303.96	101.6	15	116.6
MW-215A	Fluvial	Performance	Annual	277298.37	804164.31	304.50	304.86	128.8	15	143.8
MW-215B	Fluvial	Performance	Annual	277298.27	804177.33	304.56	304.98	105.4	15	120.4
MW-216	Fluvial	Performance	Annual	276024.68	801995.93	297.34	297.63	99.9	15	115.0
MW-217	Fluvial	Performance	Semiannual	276670.60	805213.69	304.18	304.51	101.8	15	116.8
MW-218	Fluvial	Performance	Semiannual	276936.70	805628.44	305.60	306.00	98.9	15	114.0
MW-219[1]	Fluvial	Boundary	Semiannual	276429.49	800460.96	295.13	295.00	98.0	15	113.0
MW-229[1]	Intermediate	Sentinel	Biennial	279294.17	802836.96	311.78	312.09	188.4	20	208.4
MW-252	Intermediate	Sentinel	Semiannual	278789.21	801364.70	294.16	294.40	126.1	20	146.1
MW-253	Intermediate	Sentinel	Semiannual	278287.43	801191.42	290.47	290.80	118.3	20	138.3
MW-254	Memphis	Sentinel	Semiannual	279334.36	800857.53	292.84	293.28	285.8	20	305.8
MW-255	Memphis	Sentinel	Semiannual	279304.76	801226.84	291.84	292.38	284.7	20	304.7
MW-256	Intermediate	Sentinel	Semiannual	279301.82	801243.80	292.68	293.40	127.1	20	147.1
MW-257	Fluvial	TBD	TBD	278549.06	801340.58	292.22	292.67	85.5	15	100.5
MW-258	Fluvial	TBD	TBD	278125.81	804426.82	304.37	304.83	79.3	20	99.3
MW-259	Fluvial	TBD	TBD	276279.04	804450.97	290.77	291.44	98.6	20	118.6
MW-260	Fluvial	TBD	TBD	278398.46	804376.22	304.16	304.45	68.0	20	88.3
MW-261	Fluvial	TBD	TBD	276390.64	802591.62	293.52	293.79	90.0	20	110.3
DR1-1[1]	Fluvial	Performance	Annual	276300.34	800855.57	293.14	293.42	121.7	20	141.7
DR1-1A[1]	Fluvial	Performance	Annual	276307.34	800863.06	293.00	293.37	89.2	20	109.2
DR1-2[1]	Fluvial	Performance	Annual	276536.64	801152.66	290.00	291.39	97.7	20	117.7
DR1-3	Fluvial	Performance	Semiannual	276527.27	801415.91	290.93	291.11	109.7	20	129.7
DR1-4	Fluvial	Performance	Annual	276231.20	801399.53	292.78	293.00	106.3	20	126.3
DR1-7	Fluvial	Performance	Annual	276791.26	801441.36	289.15	289.46	108.3	20	128.3
DR1-8[1]	Fluvial	Performance	Annual	276752.48	800875.32	290.09	290.47	92.7	20	112.7
DR2-1	Fluvial	Performance	Semiannual	276772.10	806497.62	304.90	305.08	73.9	20	93.9
DR2-3	Fluvial	Performance	Semiannual	276539.12	806203.16	303.44	303.66	93.0	20	113.0
DR2-4[1]	Fluvial	Performance	Annual	276455.62	806633.07	303.55	303.96	88.1	20	108.1
DR2-6	Fluvial	Performance	Semiannual	276643.99	805860.91	304.70	304.92	94.6	20	114.6
PMW21-03	Fluvial	Performance	Semiannual	276573.43	800742.52	292.11	292.72	90.3	20	110.3
PMW21-05	Fluvial	Performance	Semiannual	276628.32	801129.72	288.53	288.92	94.3	20	114.3
PMW92-02	Fluvial	Performance	Semiannual	276667.02	806476.47	304.17	304.35	94.8	10	104.8
PMW101-03A	Fluvial	Performance	Semiannual	276348.46	801198.37	291.61	291.99	119.2	20	139.2
PMW101-03B	Fluvial	Performance	Semiannual	276353.09	801194.14	291.55	291.82	99.3	20	119.3
PMW101-06A	Fluvial	Performance	Semiannual	276191.88	801187.45	292.13	292.72	120.0	20	140.0
PMW101-06B	Fluvial	Performance	Semiannual	276194.93	801183.96	292.17	292.40	99.3	20	119.3
PZ-03	Fluvial	Performance	Annual	276379.33	802941.05	298.51	298.98	108.9	10	118.9

Notes:
1) Wells re-surveyed after wellhead modifications in July 2013
ft: feet
btoc: below top of casing
msl: mean seal level

TABLE 6
REMEDIATION GOALS FROM DUNN FIELD RECORD OF DECISION
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

	Remedial Goal Objectives				
	Site-Specific Soil Screening Levels to be Protective		Protective Soil Vapor Concentration		Groundwater Target Concentrations at 10-4 Target Risk Levels and Target HI=1.0 (µg/L)
Parameter	Loess Specific Values (mg/kg)	Fluvial Deposit Specific Values (mg/kg)	Loess Specific Values (ppbv)	Fluvial Deposit Specific Values (ppbv)	
Carbon Tetrachloride	0.2150	0.1086	28.14	14.22	3.0
Chloroform	0.9170	0.4860	61.57	32.63	12.0
Dichloroethane, 1,2-	0.0329	0.0189	1.12	0.64	—
Dichloroethene, 1,1-	0.1500	0.0764	57.00	29.03	7/340
Dichloroethene, cis-1,2-	0.7550	0.4040	73.86	39.52	35.0
Dichloroethene, trans-1,2-	1.5200	0.7910	256.53	133.50	50.0
Methylene Chloride	0.0305	0.0169	5.14	2.85	—
Tetrachloroethane, 1,1,2,2-	0.0112	0.0066	0.03	0.55	2.2
Tetrachloroethene	0.1806	0.0920	15.18	0.99	2.5
Trichloroethane, 1,1,2	0.0627	0.0355	0.84	2.03	1.9
Trichloroethene	0.1820	0.0932	10.56	2.06	5.0
Vinyl Chloride	0.0294	0.0150	28.94	14.77	—

Notes:
mg/kg: milligrams per kilogram
µg/L: micrograms per liter
ppbv: parts per billion per volume
MCL: maximum contaminant level
HI: hazard index
—: Not available for groundwater cleanup goals because of low number of detections or detected values consistently less than MCLs.

TABLE 7
DUNN FIELD PRIMARY CVOC RESULTS, APRIL 2012
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

VOC Analyte	MCL (µg/L)	TC (µg/L)	Number of Locations with Analyte Above RL	Maximum Concentrations (µg/L)	Location of Maximum Concentration	Number of Locations with Analyte Above MCL	Number of Locations with Analyte Above TC
1,1,2,2-Tetrachloroethane	--	2.2	26	37.9	MW-159	NA	16
1,1,2-Trichloroethane	5	1.9	1	6.14	MW-159	1	1
1,1-Dichloroethene	7	7	10	25.7	MW-130	5	5
1,2-Dichloroethane	5	--	0	0.305	MW-130	0	NA
Carbon tetrachloride	5	3	6	3.55	MW-249	0	1
Chloroform	80	12	27	37.4	MW-151	0	5
cis-1,2-Dichloroethene	70	35	8	42.8	MW-159	0	1
Tetrachloroethene	5	2.5	10	72.5	MW-130	6	8
trans-1,2-Dichloroethene	100	50	1	4.36	MW-159	0	0
Trichloroethene	5	5	35	275	MW-159	21	21
Vinyl chloride	2	--	1	17.3	MW-159	1	NA

Notes:
µg/L micrograms per liter
--: Not Listed
RL: reporting limit
MCL: Maximum Contaminant Level
TC: Target Concentration

TABLE 8
DUNN FIELD LTM WELLS
2014 SITE MANAGEMENT PLAN
Dunn Field - Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-03	Fluvial	Performance-FSVE	Semiannual	281596.25	802100.69	292.35	290.40	65.5	10	75.5
MW-04	Fluvial	Background	Biennial	281278.87	802369.19	301.61	300.00	60.0	20	80.0
MW-06	Fluvial	Performance-FSVE	Semiannual	280604.17	802069.13	289.11	288.10	51.0	20	71.0
MW-07	Fluvial	Background-NE	Annual	281839.88	802481.70	295.10	293.10	67.0	10	77.0
MW-08	Fluvial	Background-NE	Annual	282001.04	802727.91	292.59	292.74	56.5	10	66.5
MW-13	Fluvial	Background	Biennial	281033.56	802369.21	300.01	300.10	66.0	15	81.0
MW-15	Fluvial	Performance	Semiannual	280348.88	801985.36	295.12	295.23	63.4	15	78.4
MW-28	Fluvial	Background	Semiannual	281568.58	803154.48	294.79	294.89	54.3	15	69.3
MW-31	Fluvial	Performance	Semiannual	281651.53	801783.90	290.37	287.50	64.1	15	79.1
MW-33	Fluvial	Performance	Biennial	280398.10	801561.30	280.71	277.70	44.6	15	59.6
MW-44	Fluvial	Performance	Annual	281073.71	800601.09	269.07	269.40	64.0	10	74.0
MW-54[1]	Fluvial	Performance	Semiannual	281159.21	801183.83	295.39	295.57	84.5	10	94.5
MW-57	Fluvial	Performance	Semiannual	280184.05	802006.19	290.77	291.10	60.0	10	70.0
MW-58	Fluvial	Performance	Biennial	279845.07	802066.44	290.51	290.70	57.0	10	67.0
MW-67	Memphis	Sentinel	Biennial	280473.05	800933.94	278.21	275.53	260.0	15	275.0
MW-68	Fluvial	Performance	Annual	281500.76	802040.04	291.69	291.60	72.5	10	82.5
MW-69	Fluvial	Performance	Annual	281202.55	802011.49	307.02	304.90	82.1	10	92.1
MW-70	Fluvial	Performance	Annual	281029.60	801988.49	304.99	302.80	80.8	10	90.8
MW-71	Fluvial	Performance	Annual	280584.68	801804.71	294.40	291.90	65.5	10	75.5
MW-76	Fluvial	Performance	Annual	281311.98	801642.76	302.71	303.30	73.0	20	93.0
MW-77	Fluvial	Performance	Semiannual	281142.96	801815.29	304.42	304.70	68.0	20	88.0
MW-78	Fluvial	Performance	Biennial	282051.71	802065.28	275.00	275.40	44.5	20	64.5
MW-79	Fluvial	Performance	Semiannual	281794.22	800899.03	285.03	285.40	82.5	20	102.5
MW-80	Fluvial	Background	Biennial	281417.56	800199.07	273.81	274.00	53.0	20	73.0
MW-87	Fluvial	Performance-FSVE	Semiannual	280696.36	802038.55	294.93	292.80	63.0	15	78.0
MW-91	Fluvial	Performance	Annual	280474.97	802014.43	291.99	289.30	55.0	15	70.0
MW-126	Fluvial	Background	Biennial	282390.01	800491.67	252.22	252.49	16.0	10	26.0
MW-129	Fluvial	Background-NE	Annual	282271.08	803128.53	293.01	293.33	65.0	15	80.0
MW-130[1]	Fluvial	Background-NE	Annual	282116.80	803241.45	293.17	293.77	59.5	20	79.5
MW-134	Fluvial	Performance-FSVE	Semiannual	281012.74	802102.58	300.81	301.05	75.0	15	90.0
MW-144	Fluvial	Performance	Semiannual	281138.63	801528.84	291.60	291.89	56.8	20	76.8
MW-145	Fluvial	Performance	Annual	280967.63	800823.18	284.72	284.86	80.1	20	100.1
MW-147[1]	Fluvial	Performance	Annual	281501.94	801674.17	289.76	289.93	60.3	20	80.3
MW-148	Fluvial	Performance	Annual	281377.94	801461.63	294.71	294.87	70.0	20	90.0
MW-149	Fluvial	Performance	Semiannual	281130.04	800982.76	287.18	287.44	81.4	20	101.4
MW-150[1]	Fluvial	Performance	Semiannual	281239.57	801283.62	296.86	297.00	71.2	20	91.2
MW-151	Fluvial	Performance	Semiannual	281290.42	800874.85	284.27	284.42	77.0	20	97.0
MW-152	Fluvial	Performance	Annual	281515.56	800892.84	289.59	289.82	91.0	20	111.0
MW-153	Fluvial	Performance	Biennial	282119.38	800952.34	279.17	279.26	76.1	20	96.1
MW-154	Fluvial	Background	Biennial	280501.53	800919.48	273.81	274.07	53.3	10	63.3
MW-155[1]	Fluvial	Performance	Annual	281325.32	801168.98	291.54	291.83	76.9	20	96.9
MW-157[1]	Fluvial	Performance	Semiannual	281050.86	801348.37	286.47	286.55	56.7	20	76.7
MW-158	Fluvial	Performance	Annual	281434.42	801005.34	294.07	294.38	91.0	15	106.0
MW-158A	Fluvial	Performance	Annual	281443.51	801005.67	293.95	294.22	77.9	15	92.9
MW-159[1]	Fluvial	Performance	Semiannual	281304.17	801006.69	286.36	286.68	80.5	20	100.5
MW-160[1]	Fluvial	Performance	Annual	281366.70	801304.05	293.84	294.13	64.3	20	84.3
MW-163	Fluvial	Performance	Semiannual	281152.59	801487.27	290.63	290.81	56.2	20	76.2
MW-164	Fluvial	Performance	Semiannual	280997.55	801497.47	287.48	287.71	55.6	20	75.6
MW-165	Fluvial	Performance	Semiannual	281384.63	800855.49	287.06	287.35	88.6	15	103.6
MW-165A	Fluvial	Performance	Semiannual	281383.55	800865.69	287.26	287.53	71.3	15	86.3
MW-166	Fluvial	Performance	Semiannual	281225.00	800927.99	282.72	283.29	84.6	15	100.0
MW-166A	Fluvial	Performance	Semiannual	281213.39	800927.27	282.90	283.36	68.1	15	83.4
MW-167	Fluvial	Background	Biennial	281394.03	800618.54	284.82	285.21	70.5	15	85.5
MW-169	Transition	Sentinel	Biennial	282491.23	800956.58	261.90	262.17	68.1	20	88.1
MW-170	Fluvial	Sentinel	Biennial	282443.17	801260.46	273.75	273.98	59.8	20	79.8
MW-171	Fluvial	Sentinel	Biennial	282315.35	801057.83	270.69	271.02	53.3	15	68.3
MW-174	Fluvial	Performance-FSVE	Semiannual	280352.00	802092.07	296.56	296.83	67.0	10	77.0
MW-176	Fluvial	Performance	Annual	280823.77	802032.08	299.68	299.92	76.0	10	86.0
MW-180	Fluvial	Performance	Annual	281476.43	802131.85	296.14	296.39	72.0	10	82.0
MW-182	Fluvial	Sentinel	Annual	280524.22	800623.13	275.40	272.98	62.0	10	72.0
MW-184	Fluvial	Performance	Semiannual	280903.16	801442.29	283.12	283.34	58.0	10	68.0
MW-187	Fluvial	Background	Biennial	280563.18	802348.09	302.74	303.21	76.0	10	86.0
MW-190	Fluvial	Performance	Semiannual	281138.88	801595.73	297.32	297.58	78.0	10	88.0
MW-220	Fluvial	Performance-FSVE	Semiannual	281617.49	802166.87	293.29	290.31	64.9	15	79.9
MW-221	Fluvial	Performance-FSVE	Semiannual	281399.71	802100.05	301.52	298.37	73.1	15	88.1

TABLE 8
DUNN FIELD LTM WELLS
2014 SITE MANAGEMENT PLAN
Dunn Field - Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-222	Fluvial	Performance-FSVE	Semiannual	280986.04	802145.54	303.82	301.06	74.2	15	89.2
MW-223	Fluvial	Performance-FSVE	Semiannual	280913.53	802104.29	303.00	300.41	73.9	15	88.9
MW-224	Fluvial	Performance-FSVE	Semiannual	281017.74	802181.62	304.13	301.18	73.7	15	88.7
MW-225	Fluvial	Performance-FSVE	Semiannual	280947.12	802070.50	304.52	301.30	75.0	15	90.0
MW-226	Fluvial	Performance-FSVE	Semiannual	280931.94	802147.21	303.19	300.56	74.2	15	89.2
MW-227	Fluvial	Performance-FSVE	Semiannual	280257.91	802081.00	299.70	296.64	63.6	15	78.6
MW-228	Fluvial	Performance-FSVE	Semiannual	280251.88	802157.40	301.65	298.59	64.1	15	79.1
MW-230[1]	Fluvial	Background-NE	Annual	281842.79	802800.06	286.57	286.66	59.2	15	74.2
MW-235	Fluvial	Sentinel	Annual	280727.57	800447.83	264.00	264.21	50.6	10	60.8
MW-237	Intermediate	Sentinel	Annual	281356.02	800963.99	289.18	289.53	166.5	10	176.7
MW-241[1]	Fluvial	Performance	Annual	281389.82	801396.64	292.97	293.16	73.4	15	88.4
MW-242	Fluvial	Performance	Semiannual	281297.31	801228.65	295.40	295.94	73.2	16	88.7
MW-243	Fluvial	Performance	Semiannual	281370.62	801116.45	292.26	292.53	80.7	20	100.7
MW-244	Fluvial	Performance	Semiannual	281333.49	801101.07	288.72	289.45	76.3	20	96.3
MW-245[1]	Fluvial	Performance	Semiannual	281379.46	801035.00	290.48	290.62	85.1	20	105.1
MW-246	Fluvial	Performance	Semiannual	281387.26	800951.62	288.17	288.49	85.2	20	105.2
MW-247[1]	Fluvial	Performance	Semiannual	281319.40	800900.12	286.17	286.63	80.5	20	100.5
MW-248	Fluvial	Performance	Annual	281253.66	800720.22	275.45	275.93	67.5	20	87.5
MW-249	Fluvial	Performance	Semiannual	281029.63	800789.83	285.53	285.89	78.0	20	98.0
MW-250	Intermediate	Sentinel	Annual	281045.53	800900.38	289.66	290.19	168.7	15	183.7
MW-251	Intermediate	Sentinel	Annual	281211.70	801021.75	285.83	286.16	160.2	15	175.2

Notes:
1) Wells re-surveyed after wellhead modifications in July 2013
ft: feet
btoc: below top of casing
msl: mean sea level

TABLE 9
PROPERTY TRANSFER STATUS
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

FOST No.	Area	Date FOST signed	Acres	Type of Conveyance	Type of Transfer (Transferee)	Date of Transfer/Deed
1	MI	23-Feb-01	6.52	PBC	Deed (Alpha Omega Veterans)	18-Sep-01
2	MI	27-Sep-01	4.67	PBC	Deed (Memphis Police Department)	6-Feb-02
			13.36	EDC	Deed (DRC)	6-May-02
3	MI	1-Jul-04	302.48	EDC	Deed (DRC)	14-Apr-06
			46.74	PBC	Letter of Assignment (DOI/NPS)	29-Sep-05
4	DF	4-Mar-05	1.57	PBC	Deed (Memphis)	2-Sep-05
			39.35	CPS	Deed (Dunn Field Business Park, LLC)	24-Oct-07
5	DF	12-Jul-10	24.5	CPS		
6	MI	2-Aug-10	193.0	EDC	Deed (DRC)	30-Mar-11

Notes:
CPS: Competitive Public Sale
DF: Dunn Field
DOI/NPS: Department of Interior/National Parks Service
DRC: Depot Redevelopment Corporation
EDC: Economic Development Conveyance
MI: Main Installation
PBC: Public Benefit Conveyance

TABLE 10
STATUS OF FOLLOW-UP ACTIONS FROM THIRD FIVE-YEAR REVIEW
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Issues	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)		Completion Date	Document
					Current	Future		
Rebound in groundwater concentrations of CVOCs on the MI in TAs and concentrations above MCLs in IAQ wells	Restart EBT	ODB	USEPA/TDEC	11/15/2012	N	N	11/6/2012	Injections restarted in November 2012. EBT activities will be documented in annual EBT report to be prepared following November 2013 performance monitoring.
Time required to achieve RAOs on the MI	Re-evaluate in annual report following one year of additional EBT	ODB	USEPA/TDEC	3/11/2014	N	N		

Notes:
CVOCs: chlorinated volatile organic compounds
EBT: enhanced bioremediation treatment
IAQ: intermediate aquifer
MCLs: maximum contaminant levels
MI : Main Installation
ODB: Office of the Assistant Chief of Staff for Installation Management, Base Realignment and Closure Division
RAOs: Remedial Action Objectives
TAs: treatment areas
TDEC: Tennesse Department of Environment and Conservation
USEPA: United States Environemtnal Protection Agency

TABLE 11
MAJOR MILESTONES FY14 THROUGH FY16
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Activity	2014 SMP Date	Expected Date (if different)
2014 Site Management Plan, Rev. 0 Submittal	30 November 2013	--
2013 LTM Report, Rev 0 Submittal	9 January 2014	--
2014 Site Management Plan, Rev. 1 Submittal	29 January 2014	--
2013 Year 4 AS/SVE Report, Rev 0 Submittal	1 March 2014	--
2013 Additional EBT Year 1 Report, Rev. 0 Submittal	11 March 2014	--
2013 LTM Report, Rev 1 Submittal	9 April 2014	--
2013 Additional EBT Year 1 Report, Rev. 1 Submittal	9 June 2014	--
2013 Year 4 AS/SVE Report, Rev 1 Submittal	29 June 2014	--
2014 Annual LUCIP Inspection Reports	31 July 2014	--
2015 Site Management Plan, Rev. 0 Submittal	30 November 2014	--
2014 LTM Report, Rev 0 Submittal	8 January 2015	--
2015 Site Management Plan, Rev. 1 Submittal	29 January 2015	--
2014 Year 5 AS/SVE Report, Rev 0 Submittal	1 March 2015	--
2014 Additional EBT Year 2 Report, Rev. 0 Submittal	9 March 2015	--
2014 LTM Report, Rev 1 Submittal	8 April 2015	--
2014 Additional EBT Year 2 Report, Rev. 1 Submittal	7 June 2015	--
2014 Year 5 AS/SVE Report, Rev 1 Submittal	29 June 2015	--
2015 Annual LUCIP Inspection Reports	31 July 2015	--
FSVE and AS/SVE System Abandonment	27 September 2015	--
2016 Site Management Plan, Rev. 0 Submittal	30 November 2015	--
2015 LTM Report, Rev 0 Submittal	7 January 2016	--
2016 Site Management Plan, Rev. 1 Submittal	29 January 2016	--
2015 LTM Report, Rev 1 Submittal	6 April 2016	--
2016 Annual LUCIP Inspection Reports	31 July 2016	--

TABLE 12
FISCAL YEAR REQUIREMENTS
2014 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Description	2014	2015	2016	2017	2018	2019	Out Years	Total
Dunn Field Land Use Control Sites	$84,000	$84,000	$84,000	$126,000	$84,000	$84,000	$168,000	$714,000
Dunn Field Remedial ActionSites	$385,000	$300,000	$135,000	$135,000	$135,000	$135,000	$250,000	$1,475,000
Main Installation Remedial ActionSites	$174,000	$174,000	$312,000	$253,000	$0	$0	$95,000	$1,008,000
Total	$643,000	$558,000	$531,000	$514,000	$219,000	$219,000	$513,000	$3,197,000

FIGURES

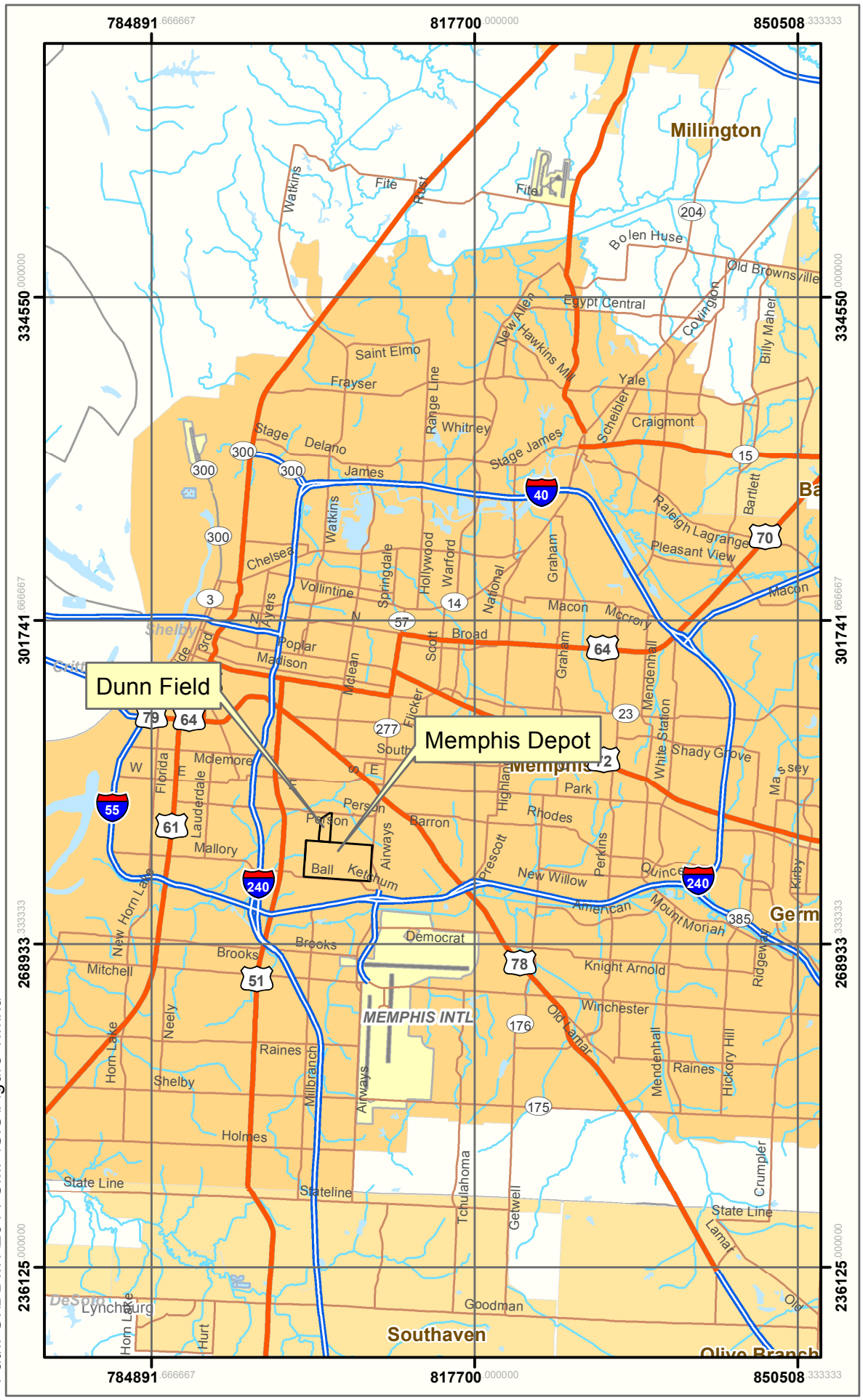

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Figure 1

SITE LOCATION MAP

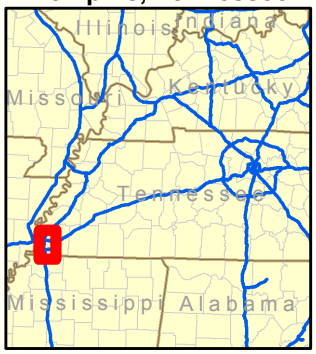
2014 SITE
MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 0.6 1.2 1.8 2.4 3 Miles

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

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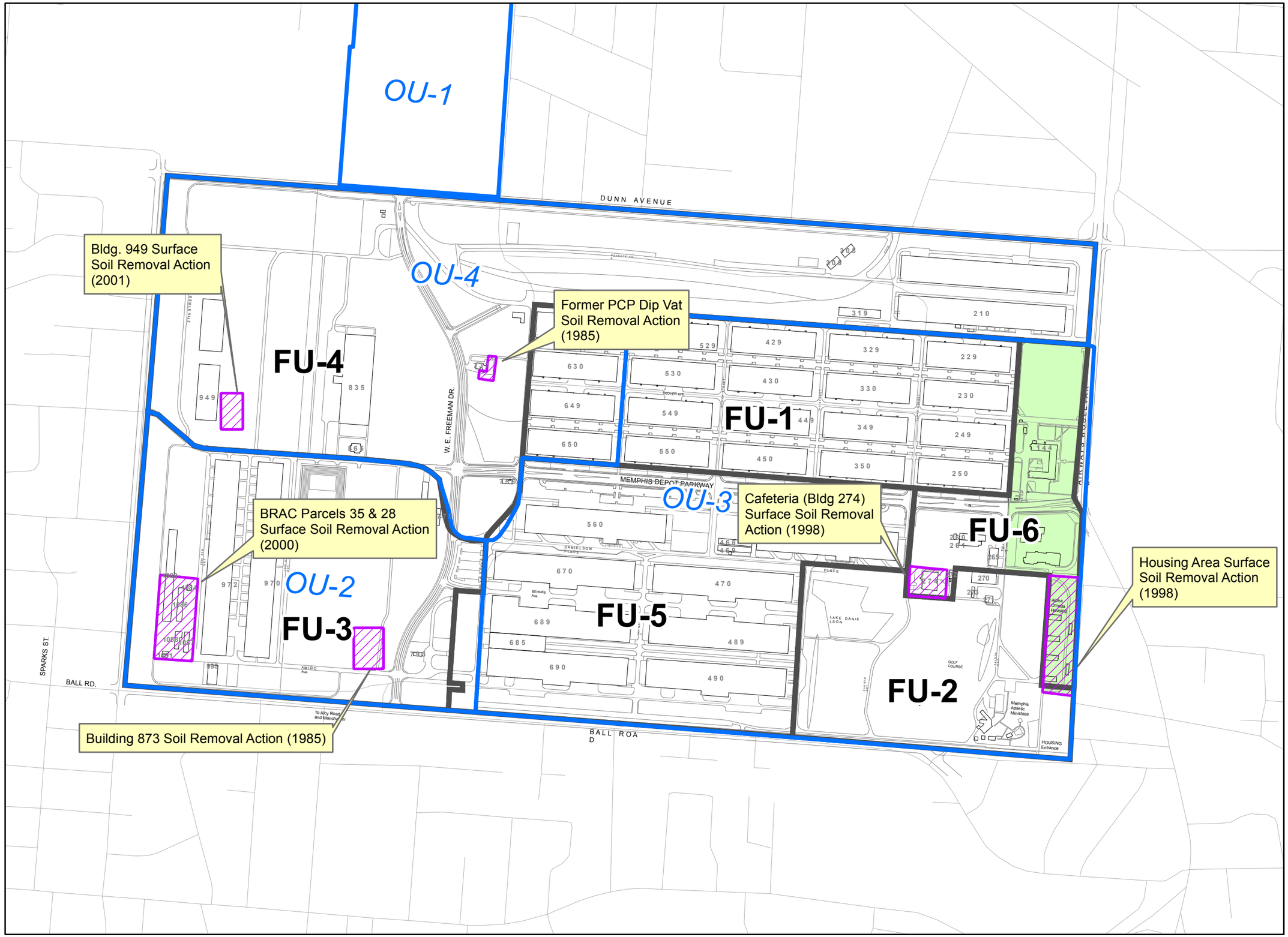

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Figure 2

UNIT BOUNDARIES AND RESPONSE ACTIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

- Operable Units (OU-#)
- Functional Unit Boundary (FU-#)
- Areas Available for Unrestricted Use
- Past Response Actions

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 250 500 1,000

Scale in Feet

Installation Location
Memphis, Tennessee

Date: November 2013
Edition: Rev 0

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Figure 3

DUNN FIELD AREA DESIGNATIONS, REMOVAL ACTIONS AND INTERIM REMEDIAL ACTION

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

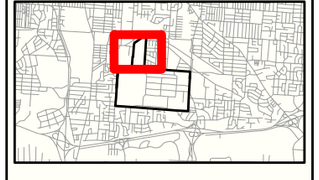
Legend

- Original Dunn Field Perimeter
- Unrestricted Use Area from ROD
- Area Designations
- IRA Recovery Well
- IRA Discharge Conveyance Line
- Removal Actions

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 150 300 600
Feet

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

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Figure 4

OU-1 SITE LOCATIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

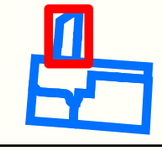
Legend

- Chemical Warfare Management Plan Site
- Proposed Early Removal Site
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Operable Units

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 100 200 400
Feet

Installation Location
Memphis, Tennessee



Date: November 2013
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Figure 5

OU-2 SITE LOCATIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

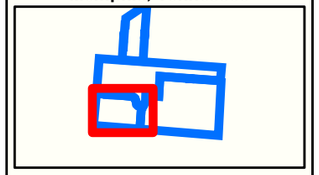
- Early Removal Site
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Trichloroethene Site
- Operable Units

Projection: NAD 1927 StatePlane Tennessee
Datum : WGS 84
Units: Feet

0 125 250 500

Scale in Feet

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

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Figure 6

OU-3 SITE LOCATIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Operable Units

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 150 300 600

Scale in Feet

Installation Location
Memphis, Tennessee

Date: November 2013
Edition: Rev 0

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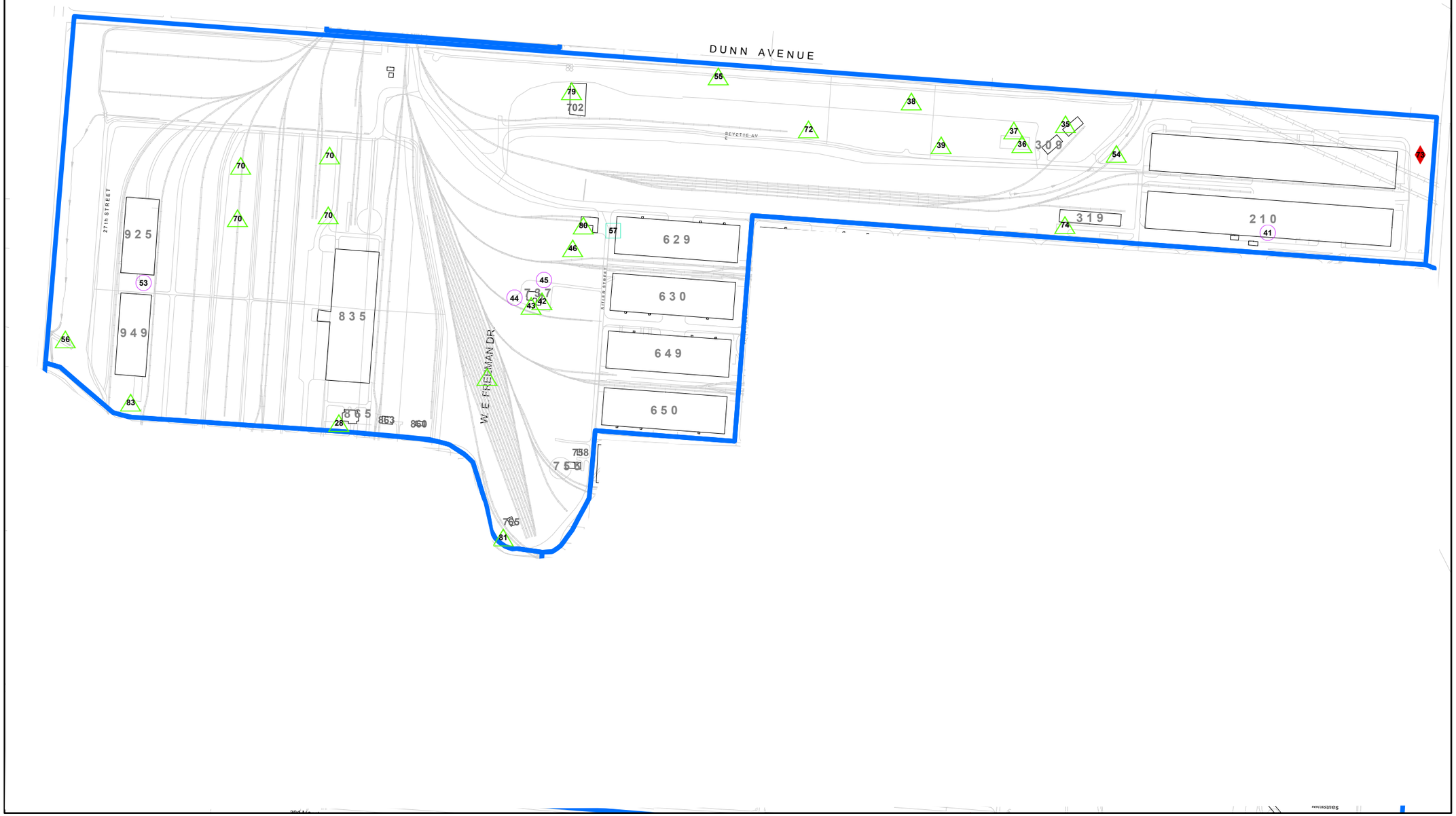

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Figure 7

OU-4 SITE LOCATIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

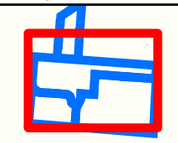
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Operable Units

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 250 500 1,000

Scale in Feet

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

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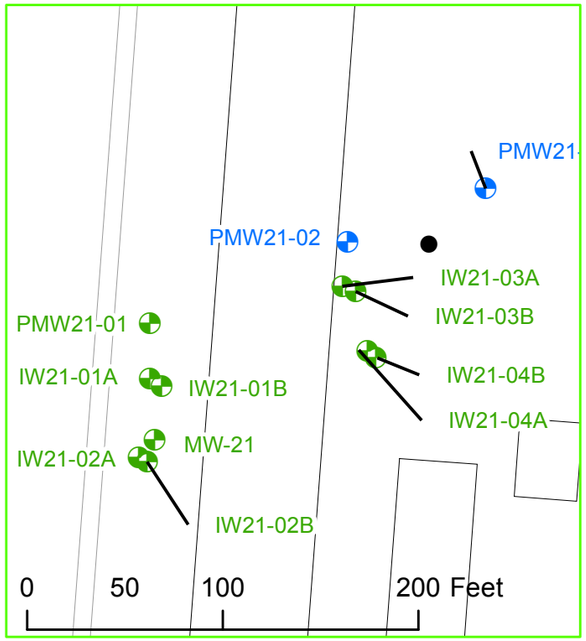
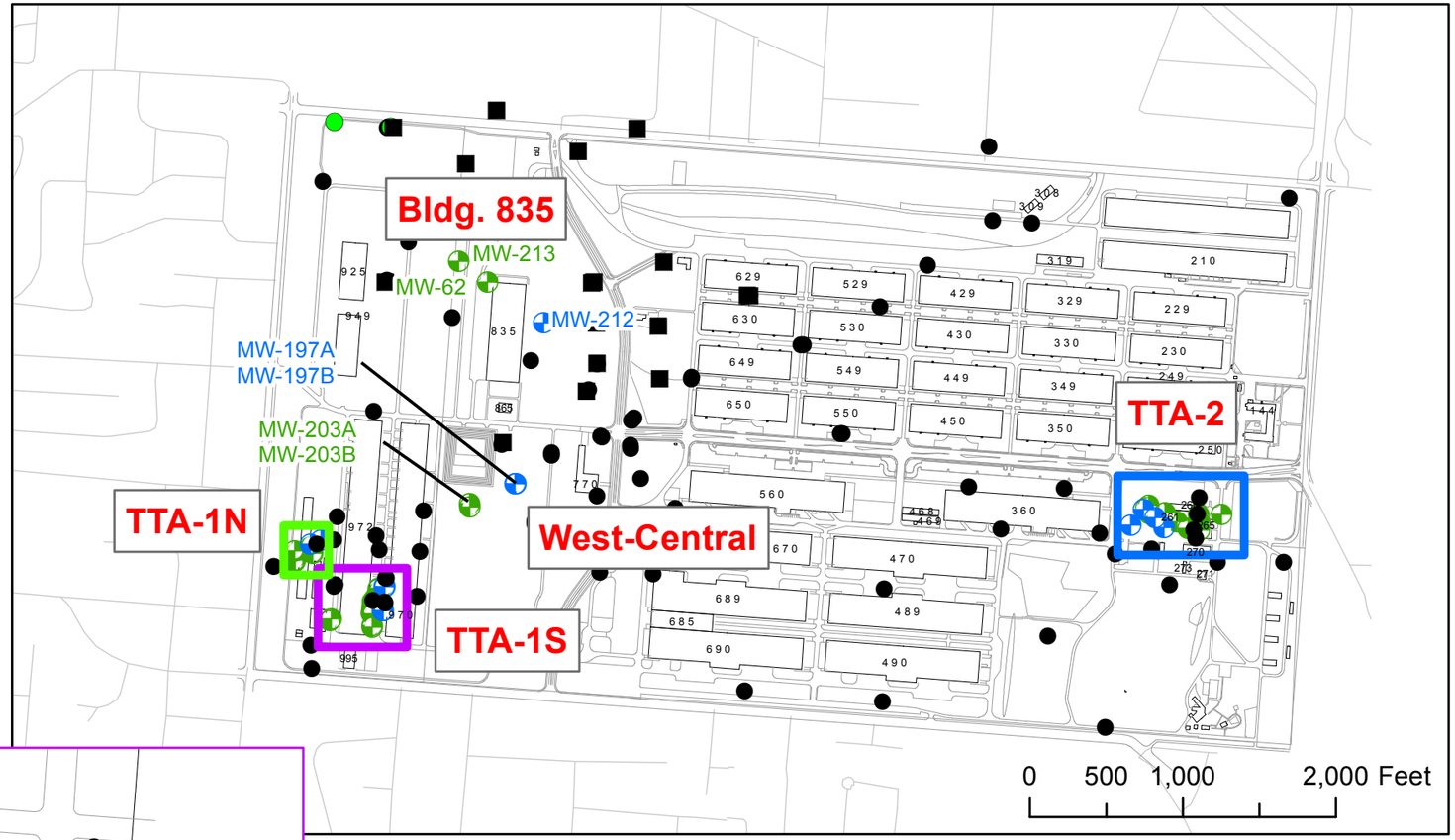
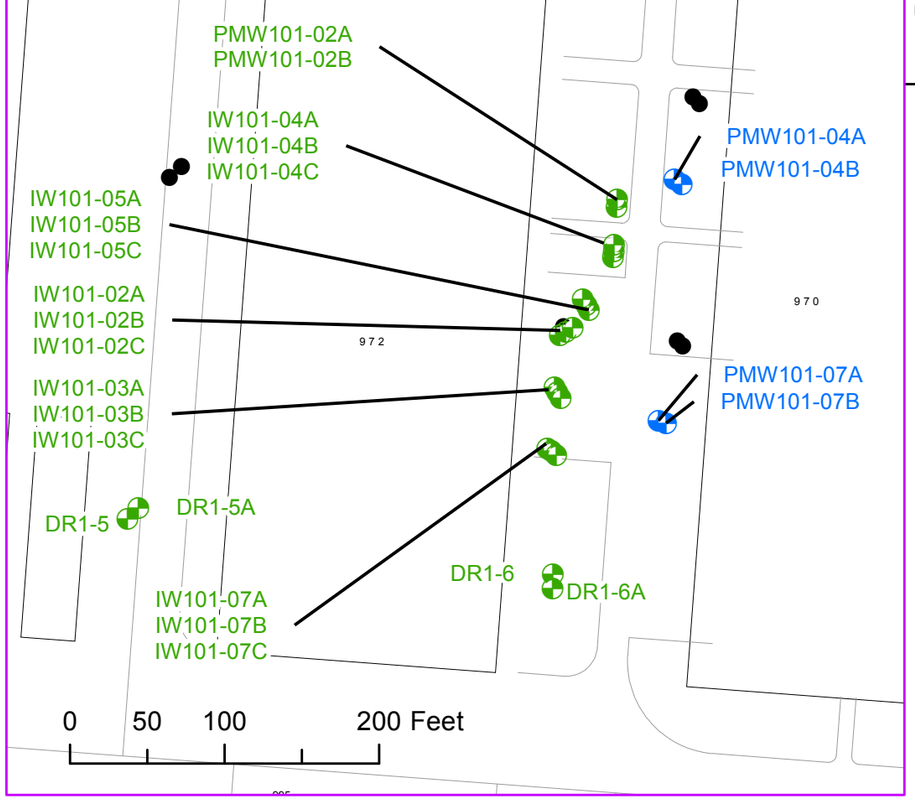






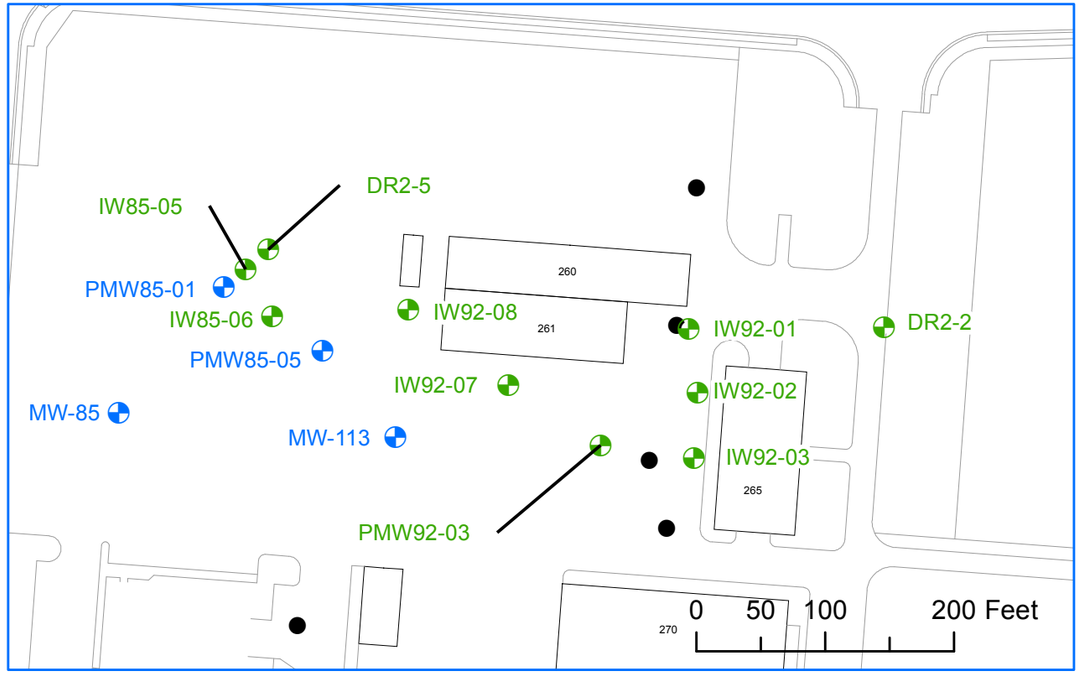


Figure 8

MAIN INSTALLATION EBT WELL LOCATION MAP

2014 SITE MANAGEMENT PLAN

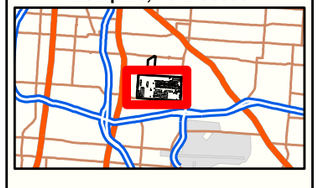
DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

- Monitoring Well Screened in the Fluvial Aquifer
- Monitoring Well Screened in the Transition Zone or Intermediate Aquifer
- Monitoring Well Screened in the Memphis Aquifer
- EBT Injection Well
- EBT Performance Monitoring Well

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

Installation Location
Memphis, Tennessee



Date: November 2013
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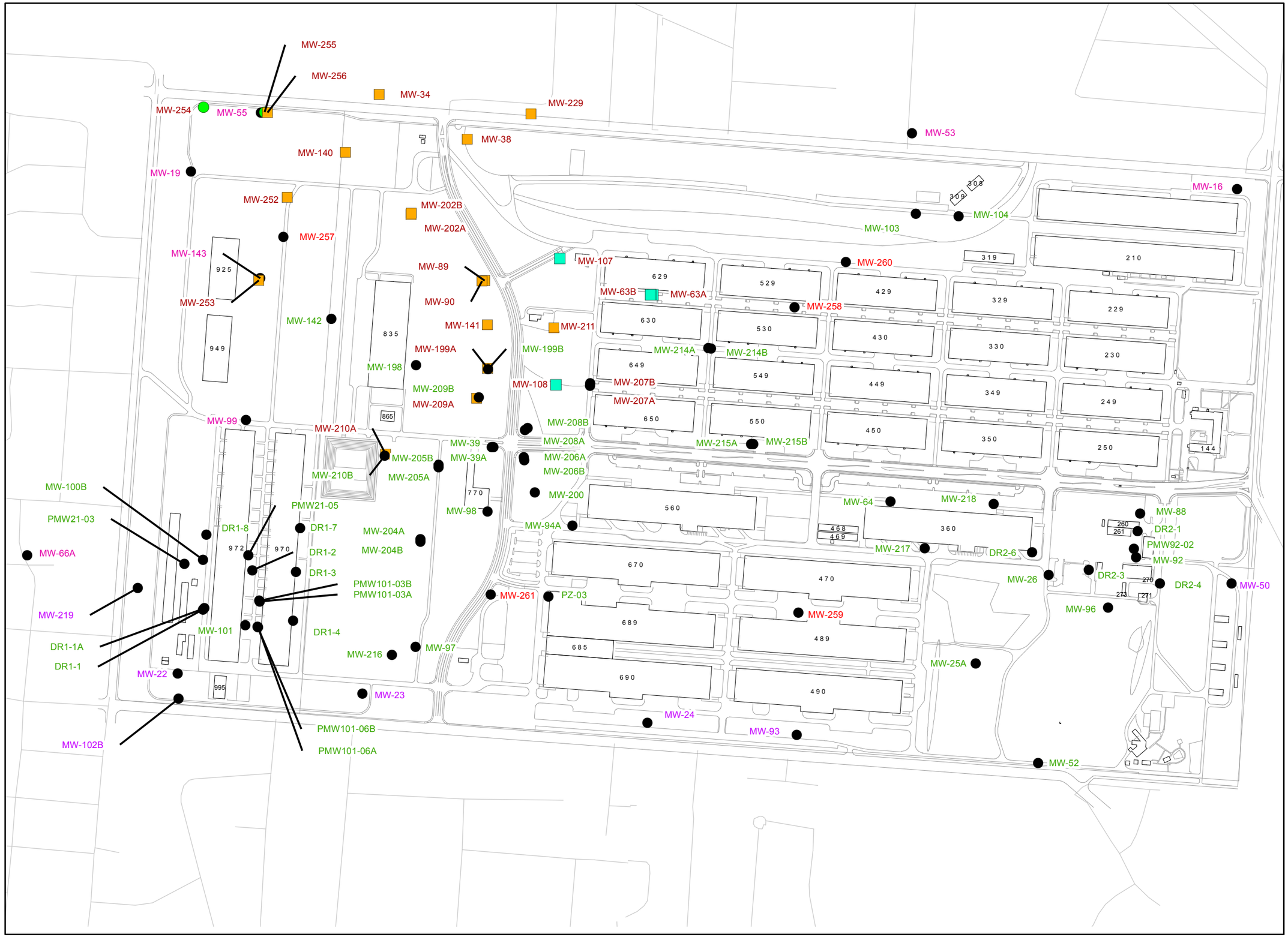

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Figure 9

MAIN INSTALLATION LTM WELL LOCATION MAP

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

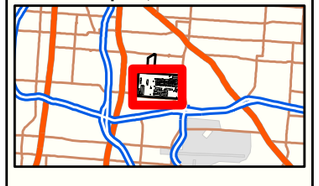
Well Classification

- MW-16 Background
- MW-34 Sentinel
- MW-21 Performance
- MW-219 Boundary
- MW-257 New - Not Classified

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 250 500 1,000
Feet

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

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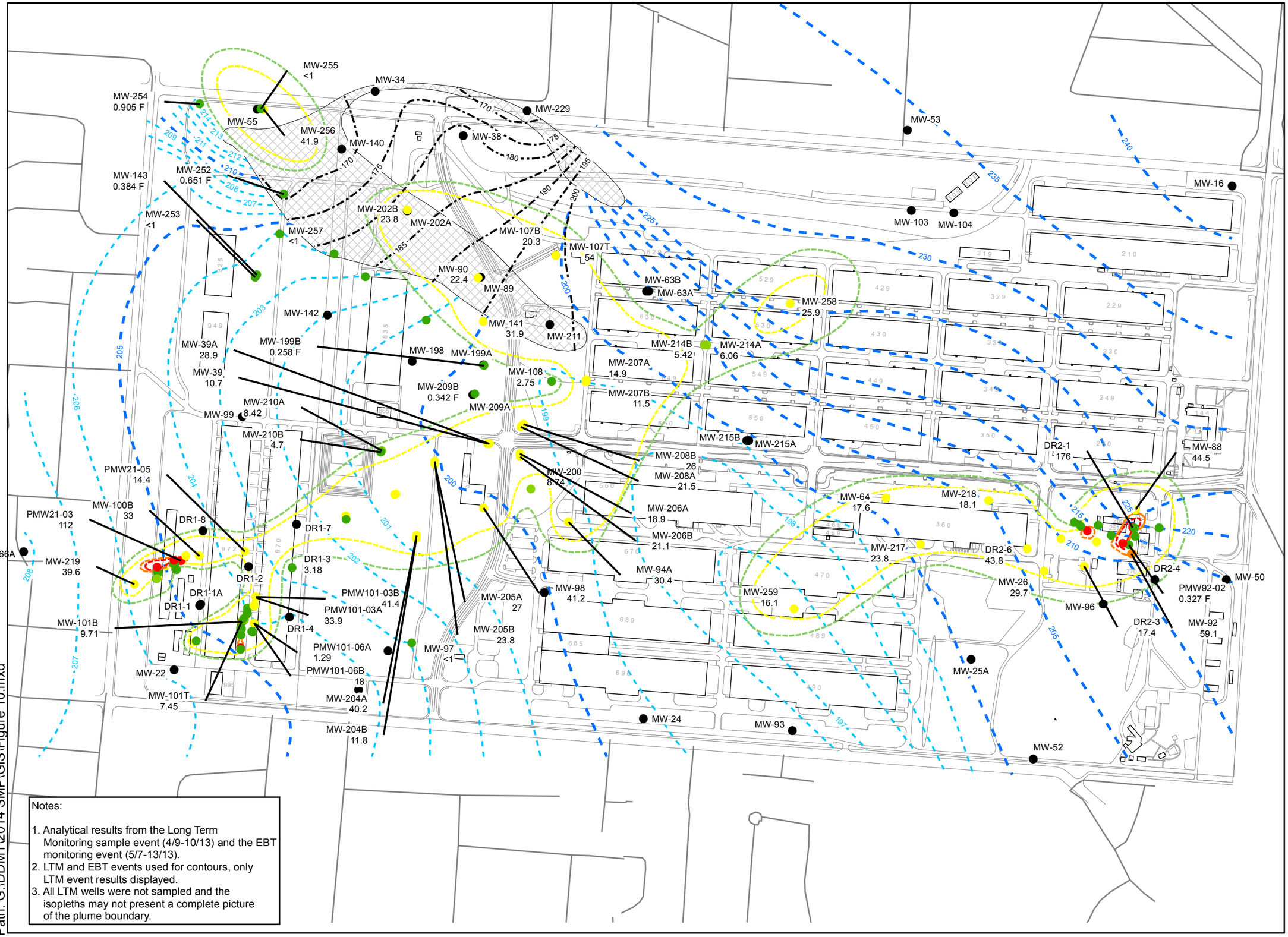

Notes:

1. Analytical results from the Long Term Monitoring sample event (4/9-10/13) and the EBT monitoring event (5/7-13/13).
2. LTM and EBT events used for contours, only LTM event results displayed.
3. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.

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Figure 10

MAIN INSTALLATION PCE CONCENTRATIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

PCE Ranges
ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

PCE Isopleth
ug/L

- 5
- 10
- 50
- 100
- Clay Elevation Exceeds Groundwater Elevation

- Potentiometric surface of the Fluvial Aquifer 1-ft. contour
- Potentiometric surface of the Fluvial Aquifer 5-ft. contour
- Potentiometric surface of the Intermediate Aquifer 5-ft. contour

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 200 400 800

Feet

Installation Location
Memphis, Tennessee

Date: November 2013
Edition: Rev 0

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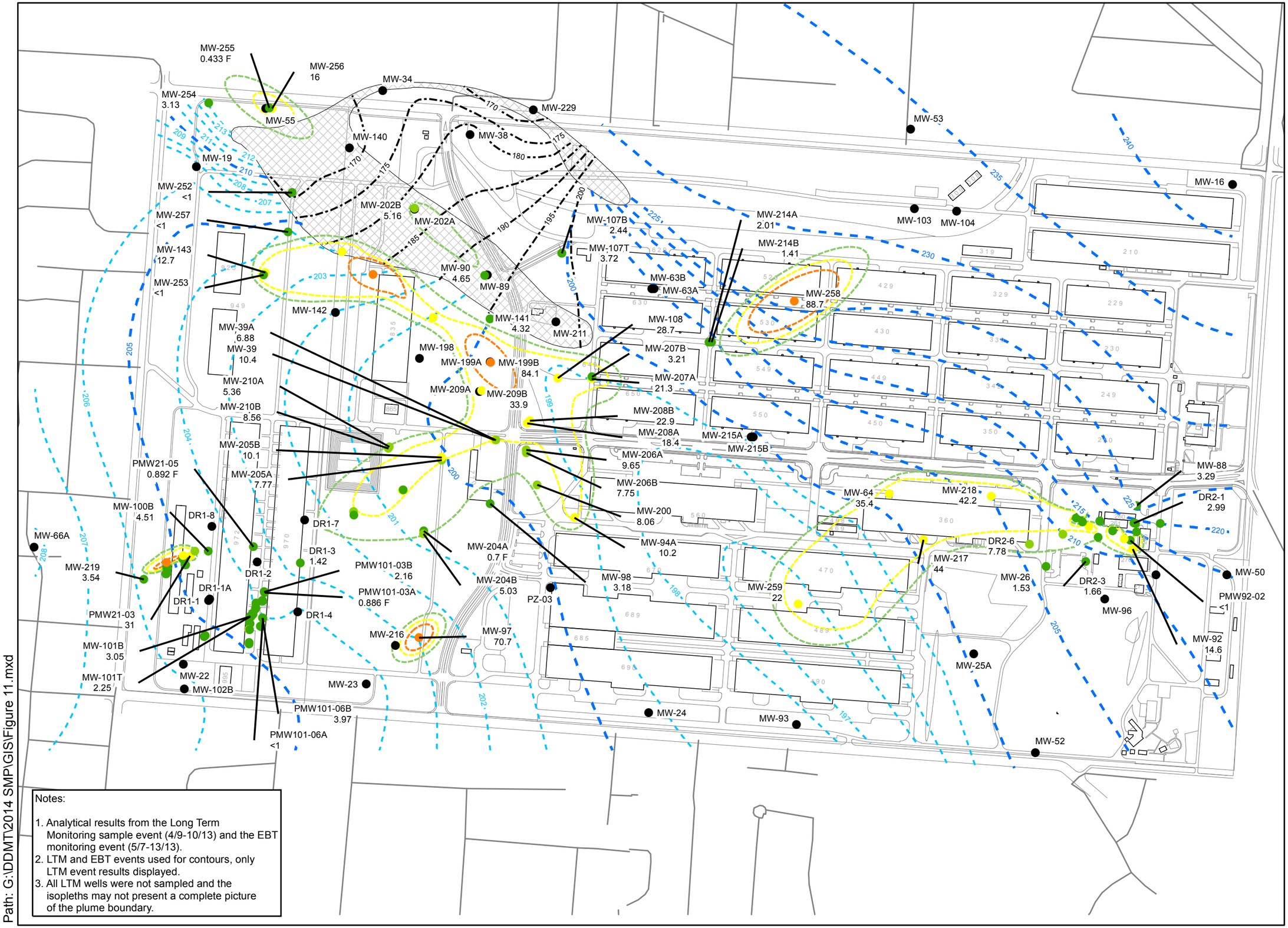

Notes:

1. Analytical results from the Long Term Monitoring sample event (4/9-10/13) and the EBT monitoring event (5/7-13/13).
2. LTM and EBT events used for contours, only LTM event results displayed.
3. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.

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Figure 11

MAIN INSTALLATION TCE CONCENTRATIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

TCE Ranges
ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

TCE Isopleth
ug/L

- 5
- 10
- 50
- 100
- Clay Elevation Exceeds Groundwater Elevation
- Potentiometric surface of the Fluvial Aquifer 1-ft. contour
- Potentiometric surface of the Fluvial Aquifer 5-ft. contour
- Potentiometric surface of the Intermediate Aquifer 5-ft. contour

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 200 400 800
Feet

Installation Location
Memphis, Tennessee

Date: November 2013
Edition: Rev 0

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A NORTH

A' SOUTH

MW-254 | MW-55 MW-256 MW-255 | MW-252 offset 333-ft. from centerline | MW-140 offset 88-ft. from centerline | MW-202A/MW-202B | MW-89/MW-90 | MW-141 | MW-199A MW-199B | MW-209A MW-209B | MW-39 MW-39A | MW-206A MW-206B | MW-200 | MW-94A | MW-94 | MW-81/MW-24

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0

Silty Clay to Clayey Silt

Sandy Clay to Clayey Sand

Sand with Gravel

Grey Clay

Clayey Sand

Silty Sand

Clay

Sand

Memphis Sand

MW-55 MW-256 MW-252 MW-140 MW-202B MW-202A MW-90 MW-89 MW-199B MW-141 MW-199A MW-209A MW-209B MW-39 MW-39A MW-206B MW-206A MW-200 MW-94A MW-94 MW-24 MW-81 MW-254

PCE 41.9
TCE 16

PCE 0.651 F
TCE < 1

PCE 23.8
TCE 5.16

PCE 22.4
TCE 4.65

PCE 0.258F
TCE 84.1

PCE 31.9
TCE 4.32

PCE 0.342F
TCE 33.9

PCE 10.7
TCE 10.4

PCE 28.9
TCE 6.88

PCE 21.1
TCE 7.75

PCE 8.74
TCE 8.06

PCE 30.4
TCE 10.2

PCE 18.9
TCE 9.65

ABANDONED

ABANDONED

PCE 0.905 F
TCE 3.13

PCE <1
TCE 0.433 F

20 0 200

Note:
PCE and TCE concentrations in ug/L from samples collected April 2013.

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Figure 12

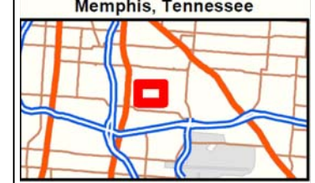
LITHOLOGIC CROSS-SECTION WITH PCE AND TCE RESULTS

2014 SITE MANAGMENT PLAN

DEFENSE DEPOT MEMPHIS, TENNESSEE

- Silty Clay to Clayey Silt
- Sandy Clay to Clayey Sand
- Fluvial Sand or Sand with Gravel
- Clayey Sand to Silty Clay
- Intermediate Sand
- Clay
- Memphis Sand
- Groundwater Elevation
- Fluvial Aquifer Groundwater Elevation 10/4/2010
- Intermediate Aquifer Groundwater Elevation 10/4/2010
- Memphis Aquifer Groundwater Elevation 10/4/2010
- Well Screen Interval

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

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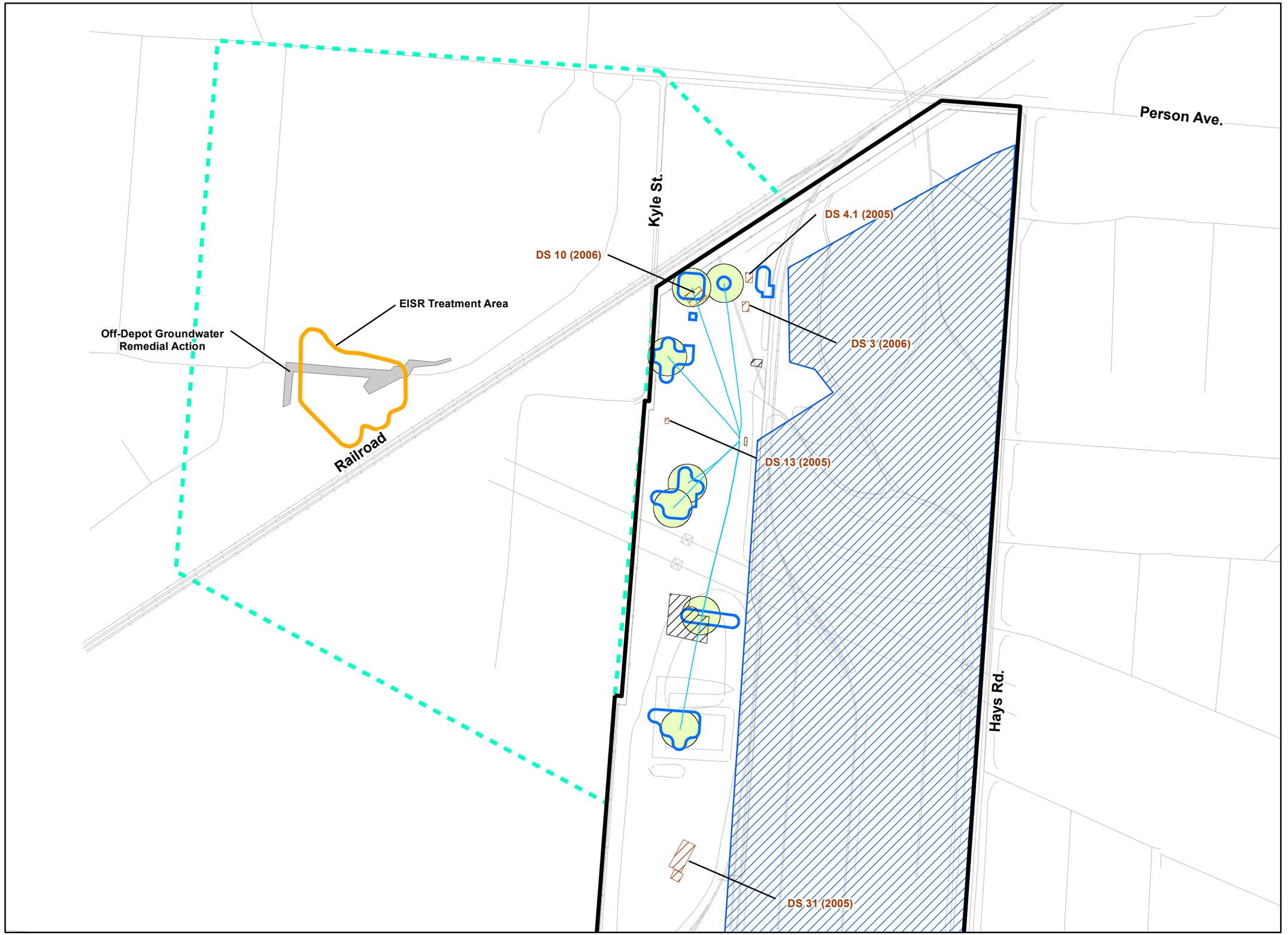

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Figure 13

DUNN FIELD DISPOSAL SITES, SOURCE AREAS AND OFF-DEPOT GROUNDWATER REMEDIAL ACTIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

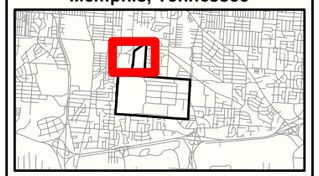
- Original Dunn Field Perimeter
- Unrestricted Use Area from ROD
- Off-Site Treatment Area
- EISR Treatment Area
- Disposal Sites Excavation Area
- Fluvial SVE Well - 60-foot radius of influence
- Fluvial SVE Conveyance Line
- SVE Control Building
- Loess Excavation Areas
- Loess Thermal-Enhanced SVE Treatment Areas
- Air Sparge-SVE Area

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

Aerial Photo Date: 2006

0 100 200 400
Feet

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

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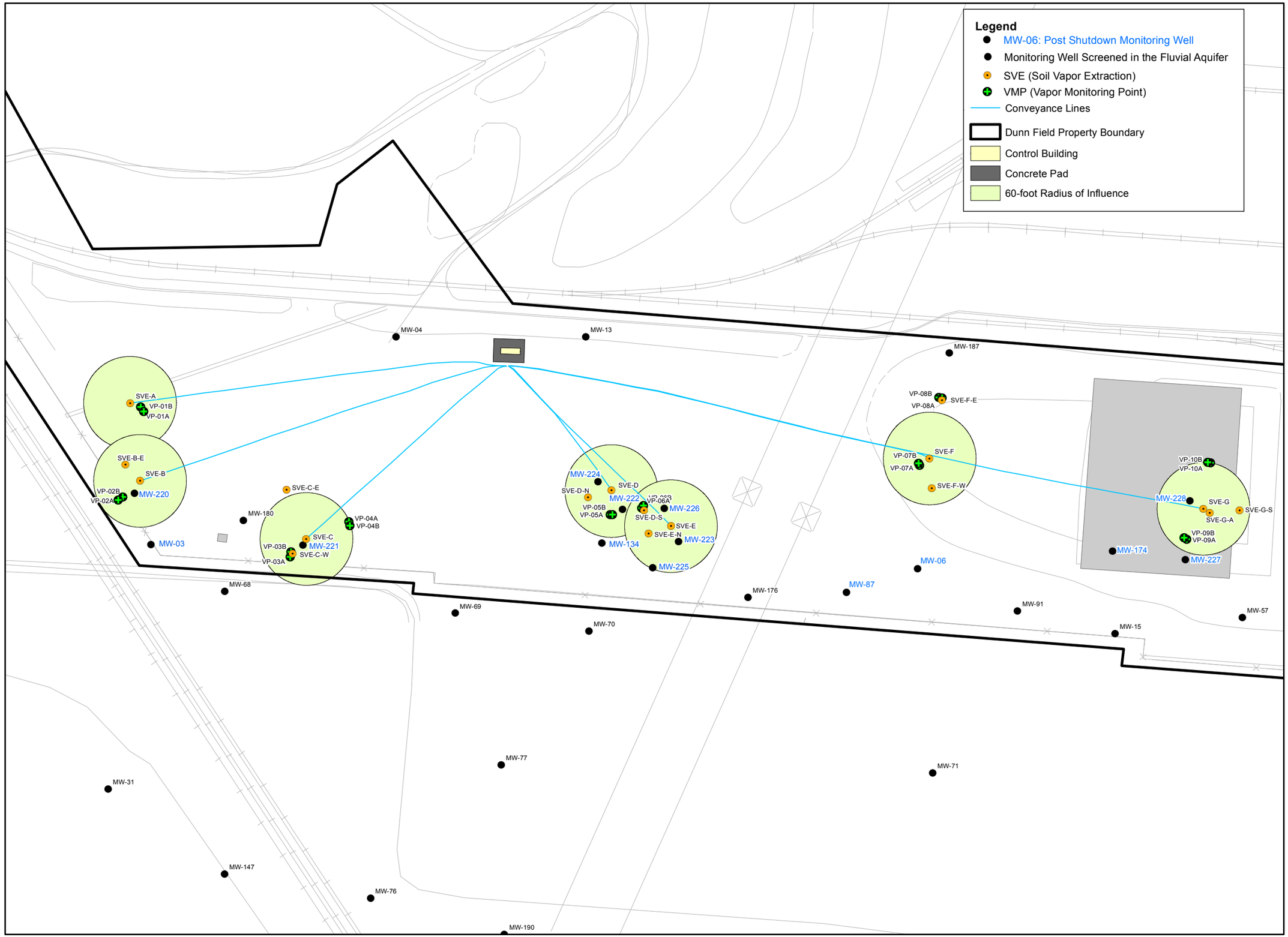

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Figure 14

FLUVIAL SVE SYSTEM

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Projection: NAD 1927 StatePlane Tennessee
Datum : WGS 84
Units: Feet

0 50 100 150 200 Feet

Installation Location
Memphis, Tennessee

Date: November 2013
Edition: Rev 0

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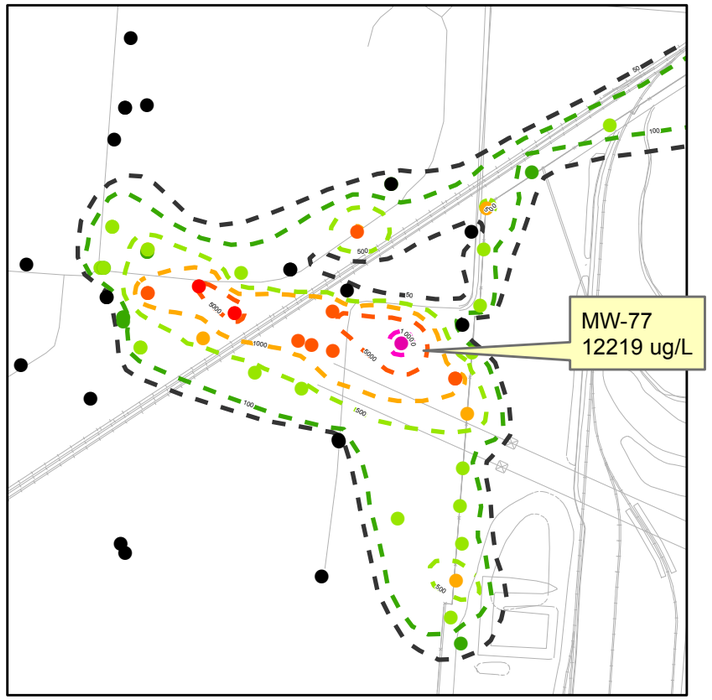
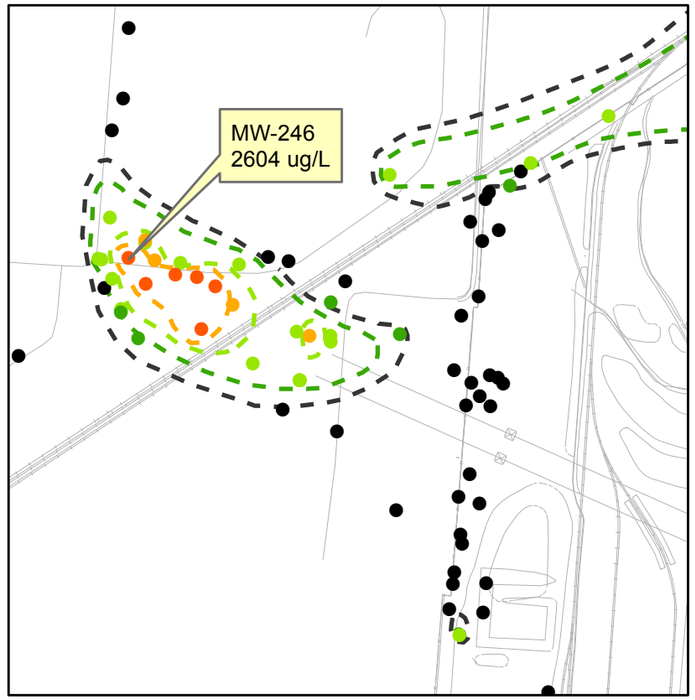
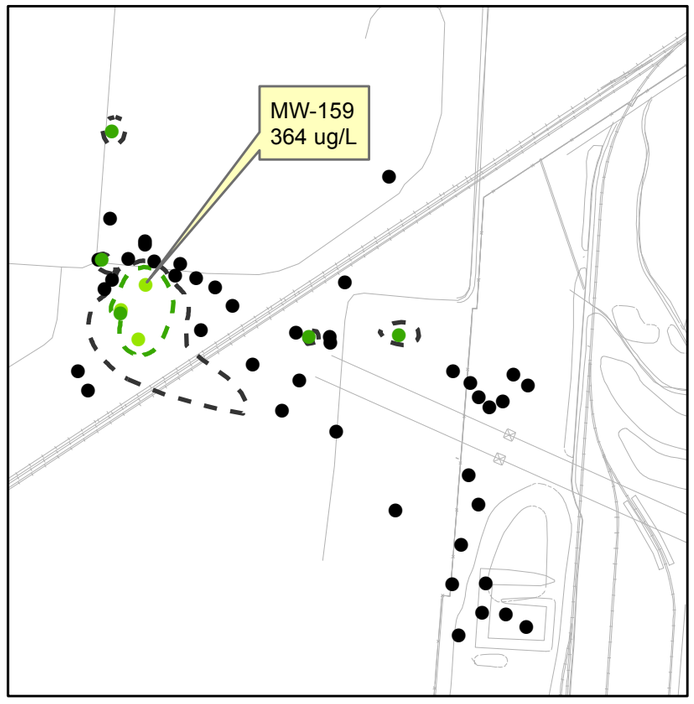


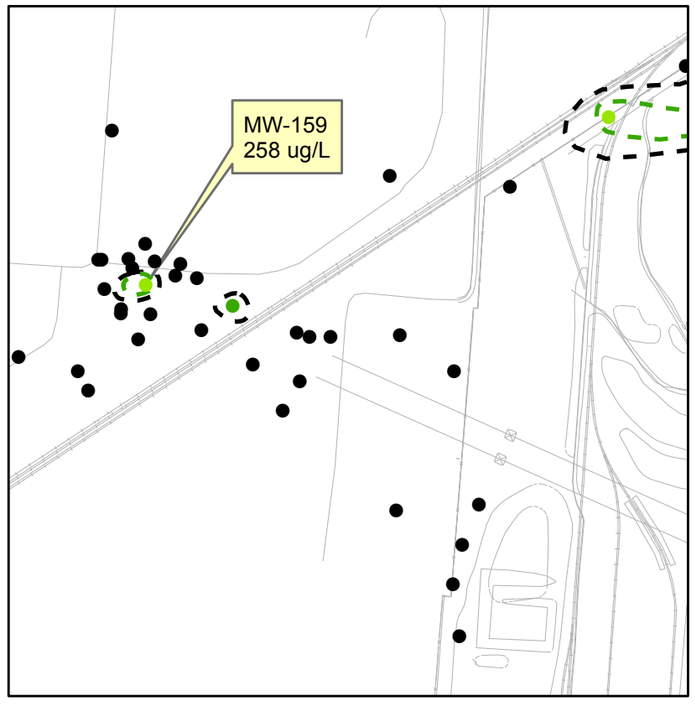
APRIL 2007



APRIL 2009



APRIL 2011



APRIL 2013

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Figure 15

DUNN FIELD TOTAL CVOC CONCENTRATIONS, 2007 - 2013

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

Total CVOC Isopleth (ug/L)
- 50
- 100
- 500
- 1000
- 5000
- 10000

Total CVOC Ranges (ug/L)
- 0 - 50
- 50 - 100
- 100 - 500
- 500 - 1000
- 1000 - 5000
- 5000 - 10000
- 10000 - 50000

0 200 400 600 800
Feet

Installation Location
Memphis, Tennessee

Date: November 2013
Edition: Rev 0

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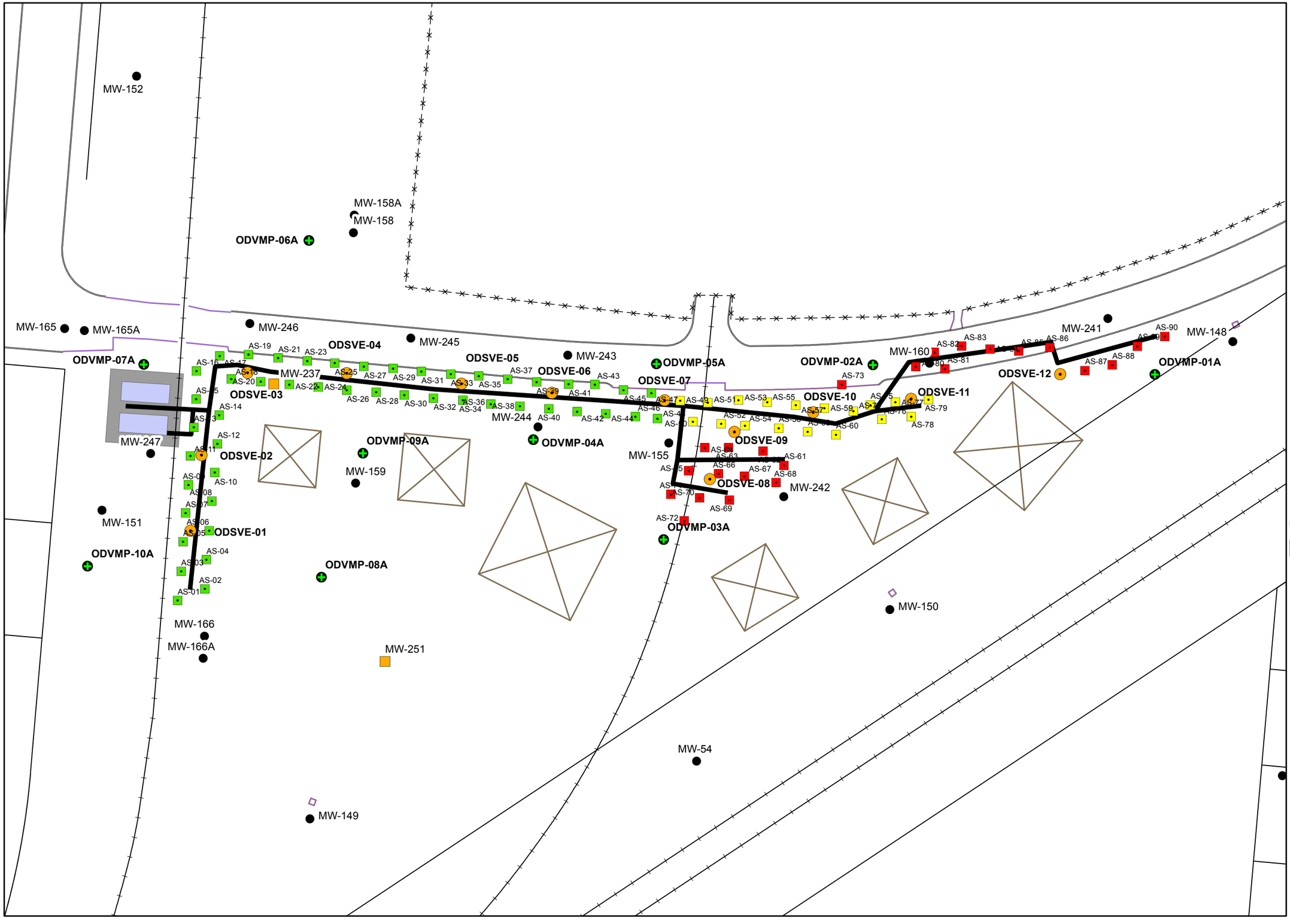

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Figure 16

AS-SVE SYSTEM

2014 SITE MANAGEMENT PLAN

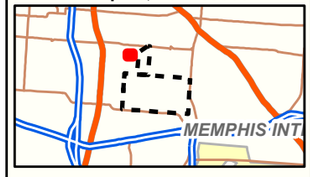
DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

- Monitoring Well Screened in the Fluvial Aquifer
- Monitoring Well Screened in the Intermediate Aquifer
- AS Location (full time)
- AS Location (1/2 time)
- AS Location (closed)
- VMP Location
- SVE Location
- Conveyance Lines
- SVE Compound

0 25 50 75 100
Feet

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

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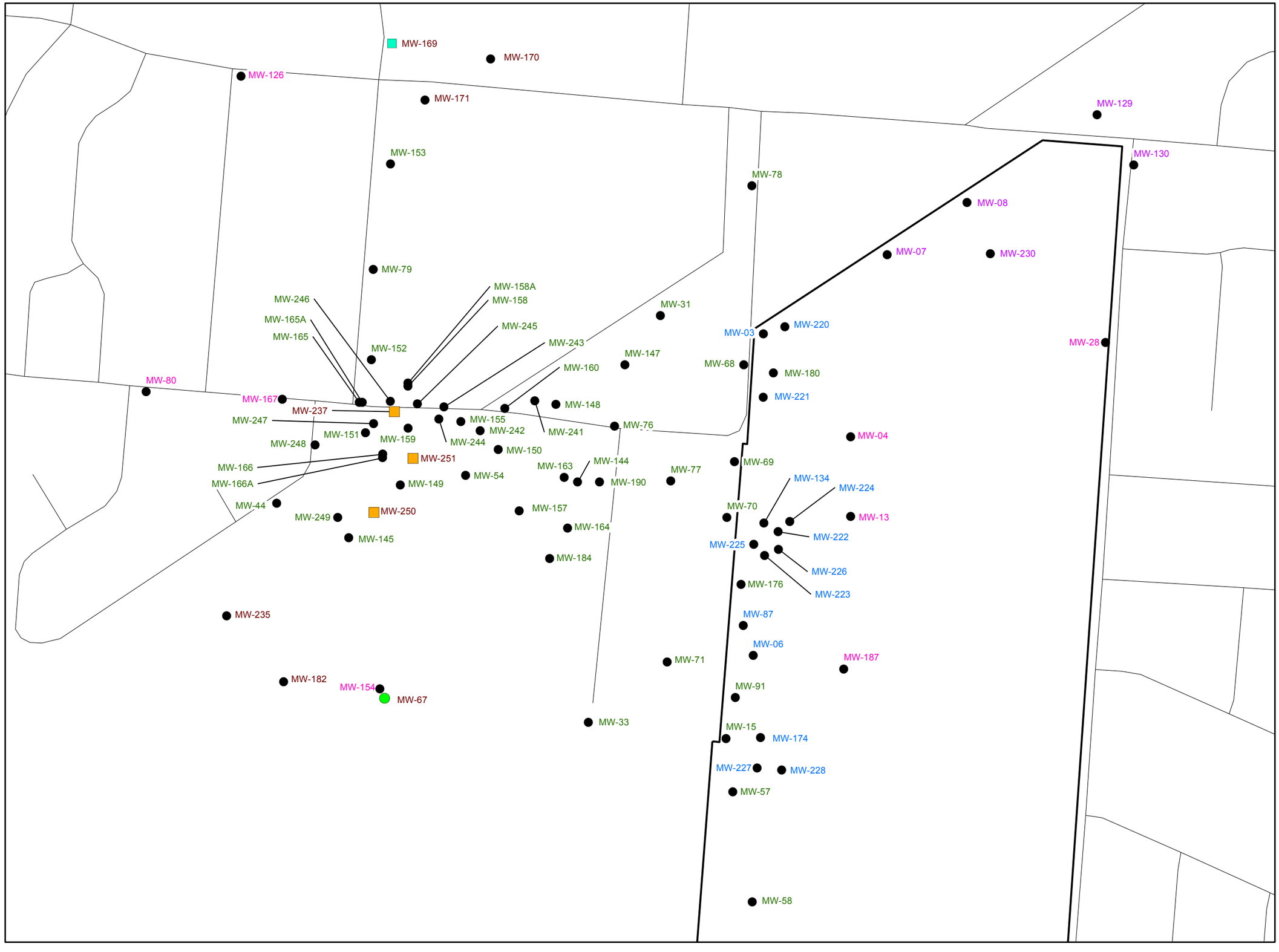

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Figure 17

DUNN FIELD LTM WELL LOCATION MAP

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

- Monitoring Well Screened in the Fluvial Aquifer
- Monitoring Well Screened in the Intermediate Aquifer
- Monitoring Well Screened in the Transition Zone
- Monitoring Well Screened in the Memphis Aquifer

Off Depot Well Classification

- MW-04 Background
- MW-07 Background-NE
- MW-250 Sentinel
- MW-15 Performance
- MW-03 Performance-FSVE

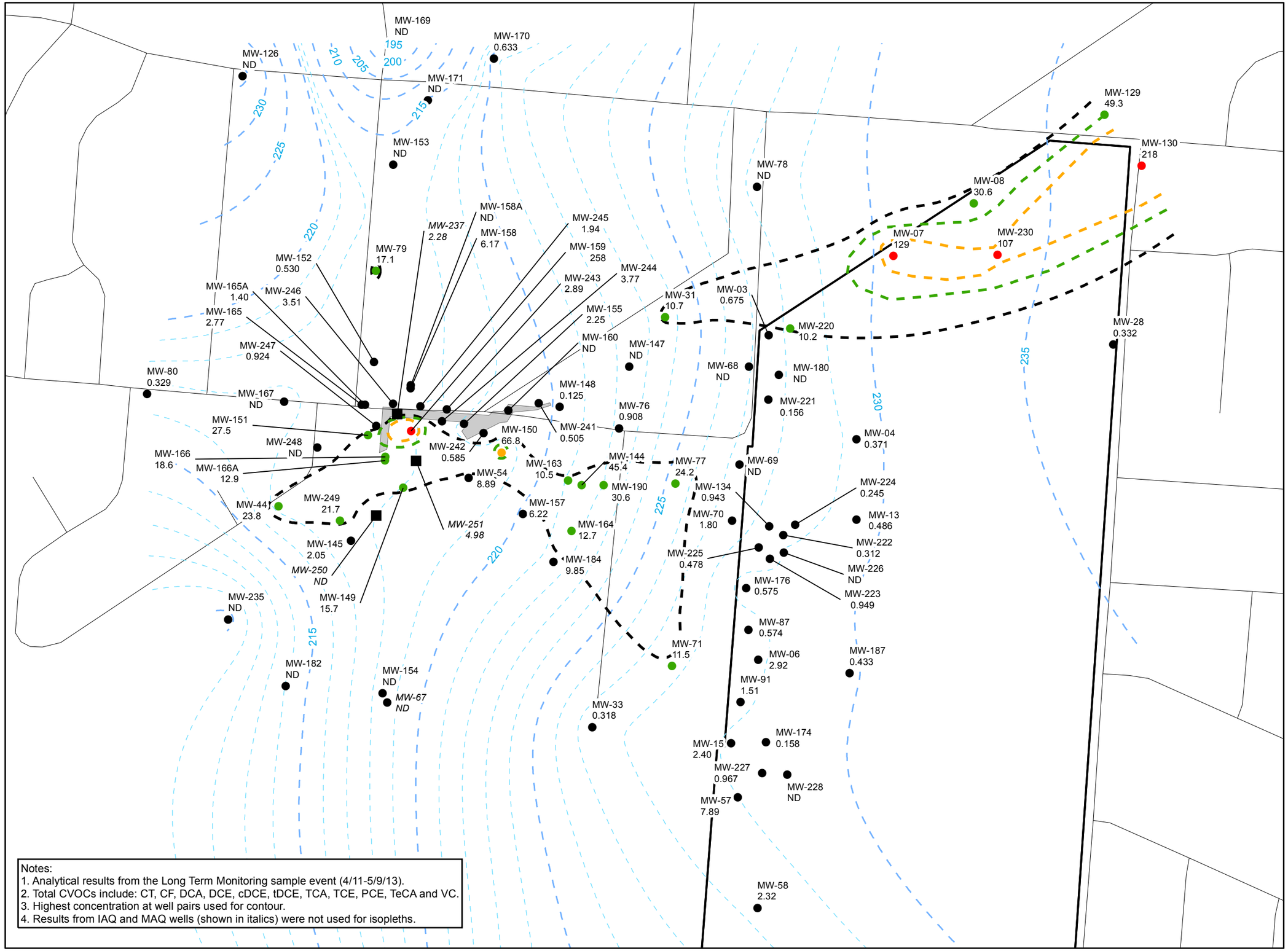
Dunn Field Boundary

0 150 300 450
Feet

Installation Location
Memphis, Tennessee

Date: November 2013
Edition: Rev 0

HDR



Notes:
1. Analytical results from the Long Term Monitoring sample event (4/11-5/9/13).
2. Total CVOCs include: CT, CF, DCA, DCE, cDCE, tDCE, TCA, TCE, PCE, TeCA and VC.
3. Highest concentration at well pairs used for contour.
4. Results from IAQ and MAQ wells (shown in italics) were not used for isopleths.

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Figure 18

DUNN FIELD TOTAL CVOC CONCENTRATIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

Total CVOC Ranges (ug/L)
- 0 - 10
- 10 - 50
- 50 - 100
- 100 - 500

Total CVOC Isopleth (ug/L)
- 10
- 50
- 100

Air Sparge Well Area

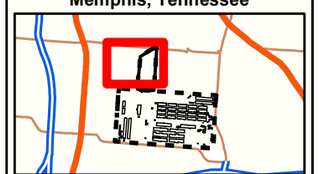
Original Dunn Field Property Boundary

Potentiometric surface of the Fluvial Aquifer 1-ft. contour

Potentiometric surface of the Fluvial Aquifer 5-ft. contour

0 100 200 300
Feet

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

HDR

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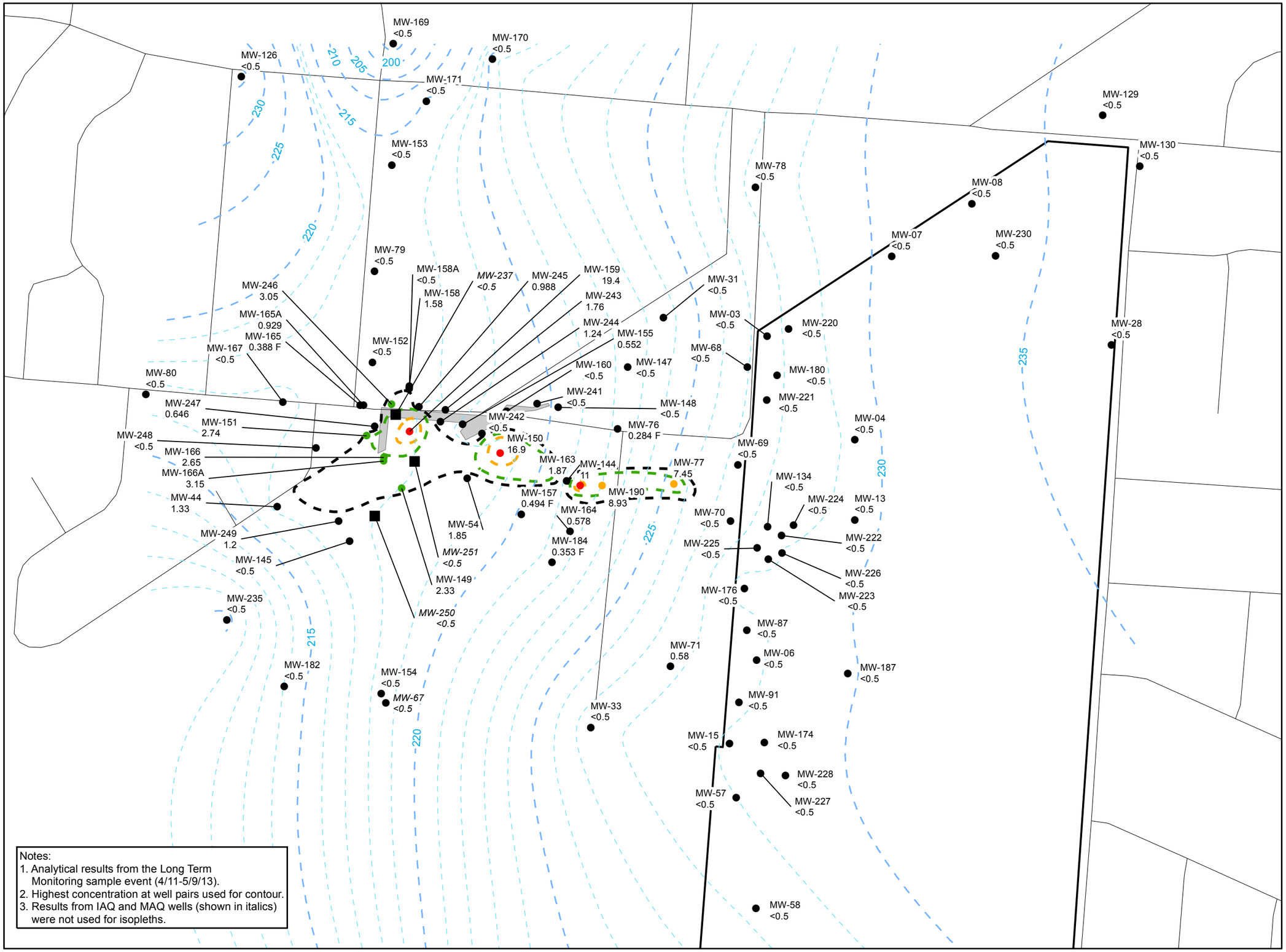

Notes:
1. Analytical results from the Long Term Monitoring sample event (4/11-5/9/13).
2. Highest concentration at well pairs used for contour.
3. Results from IAQ and MAQ wells (shown in italics) were not used for isopleths.

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N
W E
S

Figure 19

DUNN FIELD TeCA CONCENTRATIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

TeCA Ranges (ug/L)
- 0-2
- 2-5
- 5-10
- 10-50

TeCA Isopleth (ug/L)
- 2.2
- 5
- 10

Air Sparge Well Area

Original Dunn Field Property Boundary

Potentiometric surface of the Fluvial Aquifer 1-ft. contour

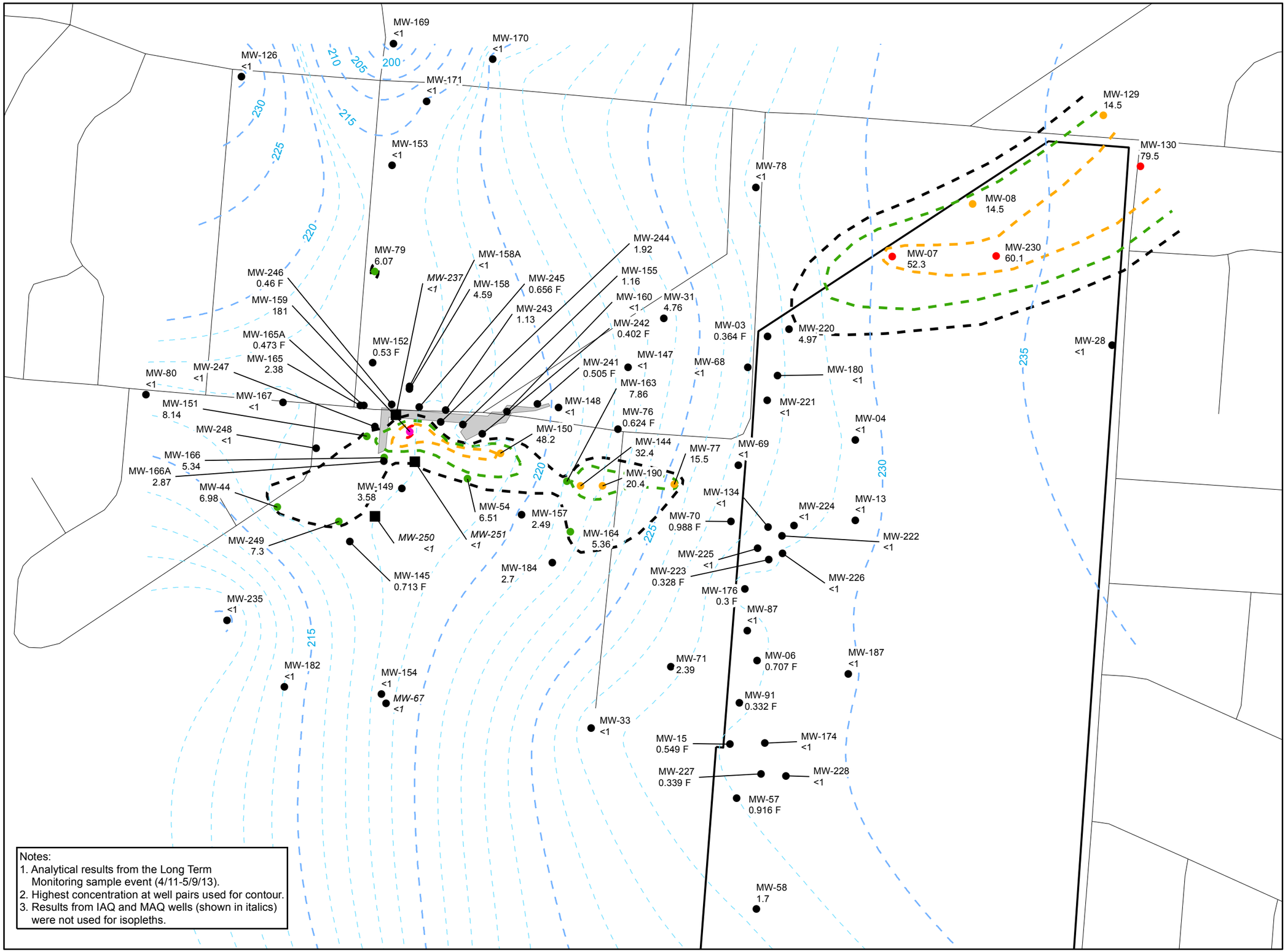
Potentiometric surface of the Fluvial Aquifer 5-ft. contour

0 100 200 300
Feet

Installation Location
Memphis, Tennessee

Date: November 2013
Edition: Rev 0

HDR



Notes:
1. Analytical results from the Long Term Monitoring sample event (4/11-5/9/13).
2. Highest concentration at well pairs used for contour.
3. Results from IAQ and MAQ wells (shown in italics) were not used for isopleths.

Path: G:\DDMT\2014 SMP\GIS\Figure 20.mxd

N
W E
S

Figure 20

DUNN FIELD TCE CONCENTRATIONS

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT MEMPHIS, TENNESSEE

Legend

TCE Ranges (ug/L)
- 0-5
- 5-10
- 10-50
- 50-100
- 100-300

TCE Isopleth (ug/L)
- 5
- 10
- 50
- 100

Air Sparge Well Area

Original Dunn Field Property Boundary

Potentiometric surface of the Fluvial Aquifer 1-ft. contour

Potentiometric surface of the Fluvial Aquifer 5-ft. contour

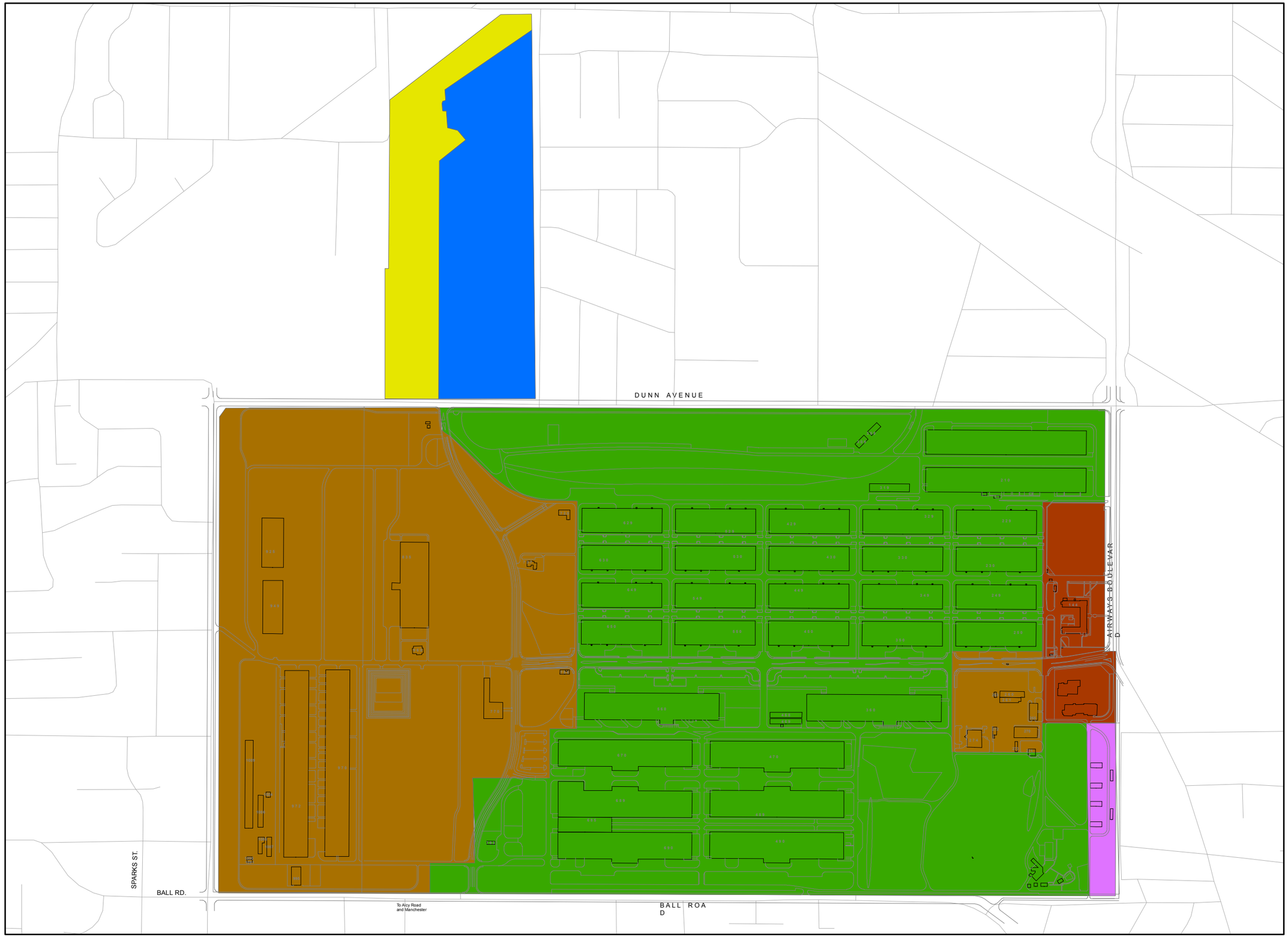
0 100 200 300

Feet

Installation Location
Memphis, Tennessee

Date: November 2013
Edition: Rev 0

HDR



N
W E
S

Figure 21

FINDING OF SUITABILITY TO TRANSFER MAP

2014 SITE MANAGEMENT PLAN

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

FOST
Fost Number

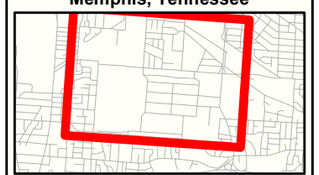
- FOST 1 *signed 02/23/01, deeds signed 02/06/02 and 05/06/02.*
- FOST 2 *signed 9/27/01, deed signed 9/18/01*
- FOST 3 *signed 07/01/04, deeds signed 04/04/05, 08/18/06 and 10/12/06.*
- FOST 4 *signed 03/04/05, deed signed 10/17/07.*
- FOST 5 *signed 7/12/10; property not transferred.*
- FOST 6 *signed 8/3/10; deed signed 3/30/11.*

Projection: NAD 1927 StatePlane Tennessee
Units: Feet

0 250 500 1,000

Scale in Feet

Installation Location
Memphis, Tennessee



Date: November 2013
Edition: Rev 0

HDR

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Figure 22
Master Schedule

ID	Status	Task Name	Duration	Start	Predecessors	Finish
1		**MAIN INSTALLATION**	**4065 d**	**Mon 9/11/06**		**Fri 10/27/17**
2		**Main Installation Remedial Action (RA)**	**3192 d**	**Mon 9/11/06**		**Sun 6/7/15**
3		MI RA-O Initial Enhanced Bioremediation Treatment	900 d	Mon 9/11/06		Thu 2/26/09
4		**MI RA-O Additional Enhanced Bioremediation Treatment**	**994 d**	**Mon 9/17/12**		**Sun 6/7/15**
5		**MI RAWP Addendum**	**136 d**	**Mon 9/17/12**		**Wed 1/30/13**
9		Additional EBT Y1 Quarterly Injections	290 d	Mon 11/5/12	6	Wed 8/21/13
10		Additional EBT Y1 Quarterly Sampling	282 d	Mon 2/4/13	9SS+91 d	Tue 11/12/13
11		**Additional EBT Y1 Annual Report**	**209 d**	**Wed 11/13/13**		**Mon 6/9/14**
12	S	Prepare and Submit Rev. 0 Additional EBT Y1 Report	119 d	Wed 11/13/13	10	Tue 3/11/14
13		Agency Review & Submit Comments on Rev. 1 Additional EBT Y1 Report	62 d	Wed 3/12/14	12	Mon 5/12/14
14	S	Prepare & Submit Rev. 1 Additional EBT Y1 Report	28 d	Tue 5/13/14	13	Mon 6/9/14
15		Additional EBT Y2 Quarterly Injections	281 d	Wed 11/13/13	10	Wed 8/20/14
16		Additional EBT Y2 Quarterly Sampling	281 d	Mon 2/3/14	15SS+82 d	Mon 11/10/14
17		**Additional EBT Y2 Annual Report**	**209 d**	**Tue 11/11/14**		**Sun 6/7/15**
18	S	Prepare and Submit Rev. 0 Additional EBT Y2 Report	119 d	Tue 11/11/14	16	Mon 3/9/15
19		Agency Review & Submit Comments on Rev. 1 Additional EBT Y2 Report	62 d	Tue 3/10/15	18	Sun 5/10/15
20	S	Prepare & Submit Rev. 1 Additional EBT Y2 Report	28 d	Mon 5/11/15	19	Sun 6/7/15
21		**MI Annual LUCIP Inspections**	**762 d**	**Tue 7/1/14**		**Sun 7/31/16**
22	S	MI Annual LUCIP Inspection and Report - 2014	31 d	Tue 7/1/14		Thu 7/31/14
23	S	MI Annual LUCIP Inspection and Report - 2015	31 d	Wed 7/1/15		Fri 7/31/15
24	S	MI Annual LUCIP Inspection and Report - 2016	31 d	Fri 7/1/16		Sun 7/31/16
25		**MI RA-O Long Term Monitoring**	2500 d	Fri 2/27/09	3	Fri 1/1/16
26		**Main Installation Compliance Monitoring**	365 d	Sat 1/2/16	25	Sat 12/31/16
27		**Main Installation RA Completion Report**	**300 d**	**Sun 1/1/17**		**Fri 10/27/17**
28	P	Prepare & Submit Rev. 0 MI RACR	60 d	Sun 1/1/17	26	Wed 3/1/17
29		Agency Review & Submit Comments on Rev. 0 MI RACR	60 d	Thu 3/2/17	28	Sun 4/30/17
30		Respond to Agency Comments on Rev. 0 MI RACR	60 d	Mon 5/1/17	29	Thu 6/29/17
31	P	Prepare & Submit Rev. 1 MI RACR	120 d	Mon 5/1/17	29	Mon 8/28/17
32		Agency Review of Rev. 1 MI RACR w/ Concurrence	60 d	Tue 8/29/17	31	Fri 10/27/17
33		**Main Installation Well Abandonment**	90 d	Fri 6/30/17	30	Wed 9/27/17
34						
35						
36		**DUNN FIELD**	**4843 d**	**Wed 7/25/07**		**Mon 10/26/20**
37		**Dunn Field Fluvial SVE Remedial Action**	**1982 d**	**Wed 7/25/07**		**Wed 12/26/12**
38		Fluvial SVE Operations Years 1 to 5	1827 d	Wed 7/25/07		Tue 7/24/12
39		Mothball Fluvial SVE System	60 d	Wed 7/25/12	38	Sat 9/22/12
40		**Fluvial SVE Year 5 Annual Report**	**155 d**	**Wed 7/25/12**	**38**	**Wed 12/26/12**
44		**Dunn Field Off Depot GW Remedial Action**	**2110 d**	**Fri 12/18/09**		**Sun 9/27/15**
45		**Dunn Field Off Depot RA-O AS/SVE Operations Years 1 to 5**	1840 d	Fri 12/18/09		Wed 12/31/14
46		**Year 4 AS/SVE Report**	**180 d**	**Wed 1/1/14**		**Sun 6/29/14**
47	S	Prepare & Submit Rev. 0 Y4 AS/SVE Report	60 d	Wed 1/1/14		Sat 3/1/14
48		Agency Review & Submit Comments on Rev. 0 Y4 AS/SVE Report	60 d	Sun 3/2/14	47	Wed 4/30/14
49	S	Prepare & Submit Rev. 1 Y4 AS/SVE Report	60 d	Thu 5/1/14	48	Sun 6/29/14
50		**Year 5 AS/SVE Report**	**180 d**	**Thu 1/1/15**		**Mon 6/29/15**

Figure 22
Master Schedule

ID	Status	Task Name	Duration	Start	Predecessors	Finish
51	S	Prepare & Submit Rev. 0 Y5 AS/SVE Report	60 d	Thu 1/1/15		Sun 3/1/15
52		Agency Review & Submit Comments on Rev. 0 Y5 AS/SVE Report	60 d	Mon 3/2/15	51	Thu 4/30/15
53	S	Prepare & Submit Rev. 1 Y5 AS/SVE Report	60 d	Fri 5/1/15	52	Mon 6/29/15
54		**Abandon Fluvial SVE and AS/SVE Systems**	90 d	Tue 6/30/15	53	Sun 9/27/15
55		**Dunn Field Annual LUCIP Inspections**	**762 d**	**Tue 7/1/14**		**Sun 7/31/16**
56	S	Dunn Field Annual LUCIP Inspection and Report - 2014	31 d	Tue 7/1/14		Thu 7/31/14
57	S	Dunn Field Annual LUCIP Inspection and Report - 2015	31 d	Wed 7/1/15		Fri 7/31/15
58	S	Dunn Field Annual LUCIP Inspection and Report - 2016	31 d	Fri 7/1/16		Sun 7/31/16
59		**Dunn Field RA-O Long Term Monitoring Years 3 - 10**	2557 d	Sun 1/1/12		Mon 12/31/18
60		**Dunn Field Compliance Monitoring**	365 d	Tue 1/1/19	59	Tue 12/31/19
61		**Dunn Field Well Abandonment**	90 d	Tue 3/31/20	60FS+90 d	Sun 6/28/20
62		**Dunn Field RA Completion Report**	**300 d**	**Wed 1/1/20**		**Mon 10/26/20**
63	P	Prepare & Submit Rev. 0 Dunn Field RACR	60 d	Wed 1/1/20	60	Sat 2/29/20
64		Agency Review & Submit Comments on Rev. 0 Dunn Field RACR	60 d	Sun 3/1/20	63	Wed 4/29/20
65		Respond to Agency Comments on Rev. 0 Dunn Field RACR	60 d	Thu 4/30/20	64	Sun 6/28/20
66	P	Prepare & Submit Rev. 1 Dunn Field RACR	120 d	Thu 4/30/20	64	Thu 8/27/20
67		Agency Review of Rev. 1 Dunn Field RACR w/ Concurrence	60 d	Fri 8/28/20	66	Mon 10/26/20
68						
69						
70		**Memphis Depot NPL Site-Wide Activities**	**2778 d**	**Mon 9/16/13**		**Sat 4/24/21**
71		**Site-Wide (MI and Dunn Field) LTM Reports**	**878 d**	**Mon 11/11/13**		**Wed 4/6/16**
72		**2013 LTM Report**	**150 d**	**Mon 11/11/13**		**Wed 4/9/14**
73	S	Prepare & Submit Rev. 0 2013 LTM Report	60 d	Mon 11/11/13		Thu 1/9/14
74		Agency Review & Submit Comments on Rev. 0 2013 LTM Report	60 d	Fri 1/10/14	73	Mon 3/10/14
75	S	Prepare & Submit Rev. 1 2013 LTM Report	30 d	Tue 3/11/14	74	Wed 4/9/14
76		**2014 LTM Report**	**150 d**	**Mon 11/10/14**		**Wed 4/8/15**
77	S	Prepare & Submit Rev. 0 2014 LTM Report	60 d	Mon 11/10/14		Thu 1/8/15
78		Agency Review & Submit Comments on Rev. 0 2014 LTM Report	60 d	Fri 1/9/15	77	Mon 3/9/15
79	S	Prepare & Submit Rev. 1 2014 LTM Report	30 d	Tue 3/10/15	78	Wed 4/8/15
80		**2015 LTM Report**	**150 d**	**Mon 11/9/15**		**Wed 4/6/16**
81	S	Prepare & Submit Rev. 0 2015 LTM Report	60 d	Mon 11/9/15		Thu 1/7/16
82		Agency Review & Submit Comments on Rev. 0 2015 LTM Report	60 d	Fri 1/8/16	81	Mon 3/7/16
83	S	Prepare & Submit Rev. 1 2015 LTM Report	30 d	Tue 3/8/16	82	Wed 4/6/16
84		**Site Management Plan (SMP) Updates**	**866 d**	**Mon 9/16/13**		**Fri 1/29/16**
85		**2014 Site Management Plan**	**136 d**	**Mon 9/16/13**		**Wed 1/29/14**
86	P	Prepare & Submit Rev 0 2014 SMP	76 d	Mon 9/16/13		Sat 11/30/13
87		Agency Review & Submit Comments on Rev 0 2014 SMP	30 d	Sun 12/1/13	86	Mon 12/30/13
88	P	Prepare & Submit Rev 1 2014 SMP	30 d	Tue 12/31/13	87	Wed 1/29/14
89		**2015 Site Management Plan**	**137 d**	**Mon 9/15/14**		**Thu 1/29/15**
90	P	Prepare & Submit Rev 0 2015 SMP	77 d	Mon 9/15/14		Sun 11/30/14
91		Agency Review & Submit Comments on Rev 0 2015 SMP	30 d	Mon 12/1/14	90	Tue 12/30/14
92	P	Prepare & Submit Rev 1 2015 SMP	30 d	Wed 12/31/14	91	Thu 1/29/15
93		**2016 Site Management Plan**	**138 d**	**Mon 9/14/15**		**Fri 1/29/16**
94	P	Prepare & Submit Rev 0 2016 SMP	78 d	Mon 9/14/15		Mon 11/30/15

Figure 22
Master Schedule

ID	Status	Task Name	Duration	Start	Predecessors	Finish
95		Agency Review & Submit Comments on Rev 0 2016 SMP	30 d	Tue 12/1/15	94	Wed 12/30/15
96	P	Prepare & Submit Rev 1 2016 SMP	30 d	Thu 12/31/15	95	Fri 1/29/16
97		**CERCLA Fourth 5-Year Review**	**270 d**	**Mon 5/1/17**		**Thu 1/25/18**
98	P	Prepare & Submit Rev. 0 4th 5-Year Review	94 d	Mon 5/1/17		Wed 8/2/17
99		Agency Review & Submit Comments on Rev. 0 4th 5-Year Review	61 d	Thu 8/3/17	98	Mon 10/2/17
100		Respond to Agency Comments on Rev. 0 4th 5-Year Review	21 d	Tue 10/3/17	99	Mon 10/23/17
101	P	Prepare & Submit Rev. 1 4th 5-Year Review	84 d	Tue 10/3/17	99	Mon 12/25/17
102		Agency Review of Rev. 1 4th 5-Year Review	7 d	Tue 12/26/17	101	Mon 1/1/18
103	P	Prepare & Submit Final 4th 5-Year Review	7 d	Tue 1/2/18	102	Mon 1/8/18
104		Final 4th 5-Year Review Signed	10 d	Tue 1/9/18	103	Thu 1/18/18
105		Notification of 4th 5-Year Review Completion	7 d	Fri 1/19/18	104	Thu 1/25/18
106		**Final Closeout Report (FCOR)**	**180 d**	**Tue 10/27/20**		**Sat 4/24/21**
107	P	Prepare & Submit Rev. 0 FCOR	60 d	Tue 10/27/20	67,32	Fri 12/25/20
108		Agency Review & Submit Comments on Rev. 0 FCOR	60 d	Sat 12/26/20	107	Tue 2/23/21
109		Respond to Agency Comments on Rev. 0 FCOR	15 d	Wed 2/24/21	108	Wed 3/10/21
110	P	Prepare & Submit Rev. 1 FCOR	30 d	Wed 2/24/21	108	Thu 3/25/21
111		Agency Review of Rev. 1 FCOR w/ Concurrence	30 d	Fri 3/26/21	110	Sat 4/24/21
112	P	Final FCOR	0 d	Sat 4/24/21	111	Sat 4/24/21
113		**Site Completion**	0 d	Sat 4/24/21	112	Sat 4/24/21