

2020 Site Management Plan

Defense Depot Memphis, Tennessee
U.S. EPA I.D. Number TN4210020570

Revision 1
September 2020



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Department of the Army

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Acronyms and Abbreviations

AOC	Area of Concern
AR	Administrative Record
AS/SVE	air sparging with soil vapor extraction
Barnhart	Barnhart Crane & Rigging Company
bgs	below ground surface
BRA	Baseline Risk Assessment
BRAC	Base Realignment and Closure
cDCE	cis-1,2-dichloroethene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	chloroform
cfm	cubic feet per minute
COC	chemical of concern
CSM	Conceptual Site Model
CSP	comprehensive sampling plan
CT	carbon tetrachloride
CVOC	chlorinated volatile organic compound
CY	cubic yard
DCE	1,1-dichloroethene
DDMT	Defense Depot Memphis, Tennessee
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
e ² M	engineering-environmental Management, Inc.
EBT	enhanced bioremediation treatment
EC	electrical conductivity
EISR	Early Implementation of Selected Remedy
EPC	exposure point concentration
EPP	Environmental Protection Provision
ESD	Explanation of Significant Differences
ET&D	excavation, transportation and disposal
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study
FOST	Findings of Suitability to Transfer
FSVE	Fluvial soil vapor extraction
FU	functional unit
HHRA	human health risk assessment
HI	hazard index

HPT	hydraulic profiling tool
HSWA	Hazardous and Solid Waste Amendment
IAQ	intermediate aquifer
ID	inside diameter
IR	Information Repository
IRA	interim remedial action
IRACR	Interim Remedial Action Completion Report
IW	injection well
lb/hr	pound per hour
LOQ	limit of quantitation
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
MIP	membrane interface probe
MLGW	Memphis Light, Gas & Water
MNA	monitored natural attenuation
MW	monitoring well
ND	not detected
NPL	National Priorities List
OPS	Operating Properly and Successfully
OU	Operable Unit
PAHs	polyaromatic hydrocarbons
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PCP	pentachlorophenol
PID	photoionization detector
PLC	programmable logic controller
PMW	performance monitoring well
ppbv	part per billion by volume
PRB	permeable reactive barrier
PRP	potentially responsible party
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
RA	remedial action
RAO	remedial action objective

RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RG	remediation goal
RI	remedial investigation
RL	reporting limit
ROD	Record of Decision
RSL	regional screening level
RW	recovery well
SCHD	Shelby County Health Department
SLERA	screening level ecological risk assessment
SMP	Site Management Plan
SRI	Supplemental Remedial Investigation
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
SWMU	Solid Waste Management Unit
TC	target concentration
TCA	1,1,2-trichloroethane
TCE	trichloroethene
TCL	Target Compound list
TDEC	Tennessee Department of Environment and Conservation
TeCA	1,1,2,2-tetrachloroethane
Trinity	Trinity Analysis and Development Corp.
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
VI	vapor intrusion
VISL	Vapor Intrusion Screening Level
VMP	vapor monitoring point
VOC	volatile organic compound
WNRC	Washington National Records Center
ZVI	zero valent iron
µg/L	micrograms per liter

1 Introduction

HDR has prepared this 2020 Site Management Plan (SMP) for the former Defense Depot Memphis, Tennessee (DDMT) under Contract W91278-16-D-0061, Task Order No. W9127819F0090 to the United States Army Corps of Engineers (USACE), Mobile District. The environmental restoration program at DDMT is directed by the Department of the Army (Army), Office of the Deputy Chief of Staff, G9, Base Realignment and Closure (BRAC) Division.

This SMP has been prepared in accordance with *Department of Defense (DoD) Manual Number 4715.20, Defense Environmental Restoration Program [DERP] Guidance* (DoD, 2018) 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, United States Environmental Protection Agency (USEPA) and Tennessee Department of Environment and Conservation (TDEC) in 1995. DDMT's USEPA Identification Number is TN4210020570.

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 is updated annually, made available for public review in the information repository (IR) and included in the Administrative Record (AR). The 2020 SMP is updated with information available as of 15 December 2019.

An IR is a records storage area at or near a Superfund site that contains all correspondence, reports, and documents pertaining to the site, as well as general Superfund program information. At an IR, people can research the site and the law pertaining to the cleanup, learn how to participate in the cleanup process, and copy any information found at the repository.

Under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), an AR is the complete collection of documents that forms the basis for selecting a response action (i.e., those documents considered or relied upon by the lead agency in selecting a remedy). Thus, the record should include final documents generated by the lead agency and support agency or agencies, as well as technical and site-specific information. Information or comments submitted by the public during a public comment period also should be included in the administrative record whether or not they support the selection decision.

The IR is maintained in the TDEC office at the following address:

TDEC
8383 Wolf Lake Dr.
Bartlett, TN 38133-4119

The public may request IR documents using TDEC's online public request website at <https://www.tn.gov/environment/contacts/public-records-request.html>. Additional information on the records request process can be obtained by calling TDEC at (901) 371-3000. Information can also be requested by calling the DDMT Community Involvement Line at 901-774-3683.

The AR for DDMT is stored by the National Archives and Records Administration, Washington National Records Center (WNRC). The last transmittal of files to the WNRC was made in October 2019. Additional shipments will be made periodically as AR documents are created. Prior to shipment, the AR documents are stored in a locked room at the DDMT field office. The WNRC address is:

WNRC
4205 Suitland Road
Suitland, MD 20745-8001

Responses to USEPA and TDEC comments on the 2020 SMP and approval letters are included in [Appendix A](#).

2 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 0.5 miles northeast of Interstate 240 (Figure 1). DDMT originated as a military facility in the early 1940s to provide stock control, materiel storage, and maintenance services for DoD. 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 634 acres and consists of the Main Installation (MI) and Dunn Field (Figure 2). 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 67 acres and includes former mineral storage and waste disposal areas.

2.2 Regulatory Status

DDMT was a generator of Resource Conservation and Recovery Act (RCRA) hazardous wastes during its period of operation. The wastes included hazardous substances that reached shelf-life expiration dates and could no longer be used, vehicle maintenance wastes, and waste materials from the cleanup of small hazardous substance spills.

On 28 September 1990, USEPA Region 4 and TDEC issued DDMT 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 (A.T. Kearney, 1990).

Subsequent to issuing the RCRA permit, USEPA prepared a final Hazard Ranking System Scoring Package for the facility. On 14 October 1992, USEPA added DDMT to the National Priorities List (NPL) (57 Federal Register 47180 No. 199). On 6 March 1995, USEPA, TDEC, and the Defense Logistics Agency entered into an FFA under CERCLA, Section 120, and RCRA, Sections 3008(h) and 3004(u) and (v). The FFA outlines the process for investigation and cleanup of environmental sites at DDMT 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 from 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 shall continue to be performed under CERCLA.

The NPL site status was revised to Construction Complete in May 2010 after construction of the selected remedies for DDMT was completed.

2.3 Site Designations

Site designations at DDMT were developed for overlapping environmental programs and for facility reuse. Four Operable Units (OUs) were established during preparation of the FFA: Dunn Field, OU 1; Southwest Quadrant MI, OU 2; Southeastern Watershed and Golf Course, OU 3; and North Central Area MI, OU 4.

The property was divided into 36 parcels based on planned reuse after DDMT was selected for closure under BRAC. Areas of environmental concern within each parcel were divided into sub-parcels 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 facilitated 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 3](#) for the MI and [Figure 4](#) 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; additional information is provided in the *Environmental Baseline Survey Report* (Woodward-Clyde, 1996). 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](#) with the current site status; the site locations are shown by OU on [Figures 5, 6, 7 and 8](#). The site designations on the figures (e.g., RI, Screening, and No Further Action) were established when the sites were identified and do not reflect the current status.

2.4 Geology and Hydrogeology

The geologic units of interest at DDMT are (from youngest to oldest): loess, including surface soil; fluvial deposits; Jackson Formation/upper Claiborne Group (Jackson/upper Claiborne); 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 DDMT area.

The fluvial (terrace) deposits at DDMT consist of two general layers. The upper layer is silty, sandy clay to clayey sand and ranges from about 0 to 30 feet thick. The lower layer is composed of interlayered sand, sandy gravel, and gravelly sand, and ranges from 30 to 100 feet thick. The uppermost aquifer is the unconfined Fluvial Aquifer, consisting of saturated sands and gravelly sands in the lower portion of the fluvial deposits. The saturated thickness ranges from 0 feet (dry) to approximately 70 feet. The groundwater level and saturated thickness of the Fluvial Aquifer are mainly controlled by the surface of the uppermost clay in the upper Claiborne and the areas of downward leakage where the clay layer is thin or absent, as noted below. The groundwater level does not reflect the nearly level ground surface at the MI. The groundwater in the Fluvial Aquifer is not a drinking water source for area residents; however, the current Tennessee groundwater classification at DDMT is General Use (TDEC Chapter 1200-04-03).

The Jackson/upper Claiborne forms the Upper Confining Unit for the Memphis Aquifer (MAQ) on a regional basis and separates the Fluvial Aquifer from the MAQ at DDMT. The upper Claiborne Group includes the Cockfield and Cook Formations; the individual layers of the Jackson/upper Claiborne consist of clays, silts, and sands deposited in lenses or individual beds that are not areally extensive. The Jackson Formation is reported to be absent in the area of DDMT. The Cockfield Formation consists of inter-fingering fine sand, silt, clay, and local lenses of lignite. The Cook Mountain Formation consists primarily of clay with varying amounts of fine sand and is reported to be the most persistent clay layer in the Upper Confining Unit. The Intermediate Aquifer (IAQ) is locally developed in sand layers within the upper Claiborne.

The Memphis Sand consists primarily 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 of approximately 120 to 300 feet below ground surface (bgs). The MAQ is a regional deep, confined aquifer and is the primary source of water for the City of Memphis. Memphis Light, Gas & Water (MLGW) extracts groundwater from several well fields in the Memphis area, which has created a regional cone of depression in the potentiometric surface, with steeper local cones of depression at each well field. The Allen Well Field is the closest to DDMT; individual extraction wells in the well field are 1 to 2 miles west of DDMT.

At locations where clay layers in the upper Claiborne Group are thin or absent, a 'window' can develop with downward flow of groundwater transporting contaminants to the IAQ, and potentially the MAQ. Studies indicate that downward leakage from the water-table aquifers (alluvial and fluvial deposits) to the MAQ is widespread in the Memphis area (Parks, 1990). Within the northwestern MI, a window between the Fluvial Aquifer and IAQ has been identified in the area northwest of LTM well MW-286 (Figure 9). The depressed Fluvial Aquifer water levels near MW-259 (Figure 9) in the south-central MI indicate a separate area of downward leakage of water ('sink') and provide additional evidence of the hydraulic connection between the Fluvial Aquifer and the IAQ.

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3 Environmental Program Status

Construction of the selected remedies for DDMT was completed in December 2009, and the *Preliminary Close Out Report* (USEPA, 2010a) was approved in May 2010. Interim remedial action completion reports (IRACRs) have been approved for all remedial actions (RAs). USEPA has concurred with operating properly and successfully (OPS) determinations for the remedies implemented on Federal property. The remedial action objectives (RAOs) for groundwater have not been met; supplemental remedial investigation, remedial action and long-term monitoring are continuing.

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. All of the MI property has been transferred for reuse through public benefit and economic development conveyances. (See [Section 3.3.](#))

Site investigations from 1989 to 2001 are described in the *Memphis Depot Main Installation Remedial Investigation Report, Volumes I through IV* (CH2M HILL, 2000). The MI RI identified contamination in surface soil and ground water. Surface soil contaminants requiring response consisted of metals, pentachlorophenol (PCP), polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), 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); CVOCs were not detected at high concentrations in soil samples on the MI.

3.1.1 Prior Removal Actions

The following actions were taken on the MI prior to the Record of Decision (ROD). The locations are shown on [Figure 3](#).

- Approximately 602 cubic yards (CY) of surface and subsurface soil were removed from the 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 were removed in 1998 because of the presence of dieldrin. The Housing Area is an exception to the overall industrial land use for MI and cleanup levels were based on residential reuse.
- Approximately 530 tons (400 CY) of surface soil surrounding the cafeteria (Building 274) were removed in 1998 because of elevated levels of PCBs.

- Approximately 980 CY of surface and subsurface soil from BRAC Parcels 35 and 28 near Buildings 1084, 1085, 1087, 1088, 1089 and 1090 were removed in 2000 because of elevated levels of metals and PAHs.

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 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 uses (industrial and recreational). The RAOs are:

Surface Soil

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

Groundwater

- Prevent human ingestion of water contaminated with volatile organic compounds (VOCs) in excess of maximum contaminant levels (MCLs) from potential future on-site wells.
- Reduce concentrations of chemicals of concern (COCs) to MCLs or lower.
- Prevent horizontal and vertical off-site migration of groundwater contaminants in excess of MCLs.

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

- Excavation, transport and off-site disposal (ET&D) of lead contaminated surface soil near Building 949. [Note: ET&D of approximately 300 CY of soil near Building 949 (see [Figure 3](#)) was completed prior to final execution of the ROD. The action was taken to accommodate the economic redevelopment of the site, documented in *Remediation Report, Removal Action at Building 949* (Jacobs Federal Programs, 2002) and noted as a significant change in the ROD.]
- Deed restrictions and land use controls (LUCs) to prevent residential land use on the MI, except at the existing housing area; to implement daycare restrictions; to prevent production/consumptive use of groundwater in the Fluvial Aquifer and drilling into deeper aquifers on the MI; and to eliminate 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.

3.1.3 Enhanced Bioremediation Treatment

The selected remedy included EBT in the most contaminated areas with the assumption that “untreated parts of the groundwater plume would degrade under natural attenuation”. The *Memphis Depot Main Installation Final Remedial Design, Revision 1* (MI RD) (CH2M HILL, 2004c) was approved by USEPA in August 2004. Groundwater concentrations equal to or greater than 100 micrograms per liter (µg/L) for PCE and TCE were used to delineate the EBT treatment areas. Sodium lactate was chosen for injection in two target treatment areas (TTA-1 and TTA-2). The MI RD also included a long-term monitoring (LTM) plan and a Land Use Control Implementation Plan (LUCIP).

The initial remedy implementation (EBT-1) included sodium lactate injections into the Fluvial Aquifer within the two treatment areas from September 2006 through February 2009 and performance monitoring from October 2006 through March 2009. CVOC concentrations for parent compounds (PCE, TCE, CT and CF) were reduced over 90 percent in injection wells (IWs) and over 80 percent in MWs at locations with baseline concentrations above 100 µg/L.

Additional investigation was performed in 2008 to identify potential source areas for CVOCs in groundwater on the MI (e²M, 2009b). The field investigation was conducted using sample grids overlaying the upgradient areas of the plumes. The magnitude and extent of CVOCs in soil were characterized by a membrane interface probe (MIP) survey and confirmation soil samples. The MIP survey identified several areas of possible soil contamination; confirmation soil samples were collected throughout the survey area but primarily targeted areas of suspected contamination. Only 5 of 70 soil samples had CVOC concentrations above the remediation goal (RG), and 3 of those samples only slightly exceeded an RG for a single CVOC.

The *Interim Remedial Action Completion Report, Main Installation, Revision 1* (MI IRACR) (HDR|e²M, 2010), including an OPS determination, was approved by USEPA in March 2010. Although EBT did not achieve the goal of reducing concentrations below MCLs, the additional field investigation, groundwater modeling and trend analysis indicated that additional RA was not necessary.

Following observed rebound in CVOC concentrations in 2010 LTM samples, EBT-2 was conducted in areas where individual CVOC concentrations of parent compounds PCE, TCE and CT exceeded 100 µg/L: TTA-1, TTA-2, the West-Central plume and the Building 835 plume. Quarterly injections were made from November 2012 to August 2014 and performance monitoring was conducted from February 2013 to November 2014. The final report for EBT-2, *Main Installation Year Four Enhanced Bioremediation Treatment Report* (HDR, 2015a), was approved by USEPA and TDEC in May 2015. The CVOC concentrations in the final samples (November 2014) decreased from the baseline samples (December 2011) by an average of 80 percent for IWs and 28 percent for performance monitoring wells (PMWs); the total number of

EBT wells exceeding MCLs decreased from 55 wells to 17 wells over the same period. While EBT-2 reduced CVOC concentrations, it was not sufficient to meet the groundwater RAOs for the MI. Additional investigation is being conducted as part of an evaluation of the selected remedy for the MI as discussed in the [Section 3.1.5](#).

3.1.4 Long-Term Monitoring

MI LTM is performed to document changes in plume concentrations, to detect potential plume migration to off-site areas or into deeper aquifers, and to track progress toward meeting RAOs in accordance with the LTM Plan in Appendix B of the MI RD (CH2M HILL, 2004c). LTM sample analyses include most USEPA Target Compound List (TCL) VOCs; analytical summary tables include the primary CVOCs and other VOCs detected above the laboratory limit of quantitation (LOQ) in one or more samples. The primary CVOCs for the MI are CT, CF, PCE, TCE, cis-1,2-dichloroethene (cDCE) and vinyl chloride (VC).

LTM wells are assigned to the Fluvial, Intermediate or Memphis Aquifers. The uppermost clay layer in the upper Claiborne which usually forms the base of the Fluvial Aquifer is absent in the central part of the MI, and the Fluvial sand and the upper Claiborne sand form a single water table aquifer. Several deeper wells in this area are designated Upper Claiborne and are grouped with the IAQ wells. In addition, the MI LTM wells are grouped in the following area/plumes: TTA-1 North, TTA-1 South, TTA-2, West-Central, Building 835, North-Central, South-Central, Southeast MI, Window and Background. The Background wells were selected based on criteria in the MI LTM Plan (wells upgradient of or at a distance from groundwater plumes and with no, or low, previous detections of site contaminants).

In 2019, MI LTM comprised 166 wells, including the Supplemental Remedial Investigation (SRI) Phase 3 wells installed June to August 2018. The MI LTM wells are listed on [Table 3](#) and the locations, color-coded by area, are shown on [Figure 10](#). The number of wells and sample frequencies by aquifer are:

- 130 Fluvial Aquifer - semiannual (81), annual (31) and biennial (18);
- 32 IAQ/UC - semiannual (13), annual (14) and biennial (5); and
- 4 MAQ - semiannual (4).

The April 2019 LTM event consisted of a water level sweep and groundwater sampling at the 98 wells designated for semiannual sampling. The most recent analytical results for the primary CVOCs from the sample events in October 2018 and April 2019 were used to evaluate extent of contamination and prepare CVOC concentration maps. The *April 2019 Long-Term Monitoring Summary Report, Revision 0* (HDR, 2019d) was submitted to USEPA and TDEC in August 2019.

The number of MI LTM wells with primary CVOCs exceeding an MCL and the maximum concentration for CVOCs exceeding MCLs in the most recent samples as of April 2019 are summarized by aquifer and area on [Table 4](#). A total of 94 MI LTM wells had concentrations above the MCL for one or more primary CVOCs. PCE and TCE were the CVOCs most often detected above MCLs and had maximum concentrations of 197 µg/L and 136 µg/L,

respectively. Concentrations and isopleths for PCE and TCE from the April 2019 semiannual LTM event are shown on [Figures 11 and 12](#); PCE and TCE concentrations are shown at wells on a cross-section through the window on [Figure 13](#).

3.1.5 Supplemental Remedial Investigation

A SRI was conducted from 2015 through 2019 to address data gaps identified through EBT performance monitoring and LTM. A Focused Feasibility Study (FFS) will be conducted upon completion of the SRI to identify and screen remedial action alternatives. An Explanation of Significant Differences (ESD) or a ROD Amendment will be prepared as necessary to document changes to the selected remedy. Further RA will be conducted after the selected remedy has been confirmed or revised.

The MI SRI, initiated in 2015, includes review of documents regarding the basis for the selected remedy and field investigation to improve understanding of site hydrogeology, extent of groundwater contamination and potential off-site sources of contamination. The *Supplemental Remedial Investigation Phase 1 Work Plan, Revision 1* (HDR, 2015b) was approved by TDEC in March 2015 and by USEPA in April 2015. The *Supplemental Remedial Investigation Phase 2 Work Plan, Revision 1* (HDR, 2016) was approved by TDEC in June 2016 and by USEPA in August 2016. SRI field investigations were performed from April to August 2015 for Phase 1 and from October 2016 to April 2017 for Phase 2. The field activities included installation, development and sampling of 20 Fluvial Aquifer wells and 2 IAQ wells; the wells were incorporated into LTM following collection of initial groundwater samples.

The *Supplemental Remedial Investigation Phases 1 and 2 Report, Revision 1* (HDR, 2018e) was approved by TDEC in January 2018 and by USEPA in June 2018. Report conclusions addressed hydraulic connections between the Fluvial Aquifer and the MAQ in the Memphis area and at DDMT; limits to natural attenuation of CVOCs in groundwater at DDMT due to low natural carbon and high dissolved oxygen; the 2009 groundwater model (HDR|e²M, 2010); and additional information on site hydrogeology and plume delineation. The report recommended additional investigation to address remaining data gaps.

The *Supplemental Remedial Investigation Phase 3 QAPP, Revision 1* (HDR, 2018c) was approved by TDEC in January 2018 and by USEPA in April 2018. The Phase 3 QAPP included installation of 24 monitoring wells in the Fluvial Aquifer and the IAQ to collect hydrogeological and analytical data and address data gaps identified in the SRI Phases 1 and 2 report and the 2016 and April 2017 LTM reports. The field investigation was performed from June to August 2018 with 19 wells installed on the MI. Five off-site wells were not installed because access agreements could not be completed prior to completion of field work.

The *Supplemental Remedial Investigation Phase 3 Summary Report, Revision 0* (HDR, 2018g) was approved by TDEC in February 2019. Responses to USEPA comments on the Phase 3 report were submitted in April 2019 and will be incorporated in the final SRI report to be prepared following completion of SRI Phase 4. The responses to USEPA comments have been incorporated in this SMP.

The *Supplemental Remedial Investigation Phase 4 QAPP, Revision 1* (HDR, 2019f) was approved by TDEC in June 2019 and by USEPA in August 2019. The QAPP was prepared to describe the additional investigation for data gaps identified through review of hydrogeological data from the Phase 3 wells, and the groundwater samples collected in August 2018 following well installation and in the October 2018 LTM event.

Well installation, development and sampling was conducted from September to November 2019. The investigation included installation of twelve wells in the Fluvial Aquifer, two wells in the IAQ and two nested wells for vertical delineation of groundwater contamination and measurement of the vertical groundwater gradient. The nested wells, designated "NW" in the table below, were installed in areas where the clay between the Fluvial and upper Claiborne sands is absent, resulting in a single water table aquifer; the wells were constructed with four, 1-inch diameter wells with 2.5-foot screens spaced over approximately 60 feet between the water table and boring termination. The other wells were constructed in the same manner as previous SRI wells, with 2-inch diameter casing and 10-foot screens at the target depth.

The well locations are shown on [Figure 14](#). The data gaps being investigated and the associated Phase 4 wells are listed below:

Data Gap	Phase 4 Well
Off-site extent of CVOCs upgradient of TTA-1S	F-4
Off-site extent of CVOCs upgradient of TTA-1N	F-5 and F-6
Off-site extent of CVOCs in North-Central plume	F-10
Extent of PCE near Building 720; vertical delineation of contamination and water levels	F-21-NW and F-22
Groundwater elevation and extent of contaminant migration into window	F-23 and F-24
Upgradient extent of TTA-2 plume	F-25
Potential contaminant migration towards sink; vertical delineation of contamination and water levels	F-26-NW and F-27
Extent of the SE plume and groundwater flow direction	F-28 and F-29
Lateral extent of North-central Plume	F-30
Offsite extent of CVOCs and groundwater flow direction in IAQ at northwest MI	I-1
IAQ groundwater flow direction in south-central MI	I-5

The draft 2020 SRI Report (HDR, 2020c) is being reviewed by Army and USACE and, following approval, will be submitted to USEPA and TDEC for review. Additional SRI activities have been performed to aid in the FFS: vertical profiling, a conceptual site model update and a soil vapor extraction pilot test. Each of these activities is summarized below and will be documented in the final SRI report.

3.1.5.1 Vertical Profiling

Vertical profiling was conducted to develop a more detailed lithological profile and evaluate variations in CVOC concentrations and hydraulic conductivity with depth in the Fluvial deposits

and the upper Claiborne sediments. Information on vertical changes in hydraulic conductivity and potential stratification of contaminants will be helpful in the conceptual site model (CSM) update ([Section 3.1.7](#)) and evaluation of remedial action alternatives for the FFS. The Vertical Profiling Technical Memorandum (HDR, 2020e) was submitted to Army in May 2020.

Walker-Hill Environmental conducted the profiling in August 2019 using a Geoprobe® MiHPT logging system with membrane interface probe (MIP), hydraulic profiling tool (HPT) and electrical conductivity (EC) at two locations on the MI. The HDR Project Geologist observed the field activities.

The two profile locations, VP-01 and VP-02, are shown on [Figure 14](#). VP-01 is located near Building 720 within the 'window', where Phase 3 well MW-286 had a relatively high PCE concentration in October 2018. The location within the 'window' and the PCE concentration indicates potential for impact to the IAQ and MAQ. VP-02 is located south of the window, between Phase 3 wells MW-284 and MW-290 and pre-existing well MW-39. The sink initially identified at MW-259 appears to extend to the northwest to MW-39 and may be an area of leakage into deeper aquifers ([Figure 9](#)).

Site conditions, including compacted and cemented sands and gravel/cobbles, caused delays for repair of the MiHPT probe and limited the depth that could be reached. The profiles ended when the probe reached refusal at 115 feet bgs for VP-01 and 120 feet bgs for VP-02. The groundwater level is approximately 92 feet bgs at VP-01 and 96 feet bgs at VP-02, so only approximately 25 feet of the profile was within the Fluvial Aquifer; the upper Claiborne sand was not reached at either location. The field activities and findings from the two vertical profiles will be provided in the final SRI Report.

3.1.5.2 Conceptual Site Model Update

A CSM Update for the MI incorporated the following three studies:

1. An evaluation of site geologic data based on the principles of sequence stratigraphy and facies models to refine the 2018 CSM (HDR, 2018a) prepared for groundwater modeling and to identify potential preferential pathways for contaminant migration.
2. Mapping CVOCs based on molar fractions to evaluate contaminant migration from different source areas in the MI study area and the extent of CVOC degradation.
3. An evaluation of the groundwater flow in the different saturated geologic strata to distinguish perched groundwater from groundwater associated with the continuous surficial sand and gravel water-bearing unit in the study area.

The Final Conceptual Site Model Update Technical Memorandum (HDR, 2020a) was submitted to Army in January 2020. A discussion of the studies and how the findings change or support the 2018 CSM, as the basis for identification and selection of remedial alternatives, will be provided in the final SRI Report.

3.1.5.3 SVE Pilot Test

Groundwater contamination on the MI is considered to have resulted from multiple, small undocumented releases prior to closure of DDMT in 1997 (HDR, 2018e). A soil vapor extraction (SVE) test was performed to evaluate the effectiveness of a single-well SVE system in limiting migration of VOCs and impacts to groundwater from suspected, small source areas. The Final SVE Pilot Test Report (HDR, 2020f) was submitted to Army in August 2020.

SVE was previously shown to be effective at Dunn Field in decreasing VOC concentrations in soil vapor and limiting contaminant migration to groundwater. The SVE system on Dunn Field began operation in 2007 and was shut down in 2012 after removal of 4,000 pounds of VOCs and confirmation soil samples demonstrated RAOs had been met ([Section 3.2.4](#)).

Three areas were selected as potential locations for the SVE pilot test: TTA-1N in the southwestern MI; TTA-2 in the southeastern MI; and Building 720, a former fuel and cleaner dispenser area, in the north-central area of the MI ([Figure 15](#)). Six vapor monitoring points (VMPs) were installed and sampled in each of the three areas in June 2019. Each VMP had a 1-foot long stainless steel mesh screen installed in the first sand layer within the lower fluvial deposits; the screen depths ranged from 32 to 43 feet bgs.

The maximum concentrations for the primary CVOCs detected in each of the three areas are listed below; cDCE was not detected (ND) above the laboratory detection limit in TTA-1N. TTA-2 was selected for the pilot test based on significantly higher concentrations.

CVOC	Area	TTA-1N	TTA-2	Bldg 720
CT	ppbV	13	15,000	14
CF	ppbV	62	670	7.1
PCE	ppbV	130	14,000	63
TCE	ppbV	5,600	1,600	630
cDCE	ppbV	ND	250	110

A deeper VMP and an SVE well were installed in TTA-2 in August 2019 ([Figure 16](#)). The VMP was constructed with a 1-foot long stainless steel mesh screen at 74 feet bgs. The 2-inch inside diameter (ID) SVE well was installed with the well screen from 43 to 73 feet bgs. The depth to water at an adjacent LTM well (DR2-1) was approximately 85 feet bgs in April 2019.

The SVE system includes a regenerative blower capable of producing a flow rate of 120 cubic feet per minute (cfm) at 90 inches of water column (in WC); the SVE well extraction rate and vacuum can be adjusted using a manual dilution valve. The trailer-mounted, blower system was connected to the SVE well by 2-inch ID suction hose; extracted vapor passed through a 35-gallon moisture separator before being discharged, without treatment, 10 feet above ground surface. Start-up testing on 27 and 28 August showed the system worked well and achieved a radius of influence greater than 120 feet from the SVE well, with the dilution valve open or closed.

The SVE system was operated from 29 August 2019 to 14 May 2020. The initial vapor sample from the SVE effluent was collected on 29 August, with confirmation samples on 9 September. Additional samples were collected on 5 December after approximately three months of operation and on 14 May 2020 at completion of the SVE pilot test. The primary CVOC concentrations in the effluent samples are listed below.

Sample		SVE1-INF-2	SVE1-EFF-1	SVE1-EFF-2	SVE1-EFF1	SVE1-EFF2	SVE1-EFF2
Dilution Valve		Closed	Open	Closed	Open	Closed	Closed
CVOC	Date	8/29/19	9/9/19	9/9/19	12/5/19	12/5/19	5/12/20
CT	ppbV	7,100	5,700	15,000	1,600	4,200	630
CF	ppbV	250	150	400	130	340	110
PCE	ppbV	13,000	3,700	9,200	670	1,700	740
TCE	ppbV	640	330	860	72	180	230
cDCE	ppbV	170	300	780	79	210	51

Individual CVOC concentrations in the samples collected with the dilution valve open were roughly 40 percent of the concentrations in the undiluted samples, which is consistent with the difference in the flow rate from the SVE well with the dilution valve open or closed (HDR, 2020f).

The mass discharge rate for CVOCs was calculated in pounds per hour (lb/hr) based on reported concentrations of each CVOC and the effluent flow rate. The discharge rate for the sample collected on 29 August was calculated to be 0.11 lb/hr, which slightly exceeded the Shelby County Health Department (SCHD) de minimus level of 0.1 lb/hr; emissions exceeding the de minimus level have permitting requirements. The dilution valve was fully opened on 4 September to lower the discharge rate by reducing the flow from the SVE well and increasing the flow of ambient air. The discharge rates for the two samples collected on 9 September were calculated to be 0.07 lb/hr with the dilution valve fully open and 0.18 lb/hr with the dilution valve closed; operations continued with the dilution valve open. The discharge rates for the two samples collected on 5 December 2019 were calculated to be 0.017 lb/hr with the dilution valve fully open and 0.034 lb/hr with the dilution valve closed; the dilution valve was closed on 30 December and remained closed for the remainder of the pilot test. The discharge rate for the final sample collected on 14 May 2020 with the dilution valve closed was calculated to be 0.009 lb/hr.

The cumulative mass removed from startup on 27 August 2019 through 14 May 2020 is estimated at 197 pounds. Groundwater concentrations decreased 5 to 91% at 11 of 14 wells in close proximity to the SVE well; three wells in the area had increased concentrations. The pilot test showed that SVE could be an effective remedial technology on the MI where high concentrations of CVOCs are observed in soil vapor.

3.1.6 Risk Assessment

The Baseline Risk Assessment (BRA) conducted during the MI RI (CH2M HILL, 2000) included a human health risk assessment (HHRA) and screening level ecological risk assessment (SLERA). Calculated health risks for site workers were within acceptable levels for future

industrial use of the property, except for lead in a limited surface soil area. The area of lead contamination was excavated in 2001 (Jacobs Federal Programs, 2002). The BRA concluded that soil contaminants of concern were present at levels that do not allow for unrestricted use and unlimited exposure. The BRA also concluded that contaminated groundwater in the Fluvial Aquifer poses an unacceptable risk through the ingestion pathway; however, land use controls prevent drilling of groundwater wells and production or consumptive use of groundwater on the MI.

An updated HHRA for potential groundwater exposures and reviews of the HHRA for potential soil exposures and the SLERA for the MI were performed in 2018. The updated Groundwater HHRA confirmed the BRA finding that there is potential for receptors to experience adverse health effects from exposure to contaminated on-site groundwater, and that exposures are currently being prevented by the existing land use restrictions at the MI. As long as these restrictions are maintained, the exposure pathways related to the contaminated groundwater are not complete, with the possible exception of vapor intrusion (VI).

The Soil HHRA review found that most organic and inorganic constituents detected at the DDMT are present at levels that do not exceed current Industrial USEPA Regional Screening Levels (RSLs). However, additional risk assessment is recommended in a few areas to assure protectiveness of the remedy: additional soil sampling for lead in Parcels 28 & 35; additional sampling for chromium speciation analysis to evaluate the potential risks based on total chromium concentrations; and review of the current status and enforcement of the dioxin-related land use restrictions for the former Dip Vat area and the PCP-related restrictions in the 2005 MI Notice of Land Use Restrictions.

The SLERA review found that concentrations of certain COCs in environmental media exceed their respective ecological screening levels. The MI is currently 87% developed with warehouses, paved roads and parking areas, and gravel-covered storage/laydown areas. The buildings are over 90% occupied, the landscaped areas are maintained, and the undeveloped areas are regularly mowed. The absence of suitable habitat for ecological receptors noted in the 2000 MI RI has not changed; without receptors, there are no complete ecological pathways of exposure.

However, the detection of dioxin/furans in on-site soils, as well as in surface water and sediment, warrants additional study due to potential for human health impacts.

USEPA provided comments for the *Human Health and Ecological Risk Assessment, Revision 0* (HDR, 2018d) (HHERA) in July 2018. Following submittal of revised responses to USEPA comments in December 2018 and further discussions, USEPA provided conditional approval of the HHERA report in April 2019 based on 1) revision of the report in accordance with responses to specific comments and 2) additional review, sampling and risk assessment, including VI, to be documented in a following comprehensive HHERA report.

The HHERA report was revised in accordance with the conditional approval, and Revision 1 (HDR, 2020b) was submitted to USEPA and TDEC in February 2020. Additional data review and risk assessment have been performed to implement the recommendations provided in the

responses to the USEPA comments. A QAPP is being prepared to document the available information from previous sampling of environmental media at DDMT and to describe the plans for additional sampling and analysis, and the applicable guidance for additional risk assessment. Analytical data from the additional sampling will be used to evaluate whether residual contamination is at concentrations protective of human health and the environment. The QAPP will be submitted to USEPA and TDEC for review.

3.1.7 Vapor Intrusion

Potential VI issues at the MI are being evaluated through a study performed in accordance with guidance from DoD (TSERAW, 2009), USEPA (USEPA, 2015), and TDEC (TDEC, 2016). The initial VI screening assessment (HDR, 2017b) identified potential cancer risks greater than the target of 1×10^{-6} and non-cancer risk greater than 1.0. Responses to comments on the screening assessment memo from USEPA and TDEC were submitted in December 2017 and incorporated in later VI documents.

The *Main Installation Vapor Intrusion Soil Gas Sampling QAPP, Revision 1* (HDR, 2018f) was approved by TDEC in February 2018 and by USEPA in June 2018. Soil vapor samples were collected from shallow borings and sub-slab locations in August and October 2018. Eight vapor sample locations were in areas of the MI used for commercial operations in order to evaluate potential risk to onsite receptors. The other two sample locations were along the property boundary to evaluate potential risk to onsite commercial and offsite residential receptors. Three soil samples for geotechnical testing were collected from soil borings adjacent to three of the soil vapor sample locations. The sample locations are shown on [Figure 17](#).

The *Soil Vapor Sampling, Main Installation Vapor Intrusion Study Memorandum* (HDR, 2019a) was submitted to USEPA and TDEC in January 2019. The memo had the following conclusions:

- Primary CVOCs (PCE, TCE, CT and CF), as well as benzene, ethyl benzene and naphthalene, were each reported in multiple soil vapor samples at concentrations exceeding screening levels.
- Risk estimates for commercial exposure by the Vapor Intrusion Screening Level (VISL) Calculator (USEPA, 2018) and the Johnson-Ettinger Model (USEPA, 2017) indicated cumulative cancer risks above 1×10^{-6} at three locations and cumulative HI above 1.0 at two locations.
- The presence of VOCs in soil vapor samples at locations where those analytes have not been detected in groundwater suggests residual soil contamination in those areas.
- Geotechnical analysis of soil samples identified the shallow soil (loess) as lean clayey silt with permeability test results of 4.6×10^{-8} to 9×10^{-8} centimeters per second.

The soil vapor sample results were used to prepare the *Main Installation Vapor Intrusion Indoor Air Sampling QAPP, Revision 0* (HDR, 2019b), which was submitted to USEPA and TDEC for review in April 2019.

USEPA provided comments on the Soil Vapor Sampling Memorandum on 17 June 2019 and Army's responses to the comments were submitted on 6 November 2019. A conference call with Army, USACE, USEPA and contractors was held on 12 December 2019 to discuss the MI VI study, USEPA comments and the scope of additional VI study. Prior to the call, USEPA provided additional comments on Army responses to comments and identified data gaps to be addressed by the MI VI Study. There was general agreement on the call that the data gaps were appropriate and warranted additional data collection and assessment. It was also agreed that Army halt plans for additional limited sampling in order to develop an updated CSM focused on VI and prepare a comprehensive sampling plan (CSP) to guide additional investigation.

A follow-up meeting was held at the USEPA Region 4 office in Atlanta on 12 February 2020 to discuss additional information needed to prepare the CSM and the CSP to address data gaps to be identified in the CSM. The information to be included in the CSM was discussed based on EPA guidance (OSWER Publication 9200.2-154, 2015). Preliminary CSM figures and tables prepared by Army were reviewed at the meeting. Discussion items included passive soil gas sampling to screen the large area outlined by the plumes with a 100-foot buffer; VI screening levels with residential exposure criteria for the on-site housing area and off-site residential areas; review of historical maximum groundwater concentrations to identify areas with potential for VI; and potential for utility corridors to provide preferential migration of VOCs.

A meeting summary was provided to all participants and the final summary was revised to incorporate USEPA comments. The VI CSM is being prepared, in accordance with the meeting summary, for submittal to USEPA and TDEC in 2020.

3.1.8 Garden Soil Sampling

In 2017, Barnhart Crane & Rigging Company (Barnhart) partnered with Landmark Training and Development Company to start a job skills/employability program for young adults and working age youth. The program included use of a 0.6-acre area as a flower and vegetable garden; use of the area for gardening was halted in June 2018. The garden area is located along the property boundary in the northwest quadrant of the MI ([Figure 18](#)). No removal actions or environmental sites have been identified in close proximity to the garden area ([Figures 3 and 8](#)). Army agreed to test soil in the garden area in response to USEPA concerns about use of the property for gardening based on the existing land use restrictions and potential for soil contamination resulting from past DDMT operations.

The samples were collected in August 2019. The area was divided into eight sample cells and a representative sample location in each cell was selected based on visual inspection ([Figure 19](#)). The sample locations included 'disturbed' areas that were used for planting (01, 02, 03 and 04), a 'disturbed' area that appeared to be a soil stockpile (08), and 'undisturbed' areas (05, 06 and 07) where planting was limited to containers. One soil sample (S09) was also collected from a container previously used for planting that was moved outside the fenced garden area prior to sampling ([Figure 19](#)). Samples were collected from 0 to 6 and 12 to 18 inches bgs in the garden area and from 6 to 12 inches below soil surface in the container.

The samples were analyzed for a broad range of potential contaminants: VOCs, semi-volatile organic compounds (SVOCs), PAHs, organochlorine pesticides, PCBs, metals and hexavalent chromium. The analytical results were compared to USEPA RSLs for industrial and residential exposure with a target cancer risk of 1E-06 and target hazard quotient of 1.

Residential RSLs were exceeded for four PAHs (Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenzo(a,h)anthracene), one pesticide (4,4-DDE) and for two metals (arsenic and hexavalent chromium). Arsenic was the only analyte to exceed an industrial RSL. However, all but one of the sample concentrations were below the arsenic background concentration (16,500 µg/kg) established for DDMT in 1998. Based on the analytical results, residential-type uses, including gardening, are not appropriate within the area subject to land use restrictions ([Section 3.3.1](#)). The *Final Garden Soil Sampling Report* (HDR, 2019g) was provided to USEPA and TDEC for their information in December 2019.

3.2 Dunn Field (OU-1)

Dunn Field, which is located across Dunn Avenue from the MI, contains approximately 67 acres and includes former mineral storage and waste disposal areas. Approximately 41 acres have been transferred through a public benefit conveyance and a competitive public sale; approximately 26 acres along the western and northern sides of Dunn Field are still held by Army. (See [Section 3.3.](#))

Site records indicated that chemical warfare material, chlorinated lime, super tropical bleach, and calcium hypochlorite, food stocks, paints/thinners, petroleum/oil/lubricants, acids, herbicides, mixed chemicals, and medical waste were destroyed or buried in pits and trenches at the Dunn Field disposal sites. Subsurface soils, including those from the disposal sites in the Disposal Area were considered to be principal threat wastes, which significantly degraded groundwater quality in the shallow Fluvial Aquifer. The following CVOCs were detected at elevated concentrations in subsurface soils in the Disposal Area:

- PCE
- TCE
- cDCE
- VC
- 1,1,2,2-Tetrachloroethane (TeCA)
- 1,1,2-Trichloroethane (TCA)
- CT
- CF

Groundwater samples were analyzed for explosives, herbicides, metals (total), pesticides, PCBs, SVOCs, and VOCs; samples were also analyzed for chemical warfare materiel breakdown products. Only CVOCs were selected as COCs for groundwater; the CVOCs with the highest groundwater concentrations were TeCA and TCE. Three CVOC plumes were identified in the Fluvial Aquifer: a northern plume, a central plume, and a southern plume. The plume along the northern boundary of the site was determined to have on-site sources due to previous releases in the northwest section of the Disposal Area on Dunn Field and undetermined off-site sources based on CVOCs detected in off-site monitoring wells (MWs) upgradient of Dunn Field. The central and southern plumes had on-site sources due to releases in the Disposal Area ([Figure 4](#)). The site investigations and evaluation of remedial alternatives

are described in the *Memphis Depot Dunn Field Remedial Investigation Report* (CH2M HILL, 2002) and the *Memphis Depot Dunn Field Feasibility Study Report* (CH2M HILL, 2003b).

3.2.1 Prior Remedial and Removal Actions

The following actions were taken on Dunn Field prior to the ROD in 2004. The locations are shown on [Figure 4](#).

3.2.1.1 Interim Remedial Action

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 to reduce contaminant mass in groundwater. The interim groundwater extraction system began operation in November 1998 with seven recovery wells (RWs); four additional RWs were brought on-line in 2001. Groundwater was discharged without treatment to the city sewer system under Industrial Discharge Agreement S-NN3-097.

Based on reduction of CVOC concentrations in groundwater following implementation of the Dunn Field ROD, all RWs were shut down by January 2009. Approximately 918 pounds of total VOCs were discharged by the interim remedial action (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 the closure activities were described in *2009 Operations and Closure Report, Dunn Field Groundwater Interim Remedial Action* (HDR, 2010).

3.2.1.2 Removal Actions

The following non-time critical removal actions were performed:

- Approximately 914 CY of soil contaminated with mustard degradation by-products, 19 CY of mustard-contaminated soil and 29 bomb casings were removed by ET&D at two separate locations on Dunn Field. The action was completed in March 2001 and documented in the *Final Chemical Warfare Materiel Investigation/Removal Action Report* (UXB International, Inc., 2001).
- Approximately 930 CY of lead-contaminated surface soil from the former pistol range were removed by ET&D. The action was completed in March 2003 and documented in *Removal Action at Former Pistol Range, Site 60* (Jacobs Federal Programs, 2003a).

3.2.2 Record of Decision and ROD Amendment

The *Memphis Depot Dunn Field Record of Decision* (Dunn Field ROD) (CH2M HILL, 2004a) was approved in April 2004 and the *Dunn Field Record of Decision Amendment* (ROD Amendment) (e²M, 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

Remedial goal objectives for soil, vapor and groundwater included in the Dunn Field ROD are shown on [Table 5](#). The soil screening levels for loess and fluvial deposit were used as RGs to be met by the RAs.

Since multiple CVOCs were detected in groundwater on Dunn Field and downgradient, targeting to meet the MCLs was not considered adequately protective of a potentially exposed receptor due to the possibility of cumulative toxicity exceeding the upper-bound limit of the acceptable risk or hazard index (HI). The individual concentration of each CVOC in plumes origination from Dunn Field are to be below MCLs and combined concentration levels are to be below a cumulative upper-bound target risk of 1 in 10,000 (1×10^{-4}) and a HI of 1.0 at each LTM well. Preliminary TCs for groundwater, which assume all primary CVOCs are present, are shown on [Table 5](#).

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

- ET&D of soil and material contained within disposal sites based upon results from a pre-design investigation
- 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 TCs.
- Implementation of LUCs, which consist of deed and/or lease restrictions; Notice of Land Use Restrictions; City of Memphis/Shelby County zoning restrictions and the SCHD groundwater well restrictions.

The Dunn Field ROD identified the eastern portion of Dunn Field, including most of the Northeast Open Area and the Stockpile Area, as suitable for unrestricted use and unlimited exposure (Figure 4).

The fundamental change documented 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 criteria used to determine the extent of the AS/SVE system and the treatment objective were also included in the ROD Amendment. 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. The RGs and TCs for the COCs shown on Table 5 were not changed from the Dunn Field ROD.

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). Locations of the Disposal Sites, Source Areas and Off Depot Groundwater RAs are shown on Figure 20.

3.2.3 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 off-site disposal in accordance with the *Memphis Depot Dunn Field Disposal Sites Final Remedial Design, Revision 1* (CH2M HILL, 2004b). The *Dunn Field Disposal Sites Remedial Action Completion Report, Revision 1* (MACTEC, 2006), was approved by USEPA in August 2006.

The Disposal Sites RA was performed during two separate mobilizations in 2005 and 2006. Approximately 2,700 CY of non-hazardous materials were transported off-site and disposed 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.

3.2.4 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 with residual 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 *Source Areas Interim Remedial Action Completion Report, Dunn Field, Revision 1* (HDR|e²M, 2009) was approved by USEPA and TDEC in November 2009. The *Dunn Field Operating Properly and Successfully Demonstration, Source Areas Remedial Action* (e²M, 2009c) was approved by USEPA in October 2009.

The Fluvial SVE (FSVE) system was installed to remove CVOCs from the fluvial sands at Dunn Field with screened intervals for the SVE wells at approximately 30 to 70 feet bgs. The FSVE system was operated from July 2007 through July 2012 under SCHD Permit #01030-01P; permit conditions included an emission limit of 5.71 lb/hr for VOCs and annual reporting of emissions. The FSVE system was shut down in July 2012 based on confirmation soil sample results demonstrating that RAOs had been met; approximately 4,000 pounds of VOCs were removed during the five years of operation. The final year of operations and monitoring was described in *Dunn Field Source Areas Fluvial Soil Vapor Extraction System Annual Operations Report, Year Five, Revision 0* (HDR, 2012a), 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 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. The thermal conduction wells operated from May to November 2008, and the vapor extraction system was shut down on 4 December 2008. Approximately 12,500 pounds of VOCs were removed during treatment. Confirmation soil samples demonstrated that clean-up standards were met.

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

3.2.5 Off Depot Groundwater Remedial Action

3.2.5.1 Early Implementation

An Early Implementation of Selected Remedy (EISR) using ZVI was performed to reduce contaminant mass downgradient of the planned PRB in order 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. The *EISR Interim Remedial Action Completion Report, Revision 1* (MACTEC, 2005) 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 in September 2005.

3.2.5.2 AS/SVE

The Off Depot Groundwater 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 LUCs to prevent access to contaminated groundwater. The AS/SVE system was constructed in accordance with the *Memphis Depot Dunn Field Off Depot Groundwater Final Remedial Design, Revision 1* (Off Depot RD) (CH2M HILL, 2008). Remedial action construction and implementation are described in *Off Depot Groundwater Interim Remedial Action Completion Report, Revision 1* (Off Depot IRACR) (HDR, 2011), which 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. The AS/SVE system layout and nearby monitoring wells are shown on [Figure 21](#).

The vapor stream passes through an 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 SCHD Permit #01030-01P issued for the FSVE system, with the VOC emission limit of 5.71 lb/hr applicable to the combined operations. SCHD cancelled the permit in 2016 and exempted the remediation system based on emissions being below the de minimus limit of 0.1 lb/hr. Effluent vapor monitoring will continue to confirm emissions remain below the de minimus limit.

AS/SVE operations include:

- Weekly site visits to adjust AS compressor and SVE blower cycles in accordance with the operating plan and to conduct system inspections to identify and schedule repair or replacement of components, as needed.
- Bi-weekly readings at AS compressor and SVE blowers for flow rate, pressure/ vacuum, temperature, and operating hours.
- Monthly flow rate, vacuum and photoionization detector (PID) measurements at SVE wells and system effluent during months when the AS manifold is open.
- Quarterly PID and vacuum measurements at VMPs.
- Quarterly vapor samples of system effluent for laboratory analysis of VOCs by TO-15.
- Semiannual report to describe operations and maintenance 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.

The latest annual report, *Off Depot Air Sparge/ Soil Vapor Extraction System Annual Operations Report, Year Eight (May 2018 through July 2019)*, Defense Depot Memphis Tennessee, Revision 0 (Trinity, 2019), was submitted to USEPA and TDEC in November 2019. The AS/SVE system is limited to full operations in alternate months to maintain northerly groundwater flow in the treatment area; the system uptime in Year 8 was approximately 87 percent during periods of full operation.

The SVE system extracted over three times the AS injection rate and vacuum measurements indicated vapor capture throughout the treatment area during Year 8. Total VOC concentrations in effluent vapor samples ranged from 75.7 to 85.2 parts per billion by volume (ppbv). The July 2019 (Y8Q4A) total VOC concentration (75.7 ppbv) is approximately 6 percent of the concentration at startup in December 2009 (1240 ppbv). The estimated VOC emission rate in the effluent during Year Eight was 0.001 pound per hour (lb/hr), below the SCHD de minimus standard of 0.1 lb/hr. Approximately 87 pounds of VOCs have been removed since startup in 2009.

Year 9 AS/SVE system operations were halted 28 August 2019, due to a suspected power surge which damaged the programmable logic controllers (PLCs) for the SVE and AS systems. The SVE system PLC was replaced 27 September and a single SVE blower was operated to maintain vapor capture in the treatment area. The AS PLC was replaced on 22 October and full operation of the AS/SVE system resumed.

Overall performance of the AS/SVE system is evaluated based on results of LTM analyses. The AS/SVE system was installed to intercept the majority of the Off Depot CVOC plume and to reduce individual CVOC concentrations below 50 µg/L. Operations are to continue until concentrations do not exceed 50 µg/L for individual CVOCs in upgradient wells. The only wells, upgradient or downgradient of the AS/SVE system, with CVOC concentrations exceeding the active remediation goal in April 2019 were TCE at 99.3 µg/L in MW-159 located immediately upgradient of the system, and CF at 93.4 µg/L in MW-87 located near the Dunn Field boundary.

In order to address the continued high concentration of TCE at MW-159, additional AS wells will be installed south of MW-159 to increase removal of CVOCs from groundwater; the well locations are shown on [Figure 21](#). The *Off Depot Air Sparge Well Installation Work Plan, Dunn Field* (Trinity, 2016) was approved by USEPA and TDEC in 2016. Army initiated discussion with MLGW for revision of the access agreement in June 2016, but MLGW was not responsive. TDEC and USEPA submitted letters in support of the agreement in 2019. A final access agreement between MLGW and Army was executed in June 2020; the additional AS wells and connections to the AS manifold are to be constructed in September 2020. Additional investigation in the area surrounding MW-87 is in progress, as discussed in [Section 3.2.7.2](#).

CVOC concentrations at MW-144 and MW-190, west of the central section of Dunn Field, have been referred to as a 'hot spot' by USEPA. These wells are within the groundwater plume originating on Dunn Field and had concentrations of TeCA and TCE above 1,000 µg/L in 2006 prior to implementation of the selected remedy; concentrations are now near 10 µg/L for TeCA and 40 µg/L for TCE and have been stable for the past few years.

The initial project schedule assumed AS/SVE operations would be conducted for 5 years. However, since the active remediation goal of CVOC concentrations at 50 µg/L (or less) has not been met, operations are currently planned to continue through July 2021.

3.2.6 Long-Term Monitoring

From 1999 to 2010, groundwater monitoring on Dunn Field was conducted to evaluate IRA 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 (CH2M HILL, 2008). Dunn Field LTM is conducted to evaluate progress in meeting RAOs to prevent further off-site 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. LTM sample analyses include most USEPA TCL VOCs; analytical summary tables include the primary CVOCs and other VOCs detected above the laboratory LOQ in one or more samples. The primary CVOCs for Dunn Field are CT, CF, 1,1-dichloroethene (DCE), trans-1,2-dichloroethene, cDCE, TeCA, PCE, TCA, TCE, and VC.

As noted in [Section 3.1.4](#), LTM wells are assigned to the Fluvial, Intermediate or Memphis Aquifers. In addition, the Dunn Field (DF) LTM wells are grouped in the following area/plumes: DF North, DF West, Off Depot and Background.

In 2019, Dunn Field LTM comprised 85 wells. The LTM wells are listed on [Table 6](#) and the well locations, color-coded by area, are shown on [Figure 22](#). The number of wells and 2018 sample frequencies by aquifer are:

- 80 Fluvial Aquifer - semiannual (10), annual (35) and biennial (35);
- 4 IAQ/UC - annual (2) and biennial (2); and
- 1 MAQ - biennial (1).

The April 2019 LTM event consisted of a water level sweep and biennial groundwater sampling; a total of 85 groundwater samples were collected. The analytical results for the primary CVOCs from the sample event were used to evaluate extent of contamination and prepare CVOc concentration maps. The April 2019 LTM Report (HDR, 2019d) was submitted to USEPA and TDEC in August 2019.

The number of Dunn Field LTM wells with primary CVOcs exceeding an MCL or TC and the maximum concentration for those CVOcs are summarized by aquifer and area on [Table 7](#). A total of 14 Dunn Field LTM wells had concentrations above an MCL or TC for one or more primary CVOcs; all 14 wells are screened in the Fluvial Aquifer and 8 of the wells are located along the northern boundary of Dunn Field or off-site near that area.

TCE was most often detected above MCLs and had a maximum concentration of 99.3 µg/L (MW-159). Concentrations and isopleths for total CVOcs and TCE from the April 2019 LTM event are shown on [Figures 23 and 24](#).

3.2.7 Additional Groundwater Investigation

3.2.7.1 Off-Site Plume Investigation

CVOc concentrations above MCLs in Fluvial Aquifer wells on the north end of Dunn Field are considered to result from contaminant migration from a suspected, off-site source(s) upgradient

of Dunn Field. Concentrations of DCE, PCE and TCE above MCLs have been detected at the north end of Dunn Field since 1993. Groundwater concentrations have exceeded MCLs for DCE, PCE, and TCE in off-site, upgradient wells (MW-129 and MW-130) since installation in 2003 (Jacobs Federal Programs, 2003b). In addition, several abandoned monitoring wells in the northern section of Dunn Field and the adjacent off-site area exceeded MCLs for the primary CVOCs; the abandoned wells are shown on [Figure 25](#).

TDEC conducted preliminary assessments and site investigations upgradient of Dunn Field to identify an off-site source(s). During investigations at the Wabash Avenue and Cintas/Production Specialties sites from 2005 to 2008, TDEC installed 11 monitoring wells ([Figure 25](#)). Elevated concentrations of CVOCs were detected at the Cintas site, but TDEC did not consider it a source for the plume migrating on to Dunn Field.

Army conducted a membrane interface probe (MIP) survey with confirmation soil sampling at the northeast corner of Dunn Field in March and April 2017 ([Figure 25](#)). *The Membrane Interface Probe Survey Report, Dunn Field* (Trinity, 2017) was approved by TDEC in November 2017 and by USEPA in February 2018. The report concluded there was no indication of source materials in the northeast portion of Dunn Field contributing to elevated CVOC concentrations in groundwater.

In October 2017, Army measured water levels and collected groundwater samples for VOC analysis from the ten TDEC wells that were still usable. *Data Collection at TDEC Wells, Dunn Field, Defense Depot Memphis, Tennessee* (HDR, 2017a) was submitted to USEPA and TDEC in December 2017. Several CVOCs were detected above the LOQ in one or more wells (DCE, CT, CF, PCE, TCE and 1,1-dichloroethane). The only CVOC reported above an MCL was DCE in CS-02 at 16.3 µg/L. The upgradient limits of the off-site plumes for TCE and DCE, based on concentrations above the LOQ, are located on the Cintas site.

The *Dunn Field Offsite Groundwater Investigation QAPP, Revision 1* (HDR, 2020d) was submitted in May 2020, following resolution of comments from USEPA; TDEC approved the QAPP in September 2019. Ten fluvial aquifer monitoring wells were planned to be installed on Dunn Field and offsite to the north and northeast ([Figure 25](#)) to provide data on hydrogeology and contaminant extent. Nine wells were installed at the planned locations in June 2020; an access agreement could not be obtained for one location (F-10). Groundwater samples were collected from the new wells in June 2020 and preliminary results were provided to USEPA and TDEC in July 2020. The new wells and the 10 existing TDEC wells will be sampled in four quarterly sampling events beginning in October 2020. A comprehensive Offsite Groundwater Investigation report will be prepared following the fourth quarterly event.

3.2.7.2 MW-87 Area Investigation

Investigation in the area of LTM well MW-87 ([Figure 22](#)) is being conducted in preparation for transfer, through competitive public sale, of the remaining government-owned property (approximately 26 acres) along the western and northern boundaries of Dunn Field. The deed for property transfer will require compliance with land use restrictions for Dunn Field, including no residential land use or other child-occupied facilities ([Section 3.3.2](#)).

CVOC concentrations in groundwater for all DF West wells were reduced below MCLs or TCs between April 2007 and April 2012 and have remained below those limits with only sporadic exceptions, except at MW-87. CVOC concentrations in MW-87 were reduced below MCLs and TCs for all CVOCs in April 2011, but began to rebound in 2013. The CF concentration increased above the TC in April 2013 and above the MCL in April 2017; the TCE concentration increased above the MCL in April 2016. The concentrations of CF (93.4 µg/L) and TCE (8.79 µg/L) were above MCLs in April 2019.

The rebound in groundwater concentrations indicates residual contamination is present in the fine-grained soils (loess and upper fluvial deposits) near MW-87. The migration of contaminants through the coarse-grained lower fluvial deposits was prevented by the SVE system operating on Dunn Field from 2007 to 2012. Contaminant migration resumed in late 2012 and increased CVOC concentrations in LTM samples were initially observed in 2013.

Additional investigation including soil, soil vapor and groundwater sampling is being conducted to identify the area of residual soil contamination and improve delineation of groundwater contamination. Analytical results will be used to estimate exposure point concentrations (EPCs) for evaluating potential exposure to contaminants in surface soil (0-2 feet bgs), subsurface soil (2-10 feet bgs), soil vapor and groundwater. The general scope of the investigation was discussed with USEPA and TDEC in conference calls. A work plan was prepared for this investigation and provided to USEPA and TDEC for their information in February 2020. Field investigation began in May 2020 and is continuing. An access agreement for installation of one or more groundwater monitoring wells on the parcel adjacent to the MW-87 area of Dunn Field is being pursued by Army.

3.3 Property Transfer and Land Use Controls

All DDMT property was made available for transfer through six Findings of Suitability to Transfer (FOSTs). The area covered by each FOST is shown on [Figure 26](#). 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, and all institutional or other controls required in the RODs have been put in place. This is based on USEPA concurrence with interim remedial action completion reports for DDMT and findings that remedies were 'operating properly and successfully', and on implementation of requirements of the approved Land Use Control Implementation Plans. Operation and monitoring of remedial actions at DDMT will continue until RAOs have been met.

Property transfers through deed or letter of assignment have been completed for all FOSTs, except for the western and northern area on Dunn Field included in FOST 5. DoD has prepared FOSTs to summarize how applicable requirements and notifications for hazardous substances on the property have been satisfied in order for DoD to provide the applicable CERCLA 120(h)(3) or CERCLA 120(h)(4) covenants. Each FOST states the property is environmentally suitable for transfer and contains a description of any long-term remedies (including land-use controls) and responsibilities for their maintenance and reporting. For NPL sites, such as DDMT,

the FOST is forwarded to the State and to USEPA for review and comment, but approval is not required. Deeds transferring real property from DoD contain, to the extent required by law, the notices, descriptions, and covenants specified in Section 120(h) of CERCLA and are submitted to USEPA for concurrence. Army plans to transfer the remaining 26 acres from FOST 5 through a competitive public sale. The acreage, type of conveyance, type of transfer, receiving party and date of transfer are listed on [Table 8](#).

DDMT is currently zoned for light industrial use. The MI is used for commercial warehousing and light manufacturing, except in the southeast quadrant of the MI where the Airways police station, a homeless shelter for veterans and a golf course are located; Dunn Field is undeveloped ([Figure 2](#)). The current property owners, acreage and land use are listed on [Table 9](#).

LUCs have been established for the MI and Dunn Field, as described in the following subsections. 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. Annual inspections are conducted to determine whether the required LUCs remain effective and that land use restrictions are being achieved.

3.3.1 Main Installation

LUCs for the MI are described in the LUCIP in Appendix C of the MI RD (CH2M HILL, 2004c). The LUCs prevent residential use of the majority of the MI and production or consumptive use of groundwater or drilling of groundwater supply wells throughout the MI; the areas covered by the LUCs are shown on [Figure 27](#).

The MI LUCIP was implemented in 2005. 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 were included in property transfers from Army. Annual inspections have been performed since 2005 and reports have been distributed in accordance with the LUCIP. The *2019 Annual Site Inspection Report* (HDR, 2019e) was submitted to USEPA and TDEC on 27 August 2019.

The *2018 Annual Site Inspection Report* (HDR, 2019c) noted that leases did not consistently include the LUCs and Environmental Protection Provisions (EPP). In contacts with property owners prior to the 2019 inspection, the owners stated the leases prepared since July 2018 reference the LUCs and the EPP. No deficiencies were identified in the 2019 inspection.

3.3.2 Dunn Field

LUCs for Dunn Field are described in the LUCIP in Appendix A of the Off Depot RD (CH2M HILL, 2008). The LUCs are to limit use of the Disposal Area to light industrial land uses, to prevent residential use of Dunn Field, and to prevent exposure to contaminated groundwater. The majority of the eastern section of Dunn Field was approved for unrestricted use in the Dunn Field ROD (CH2M HILL, 2004a). There is some overlap between the unrestricted use area and the areas subject to LUCs as approved in the Dunn Field LUCIP ([Figure 28](#)).

The Dunn Field LUCIP was implemented in 2009. 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. The *2019 Annual Site Inspection Report* (HDR, 2019e) was submitted to USEPA and TDEC on 27 August 2019. No deficiencies were identified.

4 Activities Required for Site Completion

Selected remedies for DDMT have been implemented in accordance with the MI ROD and the Dunn Field ROD Amendment, 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.

The selected remedies met soil cleanup standards. The remaining requirement for completion of remedial action is that groundwater concentrations for CVOCs, which are the contaminants of concern, are below MCLs.

Ongoing and planned activities are summarized below. The timeline for site activities is discussed in [Section 4.3](#).

- SRI field activities were completed in November 2019 ([Section 3.1.5](#)). The draft SRI report was submitted to Army and USACE for review in April 2020; following resolution of comments, the report will be submitted to USEPA and TDEC for review. The FFS will be completed following agency approval of the final SRI report. A decision document (ESD or ROD Amendment) will be prepared as necessary to document changes to the selected remedy. Further RA will be conducted after completion of the decision document.
- The HHERA report ([Section 3.1.6](#)) has been revised in accordance with the conditional approval, and the results of additional data review and risk assessment are being used to prepare a QAPP to document the data review, plans for additional sampling and analysis, and additional risk assessment.
- A VI CSM is being prepared in accordance USEPA guidance (OSWER Publication 9200.2-154, 2015) and discussions at the 12 February 2020 meeting with USEPA ([Section 3.1.7](#)). Following completion of the VI CSM, a comprehensive sampling plan will be prepared to guide additional investigation.
- AS/SVE operations ([Section 3.2.5.2](#)) will continue until concentrations do not exceed 50 µg/L for individual CVOCs in upgradient wells. Only a small area near MW-159 currently exceeds the active remediation goal. Additional AS wells are to be installed in that area in September 2020. Operations are currently planned to continue through August 2022.
- Offsite groundwater investigation is being conducted to further evaluate the source of the plume along the northern boundary of Dunn Field ([Section 3.2.7.1](#)).
- FSVE operations on Dunn Field were shut down in July 2012 after remediation goals were met. The SVE wells, piping and equipment compound remain in place while groundwater is monitored for rebound. Increased CVOC concentrations in groundwater have been observed in only one area on Dunn Field, MW-87 near the west-central boundary of Dunn Field ([Section 3.2.7.2](#)). Additional investigation is being performed in the MW-87 area to evaluate potential exposure to contaminants in soil, groundwater and

vapor prior to the planned transfer of the remaining government-owned property on Dunn Field.

- LTM at the MI ([Section 3.1.4](#)) and Dunn Field ([Section 3.2.6](#)) is performed to monitor contaminant migration horizontally and vertically and to evaluate progress toward restoring groundwater concentrations to remediation goals. LTM will continue until CVOC concentrations are at or below MCLs, and TCs for Dunn Field.
- LUCs and requirements for Five-Year Reviews will remain in place until concentrations of contaminants of concern have been reduced to levels that allow for unlimited exposure and unrestricted use.

4.1 Land Use Controls

The LUCs applicable to the MI and Dunn Field are described in the LUCIPs in the MI RD (CH2M HILL, 2004c) and the Off Depot RD (CH2M HILL, 2008). The areas covered by the LUCs are shown on [Figures 27](#) and [28](#). LUCs will remain in place until concentrations of contaminants of concern have been reduced to levels that allow for unlimited exposure and unrestricted use. As described in [Section 3.3](#), annual inspections are conducted to determine whether the required LUCs remain effective and that land use restrictions are being achieved. No deficiencies were identified in 2019.

4.2 Five-Year Reviews

The continued effectiveness of the selected remedies at the MI and Dunn Field are evaluated in CERCLA Five-Year Reviews because hazardous substances remain at the site above levels that allow for unrestricted use and unlimited exposure. Because the final remedies for both the MI and Dunn Field include LUCs in perpetuity, the period in which five-year reviews will be required is indefinite.

The initial statutory review, *Memphis Depot, Dunn Field Five Year Review* (CH2M HILL, 2003a), was triggered by initiation of the IRA groundwater recovery system at Dunn Field on DDMT in 1998. The *Second Five-Year Review, Revision 1* (e²M, 2007) was approved in January 2008, and the *Third Five-Year Review, Revision 1* (HDR, 2012b) was approved in January 2013.

The latest five-year review was conducted in 2017 in accordance with *Comprehensive Five-Year Review Guidance* (USEPA, 2001). The *Fourth Five-Year Review, Revision 2* (HDR, 2018b) was approved and signed by USEPA in April 2018.

The remedy at Dunn Field (OU 1) was found to be protective of human health and the environment. RAs completed to date have met the RGs and the operating AS/SVE system is functioning as intended. Exposure pathways that could result in unacceptable risks are being controlled through LUCs.

The remedy at the MI (OUs 2, 3 and 4) was found to be short-term protective of human health and the environment. There is no current exposure to COCs in groundwater and exposure pathways that could result in unacceptable risks are being controlled through LUCs. The

presence of a complete VI pathway is still being evaluated on the MI. Additional lines of evidence are needed to provide a conservative assessment of the VI risk to human health. In order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness:

1. The selected remedy must be improved to reduce COC concentrations below MCLs throughout the MI in a reasonable period of time. An SRI and other studies (risk assessment, vapor intrusion, vertical profiling, CSM update and SVE pilot test) are underway; an FFS will be performed upon completion of the SRI to evaluate alternative remedies. Long-term protectiveness will be verified by groundwater sampling performed during LTM and compliance monitoring.
2. The VI study must be completed in accordance with DoD and USEPA guidance, and with consideration of TDEC guidance, to evaluate whether there is a complete VI pathway.

The issues, recommended actions, schedule and status are shown on [Table 10](#).

An additional recommendation was identified which does not affect current and/or future protectiveness:

1. Additional investigation of the suspected off-site source for the groundwater plume migrating on to the northeast section of Dunn Field is necessary to evaluate whether Army has any responsibility for remedial action of the plume on Dunn Field and its impact on site closure for Dunn Field.

4.3 Timeline for Site Completion

The master schedule for MI, Dunn Field and site-wide activities through planned site completion in March 2028 is shown on [Figure 29](#). The planned completion date is the same as in the 2019 SMP. The estimated timeline for site completion includes the following:

- Main Installation
 - SRI to be completed in September 2020.
 - FFS to be completed in April 2021.
 - Additional MI Risk Assessment to be completed in October 2021.
 - ROD Amendment to be final in March 2022.
 - New Comprehensive MI VI Study to be completed in March 2024.
 - Additional RA from December 2022 through December 2025.
 - MI LTM through 2025, with final quarterly compliance monitoring in 2026.
 - MI Remedial Action Completion Report to be completed in September 2027.

- Dunn Field
 - Additional AS wells installed in May 2020.
 - Off Depot AS/SVE operates through July 2021 (Year 10).
 - Dunn Field LTM through 2021, with final quarterly compliance monitoring in 2022.
 - Dunn Field Remedial Action Completion Report to be completed in October 2023.
- Final Closeout Report to be completed in March 2028.

The timeline described above is considered a reasonable estimate given current information. Significant variables include the time required for additional MI RA to achieve RAOs and whether additional RA is necessary on the MI following additional soil/sediment sampling and risk assessment and the comprehensive MI VI study or on Dunn Field to address rebound in CVOC concentrations on Dunn Field.

The schedule assumes 3 years of additional RA at the MI, which may not be sufficient; the estimated schedule for RA will be included in the FFS.

The schedule assumes additional AS wells will be installed in early 2020 and Year 10 (August 2019 to July 2020) will be the final year of AS/SVE operation.

5 Schedule and Fiscal Year Requirements

5.1 Response Schedules

The environmental restoration activities currently planned for the next three fiscal years are summarized below. [Table 11](#) lists primary and secondary documents for the DDMT environmental restoration program through FY22; primary and secondary documents are defined in the FFA, Section XV (USEPA, 1995).

5.1.1 FY20

- MI RA
 - o Complete SVE pilot test and prepare the summary report.
 - o Prepare the CSM update memorandum.
 - o Submit the final SRI report, including additional studies.
 - o Evaluate remedial alternatives and begin the FFS report.
 - o Submit the final HHRA report, complete additional data review and complete the QAPP for additional soil/sediment sampling and risk assessment.
 - o Complete VI CSM and begin comprehensive VI sampling plan.
- MI LTM – Incorporate SRI Phase 4 wells and perform groundwater monitoring in accordance with LTM plan.
- Dunn Field/Off Depot RA
 - o Install additional AS wells near MW-159, pending access agreement.
 - o Complete Year 9 AS/SVE operations and monitoring and begin Year 10.
 - o Conduct MW-87 area investigation and prepare summary report with recommendation for further action, if necessary.
- Dunn Field LTM – Perform groundwater monitoring in accordance with LTM plan.
- Off-Site Plume – Complete QAPP for off-site investigation, install additional monitoring wells, collect initial samples and begin quarterly sampling.
- Site Management and Community Relations – Conduct annual LUC inspections; prepare SMP Update and annual community newsletter; and revise Community Involvement Plan.

5.1.2 FY21

- MI RA
 - o Submit final comprehensive VI sampling plan, complete comprehensive VI QAPP and begin VI sampling.

- o Conduct additional soil/sediment sampling and risk assessment and submit comprehensive risk assessment report for review.
 - o Complete the FFS report, prepare Revised Proposed Plan, hold public meeting and comment period and begin the MI ESD or ROD Amendment.
- MI LTM – Perform groundwater monitoring in accordance with LTM plan.
- Dunn Field/Off Depot RA – Complete Year 10 AS/SVE operations and maintain AS/SVE system until Dunn Field compliance monitoring is completed.
- Dunn Field LTM – Perform groundwater monitoring in accordance with LTM plan.
- Off-Site Plume – Complete quarterly sampling for the off-site investigation and submit report with recommendation for further action, if necessary.
- Site Management and Community Relations – Conduct annual LUC inspections; prepare SMP Update and annual community newsletter.

5.1.3 FY22

- MI RA
 - o Continue comprehensive MI VI sampling program.
 - o Complete the MI ESD or ROD Amendment and the new MI RD.
 - o Complete MI RA Work Plan and begin RA construction.
- MI LTM – Perform groundwater monitoring in accordance with LTM plan.
- Dunn Field/Off Depot RA – Maintain AS/SVE system until Dunn Field compliance monitoring is completed.
- Dunn Field LTM – Complete groundwater monitoring in accordance with LTM plan in October 2021 and begin compliance monitoring.
- Off-Site Plume – Submit the final off-site investigation report.
- Site Management and Community Relations – Conduct annual LUC inspections; prepare SMP Update and annual community newsletter.

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 on a site-wide basis. These requirements are revised annually in accordance with updates to the cost-to-complete database (Headquarters Army Environmental System) maintained by Army.

6 References

A.T. Kearney, Inc. 1990. *RCRA Facilities Assessment Report, Department of Defense Memphis Depot, Memphis, Tennessee, EPA I.D. No. TN4210020570*. Prepared for the United States Environmental Protection Agency. January 1990.

CH2M HILL, 1996. *Record of Decision for Interim Remedial Action of the Groundwater at Dunn Field (OU-1) at the Defense Distribution Depot Memphis*. Prepared for U.S. Army Corps of Engineers, Huntsville Division. April 1996.

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Tables

TABLE 1
FUNCTIONAL UNIT AND AREA DESCRIPTIONS
2020 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 MI, 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.
7	Groundwater at the Main Installation	-	No past use of groundwater	Includes all groundwater beneath the Main Installation.

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
2020 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 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.
3	36.2	Mixed Chemical Burial Site (orthotoluidine dihydrochloride) (1955)	The selected CERCLA remedy included 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. No further action is required for this site.
4	36.3	POL Burial Site (thirteen 55-gallon drums of oil, grease, and paint)	This site is associated with Dunn Field groundwater remediation for administrative purposes. No further action is required for this site. SVE system in fluvial deposits operated from July 2007 to July 2012. Thermal-enhanced SVE 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 (AS)/SVE system began operating in December 2009. USEPA approved the Off Depot IRACR in August 2011. Additional AS wells will be installed upon completion of an access agreement with Memphis Light Gas and Water. AS/SVE system operations will continue through July 2021.
5	36.4	Methyl Bromide Burial Site A (3 cubic feet) (1955)	No further action is required for this site.
6	36.2	40,037 units ointment (eye) Burial Site (1955)	No further action is required for this site.
7	36.5	Nitric Acid Burial Site (1,700 quart bottles) (1954)	No further action is required for this site.
8	36.6	Methyl Bromide Burial Site B (3,768 1-gallon cans) (1954)	No further action is required for this site.
9	36.17	Ashes and Metal Burial Site (burning pit refuse) (1955)	No further action is required for this site.
10	36.21	Solid Waste Burial Site (near MW-10) (metal, glass, trash, etc.)	The selected CERCLA remedy included 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. No further action is required for this site.
11	36.7	Trichloroacetic Acid Burial (1,433 1-ounce bottles) (1965)	No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2020 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.
13	36.9	Mixed Chemical Burial (Acid, 900 pounds; unnamed solids, 8,100 pounds)	The selected CERCLA remedy included 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. No further action is required for this site.
14	36.22	Municipal Waste Burial Site B (near MW-12) (food, paper products)	No further action is required for this site.
15	36.23	Sodium Burial Sites (1968)	No further action is required for this site.
16	36.1	Unknown Acid Burial Site (1969)	No further action is required for this site.
17	36.11	Mixed Chemical Burial Site C (1969)	No further action is required for this site.
18	36.15	Plane Crash Residue (Dunn Field)	No further action is required for this site.
19	36.24	Former Tear Gas Canister Burn Site (Dunn Field)	No further action is required for this site.
20	36.25	Probable Asphalt Burial Site (Dunn Field)	No further action is required for this site.
21	36.26	XXCC-3 Burial Site (Dunn Field)	No further action is required for this site.
22	36.15	Hardware Burial Site (nuts and bolts) (Dunn Field)	No further action is required for this site.
23	36.29	Construction Debris and Food Burial Site (Dunn Field)	No further action is required for this site.
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 for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2020 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.
62	36.12/36.13	Bauxite Storage (Northeastern Quadrant of Dunn Field)	No further action is required for 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 for 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 included 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. 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.
73	Multiple	2,4-Dichlorophenoxyacetic Acid (all grassed areas)	No further action is required for this site.
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 for this site.
86	36.18/36.19	Food Supplies (Dunn Field)	No further action is required for this site.
90	36.3	POL Burial Site (thirty-two 55-gallon drums of oil, grease, and thinner; previously listed as Site No. 4.1) (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. No further action is required for this site.
91	36.23	Sodium Phosphate Burial previously listed as Site No. 15.1 (1968)	No further action is required for this site.
92	36.23	14 Burial Pits: Na ₂ PO ₄ , sodium, acid, medical supplies, and chlorinated lime previously listed as Site No. 15.2 (1969)	No further action is required for this site.
93	36.1	Acid Burial Site previously listed as Site No. 16.1	No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2020 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. EBT was selected as the CERCLA groundwater remedy. EBT was initially performed from May 2006 until February 2009. USEPA approved the MI IRACR and the OPS determination in March 2010. Additional EBT was conducted from November 2012 to August 2014. Further MI groundwater remedial action has been halted until Supplemental Remedial Investigation (SRI) and Focused Feasibility Study are completed, and the selected remedy has been confirmed or revised. SRI Phases 1 and 2 were completed in 2017. SRI Phase 3 was completed in 2018. Phase 4 field investigation was completed in 2019. The final SRI report, a vapor intrusion study and additional risk assessment are in progress.
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.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Site No.	Parcel No.	Description	Site Status
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.
73	Multiple	2,4-Dichlorophenoxyacetic Acid (all grassed areas)	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.
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.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Site No.	Parcel No.	Description	Site Status
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
2020 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	This 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 PCP 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 action is required for this site.
43	33.9	Former Underground PCP 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 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 PCP 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.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Site No.	Parcel No.	Description	Site Status
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.
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:

AS: Air Sparging

AST: aboveground storage tank

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

DDT: 4,4'-dichlorodiphenyltrichloroethane

DRMO: Defense and Reutilization Marketing Office

IRACR: Interim Remedial Action Completion Report

MI: Main Installation

MOGAS: motor gasoline

Na: sodium

OPS: Operating Properly and Successfully

PCB: polychlorinated biphenyl

PCP: pentachlorophenol

PO4: phosphate

POL: petroleum, oil, and lubricants

RACR: Remedial Action Completion Report

SRI: Supplemental Remedial Investigation

SVE: soil vapor extraction

USEPA: United States Environmental Protection Agency

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 LTM WELLS
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Area	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, NAVD)	Ground Elevation (ft, NAVD)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
DR1-1	Fluvial	TTA-1S	276300	800856	293.14	293.42	121.7	20	141.7
DR1-1A	Fluvial	TTA-1S	276307	800863	293.00	293.37	89.2	20	109.2
DR1-2	Fluvial	TTA-1N	276537	801153	290.00	291.39	97.7	20	117.7
DR1-3	Fluvial	TTA-1S	276527	801416	290.93	291.11	109.7	20	129.7
DR1-4	Fluvial	TTA-1S	276231	801400	292.78	293.00	106.3	20	126.3
DR1-5	Fluvial	TTA-1S	276080	800828	292.79	294.86	124.7	20	144.7
DR1-5A	Fluvial	TTA-1S	276087	800835	292.79	294.87	90.0	20	110.0
DR1-6	Fluvial	TTA-1S	276044	801103	292.79	293.50	114.4	20	134.4
DR1-6A	Fluvial	TTA-1S	276035	801104	292.79	293.58	90.9	20	110.9
DR1-7	Fluvial	TTA-1N	276791	801441	289.15	289.46	108.3	20	128.3
DR1-8	Fluvial	TTA-1N	276752	800875	290.09	290.47	92.7	20	112.7
DR2-1	Fluvial	TTA-2	276772	806498	304.90	305.08	73.9	20	93.9
DR2-2	Fluvial	TTA-2	276771	806659	292.79	304.67	78.4	15	93.4
DR2-3	Fluvial	TTA-2	276539	806203	303.44	303.66	93.0	20	113.0
DR2-4	Fluvial	TTA-2	276456	806633	303.55	303.96	88.1	20	108.1
DR2-5	Fluvial	TTA-2	276831	806180	292.79	305.72	84.5	15	99.5
DR2-6	Fluvial	TTA-2	276644	805861	304.70	304.92	94.6	20	114.6
MW-16	Fluvial	Background	278838	807100	299.86	300.19	57.6	15	72.6
MW-19	Fluvial	Background	278946	800782	290.57	290.86	83.1	10	93.1
MW-21	Fluvial	TTA-1N	276473	800602	292.79	295.30	92.1	15	107.1
MW-22	Fluvial	TTA-1S	275912	800702	298.04	298.49	95.4	10	105.4
MW-23	Fluvial	Background	275791	801817	298.99	299.24	101.2	10	111.2
MW-24	Fluvial	Background	275616	803539	299.51	299.81	97.3	15	112.3
MW-25A	Fluvial	TTA-2	275975	805521	269.88	270.13	73.0	10	83.0
MW-26	Fluvial	TTA-2	276508	805962	303.69	303.89	97.6	10	107.6
MW-34	Intermediate	Window	279411	801918	299.97	300.80	136.6	20	156.6
MW-38	Intermediate	Window	279141	802450	307.45	308.45	139.9	15	154.9
MW-39	Fluvial	W-C	277281	802598	296.28	296.58	95.5	20	115.5
MW-39A	Upper Claiborne	W-C	277278	802608	298.61	298.70	148.1	20	168.1
MW-50	Fluvial	TTA-2	276456	807065	298.82	299.32	115.0	10	125.0
MW-52	Fluvial	SE	275372	805897	279.26	279.71	94.0	10	104.0
MW-53	Fluvial	Background	279177	805136	306.38	305.58	72.5	10	82.5
MW-55	Fluvial	Background	279301	801205	292.08	292.48	64.0	10	74.0
MW-62	Fluvial	B-835	278290	801858	292.79	293.90	86.1	10	96.1
MW-63A	Fluvial	N-C	278200	803573	305.96	306.33	130.0	10	140.0
MW-63B	Fluvial	N-C	278201	803558	305.78	306.22	115.0	10	125.0
MW-64	Fluvial	TTA-2	276952	805006	304.21	304.46	102.0	10	112.0
MW-66A	Fluvial	TTA-1N	276626	799793	284.22	284.34	74.6	20	94.6
MW-85	Fluvial	TTA-2	276704	806065	292.79	304.50	95.9	15	110.9
MW-88	Fluvial	TTA-2	276879	806513	305.15	305.47	82.0	15	97.0
MW-89	Intermediate	Window	278287	802555	303.98	304.38	147.0	30	177.0
MW-90	Intermediate	Window	278284	802540	304.19	304.64	115.0	30	145.0
MW-92	Fluvial	TTA-2	276614	806490	304.41	304.78	93.0	15	108.0
MW-93	Fluvial	Background	275542	804440	294.08	294.31	92.0	15	107.0
MW-94A	Fluvial	W-C	276806	803086	303.00	303.23	109.6	10	119.6
MW-96	Fluvial	TTA-2	276310	806320	289.02	289.67	75.5	20	95.5
MW-97	Fluvial	S-C	276074	802139	297.44	297.70	97.5	20	117.5
MW-98	Fluvial	W-C	276891	802573	294.43	294.93	137.0	10	147.0
MW-99	Fluvial	Background	277443	801115	285.33	285.69	91.5	20	111.5
MW-100B	Fluvial	TTA-1N	276601	800854	290.92	291.47	107.4	20	127.4
MW-101 ¹	Fluvial	TTA-1S	276204	801110	291.74	291.98	89.0	15	104.0
MW-102B	Fluvial	Background	275761	800708	311.40	312.07	120.5	20	140.5
MW-103	Fluvial	N-C	278691	805160	301.37	301.89	70.0	20	90.0
MW-104	Fluvial	N-C	278676	805417	291.98	292.18	70.5	20	90.5

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Well	Aquifer	Area	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, NAVD)	Ground Elevation (ft, NAVD)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-107 ¹	Upper Claiborne	Window	278419	803010	304.92	305.18	128.0	15	143.0
MW-108	Upper Claiborne	W-C	277658	802986	303.07	303.25	160.0	10	170.0
MW-113	Fluvial	TTA-2	276685	806279	292.79	304.92	96.0	10	106.0
MW-140	Memphis	Window	279061	801716	298.12	298.16	224.6	20	244.6
MW-141	Intermediate	Window	278019	802571	303.71	303.70	148.7	20	168.7
MW-142	Fluvial	B-835	278056	801629	291.18	291.49	85.0	20	105.0
MW-143	Fluvial	B-835	278301	801201	290.66	290.90	78.6	20	98.6
MW-197A	Upper Claiborne	W-C	276975	802042	292.79	291.54	161.7	15	176.7
MW-197B	Fluvial	W-C	276973	802037	292.79	291.43	93.8	15	108.8
MW-198	Fluvial	B-835	277776	802142	291.78	292.20	90.3	15	105.3
MW-199A	Intermediate	B-835	277756	802574	301.53	301.84	146.1	15	161.1
MW-199B	Fluvial	B-835	277752	802576	301.73	302.07	104.6	15	119.6
MW-200	Fluvial	W-C	277006	802859	300.18	300.51	102.9	15	117.9
MW-202A	Intermediate	Window	278686	802111	299.23	299.69	176.2	15	191.2
MW-202B	Intermediate	Window	278693	802112	299.51	299.74	118.8	15	133.8
MW-203A	Upper Claiborne	W-C	276842	801740	292.79	290.80	142.9	20	162.9
MW-203B	Fluvial	W-C	276821	801742	292.79	291.10	93.0	20	113.0
MW-204A	Fluvial	W-C	276725	802168	292.21	292.49	133.3	15	148.3
MW-204B	Fluvial	W-C	276708	802167	292.71	293.00	94.9	15	109.9
MW-205A	Upper Claiborne	W-C	277157	802277	292.30	292.40	141.3	15	156.3
MW-205B	Fluvial	W-C	277173	802278	292.16	292.30	97.3	15	112.3
MW-206A	Fluvial	W-C	277219	802792	299.92	300.35	127.3	15	142.4
MW-206B	Fluvial	W-C	277201	802795	299.90	300.12	96.7	15	111.7
MW-207A	Upper Claiborne	W-C	277653	803192	304.05	304.45	149.9	15	164.9
MW-207B	Fluvial	W-C	277665	803193	304.06	304.42	108.5	15	123.5
MW-208A	Upper Claiborne	W-C	277382	802799	302.21	302.40	183.5	15	198.5
MW-208B	Fluvial	W-C	277397	802815	301.79	302.08	106.7	15	121.7
MW-209A	Intermediate	B-835	277574	802507	298.05	298.36	189.0	15	204.0
MW-209B	Fluvial	B-835	277582	802520	298.49	298.72	102.3	15	117.3
MW-210A	Intermediate	W-C	277239	801958	289.61	289.70	177.0	15	192.0
MW-210B	Fluvial	W-C	277228	801952	289.29	289.53	97.0	15	112.0
MW-211	Intermediate	Window	278001	802974	303.74	304.09	166.3	15	181.3
MW-212	Fluvial	B-835	278028	802225	292.79	295.68	85.3	15	100.3
MW-213	Fluvial	B-835	278427	801669	292.79	294.20	77.3	15	92.3
MW-214A	Upper Claiborne	N-C	277878	803907	303.61	303.96	119.1	15	134.1
MW-214B	Upper Claiborne	N-C	277876	803922	303.70	303.96	101.6	15	116.6
MW-215A	Upper Claiborne	N-C	277298	804164	304.50	304.86	128.8	15	143.8
MW-215B	Fluvial	N-C	277298	804177	304.56	304.98	105.4	15	120.4
MW-216	Fluvial	S-C	276025	801996	297.34	297.63	99.9	15	115.0
MW-217	Fluvial	TTA-2	276671	805214	304.18	304.51	101.8	15	116.8
MW-218	Fluvial	TTA-2	276937	805628	305.60	306.00	98.9	15	114.0
MW-219	Fluvial	TTA-1N	276429	800461	295.13	295.00	98.0	15	113.0
MW-229	Intermediate	Window	279294	802837	311.78	312.09	188.4	20	208.4
MW-252	Intermediate	Window	278789	801365	294.16	294.40	126.1	20	146.1
MW-253	Intermediate	Window	278287	801191	290.47	290.80	118.3	20	138.3
MW-254	Memphis	Window	279334	800858	292.84	293.28	285.8	20	305.8
MW-255	Memphis	Window	279305	801227	291.84	292.38	284.7	20	304.7
MW-256	Intermediate	Window	279302	801244	292.68	293.40	127.1	20	147.1
MW-258	Fluvial	N-C	278126	804427	304.37	304.83	79.3	20	99.3
MW-259	Fluvial	TTA-2	276279	804451	290.77	291.44	98.6	20	118.6
MW-260	Fluvial	N-C	278398	804376	304.16	304.45	68.0	20	88.3
MW-261	Fluvial	S-C	276391	802592	293.52	293.79	90.0	20	110.3
MW-262	Intermediate	Window	279334	800833	293.22	293.50	154.4	10	164.6
MW-263	Fluvial	N-C	278945	805817	291.40	291.78	69.1	10	79.3

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MW-264	Upper Claiborne	N-C	278411	804590	303.72	304.00	104.8	10	115.0
MW-265	Fluvial	N-C	278112	804710	305.15	305.61	85.8	10	96.0
MW-266	Fluvial	TTA-2	277092	806686	304.68	305.10	77.1	10	87.3
MW-267	Fluvial	TTA-2	277161	806001	303.84	304.30	71.9	10	82.1
MW-268	Upper Claiborne	TTA-2	277204	805284	304.59	304.92	109.5	10	119.7
MW-269	Fluvial	TTA-1N	276369	800127	290.05	290.50	92.2	10	102.4
MW-270	Fluvial	SE	275483	805042	281.74	282.20	78.4	10	88.6
MW-271	Fluvial	S-C	276315	803774	294.91	295.50	134.7	10	144.9
MW-272	Fluvial	Background	275880	804037	293.27	293.70	112.8	10	123.0
MW-273	Intermediate	Window	279713	800122	284.73	285.00	128.1	10	138.3
MW-274	Fluvial	Background	275726	806543	294.30	294.60	89.3	10	99.5
MW-275	Fluvial	Background	275232	805306	272.31	272.59	80.5	10	90.7
MW-276	Fluvial	Background	275564	804697	288.68	288.91	87.5	10	97.7
MW-277	Fluvial	Background	275532	803998	301.67	301.96	102.3	10	112.5
MW-278	Fluvial	TTA-1N	276294	799814	292.18	292.46	91.0	10	101.2
MW-279	Fluvial	TTA-1S	275982	800579	299.89	300.17	113.0	10	123.2
MW-280	Fluvial	TTA-2	277390	806313	306.36	306.57	76.0	10	86.2
MW-281	Fluvial	N-C	278155	804123	304.56	305.03	81.7	10	91.9
MW-282	Fluvial	Background	278710	804033	307.81	308.14	76.0	10	86.2
MW-283	Fluvial	Background	278176	806074	304.34	304.87	77.0	10	87.2
MW-284	Fluvial	W-C	277049	803765	303.99	304.35	109.0	10	119.0
MW-285	Fluvial	Window	278102	803184	304.61	304.98	99.5	10	110.5
MW-286	Fluvial	Window	278427	803027	305.04	305.41	102.0	10	112.0
MW-287	Fluvial	N-C	278236	803971	304.67	305.01	84.0	10	94.0
MW-288	Fluvial	N-C	277932	803895	304.69	305.07	90.0	10	100.0
MW-289	Fluvial	N-C	277865	804526	305.41	305.85	78.0	10	88.0
MW-290	Memphis	Background	277046	803795	304.22	304.49	214.0	10	224.0
MW-291	Fluvial	N-C	278371	804963	303.59	303.97	74.0	10	84.0
MW-292	Fluvial	TTA-2	276981	806334	304.83	305.28	73.0	10	83.0
MW-293	Upper Claiborne	Window	278143	803188	304.34	304.77	152.5	10	162.5
MW-294	Fluvial	TTA-2	277351	805966	304.38	304.84	70.0	10	80.0
MW-295	Fluvial	TTA-2	277222	805292	304.35	304.72	73.0	10	83.5
MW-296	Fluvial	S-C	276362	803345	296.32	296.74	100.0	10	110.0
MW-297	Fluvial	S-C	276351	802850	297.91	298.46	100.0	10	110.0
MW-298	Fluvial	S-C	276100	802436	296.50	297.04	100.0	10	110.0
MW-299	Fluvial	B-835	278329	801532	292.71	293.04	86.0	10	96.0
MW-300	Fluvial	B-835	278451	801082	290.26	290.64	85.0	10	95.0
MW-301	Fluvial	SE	275494	805309	271.03	271.33	74.0	10	84.0
MW-302	Intermediate	TTA-2	276266	804423	291.60	291.92	160.0	10	170.0
PMW21-01	Fluvial	TTA-1N	276533	800600	292.79	295.00	88.4	20	108.4
PMW21-02	Fluvial	TTA-1N	276575	800701	292.79	293.19	91.3	20	111.3
PMW21-03	Fluvial	TTA-1N	276573	800743	292.11	292.72	90.3	20	110.3
PMW21-04	Fluvial	TTA-1N	276602	800772	292.79	292.20	89.0	20	109.0
PMW21-05	Fluvial	TTA-1N	276628	801130	288.53	288.92	94.3	20	114.3
PMW85-01	Fluvial	TTA-2	276802	806146	292.79	305.39	93.2	10	103.2
PMW85-05	Fluvial	TTA-2	276752	806222	292.79	305.32	93.2	10	103.2
PMW92-02	Fluvial	TTA-2	276667	806476	304.17	304.35	94.8	10	104.8
PMW92-03	Fluvial	TTA-2	276679	806439	292.79	304.17	92.5	10	102.5
PMW101-02A	Fluvial	TTA-1S	276282	801145	292.79	292.29	117.7	20	137.7
PMW101-02B	Fluvial	TTA-1S	276286	801145	292.79	292.24	97.8	20	117.8
PMW101-03A	Fluvial	TTA-1S	276348	801198	291.61	291.99	119.2	20	139.2
PMW101-03B	Fluvial	TTA-1S	276353	801194	291.55	291.82	99.3	20	119.3
PMW101-04A	Fluvial	TTA-1S	276299	801182	292.79	291.43	117.9	20	137.9
PMW101-04B	Fluvial	TTA-1S	276296	801187	292.79	291.75	98.6	20	118.6

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PMW101-06A	Fluvial	TTA-1S	276192	801187	292.13	292.72	120.0	20	140.0
PMW101-06B	Fluvial	TTA-1S	276195	801184	292.17	292.40	99.3	20	119.3
PMW101-07A	Fluvial	TTA-1S	276143	801172	292.79	292.52	117.9	20	137.9
PMW101-07B	Fluvial	TTA-1S	276142	801177	292.79	292.70	98.0	20	118.0

Notes:

1: MW-101 has three screened sections at the following depths (ft, btoc): 89-104, 109-119 and 124-134.

2: MW-107 has two screened sections at the following depths (ft, btoc): 128-143 and 148-158.

btoc: below top of casing

ft: feet

NAVD: North American Vertical Datum of 1988

TABLE 4
MAIN INSTALLATION MCL EXCEEDANCE SUMMARY, APRIL 2019
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

				PCE	TCE		cDCE		VC		CT	
Area	No. of Wells	No. of Wells >MCL	No. of Wells >MCL	Maximum Concentration (µg/L)	No. of Wells >MCL	Maximum Concentration (µg/L)	No. of Wells >MCL	Maximum Concentration (µg/L)	No. of Wells >MCL	Maximum Concentration (µg/L)	No. of Wells >MCL	Maximum Concentration (µg/L)
Fluvial												
TTA-1N	14	10	8	197	5	136	1	101	1	205	0	-
TTA-1S	21	11	11	44.1	1	18.4	0	-	0	-	0	-
TTA-2	28	20	15	132	9	28	0	-	6	70.9	7	86.2
West-Central	15	13	8	21.9	11	25.1	0	-	1	46.3	0	-
Building 835	10	7	0	-	6	45.9	0	-	1	43.1	0	-
North-Central	14	8	4	21.7	8	53.7	0	-	0	-	0	-
South-Central	7	4	1	13.4	3	31.6	0	-	0	-	0	-
Southeastern MI	3	3	1	11.6	2	17.4	0	-	0	-	0	-
Window	2	2	2	44.5	0	-	0	-	0	-	0	-
Background	16	0	0	-	0	-	0	-	0	-	0	-
Fluvial Summary	130	78	50	197	45	136	1	101	9	205	7	86.2
IAQ/UC												
TTA-2	2	1	1	5.17	0	-	0	-	0	-	0	-
West-Central	8	5	4	15.9	3	14.4	0	-	0	-	0	-
Building 835	2	2	0	-	2	6.98	0	-	0	-	0	-
North-Central	4	2	2	6.49	0	-	0	-	0	-	0	-
Window	16	5	5	40.3	1	6.24	0	-	0	-	0	-
IAQ/UC Summary	32	15	12	40.3	6	14.4	0	-	0	0	0	-
MAQ												
Window	3	1	1	11	0	-	0	-	0	-	0	-
Background	1	0	0	-	0	-	0	-	0	-	0	-
MAQ Summary	4	1	1	11	0	0	0	0	0	0	0	0
MI Summary												
MI Summary	166	94	63	197	51	136	1	101	9	205	7	86.2

Notes:

µg/L: micrograms per liter

MCL: maximum contaminant level

TABLE 5
 REMEDIAL GOAL OBJECTIVES FROM DUNN FIELD RECORD OF DECISION
 2020 SITE MANAGEMENT PLAN
 Defense Depot Memphis, Tennessee

	Remedial Goal Objectives				
Parameter	Site-Specific Soil Screening Levels to be Protective of Groundwater		Protective Soil Vapor Concentration		Groundwater Target Concentrations at 10-4 Target Risk Levels and Target HI=1.0 (µg/L)
	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:

HI: hazard index

mg/kg: milligrams per kilogram

ppbv: parts per billion per volume

µg/L: micrograms per liter

—: Not available for groundwater cleanup goals because of low number of detections or detected values consistently less than maximum contaminant levels.

TABLE 6
DUNN FIELD LTM WELLS
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Area	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, NAVD)	Ground Elevation (ft, NAVD)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-03	Fluvial	DF North	281596	802101	292.35	290.40	65.5	10	75.5
MW-04	Fluvial	Background	281279	802369	301.61	300.00	60.0	20	80.0
MW-06	Fluvial	DF West	280604	802069	289.11	288.10	51.0	20	71.0
MW-07	Fluvial	DF North	281840	802482	295.10	293.10	67.0	10	77.0
MW-08	Fluvial	DF North	282001	802728	292.59	292.74	56.5	10	66.5
MW-13	Fluvial	Background	281034	802369	300.01	300.10	66.0	15	81.0
MW-15	Fluvial	DF West	280349	801985	295.12	295.23	63.4	15	78.4
MW-28	Fluvial	Background	281569	803154	294.79	294.89	54.3	15	69.3
MW-31	Fluvial	DF North	281652	801784	290.37	287.50	64.1	15	79.1
MW-44	Fluvial	Off Depot	281074	800601	269.07	269.40	64.0	10	74.0
MW-54	Fluvial	Off Depot	281159	801184	295.39	295.57	84.5	10	94.5
MW-57	Fluvial	DF West	280184	802006	290.77	291.10	60.0	10	70.0
MW-58	Fluvial	Background	279845	802066	290.51	290.70	57.0	10	67.0
MW-67	Memphis	Background	280473	800934	278.21	275.53	260.0	15	275.0
MW-68	Fluvial	DF North	281501	802040	291.69	291.60	72.5	10	82.5
MW-69	Fluvial	DF West	281203	802011	307.02	304.90	82.1	10	92.1
MW-70	Fluvial	DF West	281030	801988	304.99	302.80	80.8	10	90.8
MW-71	Fluvial	DF West	280585	801805	294.40	291.90	65.5	10	75.5
MW-76	Fluvial	Off Depot	281312	801643	302.71	303.30	73.0	20	93.0
MW-77	Fluvial	Off Depot	281143	801815	304.42	304.70	68.0	20	88.0
MW-78	Fluvial	DF North	282052	802065	275.00	275.40	44.5	20	64.5
MW-79	Fluvial	DF North	281794	800899	285.03	285.40	82.5	20	102.5
MW-80	Fluvial	Background	281418	800199	273.81	274.00	53.0	20	73.0
MW-87	Fluvial	DF West	280696	802039	294.93	292.80	63.0	15	78.0
MW-91	Fluvial	DF West	280475	802014	291.99	289.30	55.0	15	70.0
MW-126	Fluvial	Background	282390	800492	252.22	252.49	16.0	10	26.0
MW-129	Fluvial	DF North	282271	803129	293.01	293.33	65.0	15	80.0
MW-130	Fluvial	DF North	282117	803241	293.17	293.77	59.5	20	79.5
MW-134	Fluvial	DF West	281013	802103	300.81	301.05	75.0	15	90.0
MW-144	Fluvial	Off Depot	281139	801529	291.60	291.89	56.8	20	76.8
MW-145	Fluvial	Off Depot	280968	800823	284.72	284.86	80.1	20	100.1
MW-147	Fluvial	DF North	281502	801674	289.76	289.93	60.3	20	80.3
MW-148	Fluvial	Off Depot	281378	801462	294.71	294.87	70.0	20	90.0
MW-149	Fluvial	Off Depot	281130	800983	287.18	287.44	81.4	20	101.4
MW-150	Fluvial	Off Depot	281240	801284	296.86	297.00	71.2	20	91.2
MW-151	Fluvial	Off Depot	281290	800875	284.27	284.42	77.0	20	97.0
MW-152	Fluvial	Off Depot	281516	800893	289.59	289.82	91.0	20	111.0
MW-153	Fluvial	DF North	282119	800952	279.17	279.26	76.1	20	96.1
MW-154	Fluvial	Background	280502	800919	273.81	274.07	53.3	10	63.3
MW-155	Fluvial	Off Depot	281325	801169	291.54	291.83	76.9	20	96.9
MW-157	Fluvial	Off Depot	281051	801348	286.47	286.55	56.7	20	76.7
MW-158	Fluvial	Off Depot	281434	801005	294.07	294.38	91.0	15	106.0
MW-158A	Fluvial	Off Depot	281444	801006	293.95	294.22	77.9	15	92.9
MW-159	Fluvial	Off Depot	281304	801007	286.36	286.68	80.5	20	100.5
MW-160	Fluvial	Off Depot	281367	801304	293.84	294.13	65.7	20	85.7
MW-163	Fluvial	Off Depot	281153	801487	290.63	290.81	56.2	20	76.2
MW-164	Fluvial	Off Depot	280998	801497	287.48	287.71	55.6	20	75.6
MW-165	Fluvial	Off Depot	281385	800855	287.06	287.35	88.6	15	103.6
MW-165A	Fluvial	Off Depot	281384	800866	287.26	287.53	71.3	15	86.3
MW-166	Fluvial	Off Depot	281225	800928	282.72	283.29	84.6	15	100.0
MW-166A	Fluvial	Off Depot	281213	800927	282.90	283.36	68.1	15	83.4
MW-167	Fluvial	Background	281394	800619	284.82	285.21	70.5	15	85.5
MW-169	Upper Claiborne	Background	282491	800957	261.90	262.17	68.1	20	88.1
MW-170	Fluvial	Background	282443	801260	273.75	273.98	59.8	20	79.8
MW-171	Fluvial	DF North	282315	801058	270.69	271.02	53.3	15	68.3
MW-174	Fluvial	DF West	280352	802092	296.56	296.83	67.0	10	77.0
MW-176	Fluvial	DF West	280824	802032	299.68	299.92	76.0	10	86.0
MW-180	Fluvial	DF North	281476	802132	296.14	296.39	72.0	10	82.0

TABLE 6
DUNN FIELD LTM WELLS
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Area	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, NAVD)	Ground Elevation (ft, NAVD)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-182	Fluvial	Background	280524	800623	275.40	272.98	62.0	10	72.0
MW-184	Fluvial	Off Depot	280903	801442	283.12	283.34	58.0	10	68.0
MW-187	Fluvial	Background	280563	802348	302.74	303.21	76.0	10	86.0
MW-190	Fluvial	Off Depot	281139	801596	297.32	297.58	78.0	10	88.0
MW-220	Fluvial	DF North	281617	802167	293.29	290.31	64.9	15	79.9
MW-221	Fluvial	DF West	281400	802100	301.52	298.37	73.1	15	88.1
MW-222	Fluvial	DF West	280986	802146	303.82	301.06	74.2	15	89.2
MW-223	Fluvial	DF West	280914	802104	303.00	300.41	73.9	15	88.9
MW-224	Fluvial	DF West	281018	802182	304.13	301.18	73.7	15	88.7
MW-225	Fluvial	DF West	280947	802071	304.52	301.30	75.0	15	90.0
MW-226	Fluvial	DF West	280932	802147	303.19	300.56	74.2	15	89.2
MW-227	Fluvial	DF West	280258	802081	299.70	296.64	63.6	15	78.6
MW-228	Fluvial	DF West	280252	802157	301.65	298.59	64.1	15	79.1
MW-230	Fluvial	DF North	281843	802800	286.57	286.66	59.2	15	74.2
MW-235	Fluvial	Background	280728	800448	264.00	264.21	50.6	10	60.8
MW-237	Intermediate	Off Depot	281356	800964	289.18	289.53	166.5	10	176.7
MW-241	Fluvial	Off Depot	281390	801397	292.97	293.16	73.4	15	88.4
MW-242	Fluvial	Off Depot	281297	801229	295.40	295.94	73.2	16	88.7
MW-243 ¹	Fluvial	Off Depot	281371	801116	292.26	292.53	80.7	20	100.7
MW-244	Fluvial	Off Depot	281333	801101	288.72	289.45	76.3	20	96.3
MW-245	Fluvial	Off Depot	281379	801035	290.48	290.62	85.1	20	105.1
MW-246	Fluvial	Off Depot	281387	800952	288.17	288.49	85.2	20	105.2
MW-247	Fluvial	Off Depot	281319	800900	286.17	286.63	80.5	20	100.5
MW-248	Fluvial	Off Depot	281254	800720	275.45	275.93	67.5	20	87.5
MW-249	Fluvial	Off Depot	281030	800790	285.53	285.89	78.0	20	98.0
MW-250	Intermediate	Off Depot	281046	800900	289.66	290.19	168.7	15	183.7
MW-251	Intermediate	Off Depot	281212	801022	285.83	286.16	160.2	15	175.2

Notes:

ft: feet

btoc: below top of casing

NAVD: North American Vertical Datum of 1988

- 1) Damage to MW-243 well casing was repaired on 4/13/18; well requires elevation survey.

TABLE 7
DUNN FIELD MCL EXCEEDANCE SUMMARY, APRIL 2019
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

			TeCA		TCA		PCE		TCE		DCE	
Area	No. of Wells	No. of Wells >MCL	No. of Wells >TC	Maximum Concentration (µg/L)	No. of Wells >TC or MCL	Maximum Concentration (µg/L)	No. of Wells >TC or MCL	Maximum Concentration (µg/L)	No. of Wells >TC or MCL	Maximum Concentration (µg/L)	No. of Wells >TC or MCL	Maximum Concentration (µg/L)
Fluvial												
DF North	15	8	0	-	0	-	8	21.3	8	39.2	3	10.1
DF West	19	1	0	-	0	-	0	-	1	8.79	0	-
Off Depot	34	5	4	10.6	1	2.16	0	-	3	99.3	0	-
Background	12	0	0	-	0	-	0	-	0	-	0	-
Fluvial Summary	80	14	4	10.6	1	2.16	8	21.3	12	99.3	3	10.1
IAQ/UC												
Off Depot	3	0	0	-	0	-	0	-	0	-	0	-
Background	1	0	0	-	0	-	0	-	0	-	0	-
IAQ/UC Summary	4	0	0	0	0	0	0	0	0	0	0	0
MAQ												
Background	1	0	0	-	0	-	0	-	0	-	0	-
MAQ Summary	1	0	0	0	0	0	0	0	0	0	0	0
DF Summary	85	14	4	10.6	1	2.16	8	21.3	12	99.3	3	10.1

Notes:
µg/L: micrograms per liter
MCL: maximum contaminant level

TABLE 7
DUNN FIELD MCL EXCEEDANCE SUMMARY, APRIL 2019
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

			VC		CF	
Area	No. of Wells	No. of Wells >MCL	No. of Wells >MCL	Maximum Concentration (µg/L)	No. of Wells >TC or MCL	Maximum Concentration (µg/L)
Fluvial						
DF North	15	8	0	-	0	-
DF West	19	1	0	-	1	93.4
Off Depot	34	5	1	4.56	1	14.0
Background	12	0	0	-	0	-
Fluvial Summary	80	14	1	4.56	2	93.4
IAQ/UC						
Off Depot	3	0	0	-	0	-
Background	1	0	0	-	0	-
IAQ/UC Summary	4	0	0	0	0	-
MAQ						
Background	1	0	0	-	0	-
MAQ Summary	1	0	0	0	0	0
DF Summary	85	14	1	4.56	2	93.4

Notes:

µg/L: micrograms per liter

MCL: maximum contaminant level

TABLE 8
PROPERTY TRANSFER STATUS
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

FOST No.	Area	Date FOST signed	Acres ¹	Type of Conveyance	Type of Transfer (Transferee)	Date of Transfer ²
1	MI	23-Feb-01	6.5	PBC	Deed (Alpha Omega Veterans)	26-Sep-01
2	MI	27-Sep-01	4.7	PBC	Deed (Memphis Police Department)	6-Feb-02
			13.4	EDC	Deed (DRC)	6-May-02
3	MI	1-Jul-04	302.5	EDC	Deed (DRC)	4-Apr-06
			46.7	PBC	Deed (Memphis)	18-Aug-06
4	DF	4-Mar-05	1.6	PBC	Deed (Memphis)	2-Sep-05
			39.4	CPS	Deed (Dunn Field Business Park, LLC)	17-Oct-07
5	DF	12-Jul-10	26.0			
6	MI	2-Aug-10	193.0	EDC	Deed (DRC)	30-Mar-11

Notes:

1): Listed acres are approximate.

2): Date Federal Agency signed Quitclaim Deed.

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 9
PROPERTY OWNERSHIP AND USE
2020 SITE MANAGMENT PLAN
Defense Depot Memphis, Tennessee

Property Owner	Acreage ¹	Use
Main Installation		
Memphis Depot TIC LLC and DP 107 LLC	250.6	Warehousing/logistics – Memphis Depot Industrial Park managed by Colliers International. Buildings are leased to multiple tenants.
Barnhart Crane & Rigging	143.8	Engineering, construction and maintenance of complex lifting and transportation equipment for heavy industry.
Economic Development Growth Engine of Memphis/Shelby Co.	69.8	Primarily undeveloped property for future warehousing/logistics or light industrial development.
City of Memphis	46.7	Recreation - Golf Course operated by Memphis Athletic Ministries.
Depot Owners Association	35.6	Memphis Depot Parkway and stormwater basins.
Supply Chain Solutions, LLC	8.2	Warehousing/logistics.
Alpha Omega Veterans Services	6.5	Homeless shelter, approved for unrestricted use.
Memphis Police Department	4.7	Airways Police Station.
Dunn Field		
Dunn Field Business Park, LLC	39.4	Undeveloped property for future warehousing/ logistics or light industrial development; approved for unrestricted use.
Army	26.0	Undeveloped.
City of Memphis	1.6	Realignment of Hayes Road.

Note:

1) Acreage is approximate

TABLE 10
STATUS OF FOLLOW-UP ACTIONS FROM FOURTH FIVE-YEAR REVIEW
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Issues	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date ¹	Affects Protectiveness (Y/N)		Completion Date	Document
					Current	Future		
Selected MI remedy of EBT and LTM has not shown expected progress toward the RAOs.	Complete SRI and FFS and determine appropriate revision to the selected remedy.	Army	USEPA/TDEC	4/9/2021	N	Y	In progress	FFS Report
Additional lines of evidence are needed to assess VI risk.	Complete VI survey in accordance with DoD and USEPA guidance.	Army	USEPA/TDEC	3/15/2024	N	Y	In progress	Comprehensive MI VI Sampling Report

Notes:

1) Milestone Date is the date of the Revision 1 submittal for the listed Document in Figure 29 of this SMP.

DoD: Department of Defense

EBT: enhanced bioremediation treatment

FFS: Focused Feasibility Study

LTM: Long-Term Monitoring

MI : Main Installation

RAOs: Remedial Action Objectives

SRI: Supplemental Remedial Investigation

TDEC: Tennessee Department of Environment and Conservation

USEPA: United States Environmental Protection Agency

VI: vapor intrusion

TABLE 11
PRIMARY AND SECONDARY DOCUMENTS, FY20 THROUGH FY22
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Activity	2020 SMP Date	Date Type
Fiscal Year 2020		
2018 LTM Report, Rev. 1	4-Oct-2019	Target
Off Depot AS/SVE Operations Report, Year 8 Rev. 0	15-Nov-2019	Target
2020 Site Management Plan, Rev. 0	17-Jan-2020	Deadline
2019 LTM Report, Rev. 0	27-Jan-2020	Target
MI CSM Update Technical Memorandum	28-Jan-2020	Target
Off Depot AS/SVE Operations Report, Year 8 Rev. 1	28-Feb-2020	Target
Dunn Field Off-Site Investigation QAPP, Rev. 1	1-Mar-2020	Target
MI Human Health & Ecological Risk Assessment Report, Rev. 1	5-Mar-2020	Target
2020 Site Management Plan, Rev. 1	17-Mar-2020	Deadline
MI Sampling and Risk Assessment QAPP, Rev.0	12-Apr-2020	Deadline
2019 LTM Report, Rev. 1	27-Apr-2020	Target
MI Supplemental RI (Phase 3-4) Report, Rev. 0	11-May-2020	Deadline
MI VI CSM, Rev. 0	14-May-2020	Target
MI SVE Pilot Test Technical Memorandum	10-Jun-2020	Target
MW-87 Area Summary Report	24-Aug-2020	Target
AS Well Installation Summary Report, Rev. 0	16-Aug-2020	Target
2020 Annual LUCIP Inspection Reports	28-Aug-2020	Target
MI VI CSM, Rev 1	10-Sep-2020	Target
MI Supplemental RI (Phase 3-4) Report, Rev. 1	11-Sep-2020	Deadline
AS Well Installation Summary Report, Rev. 1	17-Sep-2020	Target
Fiscal Year 2021		
MI Sampling and Risk Assessment QAPP, Rev.1	4-Oct-2020	Deadline
MI VI Comprehensive Sampling Plan, Rev. 0	25-Oct-2020	Target
Off Depot AS/SVE Operations Report, Year 9 Rev. 0	13-Nov-2020	Target
2021 Site Management Plan, Rev. 0	30-Nov-2020	Deadline
MI Focused Feasibility Study Report, Rev. 0	4-Jan-2021	Deadline
MI VI Comprehensive Sampling Plan, Rev. 1	21-Feb-2021	Target
2020 LTM Report, Rev. 0	25-Jan-2021	Target
2021 Site Management Plan, Rev. 1	29-Jan-2021	Deadline
Off Depot AS/SVE Operations Report, Year 9 Rev. 1	27-Feb-2021	Target
MI Focused Feasibility Study Report, Rev. 1	9-Apr-2021	Deadline
MI VI Comprehensive QAPP, Rev. 0	22-Apr-2021	Deadline
2020 LTM Report, Rev. 1	26-Apr-2021	Target
MI Rev.ised Proposed Plan, Rev. 0	24-May-2021	Deadline
MI Comprehensive Risk Assessment Report, Rev. 0	22-Jun-2021	Target
MI Rev.ised Proposed Plan, Rev. 1	13-Aug-2021	Deadline
MI VI Comprehensive QAPP, Rev. 1	19-Aug-2021	Deadline
2021 Annual LUCIP Inspection Reports	27-Aug-2021	Target
Fiscal Year 2022		
MI Comprehensive Risk Assessment Report, Rev. 1	20-Oct-2021	Target
MI ROD Amendment Rev.0	27-Oct-2021	Deadline
New MI RD, Rev. 0	1-Nov-2021	Deadline
Off Depot AS/SVE Operations Report, Year 10 Rev. 0	12-Nov-2021	Target
2022 Site Management Plan, Rev. 0	30-Nov-2021	Deadline
Dunn Field Off-Site Investigation Report, Rev. 1	20-Jan-2022	Target
2021 LTM Report, Rev. 0	24-Jan-2022	Target
2022 Site Management Plan, Rev. 1	31-Jan-2022	Deadline
MI ROD Amendment Rev.1	9-Feb-2022	Deadline
New MI RD, Rev. 1	19-Feb-2022	Deadline
Off Depot AS/SVE Operations Report, Year 10 Rev. 1	25-Feb-2022	Target
Final MI ROD Amendment	11-Mar-2022	Deadline
Public Notice of 5th Five-Year Review	15-Mar-2022	Target
Public Notice of MI ROD Amendment	23-Mar-2022	Target
2021 LTM Report, Rev. 1	25-Apr-2022	Target
New MI RAWP Rev. 0	30-Apr-2022	Deadline

TABLE 11
PRIMARY AND SECONDARY DOCUMENTS, FY20 THROUGH FY22
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Activity	2020 SMP Date	Date Type
New MI RAWP Rev. 1	13-Aug-2022	Deadline
5th Five-Year Review Report, Rev. 0	22-Aug-2022	Deadline
2022 Annual LUCIP Inspection Reports	29-Aug-2022	Target

Notes:

1. Section XV. of the DDMT Federal Facilities Agreement (FFA) states DoD is responsible for issuing Primary and Secondary Documents to EPA and TDEC in accordance with the schedule provided in the latest approved SMP.
 - a. Deadlines are the scheduled submittal dates for Primary Documents; DoD may be assessed stipulated penalties for failure to meet a Deadline (FFA, Section XXIV).
 - b. Targets are the scheduled submittal dates for Secondary Documents; stipulated penalties do not apply to Targets.
 - c. Primary Documents are those reports, plans and studies that are major, discrete portions of the response action process.
 - d. Secondary Documents are those reports, plans and studies that are discrete portions of the Primary Documents and are typically input or feeder documents.

TABLE 12
FISCAL YEAR REQUIREMENTS
2020 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Description	2020	2021	2022	2023	2024	2025	Out Years	Total
Remedial Action Sites	\$134,176	\$84,296	\$1,468,771	\$1,233,413	\$1,233,413	\$1,233,413	\$2,093,415	\$7,480,897

Note: Planned funding for 2020 (partial) has been awarded for ongoing task orders.



Figures



Site Location Map

Defense Depot
Memphis, Tennessee



A horizontal scale bar with a black background. It has a white rectangular segment in the middle. Above the bar, the number '0' is at the left end and '1' is at the right end of the white segment. Below the bar, the word 'Miles' is centered.

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 11/27/2019
Edition: Rev 0



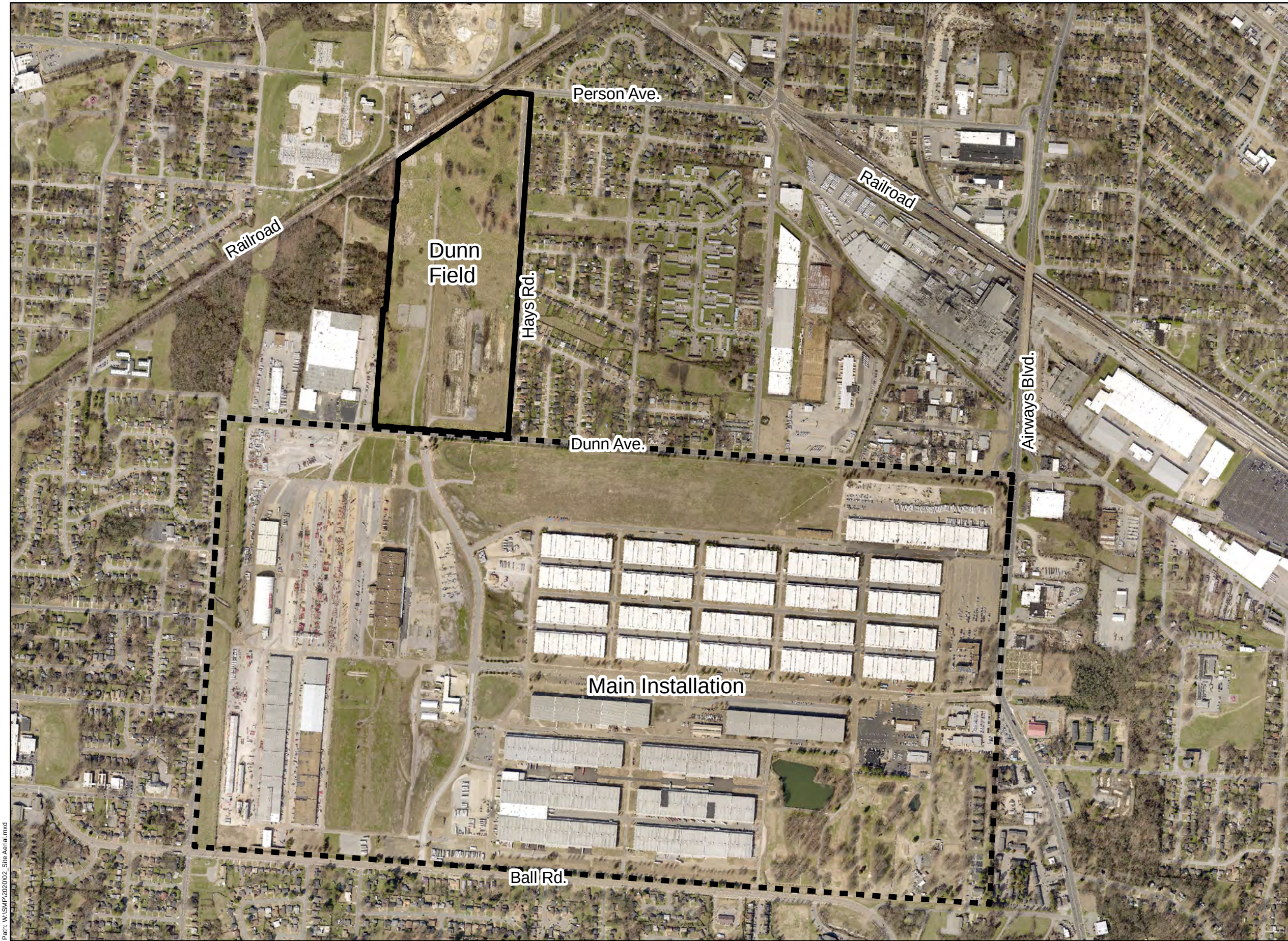


Figure 2

Site Aerial Photograph

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- ■ Main Installation Perimeter
- Dunn Field Perimeter

Aerial Photograph Source:
Shelby County TN Regional
GIS Department, 2019.



0 500 1,000
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 1/3/2020
Edition: Rev 0



Main Installation Unit Boundaries and Response Actions

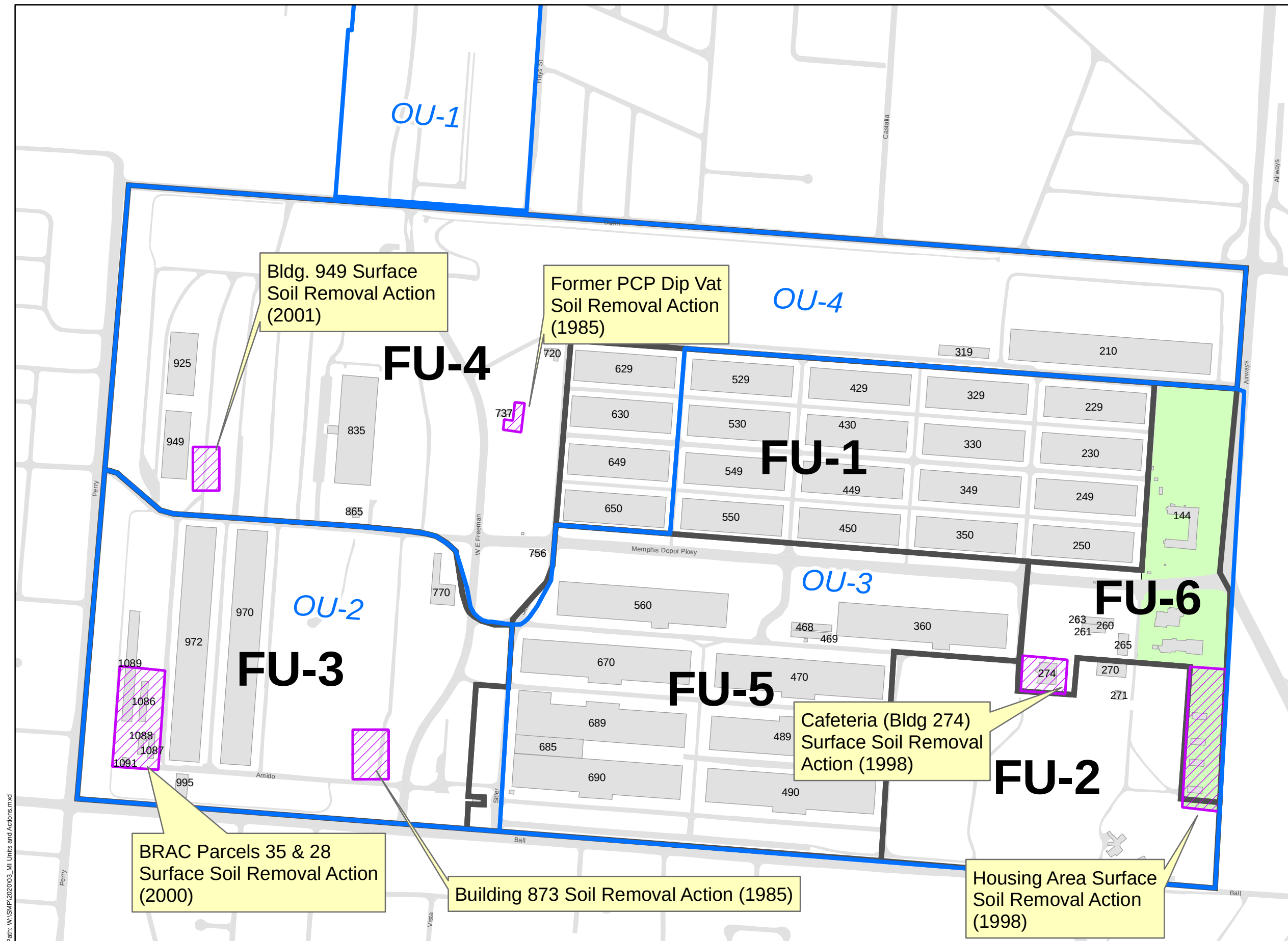
Defense Depot
Memphis, Tennessee

- Operable Units (OU-#)
- Past Response Actions
- Functional Unit Boundary (FU-#)
- Area Available for Unrestricted Use
- Buildings 490 - DDMT Assigned Number
- Roads



0 500 1,000
Feet

Date: 11/27/2019
Edition: Rev 0



Path: W:\SMP\2020\04_DF Areas and Actions.mxd



Figure 4

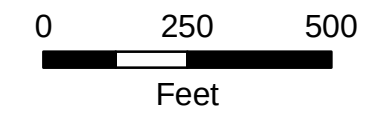
**Dunn Field
Area Designations,
Removal Actions and
Interim Remedial Action**

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Original Dunn Field Boundary
- IRA Recovery Well
- IRA Discharge Conveyance Line
- Area Designations
- Removal Actions
- Unrestricted Use Area
- Paved Area
- Roads
- Railroad



Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 11/27/2019
Edition: Rev 0



Path: W:\SWMP\2020\05_OU1_Sites.mxd



Figure 5

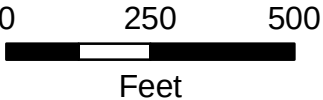
OU-1 Site Locations
Dunn Field

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Operable Units
- Chemical Warfare Manag. Plan Site
- Proposed Early Removal Site
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Paved Area
- Roads
- Railroad



Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 11/27/2019
Edition: Rev 0



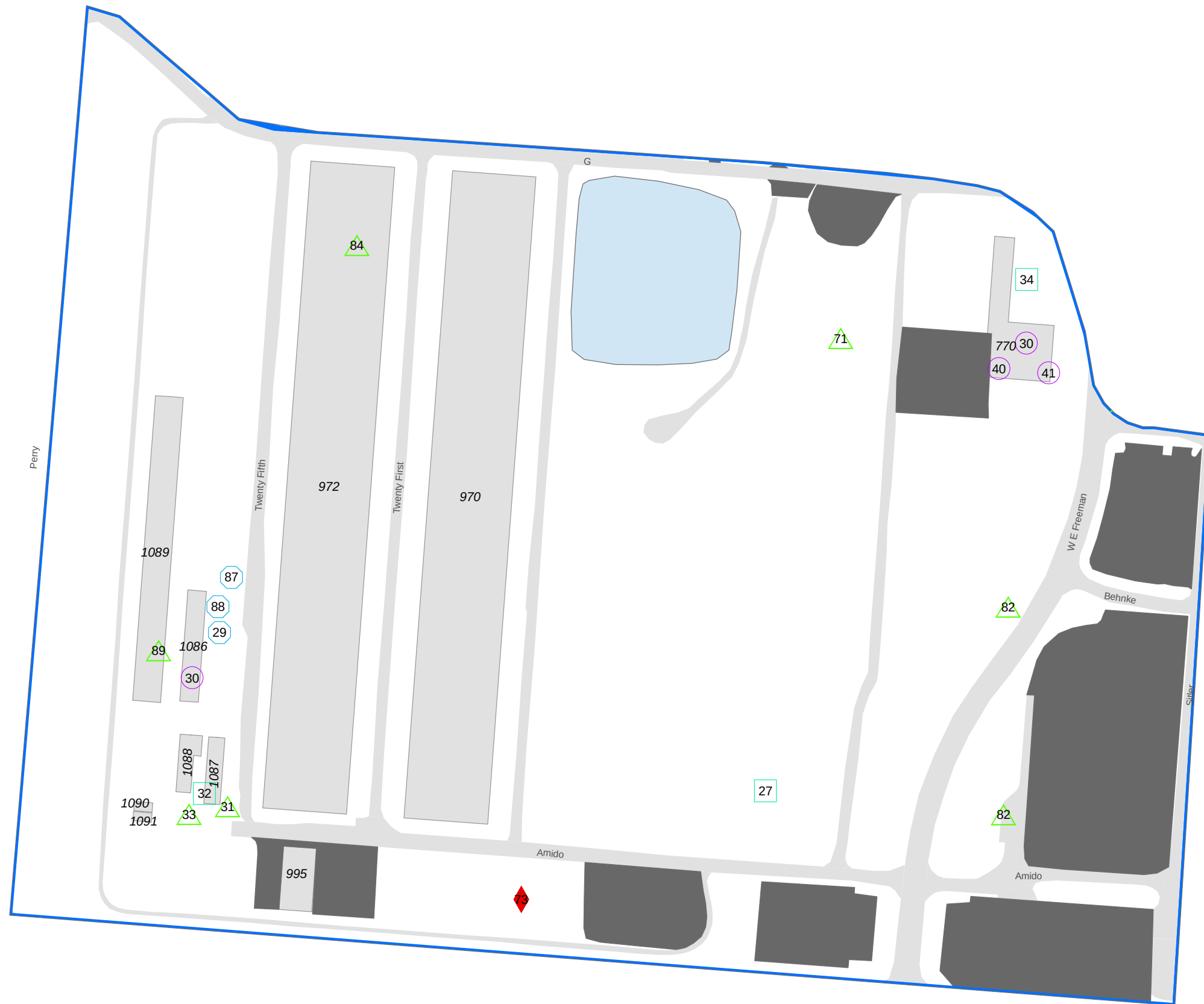


Figure 6

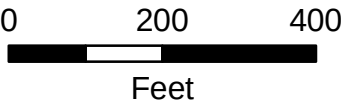
**OU-2 Site Locations
Main Installation
Southwest Quadrant**

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Operable Units
- ⬡ Proposed Early Removal Site
- ◆ Feasibility Study Site
- ◯ No Further Action Site
- ◻ Remedial Investigation Site
- △ Screening Site
- Paved Area
- Holding Pond
- Buildings 490 - DDMT Assigned Number
- Roads



Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 11/27/2019
Edition: Rev 0



Figure 7

OU-3 Site Locations
Main Installation
Southeastern Watershed
and Golf Course

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Operable Units
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Surface Water
- Paved Area
- Buildings 490 - DDMT Assigned Number
- Roads



0 300 600
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 11/27/2019
Edition: Rev 0

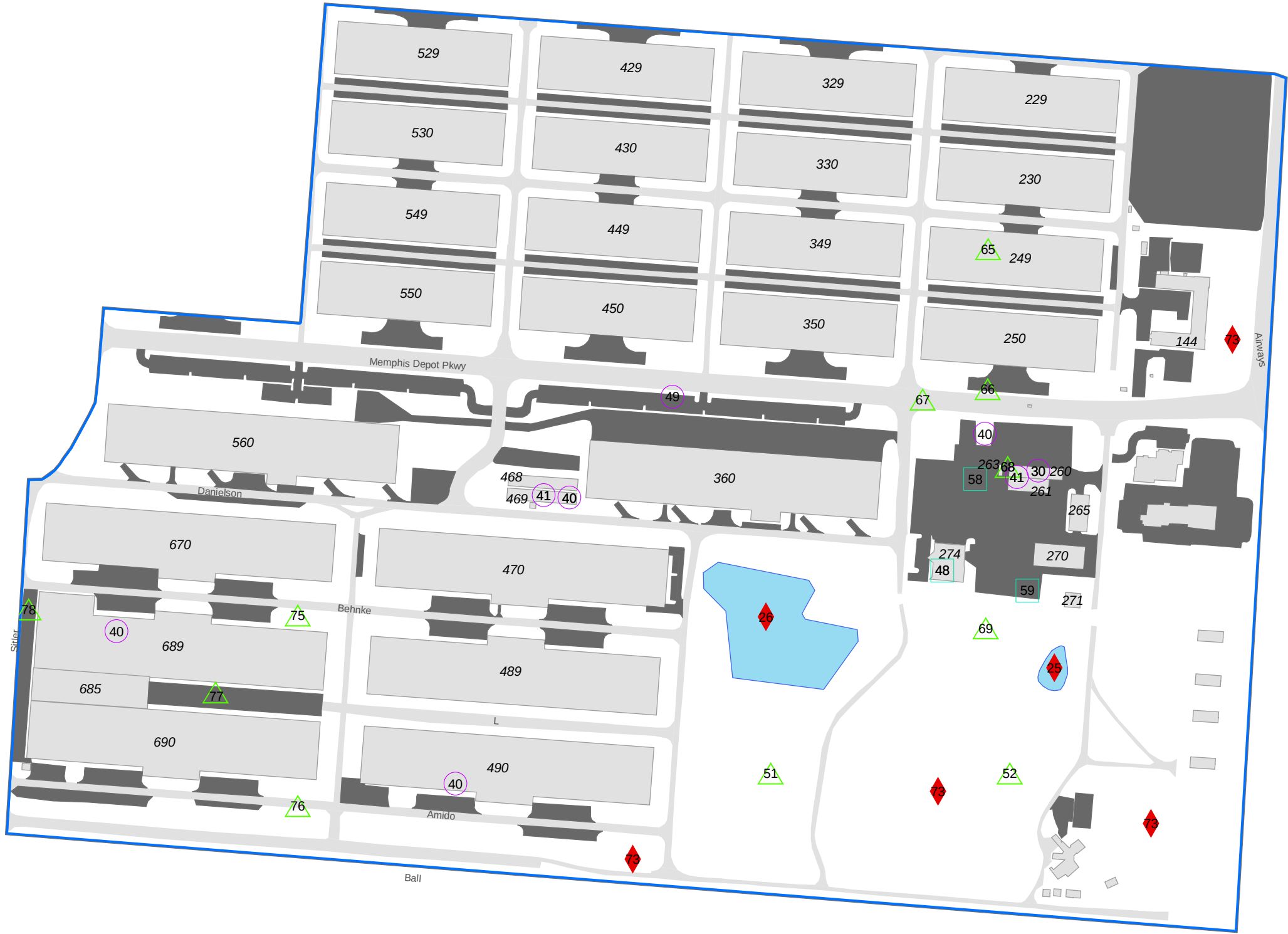
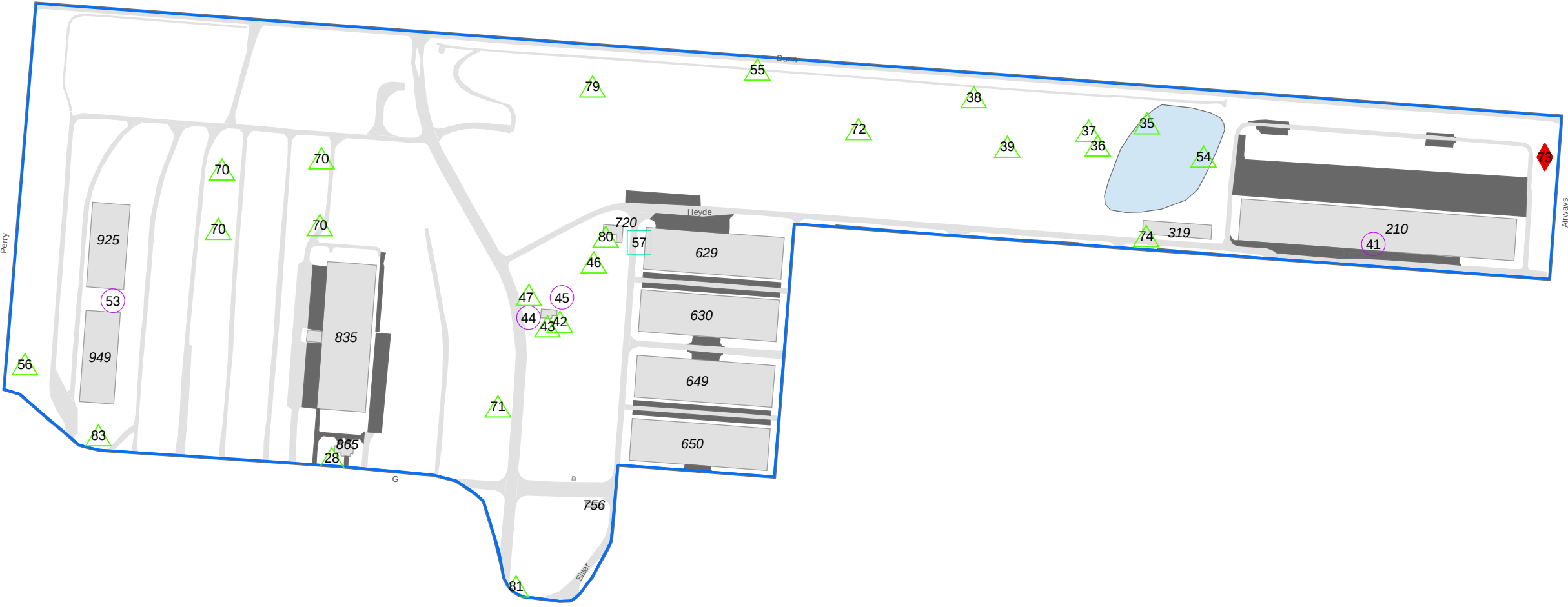


Figure 8

OU-4 Site Locations
Main Installation
North Central Area

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

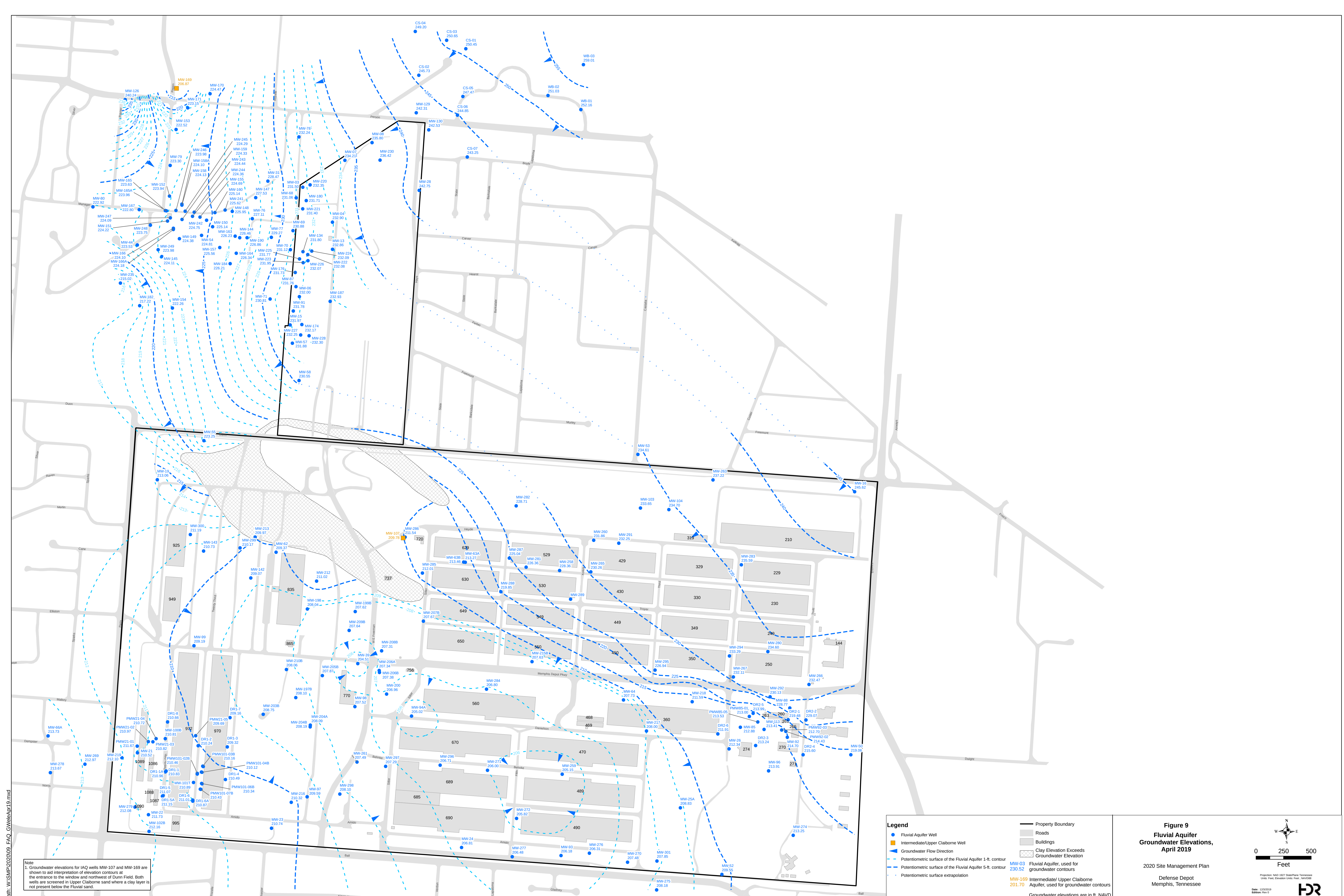


Legend

- Operable Units
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Paved Area
- Holding Pond
- Buildings 490 - DDMT Assigned Number
- Roads

North arrow pointing North (N), South (S), East (E), and West (W).

Scale bar: 0, 500, 1,000 Feet



Note
1. Groundwater elevations for IAQ wells MW-107 and MW-169 are shown to aid interpretation of elevation contours at the entrance to the window and northwest of Dunn Field. Both wells are screened in Upper Claiborne sand where a clay layer is not present below the Fluvial sand.

Legend

- Fluvial Aquifer Well
- Intermediate/Upper Claiborne Well
- Groundwater Flow Direction
- Potentiometric surface of the Fluvial Aquifer 1-ft. contour
- Potentiometric surface of the Fluvial Aquifer 5-ft. contour
- Potentiometric surface extrapolation

- Property Boundary
- Roads
- Buildings
- Clay Elevation Exceeds Groundwater Elevation
- Fluvial Aquifer, used for groundwater contours
- Intermediate/ Upper Claiborne Aquifer, used for groundwater contours

Groundwater elevations are in ft, NAVD.

Figure 9
Fluvial Aquifer
Groundwater Elevations,
April 2019

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

0 250 500

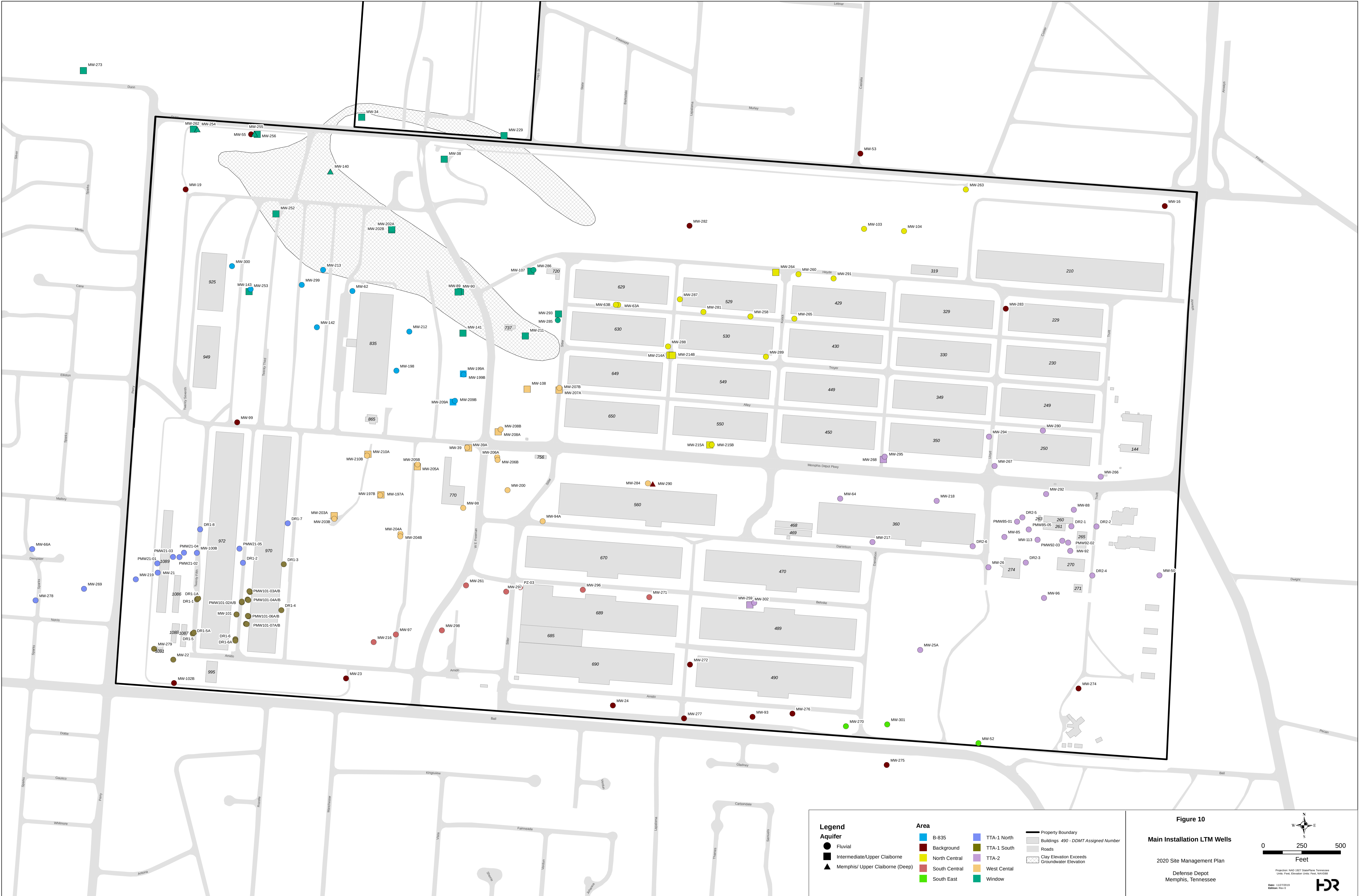
Feet

North Arrow

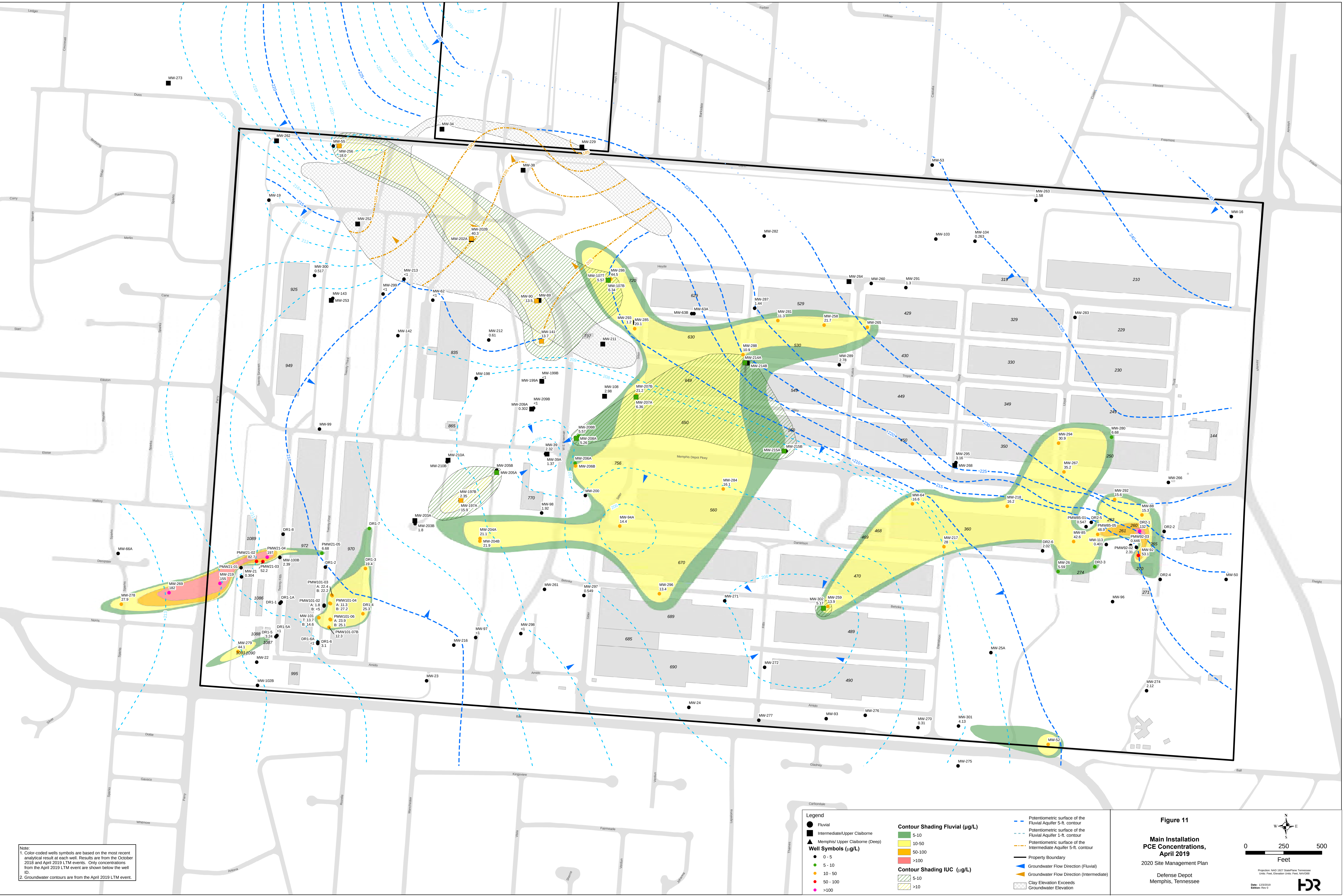
Projection: NAD 1983 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD83

Date: 1/30/2019
Edition: Rev 0

DR



Note:
1. Color-coded wells symbols are based on the most recent analytical result at each well. Results are from the October 2018 and April 2019 LTM events. Only concentrations from the April 2019 LTM event are shown below the well ID.
2. Groundwater contours are from the April 2019 LTM event.



Note:
1. Color-coded wells symbols are based on the most recent analytical result at each well. Results are from the October 2018 and April 2019 LTM events. Only concentrations from the April 2019 LTM event are shown below the well ID.
2. Groundwater contours are from the April 2019 LTM event.

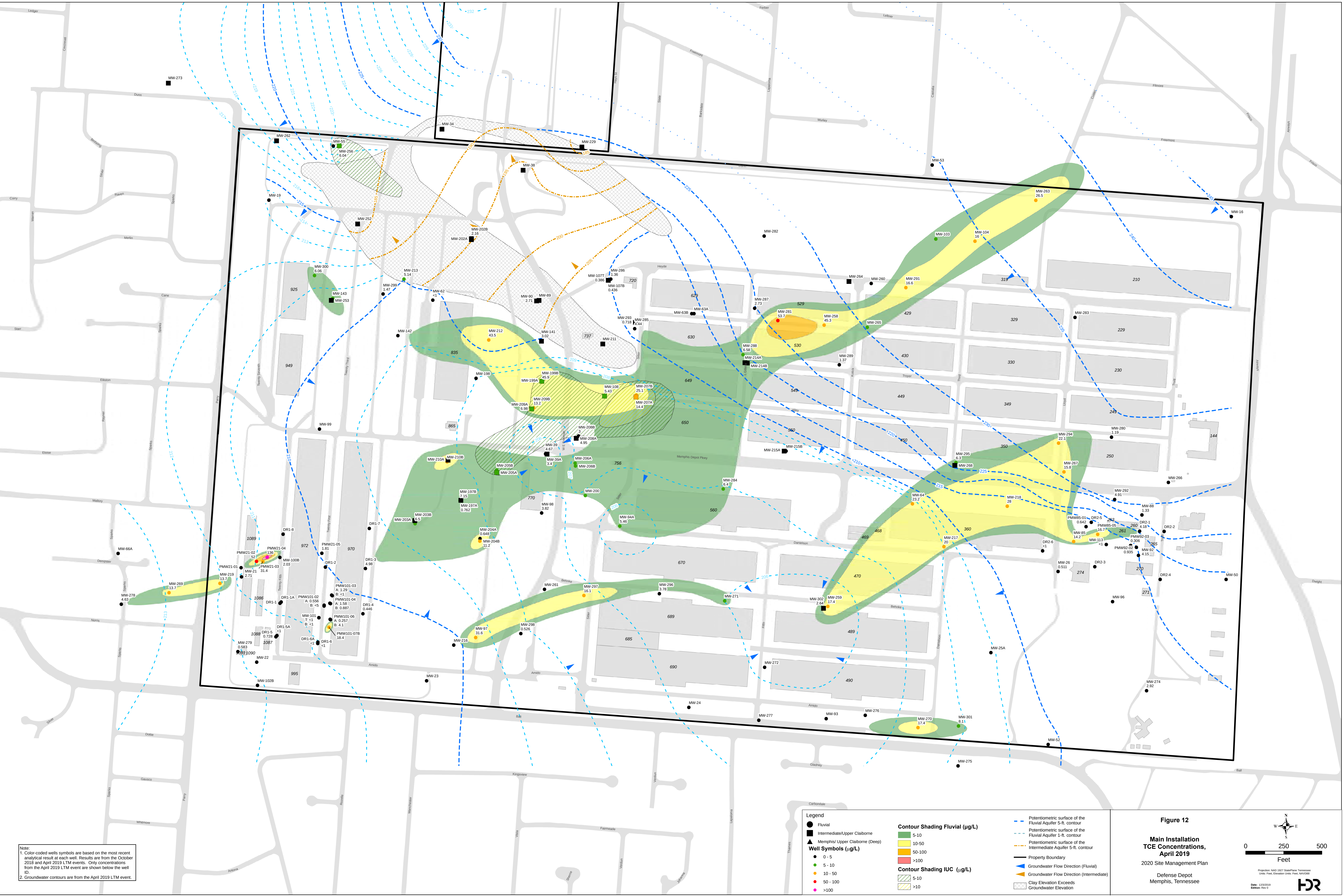
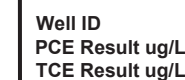


Figure 12
Main Installation
TCE Concentrations,
April 2019
2020 Site Management Plan
Defense Depot
Memphis, Tennessee

Main Installation Cross Section 1 with PCE and TCE Concentrations

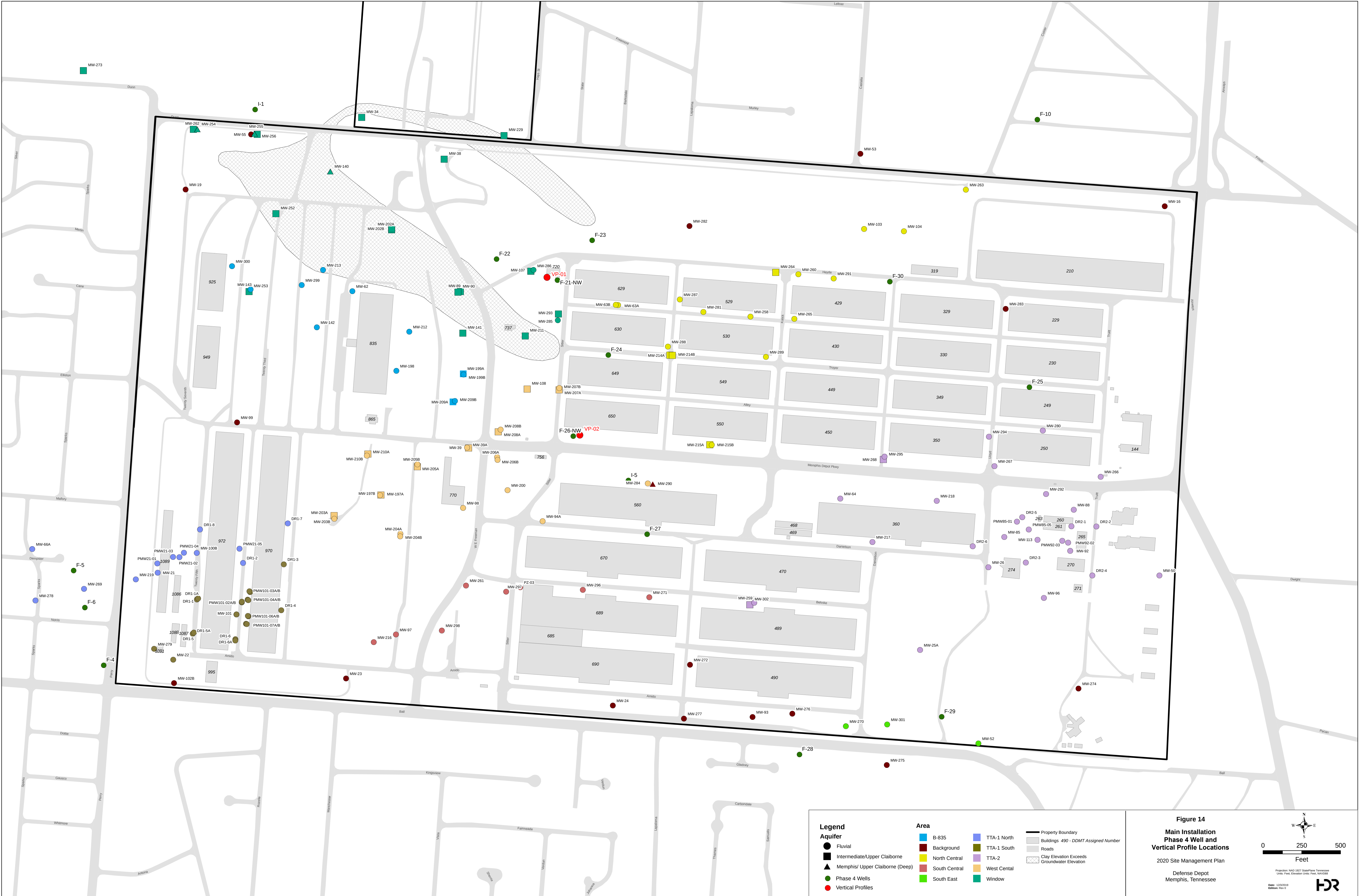
Defense Depot
Memphis, Tennessee



Results from October 2019

Note: Water levels measured at LTM wells in October 2019







Document Path: W:\SMP\2020\15_Target Sites\SVE.mxd

Document Path: W:\SMP\2020\16_SVE\Pilot Test Location Map.mxd



Legend

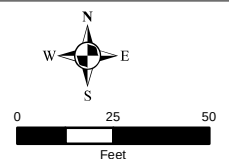
- SVE
- ▲ VMP
- Fluvial Aquifer Well
- SVE Fence System
- Buildings 490 - DDMT Assigned Number

Figure 16

SVE Pilot Test Location Map

2020 Site Management Plan

Defense Depot
Memphis, Tennessee



Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 11/27/2019
Edition: Rev 0



Figure 18

Barnhart Crane
Garden Area

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Property Boundary
- Garden Area

Aerial Date : March 2019



0 200 400
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 11/27/2019
Edition: Rev 0



Figure 19

Barnhart Crane
Garden Sample Locations

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

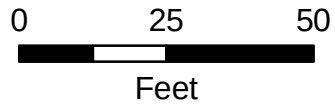
Legend

- Container Sample Location
- Hand Auger Sample Location
- Sample Grid

Area

- Aboveground Container Area
- In-Ground Planting

Aerial Date : March 2019



Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 11/27/2019
Edition: Rev 0



Dunn Field Disposal Sites, Source Areas and Off-Depot Groundwater Remedial Actions

Defense Depot
Memphis, Tennessee

 Original Dunn Field Boundary
 Fluvial SVE Conveyance Line
 Disposal Sites Excavation Area
 Off Site Treatment Areas
 Off Depot Air Sparge Area
 EISR Treatment Area
 Loess Excavation Areas
 Loess Thermal-Enhanced SVE Treatment Areas
 Fluvial SVE Well
60-foot radius of influence
 Unrestricted Use Area from ROD
 Buildings
 Paved Area
 Roads
 Railroad



0 250 500

Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 11/27/2019
Edition: Rev 0

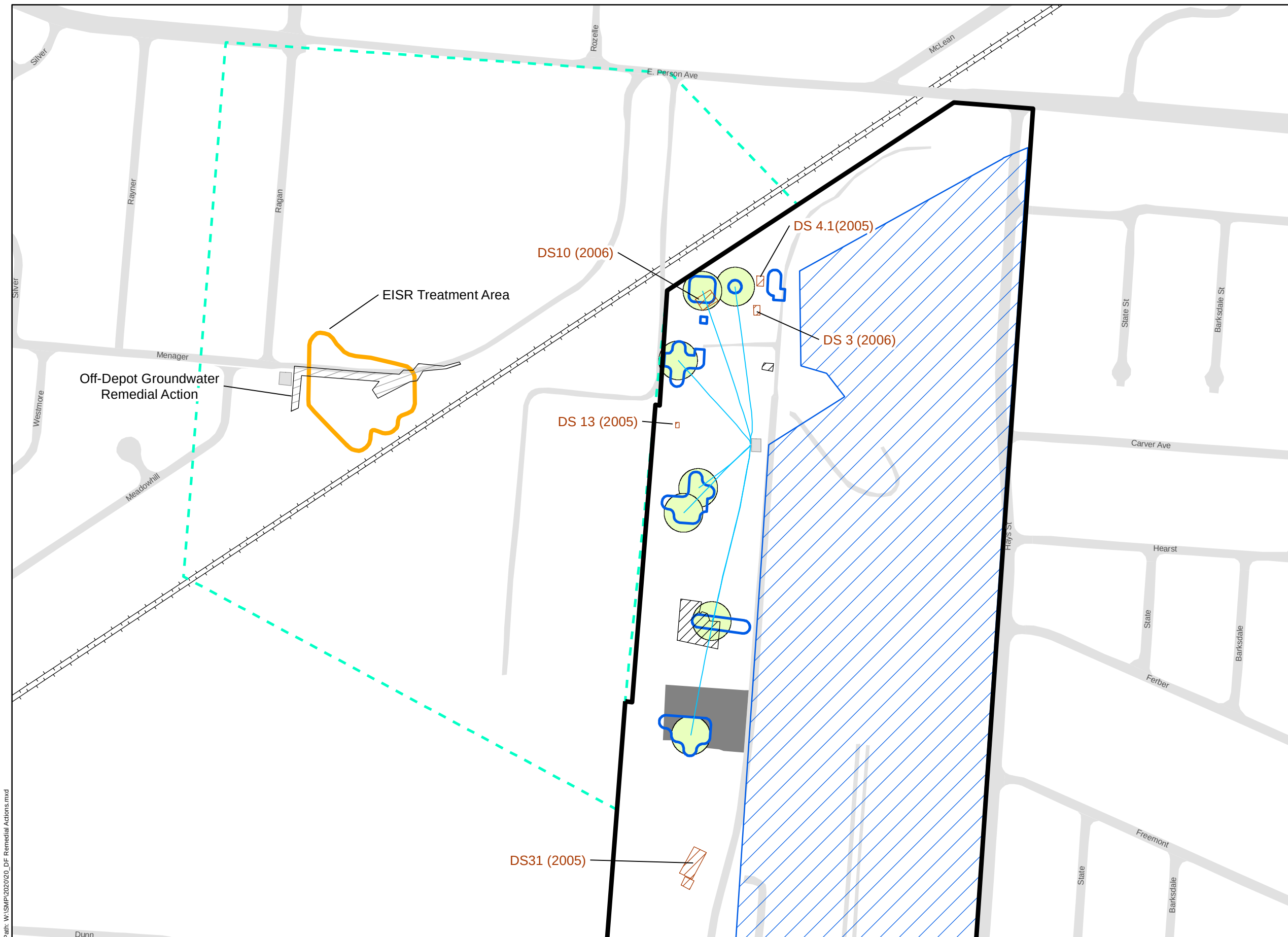


Figure 21

AS/SVE System

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

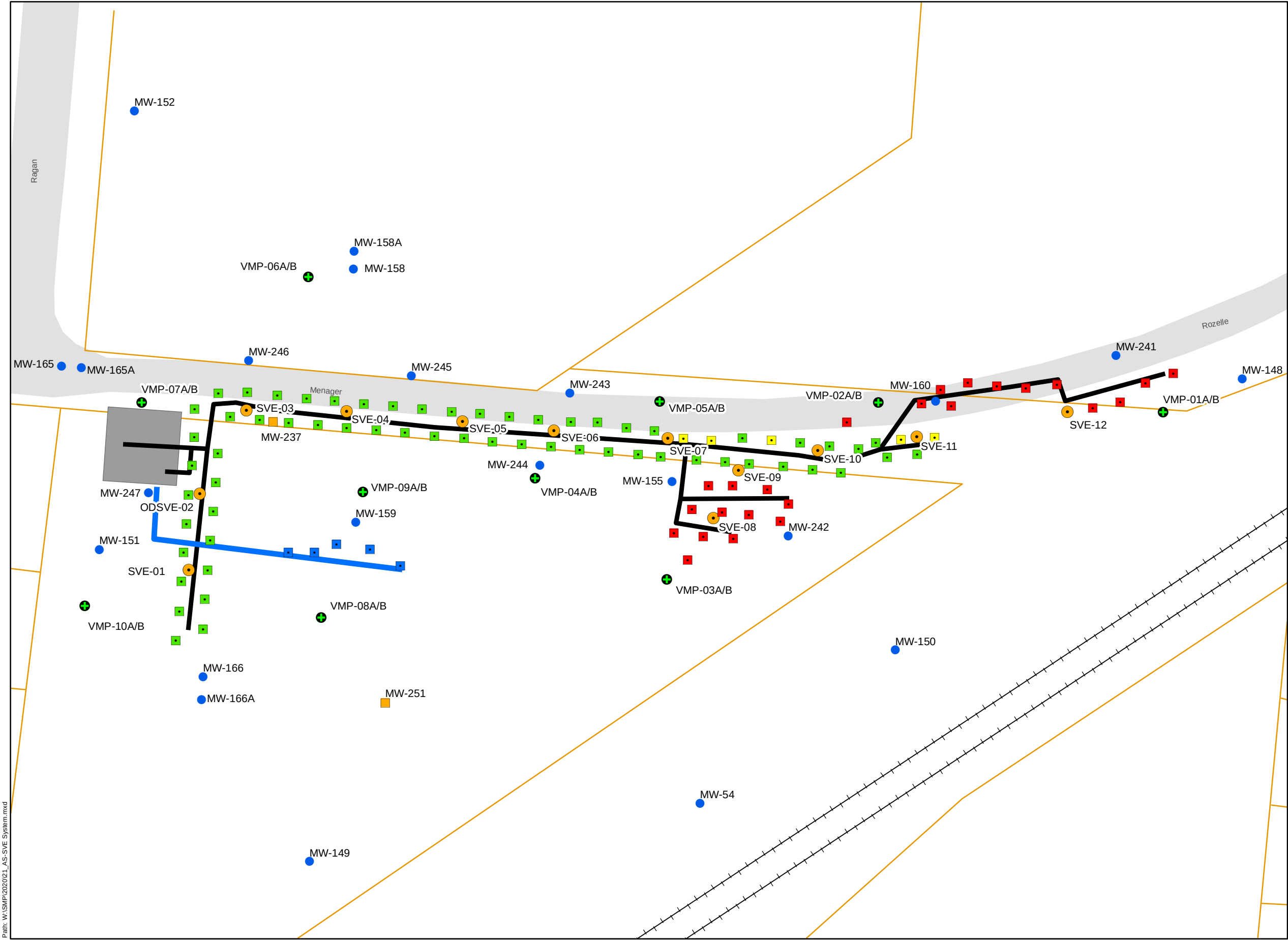
- Monitoring Well Screened in the Fluvial Aquifer
- Monitoring Well Screened in the Intermediate Aquifer
- AS Location (1/2 time)
- AS Location (full time)
- AS Location (closed)
- New AS Location (planned)
- VMP Location
- SVE Location
- Conveyance Lines
- New Conveyance Line (planned)
- SVE Compound
- Roads
- Railroad
- Parcel Boundary

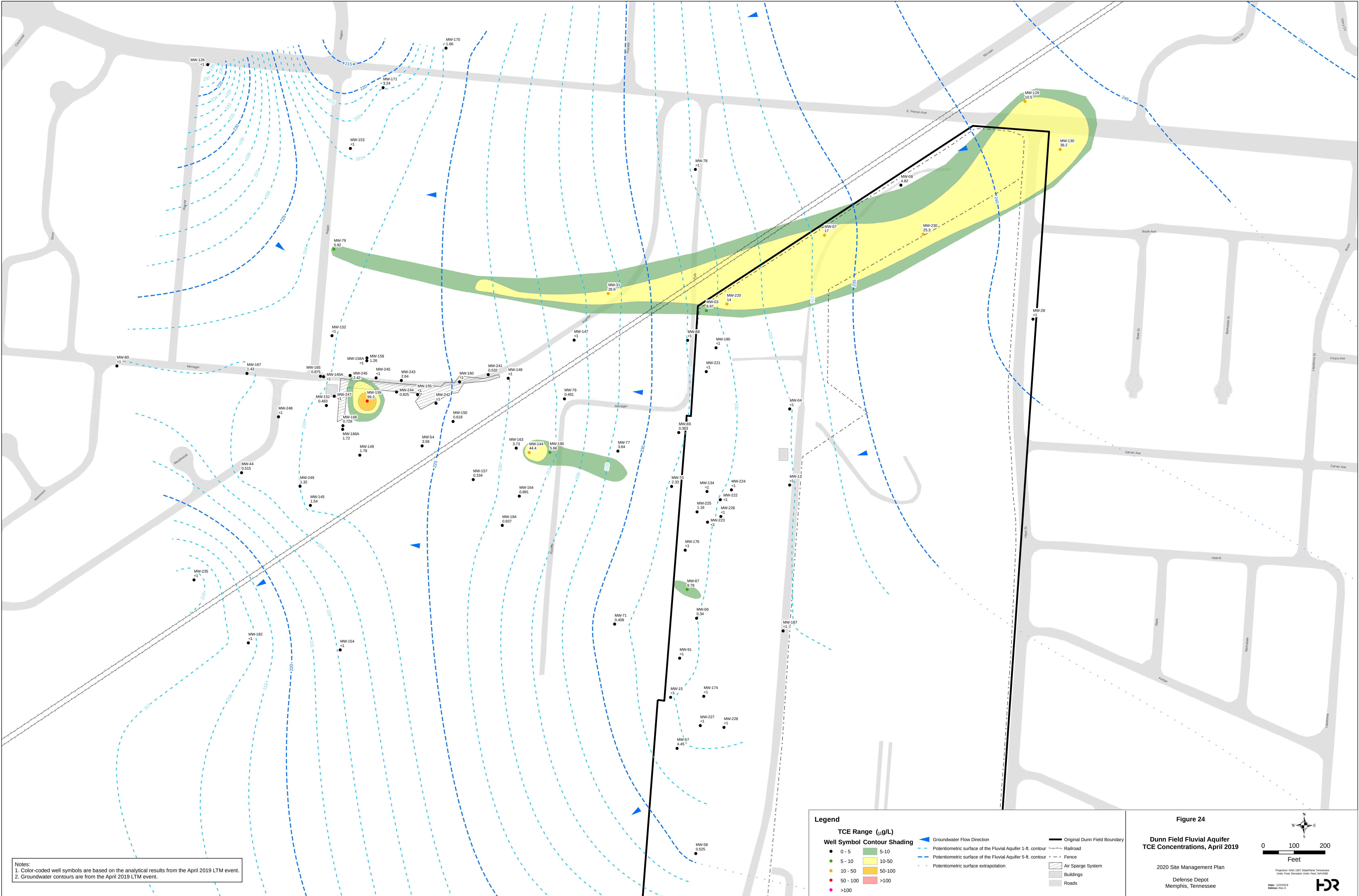


0 25 50
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, mean sea level

Date: 11/27/2019
Edition: Rev 0







Notes:
1. Groundwater contours are from April 2019.

Legend

- LTM Well
- TDEC Well
- Proposed Well Location
- Abandoned Well
- Unusable Well
- MIP Study Area

- Groundwater Flow Direction
- Potentiometric surface of the Fluvial Aquifer 5-ft. contour
- Potentiometric surface of the Fluvial Aquifer 1-ft. contour
- Original Dunn Field Boundary

Figure 25
Dunn Field Offsite Investigation

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

0 100 200
Feet

Projection: NAD 1983 Coordinate System
Units: Feet, Elevation Units: Feet, NAVD83
Date: 12/20/2019
Revision: Rev 0

HDR

Figure 26

Finding of Suitability
to Transfer Map

2020 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Property Boundary
- Date of Quitclaim Deed(s)¹
- FOST 1 9/26/01
 - FOST 2 2/6/02 and 5/6/02
 - FOST 3 4/4/06 and 8/18/06
 - FOST 4 9/2/05 and 10/17/07
 - FOST 5
 - FOST 6 3/30/11
- Note:
1) Date of signature by Army or other agency on deed.
- Buildings 490 - DDMT Assigned Number
- Roads



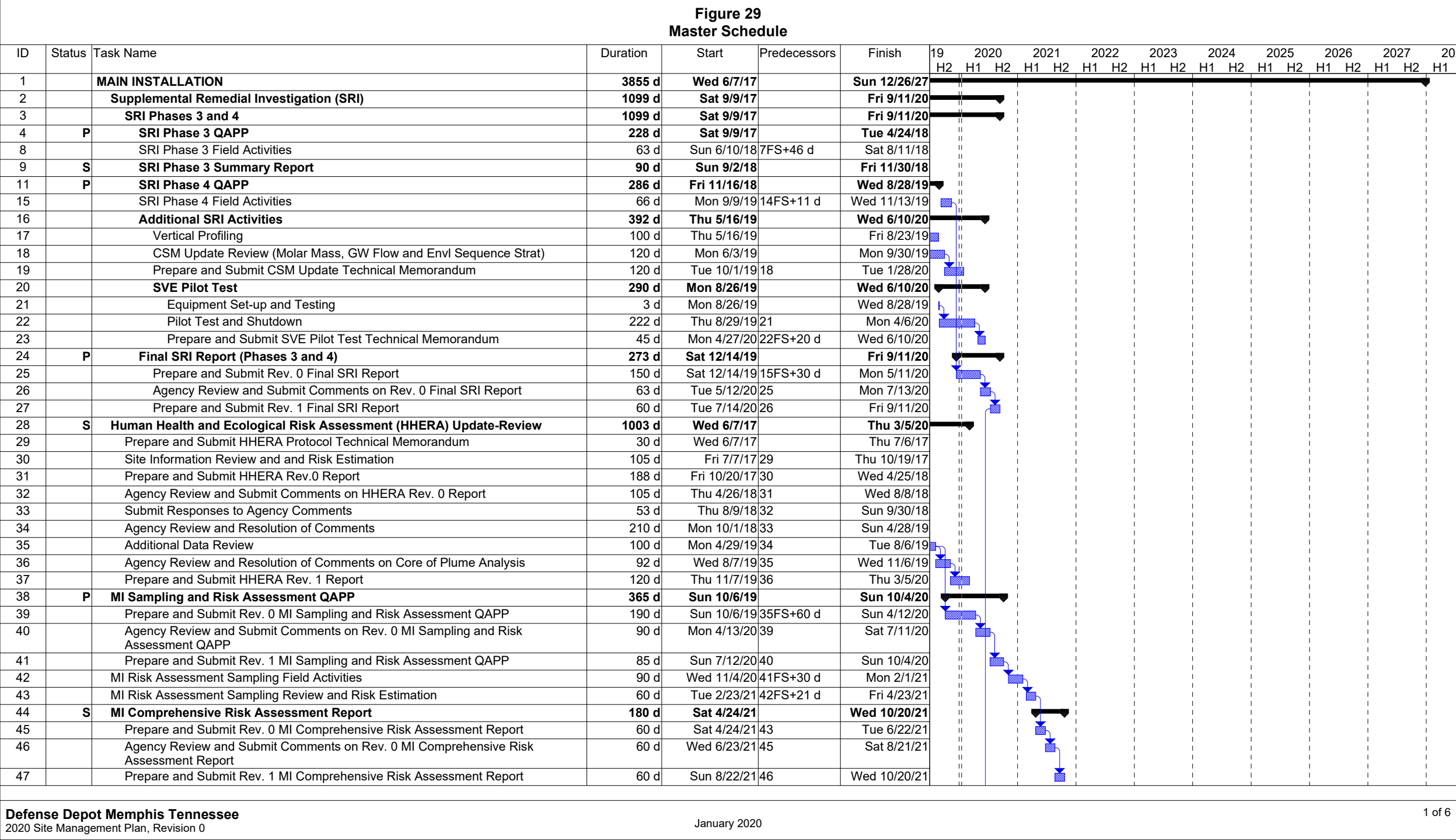
0 500 1,000
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet, NAVD88

Date: 12/2/2019
Edition: Rev 0







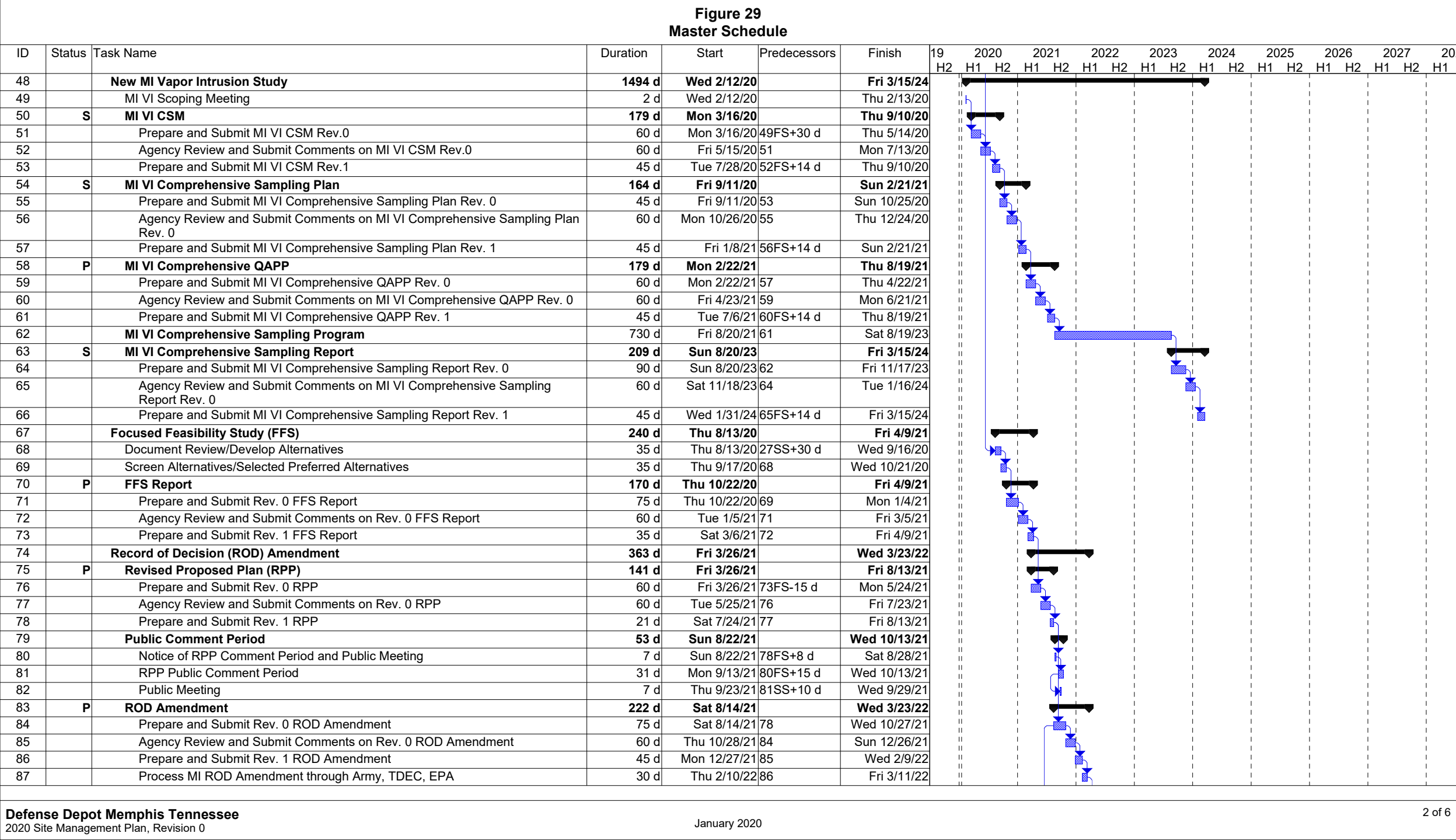


Figure 29
Master Schedule

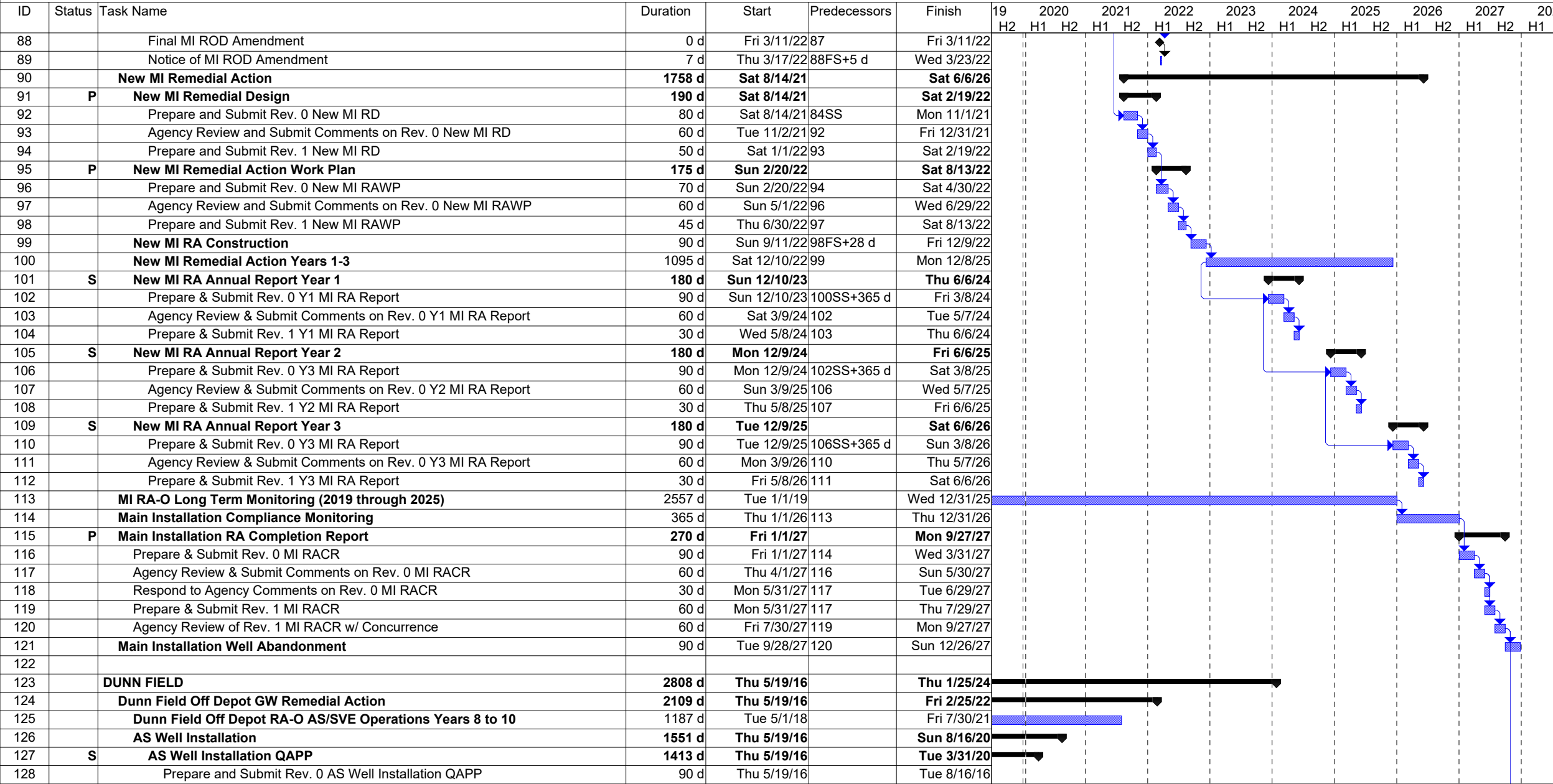


Figure 29
Master Schedule

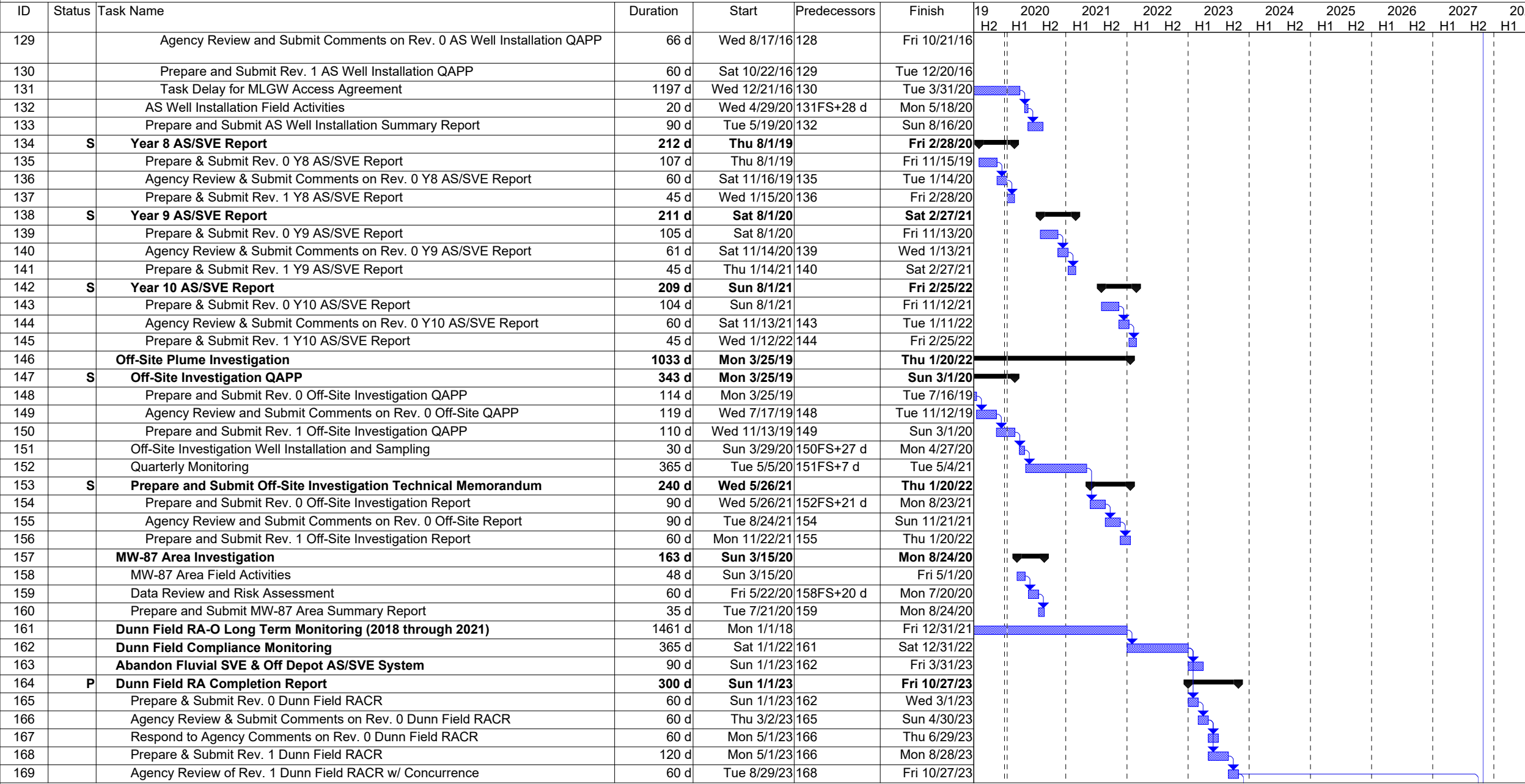
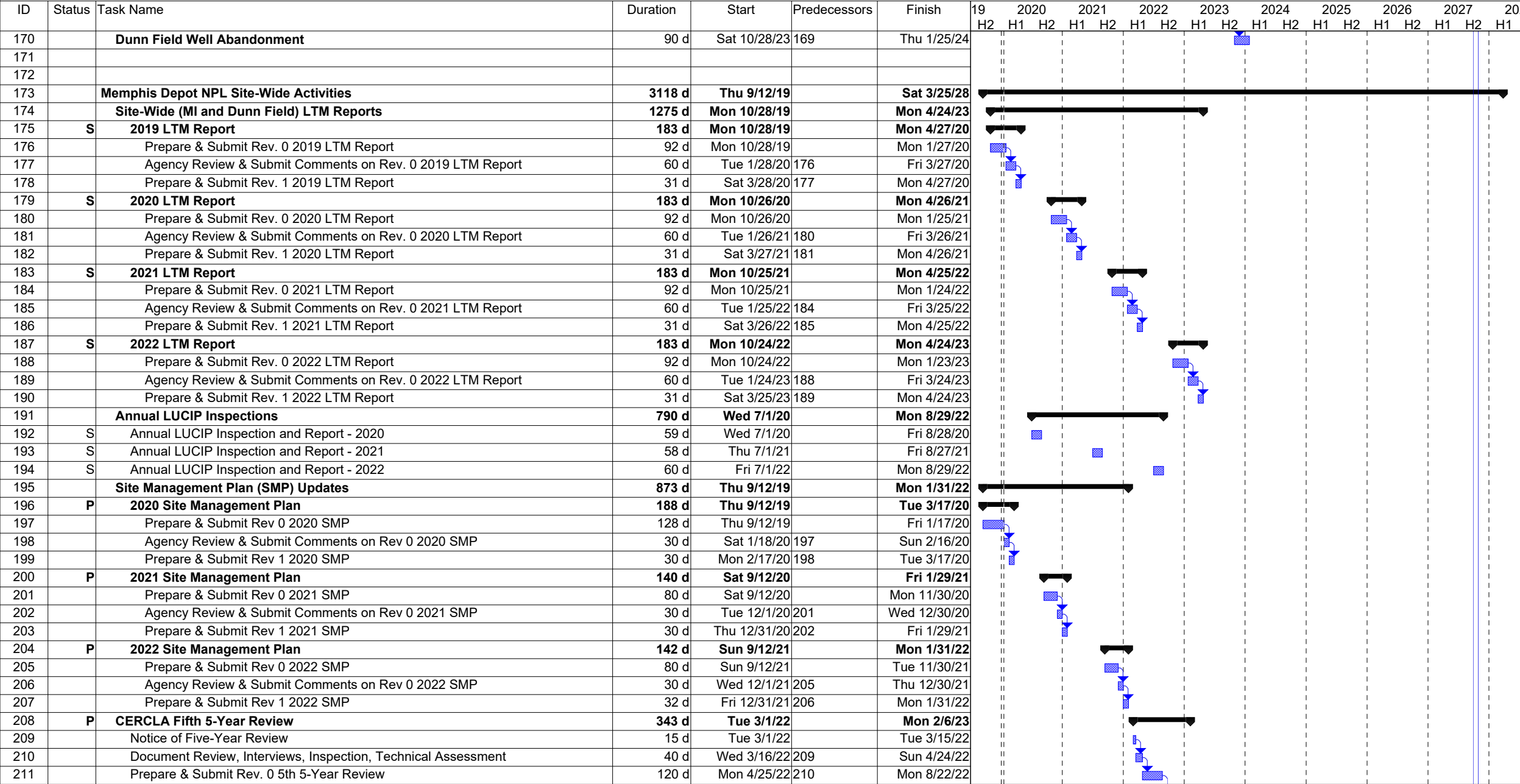
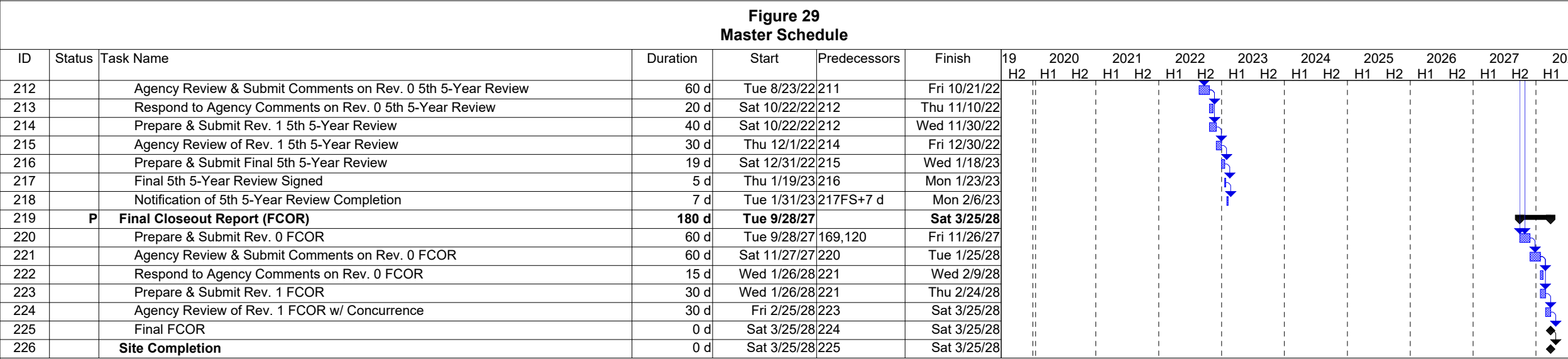
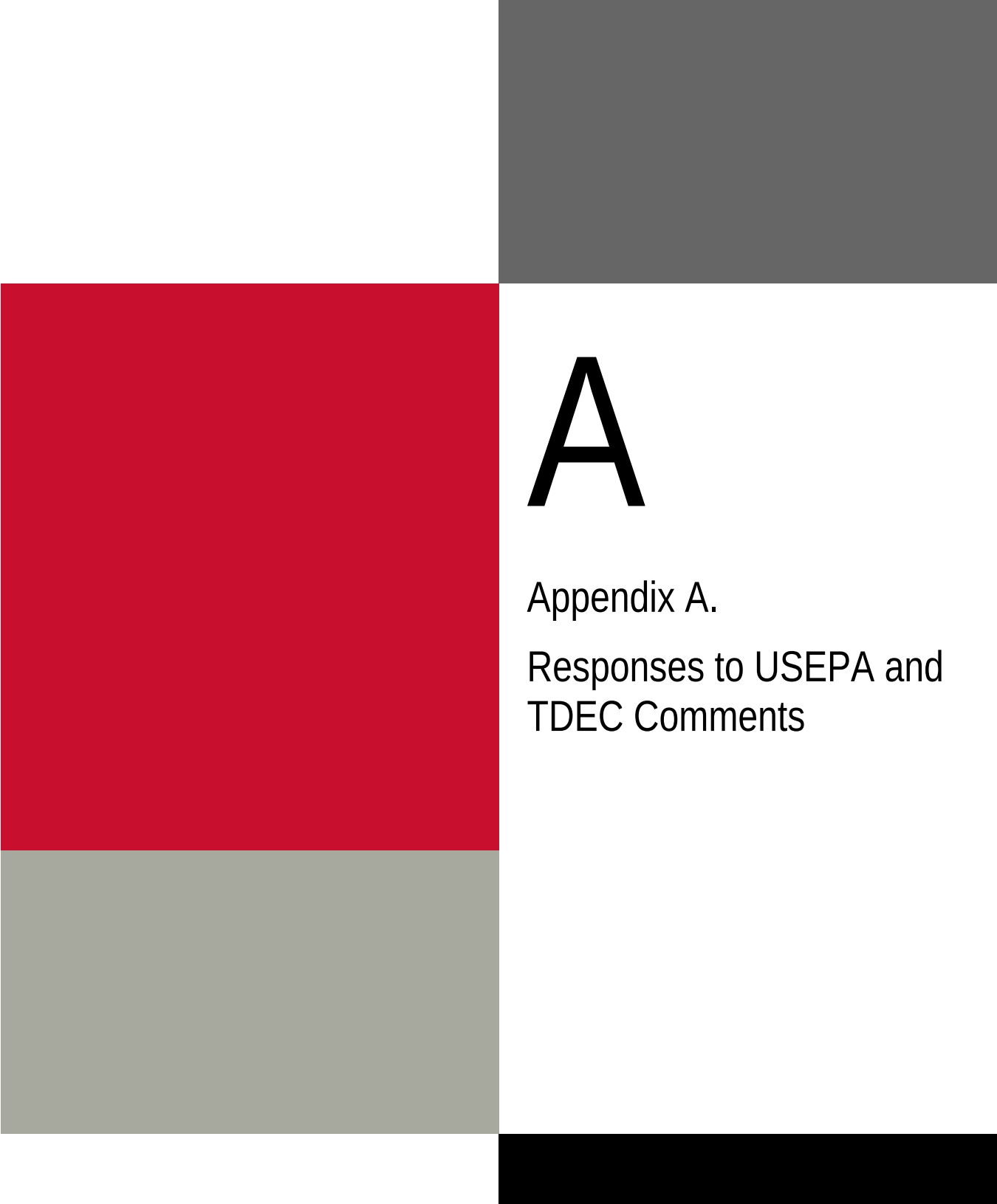


Figure 29
Master Schedule





A decorative graphic consisting of several overlapping rectangles. A large red rectangle is on the left. A dark gray rectangle is at the top right. A light gray rectangle is at the bottom left. A black rectangle is at the bottom right.

A

Appendix A.

Responses to USEPA and
TDEC Comments



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

September 07, 2020

Mr. James Foster
Base Realignment and Closure Division (ACSIM-ODB)
2530 Crystal Drive (Taylor Building), Room 5000
Arlington, VA 22202-3940

Dear Mr. Foster:

The U.S. Environmental Protection Agency (EPA) has reviewed the U.S. Department of Army's Defense Depot of Memphis, Tennessee 2020 Site Management Plan (SMP), Revision 0 response to EPA comments, dated May 13, 2020.

EPA approves the above mentioned document. Should you have any questions or concerns, please feel free to call me at on my cell number 404-229-9500.

Sincerely,

A handwritten signature in cursive script that reads "Diedre Lloyd".

Diedre Lloyd
Remedial Project Manager
Restoration & Sustainability Branch
Superfund Division

cc: Mr. James Foster, (Signed Original), United Parcel Service, Return Receipt
Mr. Jamie A. Woods, PG, Tennessee, Department of Environment and Conservation, Memphis
Environmental Field Office, 8383 Wolf Lake Drive, Bartlett, TN 38133-4119
Ms. Joan Hutton, CALIBRE, 3898 Mountain View Road, Kennesaw, GA 30152
Mr. Thomas Holmes, HDR Environmental, P.O. Box 728, Highlands, NC 28741

Above Letter was also emailed to list below and can be found at the e-file location noted below.

ec: james.c.foster10.civ@mail.mil; jamie.woods@tn.gov; joan.hutton@calibresys.com;
thomas.holmes@hdrinc.com;

e-bbc: Terrell.tina@epa.gov

C:\DDMT\DDMT_SMP\.....

**Responses to Comments from
U.S. Environmental Protection Agency (EPA) Region 4 on:
2020 Site Management Plan, Revision 0, January 2020
Defense Depot Memphis, Tennessee
Comments Received: 13 May 2020**

EPA Comments:

1. Page 1-1, Section 1, Introduction, 4th and 5th paragraphs discussion of the Information Repository (IR) and the Administrative Record (AR):
 - a. This section notes that the AR is a subset of the IR; instead, the IR and AR serve different functions and are not merely sets of data.
 - i. The IR is where current information, technical reports and any reference material are stored and can but doesn't usually have all records/documents for the SF Site.
 - ii. The AR serve different functions is established by the lead agency and is specialized record of information used to form the basis for selection of the response action for each SF site.

Response 1: The referenced text refers to a subset of site documents rather than a subset of the IR. For clarity, "subset of site documents" will be deleted, and the IR and the AR will be described per the following:

An information repository is a record storage area at or near a Superfund site that contains all correspondence, reports, and documents pertaining to the site, as well as general Superfund program information. *semspub.epa.gov*.

Under CERCLA, an administrative record is the complete collection of documents that forms the basis for selecting a response action (i.e., those documents considered or relied upon by the lead agency in selecting a remedy). *40 CFR 300.800-300.825*.

2. Please amend this section to discuss the functional differences of the IR versus the AR rather than the AR as a subset of the IR.

Response 2: See Response 1.

3. Upon conclusion of the HOT spot investigation, several options have been discussed contingent upon the investigative results. One option included the potential for a limited removal action. EPA is open to discussing this possibility upon submission of investigative data.

Response 3: Army will provide the final investigation report for the MW-87 area to USEPA and TDEC and will discuss the potential need for remedial action. Also, see Response 12b.

4. Verb tense, pg 3-7, 1st paragraph, last sentence: Information stratification of contaminants would be helpful in the conceptual site model.....". consider "will be" instead of would be or restructure sentence.

Response 4: The suggested change from "would be" to "will be" will be made.

5. Section 3.1.5.3, SVE Pilot Test, pg 3-8: Although, EPA and TDEC were informed of the ongoing SVE Pilot Test at the DDMT MI, the SVE Pilot Test has been conducted without consultation with either EPA or TDEC. EPA understands that SVE Pilot Test data will be provided in a future reporting cycle.
 - a. The SMP should provide additional data noted below along with the rationale for initiating the SVE Pilot Test without regulatory consultation.
 - i. What date was this pilot study initiated?
 - ii. What date can reporting for SVE Pilot Study be expected?
 - iii. What is the location of SVE Pilot Study on the DDMT Site? (ie: where is the Pilot Study being conducted?)
 - iv. The levels in the SVE system effluent indicate treatment of extracted vapor may be required in the future. Please provide additional detail why treatment of extracted vapor has not been conducted?

Response 5a i-iv: The pilot test was initiated in June 2019 with construction of VMPs in 3 areas of the MI (SMP Figure 15). An SVE well was installed near Buildings 260 and 265 in the southeast area of the MI (SMP Figure 16) and the test began 30 August 2019. Final vapor samples were collected on 13 May 2020 and

**Responses to Comments from
U.S. Environmental Protection Agency (EPA) Region 4 on:
2020 Site Management Plan, Revision 0, January 2020
Defense Depot Memphis, Tennessee
Comments Received: 13 May 2020**

groundwater sampling in the test area was completed by 18 May 2020. The report will be submitted to Army for internal review in late June and should be available for submittal to EPA and TDEC in August 2020. VOC concentrations in vapor effluent from the SVE system was slightly above the Shelby County Health Department (SCHD) de minimus level of 0.1 lb/hr from 29 August to 4 September. The dilution valve was opened on 4 September and subsequent analytical results demonstrated that VOC mass in the effluent was below the 0.1 lb/hr criterion through completion of the pilot test. SCHD was informed of the pilot test and the analytical results; no treatment was required. The SMP text will be updated to include a summary of the test through completion.

- v. Please provide additional information as to efficacy of the Dunn Field SVE

Response 5a v.: A sentence will be added stating Dunn Field SVE was shut down after 5 years when 4,000 pounds of VOCs removed and soil samples demonstrated RAOs had been met; a link will be provided to additional information in Section 3.2.4.

6. Section 3.1.6, Risk Assessment, Page 3-10, 5th paragraph: In 2000, it was noted that there is minimal to no suitable habitat throughout the MI and that the conditions have not changed and further notes there are no apparent complete ecological pathways of exposure on-site. The paragraph also notes that additional study is needed with respect to dioxins/furans
- a. Please provide further information to ensure understanding and provide clarity that addresses the lack of suitable habitat without any completed ecological pathways.

Response 6a: The text will be revised to state the property is currently 87% developed with warehouses, paved roads and parking areas, and gravel-covered storage/laydown areas. The buildings are over 90% occupied, the landscaped areas are maintained and the undeveloped areas are regularly mowed. The absence of suitable habitat for ecological receptors noted in 2000 remains the condition on the MI; without receptors, there are no complete ecological pathways of exposure.

The text will also be revised to state that detection of dioxins/furans warrant “additional study due to potential for human health impacts.”

7. Section 3.1.7, Vapor Intrusion, Page 3-11: This section should include a discussion of the potential extent of GW plume beyond the present property boundaries of the DDMT installation and that the GW levels indicate additional assessment is necessary.

Response 7: The text will be revised to state that VOC concentrations in groundwater samples collected beyond the DDMT property boundary indicate additional assessment is necessary and to summarize planned activities based on the February VI meeting summary.

8. Provide add supporting info for incomplete eco pathways.....

Response 8: See Response 6a.

9. Section 3.2.2 Record of Decision and ROD Amendment, Page 3-15: Please include information within this section as to the type of intended use (commercial vs. residential) for the anticipated land conveyance.

Response 9: There is no mention of property conveyance in section 3.2.2. The conveyance of the remaining government property on Dunn Field is mentioned in Section 3.2.7.2. That section will be revised to state future use of the property will have to comply with the land use restrictions including no residential land use or other child-occupied facilities (Section 3.3.2).

10. Section 3.3, Property Transfer and Land Use Controls, 1st paragraph, last sentence, following citation: “...documenting that all cleanup goals affecting current and reasonably anticipated future land uses have been achieved, and all institutional or other controls required in RODS have been put in place.” Please

**Responses to Comments from
U.S. Environmental Protection Agency (EPA) Region 4 on:
2020 Site Management Plan, Revision 0, January 2020
Defense Depot Memphis, Tennessee
Comments Received: 13 May 2020**

restate/rephrase the latter portion of the sentence referenced. The current phrasing is unclear and seems to imply that the EPA guidance documents cleanup goals were achieved. Instead please discuss site specific information that documents how cleanup goals were met.

Response 10: The wording was taken from the *Superfund Property Reuse Evaluation Checklist for Reporting the Site Wide Ready for Anticipated Use Measure* (USEPA, 2010b). The completed form has checked boxes for “All cleanup goals in the Record(s) of Decision or other remedy decision document(s) have been achieved for any media that may affect current and reasonably anticipated future land uses, so that there are no unacceptable risks.” and “Institutional or other controls required in the Record(s) of Decision or other remedy decision document(s) have been put in place.”

The following will be added to the first paragraph: “This is based on USEPA concurrence with interim remedial action completion reports for DDMT and findings that remedies were ‘operating properly and successfully’, and on implementation of requirements of the approved Land Use Control Implementation Plans. Operation and monitoring of remedial actions at DDMT will continue until RAOs have been met.”

11. Section 3.3, Property Transfer and Land Use Controls, 2nd paragraph: Please list additional steps in the FOST process or provide clarification that the FOST process is specific to DOD service property transfers and doesn’t include approval by EPA or TDEC, which is part of the CERCLA process for property transfer.

Response 11: Will add the following: “DoD prepares Findings of Suitability to Transfer (FOST) to summarize how applicable requirements and notifications for hazardous substances on the property have been satisfied in order for DoD to provide the applicable CERCLA 120(h)(3) or CERCLA 120(h)(4) covenants. The FOST states the property is environmentally suitable for transfer and contains a description of any long-term remedies (including land-use controls) and responsibilities for their maintenance and reporting. For NPL sites, such as DDMT, the FOST is forwarded to the State and to USEPA for review and comment, but approval is not required. Deeds transferring real property from DoD contain, to the extent required by law, the notices, descriptions, and covenants specified in Section 120(h) of CERCLA and are submitted to USEPA for concurrence.

12. Section 4, Activities Required for Site Completion: Please discuss the present status of the DDMT site which includes information that additional SRI is underway because previous RAOs and site MCLs were not met on either the MI or the Dunn Field portions of the Site.
- a. This portion of the SMP should also note that there is a vapor intrusion study underway on the Main Installation that will require additional work and evaluation.
 - b. This portion of the SMP should also note that the Dunn Field Site is also undergoing additional work investigative work and evaluation prior to property conveyance and AS/SVE completion.

Response 12: Required activities are summarized with links to the earlier sections which provide more detail.

Response 12a: The VI study is referenced in the third bullet item. The text will be revised to present the current status following the February meeting and will state that additional work and evaluation are required.

Response 12b: An additional bullet item will be included to discuss the MW-87 area investigation with a link to Section 3.2.7.2.



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Remediation
Memphis Environmental Field Office
8383 Wolf Lake Drive
Bartlett, TN 38133-4119

May 15, 2020

James C. Foster
BRAC Program Manager
Headquarters Department of the Army,
Assistant Chief of Staff for
Installation Management (DAIM-ODB)
Army Pentagon,
2530 Crystal Drive,
Arlington, VA 22202-3934

Subject: 2020 Site Management Plan, Rev. 0
Defense Depot Memphis, Tennessee
TDoR ID # 79-736
TN4210020570

Mr. Foster,

TDEC-DoR has reviewed the **DDMT 2020 Site Management Plan (Rev. 0)**, as compiled by HDR Inc., and approves of the document. If there are additional issues of concern, please contact me at (901) 371-3041 or at jamie.woods@tn.gov.

Regards,

A handwritten signature in blue ink, appearing to read "JAWood", with a long horizontal flourish extending to the right.

Jamie A. Woods, P.G.
Project Manager
Division of Remediation
Memphis Environmental Field Office

cc: Joan Hutton (CALIBRE)
T. Holmes (HDR Inc)
D. Lloyd (EPA-PM)

TDoR NCO: file 79-736
TDoR MEFO: file 79-736