FIFTH FIVE-YEAR REVIEW REPORT FOR NORTH HOLLYWOOD DUMP SUPERFUND SITE SHELBY COUNTY, TENNESSEE

SEPTEMBER 2020

Prepared by

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LIST OF ABBREVIATIONS AND ACRONYMS

4,4'-DDT	4,4'-Dichlorodiphenyltrichloroethane
3Q20	3 consecutive days, 20-year recurrence interval (minimum surface water flow)
ACL	Alternate Concentration Limit
ADP	Abandoned Dredge Pond
APL	Allowable Pesticide Level (same as allowable contaminant levels in fish tissue in ROD)
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	United States Agency for Toxic Substances and Disease Registry
BHC	benzene hexachloride (hexachlorocyclohexane [HCH])
BLM	Biotic Ligand Model
$CaCO_3$	Calcium carbonate
CCC	Criterion Continuous Concentration
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMC	Criterion Maximum Concentration
COC	Contaminant of Concern
CPG	Compliance Policy Guideline
CRA	Conestoga-Rovers & Associates, Ltd.
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
HI	Hazard Index
ICs	Institutional Controls
LTMMP	Long-Term Monitoring and Maintenance Plan
m/m	meters per meter
m/sec	meters per second
m2	meters squared
m3/sec	cubic meters per second
MEC	Memphis Environmental Center, Inc.
mg/kg	milligrams per kilogram
µg/day	micrograms per day
µg/L	micrograms per liter
µg/g	micrograms per gram
NCP	National Contingency Plan
NH3-N	Ammonia
NHDSC	North Hollywood Dump Steering Committee (representatives of the responsible parties)
NPL	National Priorities List
NRWQC	National Recommended Water Quality Criteria
O&M	Operation and Maintenance
ppm	parts per million
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision

RPM	Remedial Project Manager
SCC	Sediment Clean-up Criteria
SRG	Sediment Remediation Goal
SSIP	Site-Specific Indicator Parameter
TAG	Technical Action Group
TBCs	To-Be-Considered Criteria
TDEC	Tennessee Department of Environment and Conservation
TNDHE	Tennessee Department of Health and Environment
TRC	Total Residual Chlorine
USFDA	United States Food and Drug Administration
ug/g	micrograms/gram (equivalent to milligrams/kilogram)
USGS	United States Geological Survey
WREHWE	Wolf River Extended High-Water Event
WRHWE	Wolf River High-Water Event
WRWQG	Wolf River Water Quality Criteria (equivalent to NRWQC)

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and documents recommendations to address them.

The U.S. Environmental Protection Agency is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)) and considering EPA policy.

This is the fifth FYR for the North Hollywood Dump Superfund Site. The triggering action for this statutory review was the signing of the previous FYR on September 30, 2015. The FYR is required because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

This FYR describes the current operation and maintenance (O&M) activities that occurred from 2015 through 2018. The O&M activities were established per the 1997 Long-Term Monitoring and Maintenance Plan (LTMMP). Data from the 2019 sampling events were not made available in time for the review process, therefore this data will not be included in this FYR for the Site.

The Tennessee Department of Environment and Conservation (TDEC) Memphis Field Office was contracted by the EPA Region 4 to conduct the Fifth FYR and prepare this report regarding the remedy implemented at the North Hollywood Dump (NHD) Site in Memphis, Shelby County, Tennessee. This FYR was conducted from November 2019 to August 2020. The EPA is the lead agency for oversight of the Potentially Responsible Party (PRP)-financed cleanup at the Site. TDEC, as the support agency representing the State of Tennessee, reviews all supporting documentation and provides input to the EPA regarding the remedy implementation at the Site.

The agency participants in the FYR included the EPA remedial project manager (RPM) Randy Bryant and Don Sprinkle and Klarissa Kahill of TDEC. The PRP was notified of the start of the FYR. The review began on 10/8/2019.

Site Background

The NHD Site (the Site) consists of an approximately 170-acre area within the city limits of Memphis, Shelby County, Tennessee. The entire Site area includes: approximately 70 acres of former disposal areas (i.e., landfill areas) situated to the west (West Sector) and east (East Sector) of North Hollywood Street; an approximately 35-acre Abandoned Dredge Pond (ADP); an approximately 13.5-acre area previously occupied by two former surface water impoundments (Oxbow Lake and Beaver Pond); and a heavily wooded buffer zone located between surrounding Site features, and along the Wolf River. See Figures 1 and 2 in Appendix B for the location and layout of the Site.

The North Hollywood Dump opened as a municipal landfill in the 1930s and later accepted industrial wastes until its closure in 1967. Unauthorized dumping continued at the East Sector former disposal area until 1980. As a result of former landfill activities, groundwater, soils and sediments at the Site were

contaminated with a variety of pesticides, inorganic chemicals and metals. The property is presently vacant and not in use**.** The Site is in a residential community with approximately 28,000 people living within 3 miles of the Site. Residents closest to the Site are served by public water since private wells are not permitted within one-half mile of the Site.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: North Hollywood Dump		
EPA ID: TND980558894		
Region: 4	**State:** TN	**City/County:** Memphis/ Shelby County
SITE STATUS		
NPL Status: Deleted		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Randy Bryant, EPA, with support from Klarissa R. Kahill, TDEC		
Author affiliation: EPA and TDEC		
Review period: 10/08/2019 - 9/30/2020		
Date of site inspection: 11/06/2019		
Type of review: Statutory		
Review number: 5		
Triggering action date: 9/30/2015		
Due date *(five years after triggering action date)*: 9/30/2020		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The results of the Supplemental 1990 Remedial Investigation (RI) confirmed the presence of contaminants in Site soils, in the shallow groundwater of the Fluvial Sands Aquifer beneath the Site and in sediments of adjacent surface water impoundments, including the former Beaver Pond, the former Oxbow Lake and the ADP. During the Supplemental RI/FS, a baseline risk assessment was conducted to estimate the health and environmental problems that could result if the contamination at the Site was not properly remediated pursuant to the Superfund program. These analyses were based on conditions present at the Site, at the time of the analysis which included the temporary cap in place and no major increase of contaminants in the shallow aquifer that discharges into the Wolf River.

For non-carcinogenic contaminant exposure, the risk was assessed by a Hazard Index (HI) determination. The HI is a number that reflects a comparison of the calculated exposure level for a contaminant at the Site to an exposure level that would not cause harm from daily exposure for a lifetime. An HI greater than one (1) indicates that exposure exceeds the protection level. Carcinogenic risks are expressed as the probability of additional cancer incidence resulting from a lifetime of exposure.

The HI calculated for exposure to non-carcinogens in the soil and surface waters for the Site was well below one (1). Therefore, these substances were not present at levels that would be expected to cause concern. Similarly, exposure to carcinogenic compounds through contact with the soil or surface water was also determined not to be a health concern.

The exposure pathway that indicated a potentially unacceptable risk for people was the consumption of fish from the onsite water bodies (Oxbow Lake and the Abandoned Dredge Pond). Cleanup goals were established for fish and for groundwater discharging to the Wolf River to prevent contaminants from accumulating in fish in the Wolf River.

The ROD selected 15 contaminants of concern (COCs) for the Site and established action levels for these two media: 1) cleanup goals for groundwater (i.e., to prevent adverse impacts to the Wolf River) and 2) allowable contaminant levels for fish tissue. In addition, a groundwater cleanup goal for chromium and allowable contaminant level for chlordene in fish tissue were also selected in the ROD even though these contaminants were not listed as Site COCs. Throughout this report, the term COC will be used to refer collectively to the 15 COCs selected in the ROD as well as the two additional action levels for chromium and chlordene. In 2012, the EPA suggested that some of the COCs could be removed from routine monitoring. The maximum concentrations for barium, copper, nickel, and all of the BHCs reported between 1998-2010 had been lower or much lower than their respective proposed ACLs. Vanadium did not have an ACL since vanadium was not a concern for any possible risk scenario.

Table 1: COCs by Media

COC	Fish	Groundwater
Arsenic	✔	✔
Barium	✔	✔
Chromium	--	✔
Copper	✔	✔
Lead	✔	✔
Nickel	✔	✔
Vanadium	✔	--
Zinc	✔	✔
4,4'-DDT	✔	✔
Aldrin	✔	✔
BHC (total)	✔	✔
Chlordane	✔	✔
Chlordene	✔	--
Dieldrin	✔	✔
Endrin	✔	✔
Heptachlor	✔	✔
Heptachlor Epoxide	✔	✔

Response Actions

Pre-CERCLA studies at the Site date back to 1979. The EPA sampled sediment and surface water from the Site and adjacent areas and detected the presence of Site-related chemicals, including pesticides and heavy metals. Around this time, the Tennessee Department of Health and Environment (TNDHE) conducted a study of fish in the Wolf River. TNDHE was ultimately renamed as the Tennessee Department of Environment and Conservation (TDEC). TNDHE's study also indicated elevated contaminant levels that were thought to have originated from the Site.

The Memphis and Shelby County Office of Planning and Development and Memphis State University also investigated fish contamination in the Wolf River. The results of the fish study led to the eventual closure of fishing activities in the Wolf River, however, the study also determined that the North Hollywood Dump was not the sole source of fish tissue contamination.

A Technical Action Group (TAG) was formed in 1980 to address the short-term site environmental problems and the potential long-term environmental impacts from the Site. The group consisted of members from the EPA Region 4, TNDHE, the City of Memphis, Velsicol Chemical Corporation and the Memphis/Shelby County Health Department.

Beginning in 1981, the TAG initiated several activities at the Site, including the immediate removal of contaminated soil; capping of the Site by the PRPs; installation of perimeter security fencing and posting of signs at the Site; and numerous groundwater, surface water, soil, sediment and fish tissue sampling

events. The temporary vegetated soil cover over the areas of surficial contamination eliminated most of the contaminated sediment loading to the Wolf River.

The EPA proposed the Site to the National Priorities List (NPL) for investigation under CERCLA in December 1982 and finalized it on the NPL in September 1983.

A Remedial Investigation/Feasibility Study (RI/FS) report was submitted to the EPA in 1985, along with a conceptual remedial design (RD), at the conclusion of the TAG investigations. The EPA Region 4 approved the RD and remedial action activities commenced at the Site; however, the EPA Headquarters halted the remedial action (RA), asking for a supplemental RI/FS in order to ensure that the remedy complied with the new EPA guidelines. The EPA Headquarters' concerns with the TAG-selected RD were the lack of characterization of contamination in soils underlying the former disposal areas and adequacy of the selected 4-inch clean soil cover; which EPA Headquarters did not perceive as an appropriate long-term solution.

The City of Memphis and Velsicol agreed to perform the Supplemental RI/FS under an amended Commissioner's Order from the State of Tennessee, and investigations began in the spring of 1985. The Supplemental R1 and Supplemental FS were completed in April and May 1990, respectively. The EPA signed the final Site-wide Record of Decision (ROD) in September 1990.

The Site-wide ROD outlined the selected remedy for the Site, taking into consideration comments from the public and results of the RI/FS. The ROD did not explicitly identify remedial action objectives (RAOs) for the Site, but stated that "this final remedy addresses remediation of the soil, sediment, groundwater, and fish contamination by eliminating or reducing the risks posed by the Site through containment using engineering and institutional controls." The selected remedy consisted of the following remedial components:

- Installation and maintenance of a 24-inch low permeability soil cover over the former disposal area;
- Consolidation of contaminated soil near the surface water impoundment under the 24-inch cover in the controlled portion of the former disposal area, which is less prone to flooding and erosion;
- Monitoring of shallow groundwater and contamination levels to ensure that levels stay below the alternate concentration limits (i.e., ACLs) set to ensure groundwater discharged to the Wolf River remained at or below health based limits;
- Extraction of groundwater and discharge to the local sanitary sewer system, in the event groundwater contamination levels increase;
- Additional sampling of the Oxbow Lake and the ADP sediments and fish to better identify and define the contamination;
- Installation and maintenance of a 36-inch hydraulic cover over the contaminated sediments;
- Removal of contaminated fish and restocking of surface water impoundments to maintain the environmental food chain of the area;
- Installation and maintenance of a fence around the entire Site; and
- Implementation of land and groundwater use restrictions on the Site.

Table 2: Cleanup Goals for Fish and Groundwater

COC	NRWQC (WRWQC) µg/L			Groundwater ACL µg/L			Fish Tissue Allowable Concentration Limit mg/kg		
	EPA 2015	EPA 2009	ROD	Based on EPA 2015 NRWQC	Based on EPA 2009 NRWQC	ROD	URS 2015	EPA 2012	ROD
Metals									
Arsenic	0.14	0.140	0.140	207	218	150.42	NC	NC	0.0062
Chromium	11	11	0.290	2,602	2,582	56.4	NC	NC	NE
Lead	0.39	0.41	3.800	92.2	96.2	738.3	NC	NC	1.5
Zinc	28.5	29.6	47	6,741	6,948	9,151	NC	NC	2,154
Pesticides									
4,4'-DDT	0.000030	0.00022	0.00059	0.04	0.34	0.64	NC	NC	0.032
Aldrin	0.00000077	0.00050	0.00136	0.001	0.08	1.46	NC	NC	0.000654
Chlordane	0.00032	0.00081	0.00048	0.47	1.26	0.51	0.04	0.03	0.0083
Chlordene	NE	NE	NE	NC	NE	NC	0.04	0.03	0.0083
Dieldrin	0.0000012	0.000054	0.000144	0.002	0.08	0.15	NC	0.0006	0.00067
Endrin	0.03	0.036	0.0023	7.10	8.45	0.45	0.2	0.1	3.2
Heptachlor	0.0000059	0.000079	0.000079	0.009	0.12	0.23	NC	NC	0.0024
Heptachlor Epoxide	0.000032	0.000039	0.00100	0.05	0.06	1.07	0.001	0.001	0.0024

Note: This table reflects the focused COCs and cleanup levels based on the Agency's 2012 recommendations
NC: no change
NE: not evaluated
ug/L: micrograms per liter
ug/kg: micrograms per kilogram

Status of Implementation

The Consent Decree was lodged with the court on October 30, 1991. The Consent Decree required that the PRPs conduct a Remedial Design/Remedial Action (RD/RA) at the Site based on the remedy selected in the ROD. The RD process for the Site commenced in December of 1991 and the EPA approved the final RD on September 27, 1993. The monitoring of the effectiveness of the selected remedy for the ADP would be based on sampling and analysis of sediment samples. Sediment cleanup levels that would be necessary to achieve the allowable contaminant levels in fish tissue identified therein would be calculated during the RD process. In April 1993, as a result of additional investigation activities completed after the ROD, the EPA:

1) Determined that only four fish tissue COCs (the pesticides chlordane, chlordene, endrin, and heptachlor epoxide) would have to be monitored;

2) Determined that monitoring of ADP remedy effectiveness would be based on the analysis of fish tissue samples rather than sediment samples for these four COCs;
3) Established sediment cleanup goals for the four (4) COCs (the EPA goals, as well as a second set of "verification" sediment cleanup goals calculated by the NHDSC, were included in the Final RD Report); and
4) Stated that violations would be based on a statistical evaluation of whether ADP fish tissue concentrations exceeded Wolf River fish tissue concentrations rather than on exceedance of the allowable contaminant levels established in the ROD for these four COCs. Hereafter, the term Allowable Pesticide Levels (APLs) will be used when referring to the allowable pesticide levels for these four (4) fish tissue COCs.

The decision to base remedy evaluation on fish tissue rather than sediment sampling and analysis was based on the concern that contaminated sediments from other sources might enter the ADP from the Wolf River during high-water or flooding events. Similarly, the proposal to compare fish tissue constituent concentrations from the ADP to fish tissue constituent concentrations from the Wolf River; to determine the effectiveness of the remedy, was discarded since Wolf River fish tissue concentrations bioaccumulated constituents from other sources.

Site cleanup activities began in early 1994. Contaminated solid waste materials, including drums, refuse, debris and soil, were excavated as part of the Site's remedy and placed in the West Sector former disposal area prior to final capping. The existing low-permeability clay cap across the approximately 70- acre former disposal area was enhanced and, in some areas, extended laterally, resulting in a uniform thickness of two (2) feet across the landfill. The cap was seeded and fertilized to establish hardy vegetation growth.

In 1995, fish were harvested from all three (3) existing surface water impoundments; ADP, Oxbow Lake, and Beaver Pond. Harvested fish carcasses were disposed of in the West Sector former disposal area prior to final capping. The top 40-inches of contaminated sediments from the central portion of the ADP were dredged, removed, and deposited in on the former Oxbow Lake. A minimum three- (3) foot-thick soil cover was emplaced over both the Oxbow Lake and the Beaver Pond filling these water bodies to grade. These former surface water impoundments were then graded for proper drainage. The clean underlying sediment remaining in the central portion of the ADP was then utilized as an on-site sediment borrow source for other portions of the ADP. The northwestern lobe and portions of the southeastern lobe of the ADP were covered with a combination of hydraulic dredge fill from the ADP (36 percent) and imported sand from an off-site borrow source (64 percent). The resulting clean soil cover ranges from the minimum requirement of three (3) feet to as much as seven (7) feet in thickness. Since completion of the remedial work in December 1996, fish have been allowed to repopulate the sole remaining on-site surface water impoundment, the ADP, via natural mechanisms such as migration from the Wolf River during periods of very high stage.

The final Site inspection occurred on January 30, 1997. Participating in the inspection were representatives from the EPA, TDEC (formerly TNDHE), MEC and CRA. Construction completion was achieved in July 1997. The EPA deleted the Site from the NPL in December 1997.

Long term monitoring and maintenance activities were established in the LTMMP which was approved by the EPA in March 1997. This plan requires monitoring of groundwater, Wolf River surface water, ADP fish tissue, and ADP sediments, as well as regular site inspections to verify the integrity of the vegetated low-permeability cap across the former disposal areas, the security fence controlling access to

the Site, the off-site surface water drainage system, and the monitoring well network for the Site. Groundwater and Wolf River surface water sampling events were initially conducted quarterly, then semi-annually, and ultimately on an annual basis beginning in 2003. Groundwater contaminants have not been detected at levels exceeding their respective ACLs. Therefore, it has not been necessary to extract groundwater from the shallow Fluvial Sands Aquifer and discharge to the municipal sewer system.

The LTMMP specified that the first fish tissue (and sediment) sampling event be performed two years after completion of remedial activities. A statistical comparison of the sampling results would be made between fish collected in the ADP and the fish collected in die Wolf River. Subsequent fish sampling events would be performed every two to three years. See Appendix B, Figures 4 and 5, for approximate fish sampling locations in the Wolf River and ADP.

Fish tissue concentrations have varied over the years, decreasing in some years and increasing in other years. A spike in fish tissue concentrations in 2001 prompted the EPA to request a health consultation from the United States Agency for Toxic Substances and Disease Registry (ATSDR), which was completed in September 2002. As a result, the NHDSC implemented a series of the EPA-approved supplemental corrective measures designed to minimize trespassing at the Site for fishing and the potential consumption of ADP fish by local residents. These supplemental corrective measures included the installation of additional fencing around most of the ADP (completed in July 2003) and harvesting, removal and on-site disposal of ADP fish in September 2003.

Supplemental corrective measures were implemented in response to an increase in trespassing during 2006. These measures included - but were not limited to - installation of additional warning signs about the dangers of eating ADP fish and performance of more frequent inspections (daily and/or weekly) of the ADP perimeter, especially when conditions are more conducive for fishermen to trespass onto the ADP (e.g., longer daylight hours and warmer weather) and/or when an increased frequency of trespassing is observed.

The weekly inspections performed by the NHDSC include all ADP fencing and any other ADP areas where evidence of recent trespassing has been observed. The daily inspections performed by the NHDSC include any areas of ADP fencing and, as appropriate, other ADP areas where recent evidence of trespassing or vandalism has been observed. The NHDSC fully documents the dates/times of all inspections, as well as all trespassing/fence vandalism incidents. The locations of the most recent fence repairs from CY 2018 are shown on a map in Appendix B, Figure 6.

Areas along the southern, eastern, and northern perimeter of the ADP were previously reported as locations of vandalism or damage caused by fallen trees or tree limbs. Sections of the fence were repaired by a contractor. The NHDSC Project Coordinator at the time also indicated other areas where fishermen have historically trespassed to access the ADP and stated that the frequency of trespassing had continued to decrease over the past few years to very minimal levels.

Overall, the vegetated cover over the capped former disposal areas was well established, any areas of rutting or slight erosion were re-established with vegetation, immediate repairs were made to all damaged portions of the ADP and east and west sector former disposal area fencing, and all monitoring wells were secured and properly labeled.

The NHDSC has proposed that, as required, periodic fish harvests at the ADP be implemented as a supplemental corrective measure for the Site. However, to date, the NHDSC has not further pursued this recommendation with the EPA or TDEC because the above-noted supplemental corrective measures have been very successful at minimizing the frequency of trespassing at the ADP.

Institutional Control (IC) Review

Additional review of existing information demonstrates that all five parcels that contain any portion of the landfill have a Notice of Hazardous Substances Site that was filed in either 1988 or 2013. A sixth parcel is not part of the landfill but is located between the ADP and the Wolf River. The parcel is subject to a conservation easement that prohibits agricultural, commercial, or industrial land use. The seventh parcel is a waterbody (the ADP) and as such is not subject to land use/deed restrictions but is currently managed by fencing and signage restricting fishing. Furthermore, Shelby County has a GIS map with layers including zoning, parcels, etc. The parcels that contain the landfill are zoned as CA (conservation agriculture) or CA-FP (conservation agriculture-floodplain). Shelby County ordinances regulate the installation of water wells within one-half mile of the boundaries of a listed federal or State Superfund site or Resource Conservation and Recovery Act corrective action site.
See Appendix B, Figure 2, for a parcel map.

Table 3: Summary of Planned and/or Implemented Institutional Controls (ICs)

Media	Institutional Controls (ICs) Needed	ICs Called for in the Decision Documents	Impacted Parcels	IC Objective	Instrument in Place
Groundwater	Yes	Yes	042068 00076 042068 00077 042068 00078 072045 00066 072119 00009 072119 00011 072119 00025	Restrict use of shallow aquifer as a drinking water source	Installation, modification, repair, or abandonment of a water well or any other type well must be approved and permitted by the Groundwater Quality Control Board for Shelby County
				Restrict well use at the Site	
Aquatic Life	Yes	Yes	042068 00078 072119 00009 072119 00025	Restrict consumption of fish from surface water from impoundment	Signs warning about fish consumption are posted around the ADP. Engineering controls, including a perimeter fence, have also been implemented.
					(Fishing advisories for 19 miles of the adjacent Wolf River issued by TDEC and Tennessee Wildlife Resources Agency)

Soil	Yes	Yes	042068 00076 042068 00077 042068 00078 072045 00066 072119 00009 072119 00011 072119 00025	Restrict future Site land uses to be consistent with the remedy in place	All five parcels that contain a portion of the landfill have a Notice of Hazardous Substances Site. A sixth parcel is not part of the landfill but is located between the ADP and the Wolf River. A conservation easement prohibits agricultural, commercial or industrial land uses only on parcel 072119 00009. The easement also prohibits filling, excavating, or dredging of this wetland parcel and prohibits construction or placement of any buildings on the land. The seventh parcel (042068 00078) is the ADP listed above.

Systems Operations/Operation and Maintenance (O&M)

The NHDSC is responsible for the Site's long-term O&M and monitoring activities in accordance with the LTMMP. The primary O&M activities currently being performed include:

- Monthly Site inspections with comprehensive quarterly Site inspections, including all fencing and other access controls;
- Visual examination of the vegetated former disposal area cap and adjacent slopes with regard to overall integrity and condition, erosion, settlement, deep-rooted vegetated, burrowing animals and the need for any corrective action;
- Examination of the condition of all groundwater monitoring wells, including confirmation of the tightness of all well caps and lubricating of all well locks;
- Weekly inspection of the ADP fencing, other ADP access control and as appropriate, other ADP areas where recent evidence of trespassing or vandalism has been observed;
- Daily inspections of areas where recent evidence of trespassing or vandalism has been observed are performed, as required, especially when conditions are most conducive to attempt fishing at the ADP;
- Repair of vandalized or otherwise damaged Site fencing as needed; and
- Ongoing site maintenance activities such as mowing and fertilizing of the vegetated cap and adjacent slopes.

In addition, the NHDSC also performs routine monitoring activities in accordance with the LTMMP. The primary routine monitoring activities include:

- Annual groundwater sampling;
- Annual surface water sampling in conjunction with annual groundwater sampling;
- Water level measurements in all Site-related wells prior to initiating the annual groundwater sampling event and during Wolf River high-water events of sufficient magnitude and duration to alter the hydraulic gradient across the Site;
- Collection of tissue samples from fish in the ADP and the Wolf River at a minimum of once every three (3) years; and
- Collection of ADP sediment for chronic toxicity testing and related elutriate quality analyses once every three (3) years in conjunction with ADP fish tissue sample collection.

Areas along the southern, eastern, and northern perimeter of the ADP were previously reported as locations of vandalism or damage caused by fallen trees or tree limbs. Sections of the fence were repaired by a contractor. The NHDSC Project Coordinator at the time also indicated other areas where fishermen have historically trespassed to access the ADP and stated that the frequency of trespassing had continued to decrease over the past few years to very minimal levels.

Historically, trespassing fishermen had accessed the ADP from the unfenced portion of the Site along the Wolf River, by cutting a section of the fence or pulling up the bottom of the fence and crawling beneath it. The NHDSC immediately repairs all vandalized sections of the fence with baling wire and marks both these areas as well as areas repaired by their contractor with survey tape to facilitate monitoring for future tampering with the repair. Two lines of heavy rope with caution tape wrapped around them had been strung along the preferred access area to the ADP from the Wolf River side, again, to facilitate monitoring. The location of recent fence repairs is shown in Appendix B, Figure 6.

- **CY 2015** – All previous fence repairs remained intact. There no additional vandalism and no evidence of trespassers observed. The former disposal area cap remains in excellent condition with no areas of concern requiring immediate corrective action.

- **CY 2016** – Vandalism/damage to ADP fencing and east and west sector fencing due to trespassers, and a vehicle accident occurred in CY 2016. Trespassers (fishermen) were observed as well. All damages to the fence were immediately repaired and trespassers were escorted from the ADP/site and made aware of health risks related to consuming ADP fish as well as legal action associated with trespassing on the site. Well OW-11 was damaged by the vehicle accident that occurred at the west sector fence along North Hollywood Street. The well was repaired by McCray Drilling on July 27. The former disposal area cap remains in excellent condition with no areas of concern requiring immediate corrective action.

- **CY 2017** - All previous fence repairs remained intact. There was no additional vandalism and no evidence of trespassers observed. The former disposal area cap remains in excellent condition with no areas of concern requiring immediate corrective action.

- **CY 2018** – All previous fence repairs remained intact. There was no additional vandalism and no evidence of trespassers observed. Five coyote burrows previously observed in March 2012 were located beneath heavy vegetation during the 2018 monthly inspections Jan-May. The burrows were deemed inactive. Areas of shallow rutting on the cap east and west sector former disposal area were identified, and vegetation has been stabilized. Vegetation has also been stabilized in areas of light erosion in the southwest section of the East sector former disposal area.

Overall, the vegetated cover over the capped former disposal areas was well established, any areas of rutting or slight erosion were re-established with vegetation, immediate repairs were made to all damaged portions of the ADP and east and west sector former disposal area fencing, and all monitoring wells were secured and properly labeled.

Annual O&M costs include Site inspections, cap and access control maintenance, sampling and other monitoring activities and monitoring well maintenance, as well as associated report preparation, project management, administration and the EPA oversight costs. The ROD estimated that the O&M activities would have a total cost over 30 years of $1,578,670 for groundwater and $31,640 for surface water

impoundments. The projected annual cost for O&M activities for 2004 through 2028 was estimated at $92,780. Annual O&M costs for the period covered by this FYR (2015-2018) are presented in Table 4.

Table 4. Annual O&M Costs

Year	Total Cost
January 1 - December 31, 2015	$151,210
January 1 - December 31, 2016	$108,183
January 1 - December 31, 2017	$59,519
January 1 - December 31, 2018	$121,312
January 1 - December 31, 2019	$173,271

III. PROGRESS SINCE THE PREVIOUS REVIEW

Table 5: Protectiveness Determinations/Statements from the 2015 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	**Short-term Protective**	The remedy at the Site currently protects human health and the environment because contaminant source materials have been addressed through excavation and placement of contaminated materials in a capped former disposal area; targeted dredging of contaminated sediments and placement of a soil cover over discrete areas of the ADP and former surface water impoundments; appropriately implemented Site O&M activities; and long-term monitoring data that indicate contaminant levels in groundwater, ADP sediment and ADP fish tissue have declined. However, in order for the Site's remedy to be protective in the long-term, ACLs need to be recalculated using the EPA 2015 NRWQC, an expanded fish tissue sampling program needs to be carried out in late 2015 to allow calculation of updated cancer and noncancer risk levels for all original Site COCs, and issues surrounding institutional controls on six of the seven parcels of the Site have to be addressed.

Each recommendation and its current status are summarized in Table 6 and discussed below.

Table 6: **Recommendations from Previous FYR**

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
Sitewide	Many of NRWQC, from which groundwater ACLs for Site are back-calculated, have changed, hardness-dependent NRWQC may be subject to change and other components of ACL calculation (i.e., Wolf River 15-Year Average and 3Q20 Daily Mean Flows) may also have changed	Recalculate ACLs using EPA 2015 NRWQC and updated values for other possibly changed components of calculation. Compare recent results for groundwater samples with new ACLs.	Completed		5/1/2019
Sitewide	ADP fish tissue concentrations remain above levels safe for human consumption and at current very slow rate of decrease will continue to do so for foreseeable future. However, it is possible that a higher excess cancer risk level (e.g., 10^{-5}), closer to the current levels being measured in ADP fish tissue, might be appropriate for one or more of current ADP fish tissue COCs (in particular, chlordane) without total excess cancer risk and total noncancer risk exceed- ing the required values of 10^{-4} and 1, respectively.	Expand scope (i.e., number of samples and original full set of COCs identified in ROD) of next fish tissue sampling event scheduled for late 2015 to allow a full evaluation of whether adoption of higher risk levels is possible. Calculate updated excess cancer/ non-cancer risk levels for original COCs identified in the ROD.	Completed	The fish tissue sampling plan was expanded for the collection of additional samples in the 2015 and 2018 Sampling Events. Allowable pesticide levels (APLs) for the Site COCs were updated by the URS in August 2015. The updated 2015 APLs for many of the COCs were more stringent than the 1990 ROD established APLs.	8/14/2015
Sitewide	Multiple parties own the parcels that make up the Site. At present, no land use restrictions are in place for six of these seven parcels. Four of the parcels are privately owned.	EPA to coordinate a conference call between EPA, TDEC, and NHDSC to determine the best approach to resolving this issue	Ongoing	Local laws and regulations prohibit installation of water supply wells in the Fluvial Aquifer, prohibit installation of water wells within in a 1/2 mile of a Superfund Site, prohibit installation of wells in areas subject to flooding, and require permits for installation and abandonment of supply and monitoring wells. In addition, TDEC-DOR filed a	Click here to enter a date

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
				Notice of Hazardous Substances Site for all parcels that make up the Site in June 2013. It still needs to be determined if land use restriction should be established for private parcels in the event parcels are redeveloped or sold. The conference call between EPA, TDEC, and the NHDSC has not occurred.	

As recommended in the Fourth FYR, the ACLs were recalculated using the new National Recommended Water Quality Criteria (NRWQC) published by the EPA in June 2015, recent hardness data, and updated Wolf River 15-Year Average Daily Mean Flow value, and an updated Wolf River 3Q20 Daily Mean Flow value. A discussion of the recalculated results is provided in Appendix C of this document.

The EPA calculated revised APLs for chlordane (total), chlordene, dieldrin, and heptachlor epoxide in a transmittal date June 5, 2012. The EPA 2012 APLs for these pesticides were more stringent than the original APLs identified in Table 24 of the 1990 ROD. The Remedial Goal Option for endrin was the only parameter the EPA recommended possibly changing, although none of APLs for any of these parameters have been formally adopted. In the Fourth FYR of the Site, the EPA determined that in order for the Site's remedy to be protective in the long-term, calculations of safe levels in edible fish tissue for the Contaminants of Concern (COCs) identified in the 1990 ROD would need to be updated. In response, the NHDSC hired URS Corporation to update the APLs for the Site in August 2015. The updated APLs for all COCs with the exception of 4,4'-DDT, aldrin, dieldrin, heptachlor, and arsenic are more stringent than the original APLs identified in Table 24 of the 1990 ROD. All three APLs (1990 ROD, 2012 EPA, and 2015 URS) are included in Table 2.

It was recommended in the two preceding FYRs that land use restrictions be established on five (5) of the seven (7) parcels that make up the Site. Three (3) of the parcels are privately-owned by an individual, two (2) of the parcels are owned by the City of Memphis (which primarily consists of the ADP and immediately adjacent shoreline areas), one parcel is owned by Shelby County Government and the last parcel is owned by a limited liability corporation. A conservation easement exists on the parcel owned by Shelby County, effectively limiting land use on this parcel. In 2019, a land use easement was established on one of the privately-owned parcels (042068 00076) for the Wolf River Greenway Trail. The existing deed information demonstrates that all five parcels that contain a portion of the landfill have "Notices of Hazardous Substances Site" that were filed in either 1988 or 2013. However, there is still some question on whether more specific land use restrictions on the five parcels would be appropriate.

Concerning the two properties owned by the City of Memphis, the NHDSC has stated that the City's Real Estate Department thought that establishment of the deed restrictions could be postponed because the City was in full control of the property and should be postponed because it was not yet completely

certain that further supplemental corrective actions at the ADP would be required. This issue is to be discussed further between EPA, TDEC, and the NHDSC, but this discussion has not yet taken place.

IV. FIVE-YEAR REVIEW PROCESS

The EPA Region 4 held a site review (kick-off) conference call for the FYR in October 2019. The EPA participants included the RPM, Randy Bryant, and Sharon Thoms, the ecological risk assessor. The TDEC-DOR participants included Don Sprinkle and Klarissa Kahill. The RPM outlined the needs of the upcoming Fifth Five-Year review as well as the FYR completion deadlines.

The following points will be addressed further in the subsequent paragraphs:

- Community Notification/Involvement
- Data Review
- Site Inspection

Community Notification

The FYR Report will be made available to the public once it has been finalized. Copies of this document will be placed in the designated public repository: The Benjamin L. Hooks Central Branch of the Memphis Public Library System, located at 3030 Poplar Avenue, Memphis, Tennessee 38111. A public notice was placed in the Commercial Appeal newspaper to announce the start of the FYR for the Site and to note that the final FYR Report would be placed in the Site's document repository. Community interviews were not conducted during this fifth FYR given the time since the RA was completed and the routine nature of Site O&M activities.

Data Review

Groundwater

Cleanup goals for the groundwater COCs were based on Site-specific ACLs. Given that institutional controls were in place prohibiting access to the Fluvial Sands Aquifer for use as a drinking water source, the Federal Safe Drinking Water Act was not applied to Site groundwater at the time the ROD was signed. On the other hand, contaminated groundwater in the Fluvial Sands Aquifer underlying the Site discharges directly to the Wolf River. Consequently, it was necessary to develop groundwater ACLs for the Site that would be protective of Wolf River water quality from both the perspective of human health (i.e., because the local population consumed fish caught in the river) and the perspective of the aquatic life in the river. To achieve the required protection of Wolf River water quality, the ROD back-calculated the groundwater ACLs from the lowest of the applicable NRWQC values (i.e., protection of human health or protection of aquatic life). For COCs that were known or potential carcinogens, the selected NRWQC and resulting calculated ACL were based on a 10-6 excess cancer risk level due to the consumption of fish from the Wolf River.

A detailed discussion of the ACL calculation process can be found in Appendix C of this document. In summary, to calculate the ACL, the applicable NRWQC is multiplied by either the Wolf River 15-Year Average Daily Mean Flow (for NRWQC based on the protection of human health) or the Wolf River 3Q20 Daily Mean Flow (for NRWQC based on the protection of aquatic life), and then divided by the Total Mass Flux from the Site discharging into the Wolf River.

As shown in Table 7, the results of the four annual sampling events completed between 2015 and 2018, average metals concentrations measured in groundwater did not produce any exceedances of an ACL (calculated in accordance with the ROD and 1997 LTMMP). However, average pesticide concentrations in groundwater exceeded the respective ACLs. Aldrin exceeded the ACL in 2015, 2016; dieldrin exceeded the ACL in 2018.

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Table 7: Average Groundwater Concentrations compared to the most current ACL

Current Dataset (2015-2019)			
COC	**Year**	**Average Groundwater Concentration (µg/L)**	**ACL Based on EPA 2015 NRWQC (µg/L)**
Metals			
Arsenic	2015	10.46	207
	2016	11.08	
	2017	18.30	
	2018	10.72	
	2019	NA	
Chromium	2015	0.87	2,602
	2016	0.58	
	2017	2.84	
	2018	1.26	
	2019	NA	
Lead	2015	1.25	92
	2016	1.25	
	2017	1.25	
	2018	0.75	
	2019	NA	
Zinc	2015	1.66	6,741
	2016	3.78	
	2017	17.35	
	2018	10.14	
	2019	NA	
Pesticides			
4,4'-DDT	2015	0.0099	0.04
	2016	0.0258	
	2017	0.0107	
	2018	0.0181	
	2019	NA	
Aldrin	2015	**0.0025**	0.001
	2016	**0.0025**	
	2017	**0.0422**	
	2018	0.0001	
	2019	NA	
alpha-Chlordane	2015	0.0020	0.47
	2016	0.0049	
	2017	0.0014	
	2018	0.0001	
	2019	NA	

gamma-Chlordane	2015	0.0133	0.47
	2016	0.0112	
	2017	0.0171	
	2018	0.0030	
	2019	NA	
Technical Chlordane	2015	0.0153	0.47
	2016	0.0160	
	2017	0.0185	
	2018	0.0032	
	2019	NA	
Chlordene	2015	0.0198	NC
	2016	0.0441	
	2017	0.0307	
	2018	0.0238	
	2019	NA	
Dieldrin	2015	0.0018	0.002
	2016	0.0024	
	2017	0.0012	
	2018	**0.0032**	
	2019	NA	
Endrin	2015	0.0049	7.10
	2016	0.0155	
	2017	0.0004	
	2018	0.0003	
	2019	NA	
Heptachlor	2015	0.0022	0.009
	2016	0.0022	
	2017	0.0002	
	2018	0.0005	
	2019	NA	
Heptachlor Epoxide	2015	0.0061	0.05
	2016	0.0022	
	2017	0.0006	
	2018	0.0013	
	2019	NA	

Notes:
ug/L: micrograms per liter
NA: 2019 data not available at time of draft FYR

Fish

Chlordane (total) average concentrations in ADP fish tissue for all trophic levels combined increased from 2015 (0.314 micrograms/gram or µg/g) to the 2018 (0.534 µg/g) fish tissue sampling event. Average chlordane concentrations detected for both events exceeded the APL established in the 1990 ROD (0.0083 µg/g), the 2015 URS re-calculated APL (0.04 µg/g), and the corresponding higher 2012 EPA re-calculated APL (0.03 µg/g, with an excess cancer risk screening level of 1 E-6). An increase in the overall average concentration is due to average chlordane levels in foragers rising significantly from 0.143 µg/g in 2015 to 1.200 µg/g in 2018.

Chlordane total average concentrations in Wolf River fish tissue for all trophic levels combined were lower in 2015 (0.053 µg/g) and 2018 (0.051 µg/g) than concentrations detected in the ADP during these years. A slight decrease in chlordane concentrations was observed in Wolf River fish tissue concentrations between 2015 and 2018. However, concentrations still exceeded the 2015 URS re-calculated APLs. No samples were above the HI based level of 0.2 µg/g for chlordane.

Chlordene average concentrations in ADP fish tissue for all trophic levels combined decreased from 2015 (0.066 µg/g) to the 2018 (0.027 µg/g) Fish Tissue Sampling Event.

Overall, pesticide concentrations in ADP fish tissue remain in almost all instances well above the corresponding Wolf River fish tissue concentrations. However, average pesticide concentrations in ADP fish tissue have generally decreased from 2015 to 2018. An exception to this decline is seen in the pesticide concentrations in forager fish which have shown an increase from the 2015 through 2018 for all pesticides (chlordane, chlordene, endrin, and heptachlor epoxide). See Appendix E for fish tissue data.

November 2018 fish tissue concentrations in Wolf River fish tissue are lower than the previous November 2015 concentrations. However, no foragers were collected from the Wolf River during the November 2015 sampling. Only one forager was collected in the Wolf River in 2018. The average concentrations of chlordane (Total) and heptachlor epoxide in the November 2018 tissue concentrations in the Wolf River were slightly higher than the November 2012 concentrations.

The results from the APP and Wolf River fish tissue samples are statistically compared in order to determine whether contaminant concentrations are increasing in the APP. If average concentrations in fish from the APP are statistically greater than Wolf River fish tissue concentrations, this is considered an exceedance (i.e., violation), and the NHDSC and EPA would evaluate the necessity of implementing possible contingency actions, such as a fish harvest. The NHDSC has recommended that this statistical comparison be discontinued until ADP fish tissue concentrations have decreased enough to at least be somewhat similar to the much lower Wolf River fish tissue concentrations that are being measured.

Surface water

The estimated daily maximum and daily average concentrations of each site-specific indicator parameter in Wolf River surface water contributed by discharge of potentially impacted shallow groundwater from the Site was calculated (calculated in accordance with the 1997 LTMMP) and compared to the WRWQC (current 2015 NRWQC) from 2015-2018. Similar to previous years, there were no exceedances of WRWQC by the estimated daily maximum and daily average concentrations for metals. However, as noted in Table 8, there were four (4) exceedances of the WRWQC for estimated daily

maximum concentrations for pesticides (4,4'DDT, Aldrin, Dieldrin, and Heptachlor) and two (2) exceedances of daily average concentrations for pesticides (Aldrin and Dieldrin).

Table: 8 Estimated Site COC Impact on Wolf River Surface water, 2015-2018

Current Dataset (2015-2018)					
COC	**Year**	**Total Mass Flux µg/day**	**Estimated Daily Maximum Concentration µg/L**	**Estimated Daily Average Concentration µg/L**	**NRWQC WRWQC µg/L EPA 2015**
Metals					
Arsenic	2015	$2.00x10^7$	0.030688	0.007752	0.14
	2016	$2.80x10^7$	0.047217	0.008185	
	2017	$4.60x10^7$	0.081874	0.22259	
	2018	$2.70x10^7$	0.042461	0.029677	
Chromium	2015	$1.66x10^6$	0.002546	0.000643	11
	2016	$1.81x10^5$	0.000010	0.000426	
	2017	$7.44x10^6$	0.012520	0.003404	
	2018	$3.16x10^6$	0.004974	0.003476	
Lead	2015	$2.39x10^6$	0.003662	0.000925	0.39
	2016	$3.14x10^6$	0.005298	0.000918	
	2017	$3.14x10^6$	0.005574	0.001515	
	2018	$1.88x10^6$	0.002959	0.002068	
Zinc	2015	$3.16x10^6$	0.004841	0.001223	28.5
	2016	$9.47x10^6$	0.015999	0.002773	
	2017	$4.34x10^7$	0.77137	0.020971	
	2018	$2.55x10^7$	0.040081	0.028013	
Pesticides					
4,4'-DDT	2015	$1.88x10^4$	0.000029	0.000007	0.000030
	2016	$6.48x10^4$	**0.000109**	0.000019	
	2017	$2.65x10^4$	**0.000047**	0.000013	
	2018	$4.53x10^4$	**0.000071**	**0.00005**	
Aldrin	2015	$4.87x10^3$	**0.00000746**	**0.00000188**	0.00000077
	2016	$6.15x10^3$	**0.000010**	**0.000002**	
	2017	$1.05x10^3$	**0.000186**	**0.000051**	
	2018	$2.51x10^2$	0.00000039	0.00000028	
alpha-Chlordane	2015	$3.88x10^4$	0.000006	0.000001	0.00032
	2016	$1.22x10^4$	0.000021	0.000004	
	2017	$3.49x10^3$	0.000006	0.000002	
	2018	$3.14x10^2$	0.00000	0.00000	
gamma-Chlordane	2015	$2.54x10^4$	0.000039	0.000010	0.00032
	2016	$2.79x10^4$	0.000047	0.000008	
	2017	$4.28x10^4$	0.000076	0.000021	
	2018	$2.65x10^4$	0.00001	0.00001	
	2015	$7.53x10^3$	0.000045	0.000011	0.00032

Technical Chlordane	2016	$4.02x10^5$	0.000068	0.000012	
	2017	$4.64x10^4$	0.000082	0.000022	
	2018	$7.83x10^3$	0.00001	0.00001	
Chlordene	2015	$3.80x10^4$	0.000058	0.000015	NE
	2016	$1.11x10^4$	0.000187	0.000032	
	2017	$6.01x10^4$	0.000137	0.000037	
	2018	$7.73x10^4$	0.000094	0.000066	
Dieldrin	2015	$3.35x10^3$	**0.0000051**	**0.0000013**	0.0000012
	2016	$5.90x10^3$	**0.000010**	**0.000002**	
	2017	$2.87x10^3$	**0.000005**	0.000001	
	2018	$7.98x10^3$	**0.000013**	**0.000009**	
Endrin	2015	$9.43x10^3$	0.000014	0.000004	0.03
	2016	$3.89x10^4$	0.000066	0.000011	
	2017	$9.41x10^2$	0.000002	0.0000005	
	2018	$6.27x10^2$	0.0000	0.0000	
Heptachlor	2015	$4.25x10^3$	**0.0000065**	0.0000016	0.0000059
	2016	$5.40x10^3$	**0.000009**	0.000002	
	2017	$5.65x10^2$	0.000001	0.0000003	
	2018	$1.19x10^3$	0.000002	0.000001	
Heptachlor Epoxide	2015	$1.17x10^4$	0.000018	0.000005	0.000032
	2016	$5.52x10^3$	0.000009	0.000002	
	2017	$1.40x10^3$	0.000002	0.000001	
	2018	$3.35x10^3$	0.000005	0.000004	

Notes
ug/l: micrograms /liter

The measured concentrations of contaminants in surface water samples are also compared to the most current WRWQC (2015 NRWQC). A statistical evaluation of all historical surface water analytical results generated through 2018 was performed to determine if there was any significant difference in water quality between the downstream and upstream sampling locations.

With the exception of zinc, this evaluation did not reveal a statistically significant increase in the concentrations of COCs for downstream versus upstream samples (Table 9). Historically zinc has been the only COC to consistently occur in downstream location samples at concentrations higher than upstream location samples. This statistically significant increase is likely due to the occurrence of somewhat higher zinc concentrations that have periodically and as recently as 2017, been detected in the downstream sample locations.

In the current dataset, zinc concentrations analyzed by method 200.8 were elevated at downstream sample locations in 2015 and 2017, while zinc concentrations were not detected in 2018 by methods 6010B or 200.8. Zinc concentrations downstream, have not exceeded the updated WRWQC since 2006, while zinc concentrations upstream and adjacent last exceeded the WRWQC in 2013. Concentrations of zinc at upstream and downstream locations, analyzed by method 6010B, were the same each year except

for 2017. Concentrations of zinc in downstream, adjacent, and upstream sample locations did not exceed the WRWQC in the time period 2015-2018. As mentioned in the previous FYR, the NHDSC contends that periodic occurrences of elevated zinc concentrations in downstream (and adjacent) Wolf River surface water samples do not appear to be site related.

Table 9: Statistical Results of COC concentrations at upstream and downstream Wolf River

AVERAGE CONCENTRATIONS IN WOLF RIVER SURFACE WATER AND RESULTS OF STATISTICAL ANALYSIS ***North Hollywood Dump / Memphis, Tennessee*** ***2017 Annual Report***				
Site-Specific Indicator Parameter	**Location and Average Concentration (µg/L)**			**Statistical Difference Between SW- 1 and SW-3**
	SW-1	**SW-2**	**SW-3**	
Metals				
Arsenic	3.783	4.017	4.083	*NO*
Chromium	2.933	2.980	2.622	*NO*
Lead	2.844	2.462	2.253	*NO*
Zinc	30.480	27.059	14.075	*YES*
Pesticides				
4,4'-DDT	0.009	0.013	0.008	*NO*
Aldrin	0.007	0.006	0.005	*NO*
alpha-Chlordane	0.032	0.034	0.032	*NO*
gamma-Chlordane	0.032	0.035	0.032	*NO*
Technical Chlordane *(see Note 8)*	0.064	0.069	0.064	*NO*
Chlordene	0.020	0.015	0.021	*NO*
Dieldrin	0.006	0.009	0.006	*NO*
Endrin	0.007	0.008	0.007	*NO*
Heptachlor	0.014	0.007	0.008	*NO*
Heptachlor Epoxide	0.005	0.005	0.005	*NO*

Notes:

1. Location SW-1 is downstream of the Site, location SW-2 is adjacent to the Site, and location SW-3 is upstream of the Site.
2. The indicator parameter concentrations in the samples from upstream location SW-3 and downstream location SW-1 are statistically analyzed using Cochran's Approximation to the Bechren-Fisher t-test and the t-statistic for 0.05 level of significance to determine if any of the downstream indicator parameter concentrations are statistically different from the corresponding upstream concentrations. The statistical analysis completed as part of this *2018 Annual Report* used the analytical results from all 28 Sampling Events that have been performed during the period from March 1998 through October 2018.
3. The occurrence of the metal zinc at a statistically higher concentration in the downstream samples versus the upstream samples reflects the occasional detection of this metal at elevated concentrations in the downstream samples and is not believed to be related to the Site -- see ***Section 3.2*** of text for additional information.
4. Although not required, the indicator parameter concentrations in the samples from downstream location SW-1 versus adjacent location SW-2 and from adjacent location SW-2 versus upstream location SW-3 were also statistically analyzed per *Note 2* above. The results for these statistical analyses are not shown in the above table, but are summarized herein. None of the adjacent sample concentrations were found to be statistically higher than the corresponding upstream sample concentrations.
5. If an indicator parameter was not detected in a sample, then ¼, ½, or ¾ of the method detection limit was used as the concentration of that indicator parameter in the statistical analysis if the indicator parameter had been detected in ¼, ½, or ¾ *(i.e., <½, ½ - <¾, or ≥¾)* of the entire set of samples collected from the location *(see also Note 6 below).*
6. The Wolf River surface water samples at all three locations were analyzed for metals using two different methods: 6010 *(as previously)* and also 200.8. For each metal, the highest concentration detected by either method was used in the statistical analysis. If a metal was not detected by either method, then the appropriate fraction -- per *Note 5* -- of the lower of the two method detection limits was used as the concentration in the statistical analysis.
7. For location SW-2, where duplicate sample sets have been collected *(SW-22)* , the highest detected concentration of the indicator parameter in either of the two samples was used in the statistical analysis. If an indicator parameter was not detected in either sample and the method detection limits were different, then the appropriate fraction -- per *Note 5* above -- of the higher of the two method detection limits was used as the concentration in the statistical analysis.
8. Technical Chlordane values were calculated as first described in the *2010 Annual Report.*

Key: µg/L = Micrograms per Liter

It should be noted that beginning in 2013 in addition to method 6010B, samples were also analyzed using method 200.8. 6010B MDLs for all parameters except chromium, zinc, chlordene (which no NRWQC/WRWQC has been established), and endrin are above the corresponding WRWQC.

The metals arsenic and lead were the only COCs detected at levels exceeding the WRWQC (using method 200.8) in samples from both the downstream and upstream Wolf River surface water locations during 2015-2018 (Appendix E). Increased arsenic and lead concentrations at upstream locations occurred in 2016 and 2017, while concentrations at upstream and downstream locations were the same in 2018. Chromium concentrations at downstream and upstream Wolf River surface water

locations have not exceeded the updated WRWQC since 2003. However, similar to arsenic and lead, chromium concentrations at upstream locations were elevated in 2016 and 2017 compared to downstream locations.

Pesticide COCs in upstream location samples have not been detected in Wolf River surface water samples since 2008. Aldrin (0.0159 µg/L) was detected at downstream sample locations in 2018 for the first time since 2010. The 2018 aldrin detection was above the MDL (0.0004 µg/L) and the WRWQC (0.00000077 µg/L). Refer to Appendix E for a summary of COC concentrations at upstream and downstream Wolf River surface water locations from 1998-2018.

Sediment

The Fifth FYR considered the collection and analysis of sediment samples as required by the LTMMP; chronic toxicity testing and related elutriate quality analyses, including ammonia and total residual chlorine.

The results from the 2015 sediment samples indicated that samples from locations ADP-2 (un-remediated) and ADP-3 (remediated) did not show toxicity. All other sample locations were considered chronically toxic based on reproduction inhibition measured by the IC-25 (chronic toxicity based on inhibition of reproduction in at least 25% of the test organisms). The results from the 2018 sediment samples indicated that samples ADP-4 (un-remediated) and ADP-6 (remediated) did not show any toxicity. All other samples were considered chronically toxic based on the reproduction inhibition measured by the IC-25. Over time, both remediated and un-remediated areas have shown some toxicity and no clear pattern of toxicity has been established.

The EPA had informed the NHDSC that based on the historical samples analysis results from 1998 through 2010, it would be acceptable to remove barium, copper, nickel, vanadium, and all four BHC isomers from routine monitoring or reducing the monitoring frequency to correspond with the ongoing FYRs. The NHDSC recommended that all four metals and the four BHC isomers (1) be eliminated from the groundwater and surface water monitoring programs (per the 1997 LTMMP, surface water samples are to be analyzed for the same parameters as the groundwater samples), and (2) only be reinstated in the event that increasing concentration trends are observed in one or more of the remaining parameters based on the results of future sampling events. In making this recommendation, it was noted that the analysis results for these eight parameters in the samples collected during 2011, 2012, and 2013 were very similar to the results for the 1998 through 2010 samples evaluated by the EPA. These eight (8) parameters were last analyzed in samples collected in 2014.

Site Inspection

The Site Review Meeting and Site Inspection took place on November 6, 2019. The site inspection included the following participants: Dave Backus of Fisher Arnold, Randy Bryant of the Region 4 EPA, and Don Sprinkle and Klarissa Kahill of TDEC. The completed site inspection checklist and photographs are included in Appendix F. Photographs were taken of the site including monitoring wells, access controls, the protective cap of the former east and west sector disposal areas, and warning signs for the consumption of ADP fish. The site tour was led by Dave Backus since Fisher Arnold was hired by the PRP in 2019 to assist with O&M activities and reporting.

During the Site inspection, access gates were found to be closed and secured with locks, and signage prohibiting trespassing was seen posted along all sections of the security fence. Additional signage warning about the health risks of consuming fish from the ADP was installed around the water body, including all locations where repeat vandalism of the fence had occurred or where trespassing fishermen had historically accessed the ADP from the unfenced side of Wolf River. The fish consumption warning signs and "No Trespassing" signs were in good condition. Monitoring wells, both on and off the Site, were secured and clearly labeled.

The protective cap of both the East and West sector disposal areas, as well as the adjacent slope areas, had well-established vegetation and there were no signs of plant stress or erosion. There was some ponding (standing water) observed on the East cap, likely due to recent rainfall. A gravel road and cap were installed on-site to allow repairs and clean out of the existing sewer line on the East sector of the Site.

In preparation for the current FYR, Klarissa Kahill of TDEC reviewed the previous FYR, 1990 ROD, and relevant testing and monitoring results from the last 10 years. Klarissa Kahill also conducted research on the Shelby County Register of Deeds website. The approximately 170-acre Site is principally situated on seven (7) property parcels owned by five (5) different entities. Table 3 lists the parcels and summarizes the existing notices and use controls.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes. Site O&M activities include implementation of the required groundwater, surface water, sediment and fish tissue sampling events, as well as inspection and maintenance of access controls, the vegetated low permeability cap and monitoring wells. All O&M activities are implemented routinely and in accordance with the LTMMP. As noted previously, some fence vandalism and trespassing continue to occur at the Site, predominantly in order to gain access to the ADP for fishing. However, appropriate actions to deter trespassers - such as the extensive installation of warning signs, rapid repairs to damaged fencing, increased monitoring frequency to catch trespassers in the act and informing all trespassers caught about site risks - are being taken.

Groundwater monitoring results indicated that the average measured concentrations during this review period have generally been below their respective ACLs. However, aldrin concentrations were above the ACL during 2015 through 2017 timeframe but were well below the ACL in 2018.

Estimated groundwater impacts on Wolf River surface water quality are based on the estimated daily maximum and daily average concentrations in groundwater from 2015 through 2018. There were no exceedances of WRWQC by the estimated daily maximum and daily average metals concentrations in groundwater from 2015 through 2018. However, there were four exceedances (4,4'DDT, Aldrin, Dieldrin, and Heptachlor) of the WRWQC (current 2015 NRWQC) for estimated daily maximum pesticide concentrations and two exceedances (Aldrin and Dieldrin) of estimated daily average pesticide concentrations from 2015 through 2018. These concentrations might be biased high because a fraction of the method detection limit is used to calculate the mass flux contribution and these detection limits are at least two (2) or three (3) orders of magnitude higher than the corresponding new 2015 WRWQC/NRWQC.

Surface water samples from the Wolf River are collected at locations upstream, adjacent, and downstream from the Site in conjunction with each groundwater sampling event. Surface water results are evaluated to determine if there was any significant difference in water quality between the downstream and upstream sampling locations. With the exception of zinc, this evaluation has not revealed a statistically significant increase in the COC concentrations in the downstream versus upstream samples.

The metals arsenic and lead were the only COCs detected at levels exceeding the WRWQC (using method 200.8) in samples from both the downstream and upstream Wolf River surface water locations during 2015-2018 (Appendix E). Increased arsenic and lead concentrations at upstream locations occurred in 2016 and 2017, while concentrations at upstream and downstream locations were the same in 2018. Chromium concentrations at downstream and upstream Wolf River surface water locations have not exceeded the updated WRWQC since 2003. However, similar to arsenic and lead, chromium concentrations at upstream locations were elevated in 2016 and 2017 compared to downstream locations.

Pesticide COCs in upstream location samples have not been detected in Wolf River surface water sample since 2008. Aldrin (0.0159 µg/L) was detected at a downstream sample location in 2018 (for the

first time since 2010). The 2018 aldrin detection was above the MDL (0.0004 µg/L) and the WRWQC (0.00000077 µg/L). Refer to Appendix E for a summary of COC concentrations at upstream and downstream Wolf River surface water locations from 1998-2018.

Overall, pesticide concentrations in ADP fish tissue remain in almost all instances well above the corresponding Wolf River fish tissue concentrations. However, average pesticide concentrations in ADP fish tissue have shown a decrease from 2015 to 2018. The exception to this being pesticide concentrations in foragers which has shown an increase from the 2015 through 2018 Fish Tissue Sampling Event for all pesticides (chlordane, chlordene, endrin, and heptachlor epoxide).

Finally, it is noted that all five parcels that contain a portion of the landfill have a Notice of Hazardous Substances Site that was filed in either 1988 or 2013. A sixth parcel is not part of the landfill but is located between the ADP and the Wolf River. The parcel is subject to a conservation easement that prohibits agricultural, commercial, or industrial land use. The seventh parcel is a waterbody (the ADP) and as such is not subject to land use/deed restrictions but currently managed by fencing and signage restricting fishing. Furthermore, Shelby County has a GIS map with layers including zoning, parcels, etc. The parcels that contain the landfill are zoned as CA (conservation agriculture) or CA-FP (conservation agriculture-floodplain). Shelby County ordinances regulate the installation of water wells within one-half mile of the boundaries of a listed federal or State Superfund site or Resource Conservation and Recovery Act corrective action site. However, it may still be beneficial to attempt to record current land use restrictions on the deeds associated with the five parcels of the landfill as well as the ADP.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Question B Summary:

Yes, subject to the caveats noted in the following discussion. The Site's groundwater ARARs were based on a site-specific ACL that was back-calculated from the then existing NRWQC using the Wolf River 15-Year Average Daily Mean Flow (for NRWQC based on the protection of human health) or the Wolf River 3Q20 Daily Mean Flow (for NRWQC based on the protection of aquatic life) and the total groundwater flux from the Site. The current ACLs were recalculated in 2015 because the NRWQC and other components of the calculation had changed.

In Table 24 of the ROD, the APLs for COC levels in edible fish tissue were established based on a 1 x 10 -6 excess cancer (carcinogenic) risk level (chlordane, chlordene, and heptachlor epoxide) for a 70-kilogram adult consuming 6.5 grams of fish per day, which was the default consumption rate for recreational fishing at the time.

In 2012, the EPA recalculated levels for the four COC currently being monitored at the Site (i.e., chlordane, chlordene, endrin, and heptachlor epoxide) plus one of the other original COCs listed in the ROD (i.e., dieldrin). In a June 5, 2012 transmittal, the EPA noted that (a) the default consumption rate for recreational fishing recommended by EPA had increased to 17.5 grams per day; (b) the value for the cancer slope factors for chlordane had decreased from those used at the time of the 1990 ROD; and (c) it could not be determined if the current reference doses were different because the 1990 ROD had not listed these values. Based on the current values for these required input parameters, the EPA proceeded to calculate a range of Remedial Goal Options (RGOs) -- which, effectively, are the same as the APLs --

for chlordane based on both cancer (carcinogenic) endpoints (excess risks of 1 x 10-5, 1 x 10-6, and 1 x 10-4) as well as non-cancer (non-carcinogenic) endpoints (HQs of 0.1, 1, and 3). The EPA-recalculated RGO (i.e., APL) for chlordane at the 1 x 10-6 excess cancer risk level used in the 1990 ROD was higher than the previous values. The EPA did not recommend adopting the recalculated RGO for this parameter. The EPA also noted that (a) individual chemical-specific RGOs (i.e., APLs) must be selected so that the total (i.e., summed) carcinogenic risk for all of the chemicals of concern (COCs) listed in Table 24 of the 1990 ROD did not exceed 1 x 10-4 and (b) the total (i.e., summed) non-carcinogenic HI for the COCs did not exceed 1 because they all have the liver as a target organ for non-carcinogenic toxicity. Expanded fish tissue sampling events have been implemented through the most recent 2018 fish tissue sampling event.

The Site was not in use at the time the ROD was signed, and it still remains vacant and closed to public access; consequently, the exposure assumptions from the ROD remain valid and the exposure pathways are being controlled. The EPA and City of Memphis are both concerned that any increase in public access to interior portions of the Site would likely result in increased trespassing and fishing at the ADP. Given that the ingestion of fish from the ADP should not be permitted until fish tissue concentrations have declined below levels safe for consumption, the EPA and City of Memphis would prefer to minimize opportunities for trespassing fishermen to access the ADP. Consequently, the Site remains closed to the public. Phase 4 of the Wolf River Conservancy Greenway Project, a 1.25-mile-long trail that runs along the southern border of the east and west former disposal areas, is currently under construction. This greenway trail does not impede the site boundaries, so there is no risk of the greenway trail affecting the protective cap or ultimately impacting the effectiveness of the Site remedy.

The remedy was selected to eliminate or reduce the risks posed by sediment, groundwater and fish contamination at the Site through containment using engineering and institutional controls. Cleanup activities, combined with institutional controls, have effectively reduced or eliminated these risks. Long-term monitoring to ensure that contaminant levels in groundwater, sediment and fish tissue continue to decline or remain below cleanup goals is presently ongoing.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the OU1 remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations				
Issues and Recommendations Identified in the FYR:				
Sitewide	**Issue Category: Institutional Controls**			
	Issue: The landfill is located on five parcels that are privately owned. A Notice of Hazardous Substance Site has been filed on all parcels that make up the Site. However, updated land use restrictions may still be appropriate for those five parcels in the event that the parcels were resold or redeveloped.			
	Recommendation: Attempt to place current land use restrictions on privately-owned parcels at the Site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	6/30/2022

OTHER FINDINGS

One additional recommendation was identified during the FYR. This recommendation does not affect the current and/or future protectiveness. It may not be necessary to continue analyzing samples for metals by both methods, 200.8 and 6010B. Instead, arsenic and lead could be analyzed by method 200.8 and chromium and zinc by method 6010.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement	
Operable Unit: Sitewide	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy at the Site currently protects human health and the environment because contaminant source materials have been addressed and also because institutional controls are in place to reduce the catching and eating of fish from the ADP that still have elevated levels of pesticides. Contaminant source materials have been addressed through: excavations and placement of contaminated materials in a capped former disposal area; targeted dredging of contaminated sediments and placement of a soil cover over discrete areas of the ADP and former surface water impoundments; appropriately implemented Site O&M activities; and long-term monitoring data that indicate contaminant levels in groundwater, ADP sediment and ADP fish tissue have declined. In the short-term, the protectiveness of the Site's remedy is enhanced by Shelby County and City of Memphis local laws and regulations. However, for the Site's remedy to be protective in the long-term, issues surrounding institutional controls/land use restrictions on five of the seven parcels of the Site should be addressed. Specifically, it should be determined if local laws will continue to protect the parcels that make up the site or will additional land use restrictions need to be established in the future in the event parcels are redeveloped or sold.	

VIII. NEXT REVIEW

The next FYR for the North Hollywood Dump NPL Site will be due within five (5) years of the completion date of this FYR.

APPENDIX A – REFERENCE LIST

2015 Annual Report – Long Term Monitoring and Maintenance Program for North Hollywood Dump, Memphis, TN North Hollywood Dump Steering Committee, December 2019

2016 Annual Report – Long Term Monitoring and Maintenance Program for North Hollywood Dump, Memphis, TN North Hollywood Dump Steering Committee, December 2019

2017 Annual Report – Long Term Monitoring and Maintenance Program for North Hollywood Dump, Memphis, TN North Hollywood Dump Steering Committee, December 2019

2018 Annual Report – Long Term Monitoring and Maintenance Program for North Hollywood Dump, Memphis, TN North Hollywood Dump Steering Committee, December 2019

EPA Record of Decision: North Hollywood Dump. EPA ID: TND980558894. Memphis, TN. September 13, 1990.

Fourth Five-Year Review for North Hollywood Dump U.S. EPA Region 4, September 2015
Property Deeds from the Shelby County Register of Deeds

https://register.shelby.tn.us/search/index.php2015 Groundwater Quality Monitoring, Stauffer Chemical Superfund Site, Tarpon Springs, Florida. Prepared by O'Brien & Gere for U.S. EPA. October 2015.

APPENDIX B – FIGURES

Figure 1. North Hollywood Dump Site located in Memphis, Shelby County, TN.

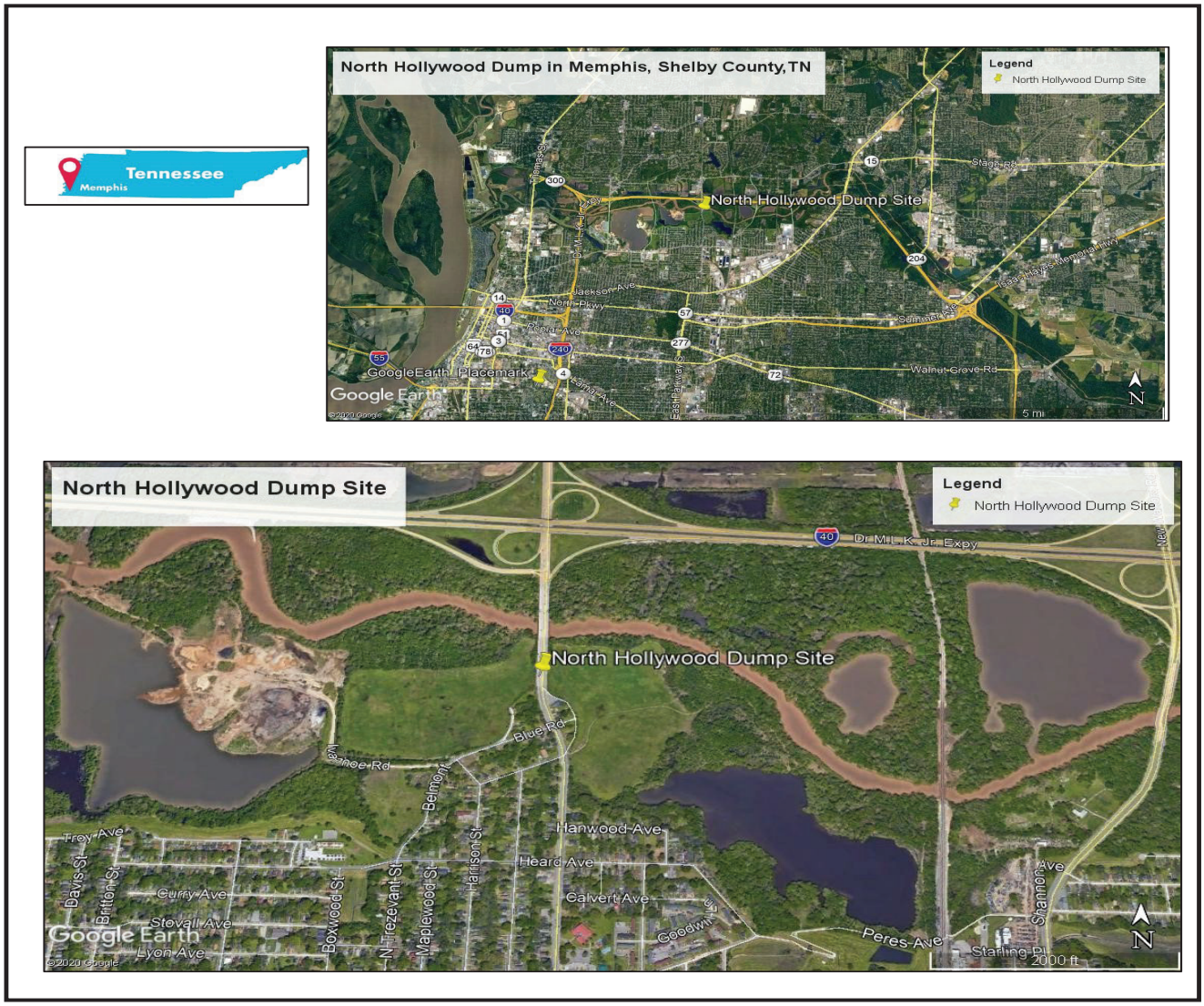


Figure 2. Parcel IDs at North Hollywood Dump Site located in Memphis, Shelby County, TN.

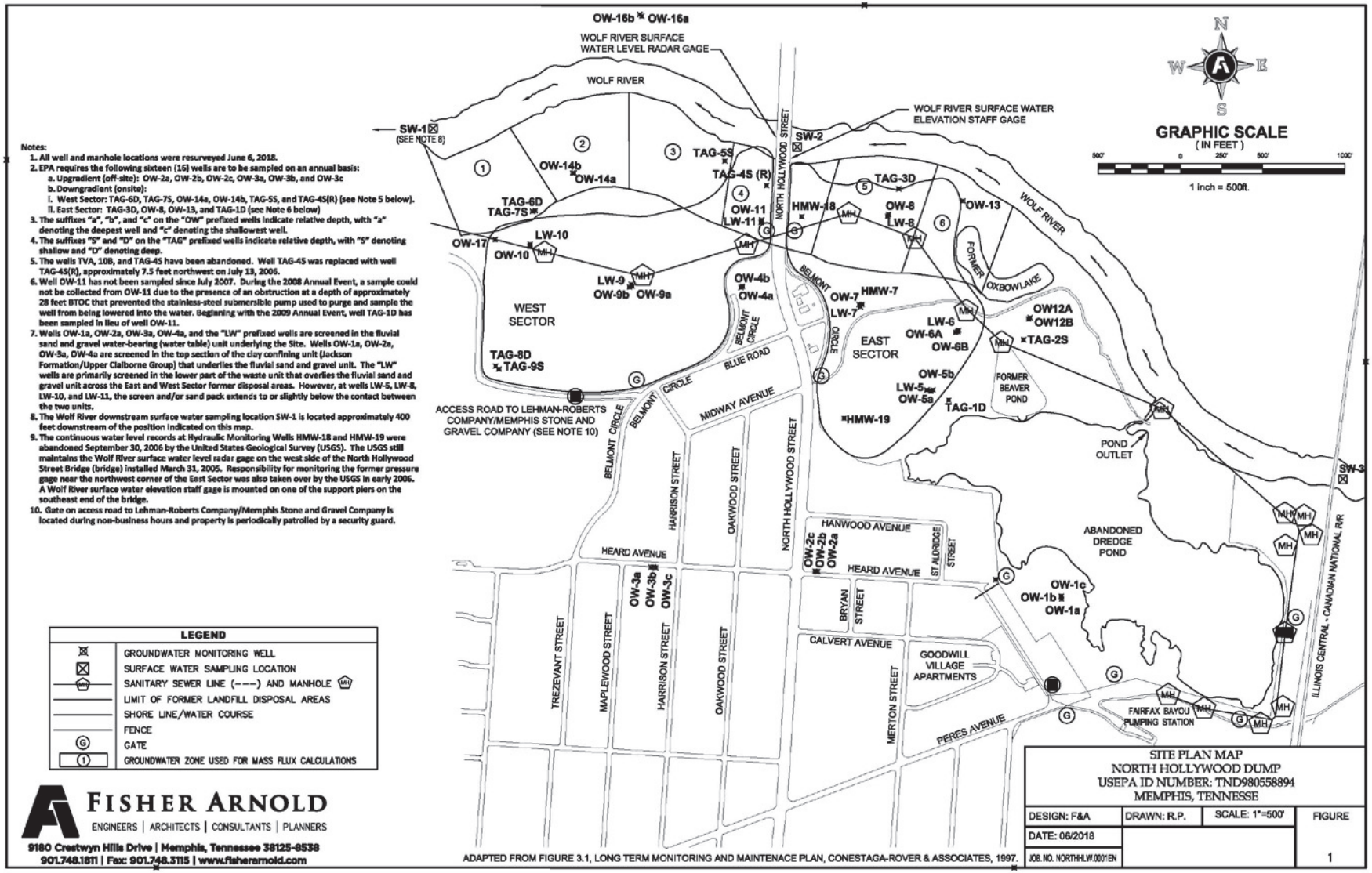


Figure 3. Detailed site plan map of the North Hollywood Dump Site. Map adapted from the 2018 annual report for the Site.

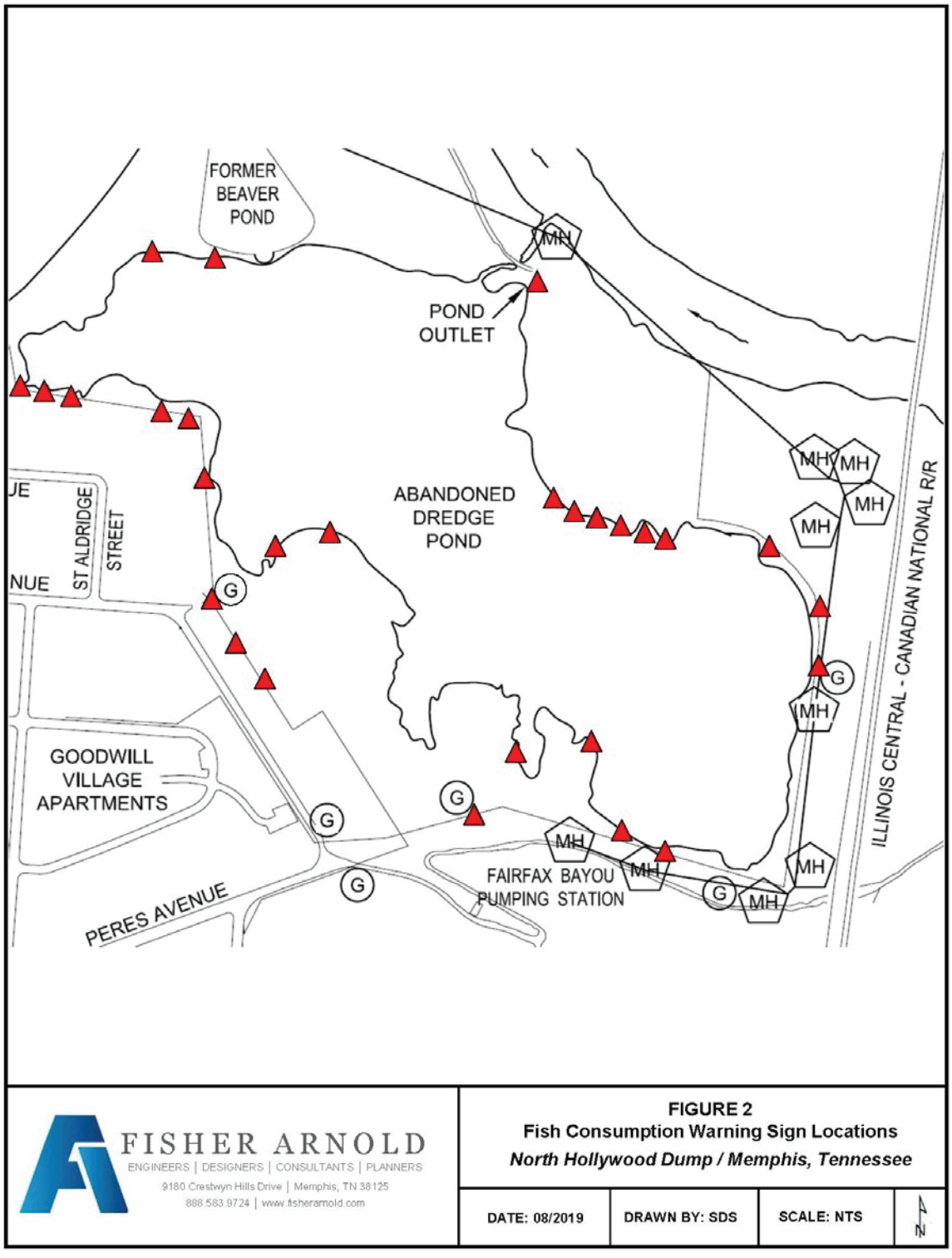
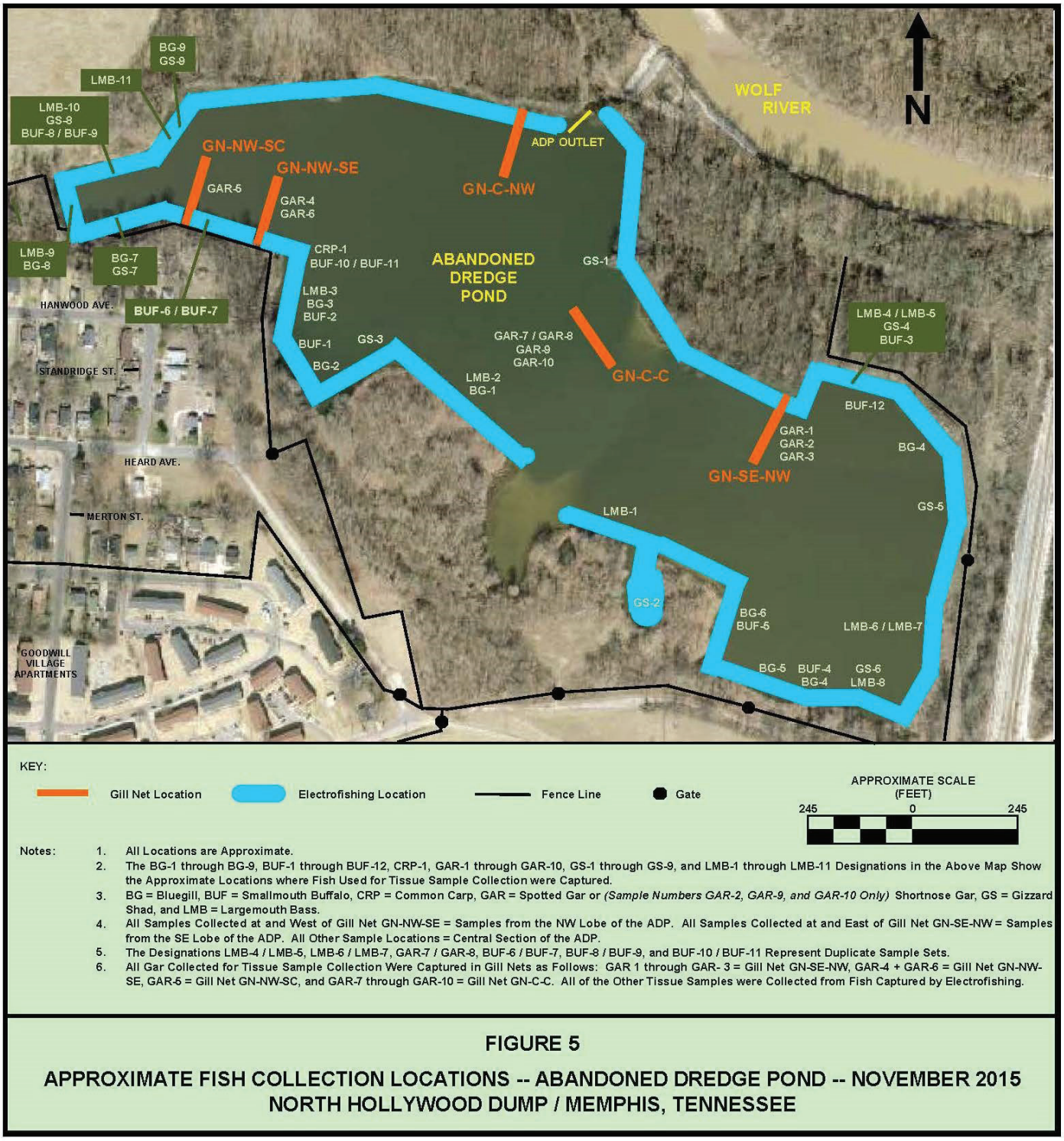


Figure 4. Location of fish consumption warning signs at the Site.
Map adapted from the 2018 annual report for the Site.



Notes:

1. All Locations are Approximate.
2. The BG-1 through BG-9, BUF-1 through BUF-12, CRP-1, GAR-1 through GAR-10, GS-1 through GS-9, and LMB-1 through LMB-11 Designations in the Above Map Show the Approximate Locations where Fish Used for Tissue Sample Collection were Captured.
3. BG = Bluegill, BUF = Smallmouth Buffalo, CRP = Common Carp, GAR = Spotted Gar or *(Sample Numbers GAR-2, GAR-9, and GAR-10 Only)* Shortnose Gar, GS = Gizzard Shad, and LMB = Largemouth Bass.
4. All Samples Collected at and West of Gill Net GN-NW-SE = Samples from the NW Lobe of the ADP. All Samples Collected at and East of Gill Net GN-SE-NW = Samples from the SE Lobe of the ADP. All Other Sample Locations = Central Section of the ADP.
5. The Designations LMB-4 / LMB-5, LMB-6 / LMB-7, GAR-7 / GAR-8, BUF-6 / BUF-7, BUF-8 / BUF-9, and BUF-10 / BUF-11 Represent Duplicate Sample Sets.
6. All Gar Collected for Tissue Sample Collection Were Captured in Gill Nets as Follows: GAR 1 through GAR- 3 = Gill Net GN-SE-NW, GAR-4 + GAR-6 = Gill Net GN-NW-SE, GAR-5 = Gill Net GN-NW-SC, and GAR-7 through GAR-10 = Gill Net GN-C-C. All of the Other Tissue Samples were Collected from Fish Captured by Electrofishing.

FIGURE 5

APPROXIMATE FISH COLLECTION LOCATIONS -- ABANDONED DREDGE POND -- NOVEMBER 2015
NORTH HOLLYWOOD DUMP / MEMPHIS, TENNESSEE

Figure 5. Fish collection locations from the ADP in 2015.
Map image adapted from the 2015 annual report for the Site.

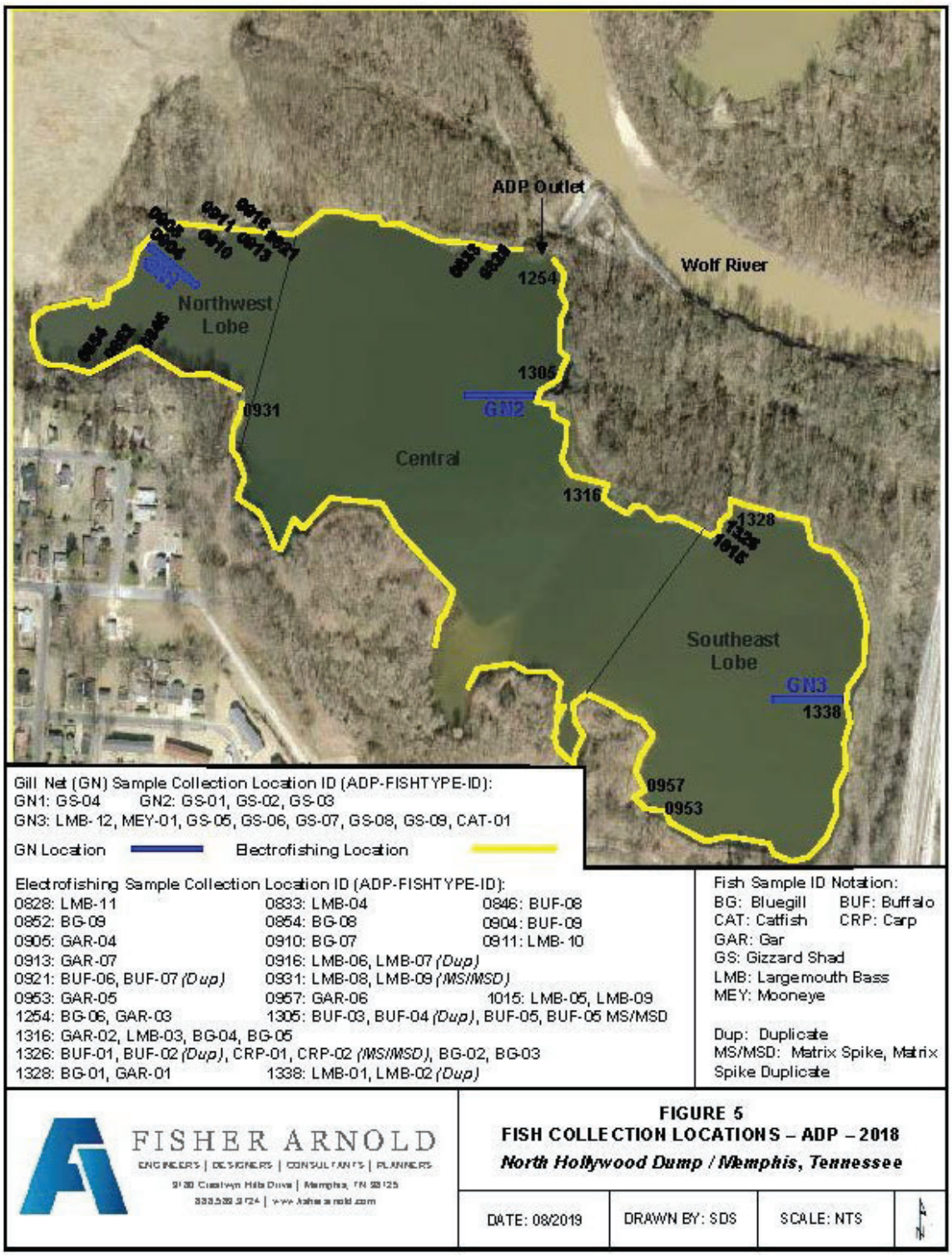


Figure 5 Cont'd. Fish collection locations from the ADP in 2018.
Map image adapted from the 2018 annual report for the Site.

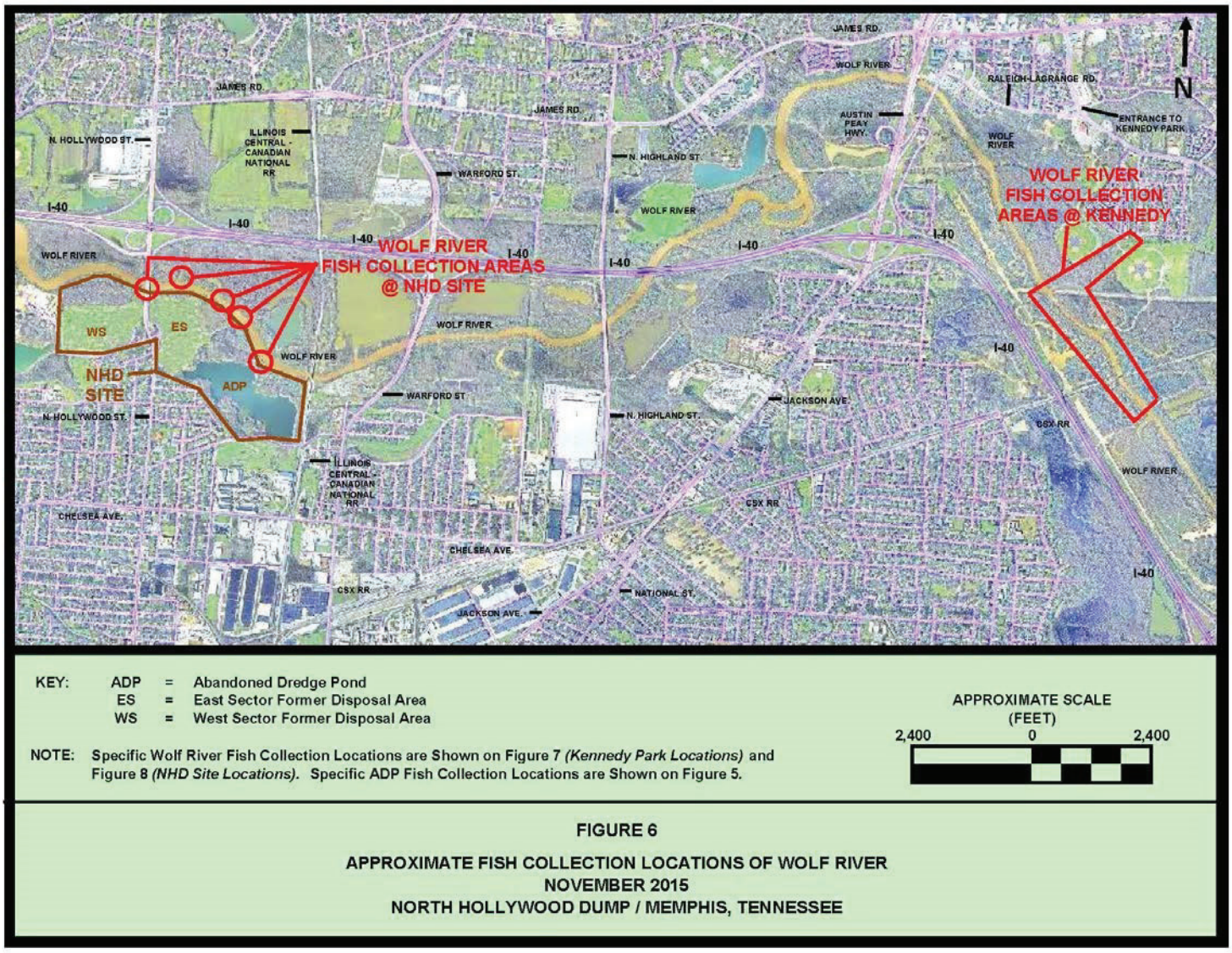


Figure 6. Fish collection locations from the Wolf River in 2015.
Map image adapted from the 2015 annual report for the Site.

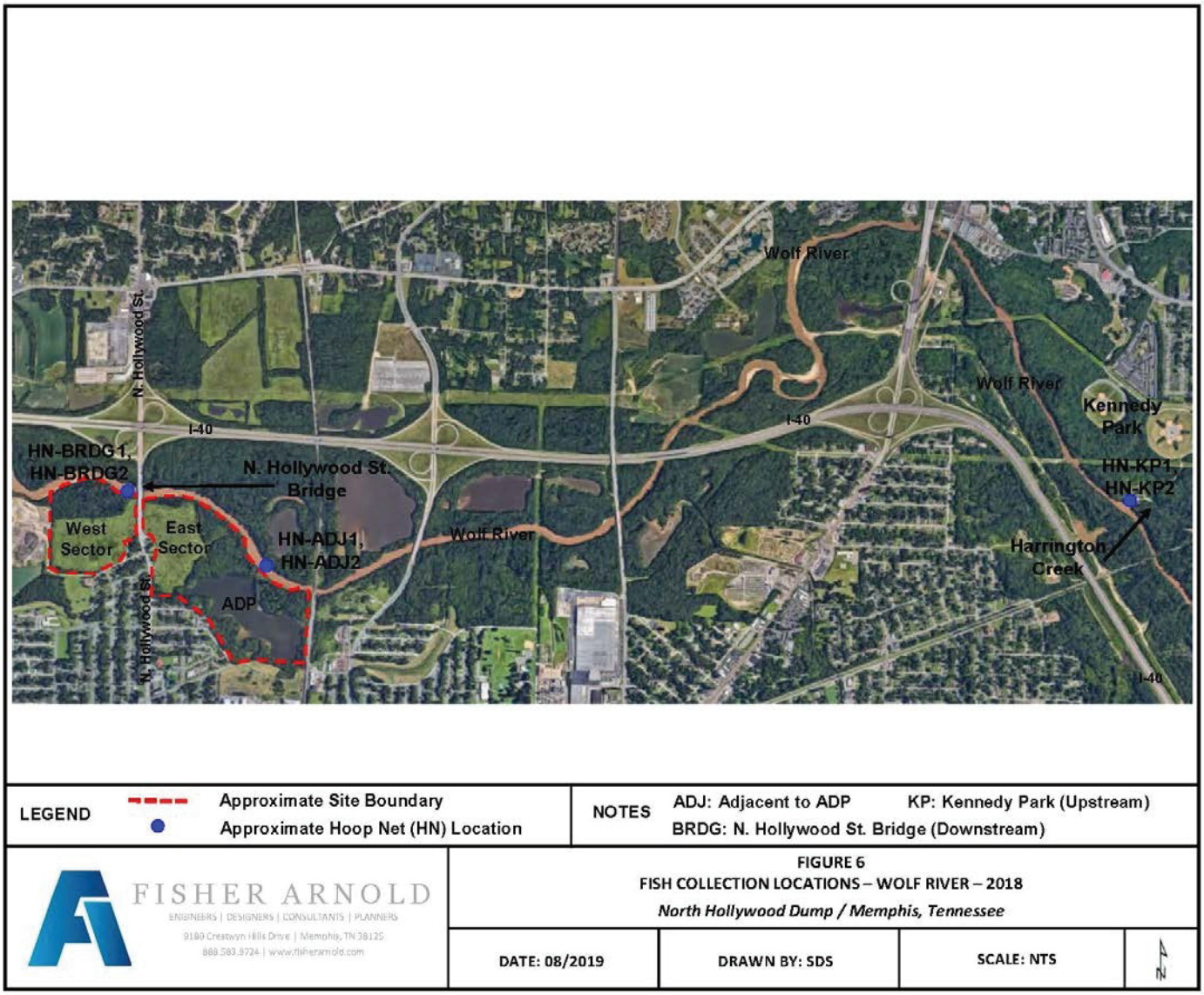


Figure 6 Cont'd. Fish collection locations from the Wolf River in 2018.
Map image adapted from the 2018 annual report for the Site.

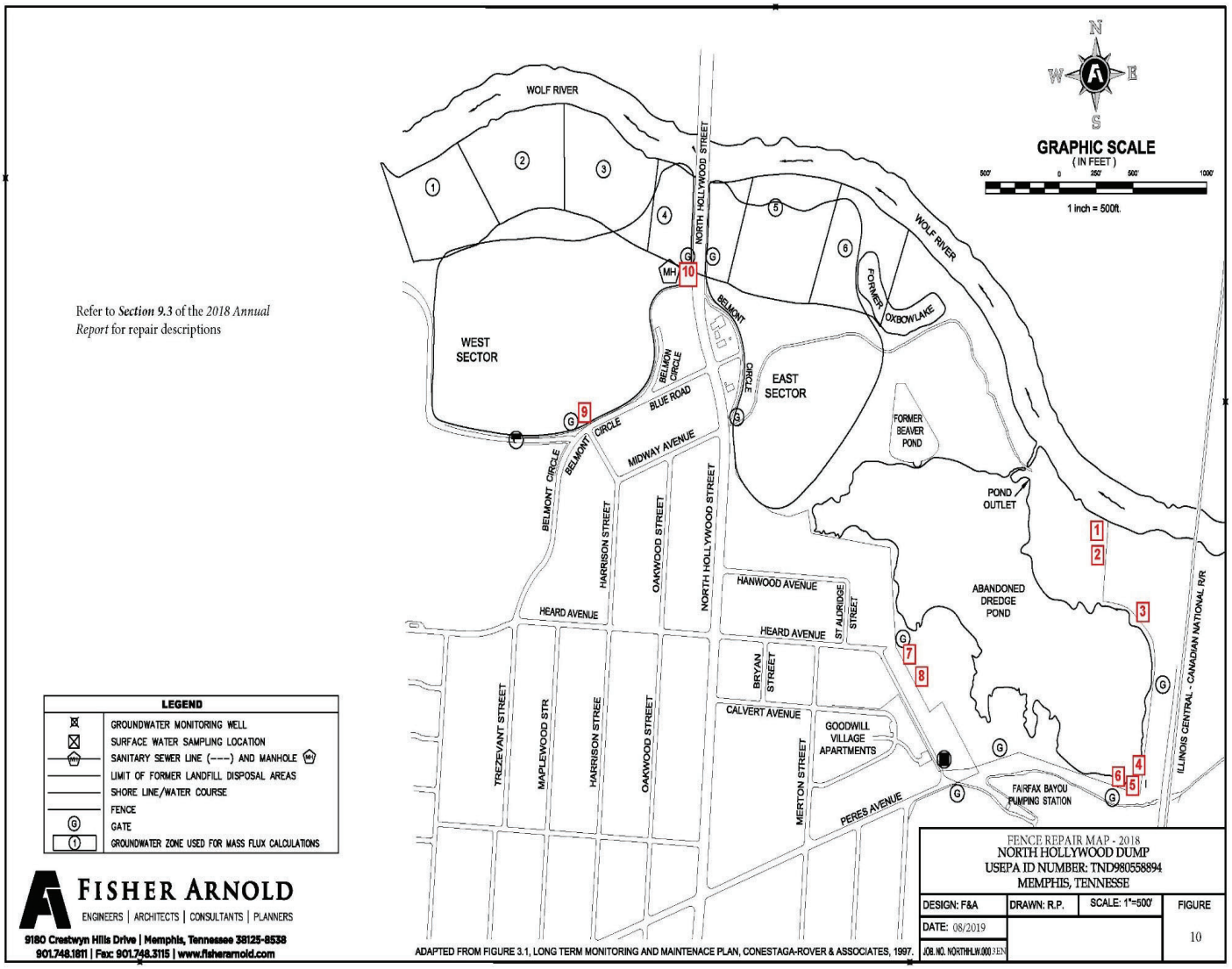


Figure 7. Most recent fence repair locations CY 2018 (adapted from 2018 annual report)

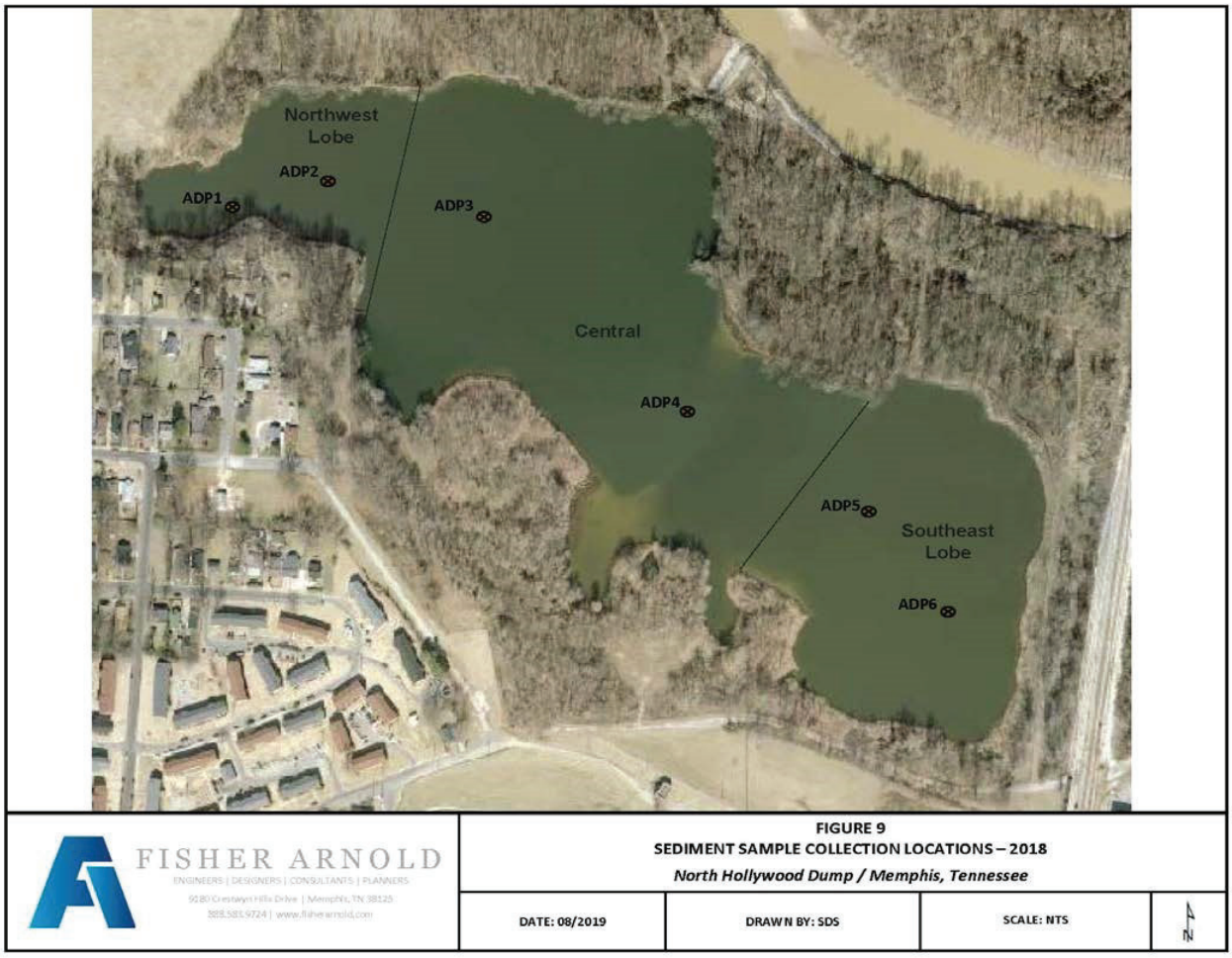
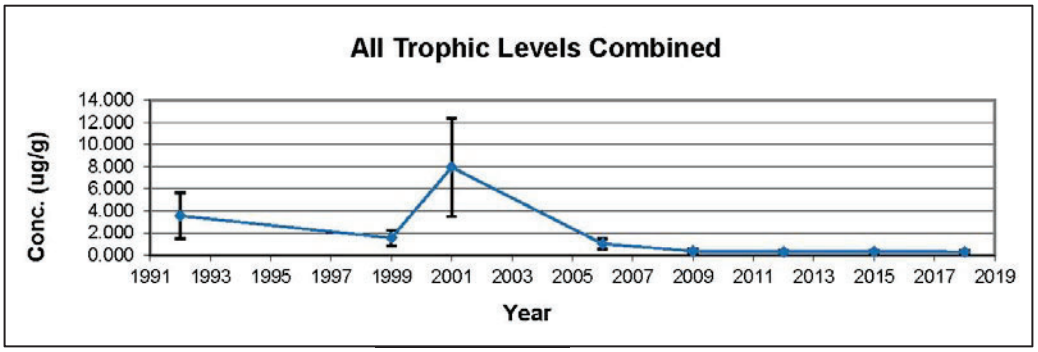


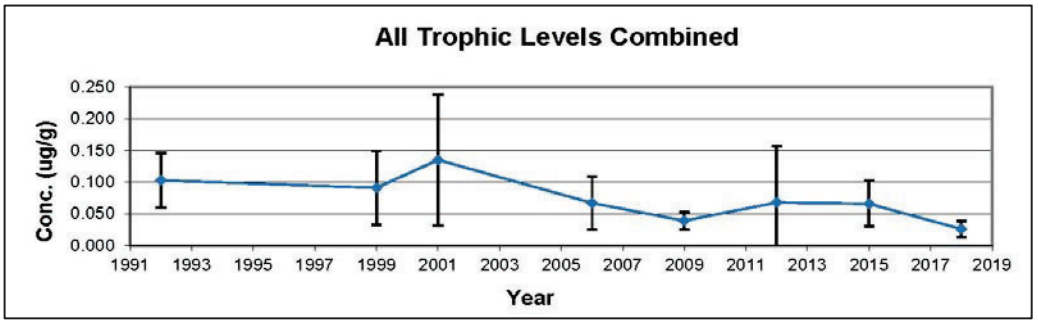
Figure 8. Sediment sample locations in the ADP CY 2018 (adapted from 2018 annual report)

Figure 9. Average concentrations in fish tissue of ADP. Upper and Lower 95% Confidence Intervals

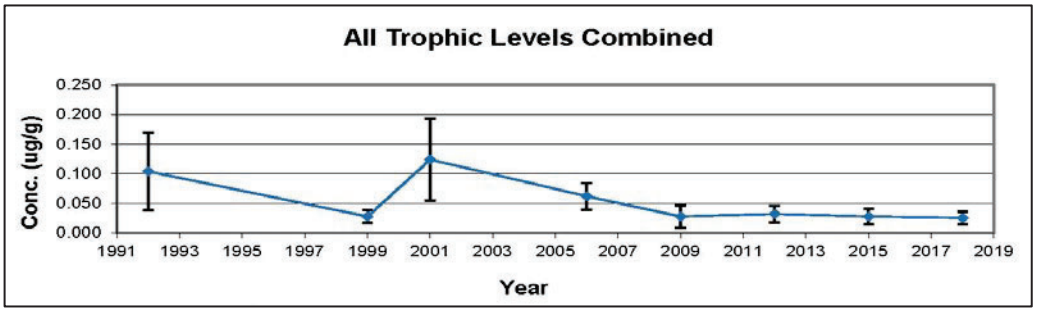
Chlordane



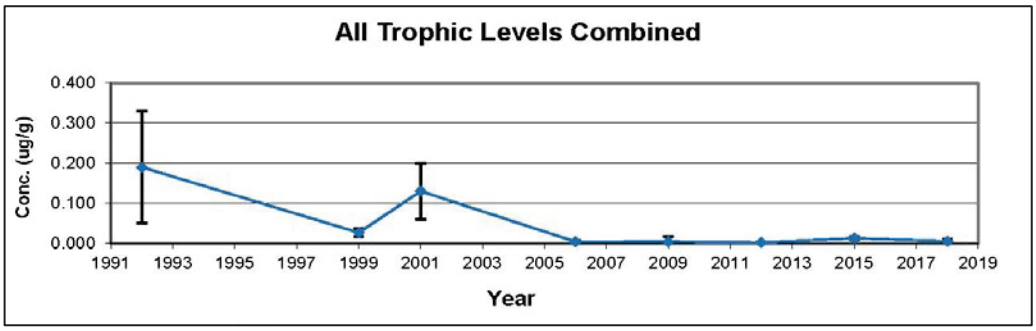
Chlordene



Endrin



Heptachlor Epoxide



APPENDIX C –ACL CALCULATIONS

Excerpt from the 2015 Annual Report – Recalculation of Allowable Contaminant Levels

In accordance with the procedure used in the 1990 ROD, the new ACLs for shallow groundwater were calculated from the current EPA NRWQC using the following formula: ACL = NRWQC x Wolf River Daily Mean Flow (3Q20 or 15-Year Average) x UCF 1 x UCF 2 Total Groundwater Flux x UCF 1 x UCF 3 The numerator of the above formula is equivalent to the Allowable Mass Flux for each Site-Specific Indicator Parameter (µg/day) discharging via shallow groundwater into the Wolf River as listed in Table B-23 of Appendix B in the 2015 annual report. The 3Q20 Daily Mean Flow is the lowest average daily mean flow for a river, stream, or creek over 3 consecutive days with a 20-year recurrence interval. At the time of the 1990 ROD, daily discharge measurements were not being made on the Wolf River at N. Hollywood Street. A 3Q20 Daily Mean Flow *(190 cubic feet per second [cfs])* statistically determined by the USGS for the Wolf River at Germantown Road, which is located approximately 14 miles upstream of the Site and had a record of daily discharge measurements dating back to 1968, was used. In 1995, the NHDSC requested that the USGS statistically determine 3Q20 Daily Mean Flow values based on: (A) The N. Hollywood Street data set, (B) the subset of the Germantown Road data set matching the time period covered by the N. Hollywood Street data set, and (C) the complete Germantown Road data set. Based on the 3Q20 Daily Mean Flow values statistically determined for each of the three data sets, and on discussions with the USGS regarding these results, the NHDSC determined that the 3Q20 Day Mean Flow value of 185 cfs statistically determined from the complete Germantown Road data set was the most valid to use in calculation of the ACLs.

Based on a statistical regression completed by the NHDSC using Wolf River at N. Hollywood Street Daily Mean Flow values reported by the USGS on the same dates as the lowest (0.51 percentile = 168 - 201 cfs) Daily Mean Flow values for the Wolf River at Germantown Road, it appears that, under low flow conditions, the Wolf River at N. Hollywood Street Daily Mean Flow will usually be approximately 10% higher than the corresponding Wolf River at Germantown Road Daily Mean Flow. However, the low flow data set upon which this statistical regression was performed at present appears to be too small to allow the 3Q20 Daily Mean Flow value determined using the complete Germantown Road data set to be adjusted with confidence to produce a corresponding 3Q20 Daily Mean Flow value for the Wolf River at N. Hollywood Street.

In accordance with the 1990 ROD, the 3Q20 Wolf River Daily Mean Flow is used to calculate the ACL when the NRWQC is based on protection of aquatic life (the metals chromium, lead, and zinc; and the pesticide endrin) and correspond to the freshwater Criteria Continuous Concentration (CCC). The CCC, is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. Freshwater CCCs for the metals (trivalent chromium, lead, and zinc) can be calculated based on site-specific surface water hardness data.

The City of Memphis Stormwater Department has been collecting surface water samples from the Wolf River to be analyzed for hardness and other parameters since July 2004. Consequently, the freshwater CCCs for these three hardness-dependent metals were calculated, in accordance with Appendix B of the 2015 annual report, using the arithmetic mean hardness value (18.8 milligrams per liter [mg/L] as CaCO3) for monthly surface water samples collected from the Wolf River at locations approximately 4.5 miles upstream and approximately 1.3 miles downstream of the Site between July 2004 and

November 2011. The calculated hardness-specific CCC for trivalent chromium (18.8 µg/L) was higher than the CCC for hexavalent chromium (11.0 µg/L) as determined by the EPA NRWQC based on a hardness of 100 mg/L as CaCO3. Consequently, the CCC for chromium shown in Table B-26 of Appendix B in the 2015 annual report and adopted as the ACL is the lower value published for the hexavalent form of this metal.

The 15-Year Average Wolf River Daily Mean Flow (1,159 cfs) is used to calculate the ACL when the NRWQC is based on the protection of human health. The Annual Daily Mean Flow values for CY 2000 through 2015 for the Wolf River at N. Hollywood Street are reported by the USGS.

Unit Conversion Factor (UCF) 1 converts cubic feet per second to cubic feet per day and cubic meters per second to cubic meters per day (86,400 m3/day). UCF 2 converts cubic feet per day to liters per day (28.32 L/day). UCF 3 converts cubic meters per day to liters per day (1,000 L/day).

The Total Groundwater Flux, 0.2215 m3/sec, represents the sum of the individual fluxes across each of the six zones along the downgradient boundary of the Site with the Wolf River. the groundwater flux across each zone is calculated using the following form of Darcy's Law: Q = K x I x A, where Q = groundwater flux (i.e., discharge), K = hydraulic conductivity, I = horizontal hydraulic gradient, and A = cross-sectional area through which the discharge occurs. Per Note 2 in Table F-2 of Appendix F in the 2015 annual report, the hydraulic conductivity K is equal to 3.75 x 10-2 cm/s for all zones and represents the geometric mean of the hydraulic conductivity values reported in the Supplemental Remedial Investigation Report for the Site dated April 1990. Per Note 4 in Table F-2 of Appendix F in the 2015 annual report, the cross-sectional area A of each zone is equal to the length of the boundary along the Wolf River across which discharge from the zone occurs times the average saturated thickness (36 ft or 10.97 m) of the fluvial sand and gravel unit. The boundary length and cross-sectional area for each zone is provided in Table F-2 of Appendix F of the 2015 annual report. The average saturated thickness of the fluvial sand and gravel unit was determined in the Supplemental Remedial Investigation Report for the Site dated April 1990.

Although not mentioned in the *Fourth Five-Year Review,* the weighting factors applied to the six downgradient zones used in the calculation of the average groundwater concentrations were also recalculated and provided in Table B-24 of Appendix B of the 2015 annual report. Table B-24 can be found below.

The ACL could not be calculated for chlordene because the EPA has not established NRWQC for this Site-Specific Indicator Parameter. The NRWQC, where established, for the Site-Specific Indicator Parameters that are known or suspected carcinogens (i.e., the metal arsenic and all of the pesticides except endrin) are based on the protection of human health (1 x 10-6 excess cancer risk) due to exposure via consumption of organisms (e.g., fish).

The ACLs based on the 2015 Wolf River Water Quality Criteria (WRWQC) are, with the exception of arsenic, chromium, and endrin, more stringent compared to the EPA NRWQC from the 1990 ROD. While arsenic has remained unchanged (0.14 µg/L), only the ACLs for chromium and endrin have increased in value (0.29 µg/L vs. 11.0 µg/L and 0.0023 µg/L vs. 0.03 µg/L, respectively). These values are provided in Table B-27 of Appendix B of the 2015 annual report.

In accordance with the 1990 ROD and the 1997 LTMMP, an exceedance of an ACL (i.e., a violation) is only determined based on a comparison with the calculated average groundwater concentration for the Site and not the concentration measured in any single groundwater sample collected from an individual well.

Referenced tables B-23, B-34, B-27, and F-2 follow:

TABLE B-23
RECALCULATION ALTERNATE CONCENTRATION LIMITS FOR SHALLOW GROUNDWATER
North Hollywood Dump / Memphis, Tennessee
2015 Annual Report

Site-Specific Indicator Parameter	Current EPA NRWQC (µg/L)	Wolf River Daily Mean Flow (cfs)		Allowable Mass Flux (µg/day)	Total Groundwater Flux (m^3/sec)	Unit Conversion Factor (UCF)			1990 ROD Groundwater ACL (µg/L)	Recalculated Groundwater ACL (µg/L)
		3Q20	15-Year Average			UCF 1	UCF 2	UCF 3		
Metals										
Arsenic	0.14	NA	1,159	(3.97×10^{8})	0.02215	86,400	28.32	1,000	150.42	207
Chromium	11.0	185	NA	(4.98×10^{8})	0.02215	86,400	28.32	1,000	56.4	2,602
Lead	0.39	185	NA	(1.86×10^{8})	0.02215	86,400	28.32	1,000	738.3	92
Zinc	28.5	185	NA	(1.34×10^{10})	0.02215	86,400	28.32	1,000	9,151	6,741
Pesticides										
4,4'-DDT	0.000030	NA	1,159	(8.51×10^{4})	0.02215	86,400	28.32	1,000	0.64	0.04
Aldrin	0.00000077	NA	1,159	(2.18×10^{3})	0.02215	86,400	28.32	1,000	1.46	0.001
alpha-Chlordane	0.00032	NA	1,159	(9.07×10^{5})	0.02215	86,400	28.32	1,000	NC	0.47
gamma-Chlordane	0.00032	NA	1,159	(9.07×10^{5})	0.02215	86,400	28.32	1,000	NC	0.47
Technical Chlordane	0.00032	NA	1,159	(9.07×10^{5})	0.02215	86,400	28.32	1,000	0.51	0.47
Chlordene	NE	NA	NA	NA	NA	NA	NA	NA	NC	NC
Dieldrin	0.0000012	NA	1,159	(3.40×10^{3})	0.02215	86,400	28.32	1,000	0.15	0.002
Endrin	0.03	185	NA	(1.36×10^{7})	0.02215	86,400	28.32	1,000	0.45	7.10
Heptachlor	0.0000059	NA	1,159	(1.67×10^{4})	0.02215	86,400	28.32	1,000	0.23	0.009
Heptachlor Epoxide	0.000032	NA	1,159	(9.07×10^{4})	0.02215	86,400	28.32	1,000	1.07	0.05

Notes:

1. The *Fourth Five-Year Review* recommended the Alternate Concentration Limits (ACLs) for shallow groundwater to be recalculated using the new U.S. Environmental Protection Agency (EPA) National Recommended Water Quality Criteria (NRWQC) published in June 2015, recent hardness data, an updated Wolf River 15-Year Average Daily Mean Flow value, and an updated Wolf River 3Q20 Daily Mean Flow value.

2. In accordance with the procedure used in the 1990 *Record of Decision* (ROD), the new ACLs were calculated from the current NRWQC using the following formula:

$$\frac{\text{NRWQC} \times \text{Wolf River Daily Mean Flow (3Q20 or 15-Year Average)} \times \text{UCF 1} \times \text{UCF 2}}{\text{Total Groundwater Flux} \times \text{UCF 1} \times \text{UCF 3}}$$

The numerator of the above formula is equivalent to the Allowable Mass Flux for each Site-Specific Indicator Parameter *micrograms per day (µg/day)* discharging via shallow groundwater into the Wolf River as listed in the above table. In accordance with the 1990 ROD, the 3Q20 Wolf River Daily Mean Flow is used to calculate the ACL when the NRWQC is based on protection of aquatic life *(see Notes 6 and 9 below)*, whereas the 15-Year Average Wolf River Daily Mean Flow is used to calculate the ACL when the NRWQC is based on the protection of human health *(see Notes 4, 5, and 10 below)*. UCF 1 converts cubic feet per second to cubic feet per day and cubic meters per second to cubic meters per day. UCF 2 converts cubic feet per day to liters per day. UCF 3 converts cubic meters per day to liters per day. The source or derivation of the other components of the formula are identified in the additional notes provided below. In accordance with the 1990 ROD, an exceedance of an ACL is determined based on a comparison with the average groundwater concentration calculated using the results for the samples collected from the downgradient wells located in Zones 1 through 6 and not the concentration measured in a groundwater sample collected from any single monitoring well individually *(see **Figure 1** of **Appendix A** for the location of Zones 1 through 6 and the well or wells included in each zone)*.

3. ACL could not be calculated for chlordene because the EPA has not established any NRWQC for this parameter.

3. The current EPA NRWQC with associated explanations and qualifications are provided in an EPA document that is available on the internet at the following address:

https://www.epa.gov/sites/production/files/2015-06/documents/nrwqc-2004.pdf

4. The NRWQC, where established, for the Site-Specific Indicator Parameters that are known or suspected carcinogens *(i.e., the metal arsenic and all of the pesticides except endrin)* are based on the protection of human health *(1×10^{-5} excess cancer risk)* due to exposure via consumption of organisms *(e.g., fish)*.

6. The NRWQC, where established, for all of the non-carcinogenic Site-Specific Indicator Parameters except barium *(i.e., the metals chromium, lead, and zinc; the pesticide endrin)* are based on the protection of aquatic life and correspond to the freshwater Criteria Continuous Concentration (CCC), which is defined as an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. The current EPA NRWQC document requires that the freshwater CCC for the metal copper be calculated using the Biotic Ligand Model (BLM). Unfortunately, the BLM could not be used at the Site because the requisite multiplicity of Wolf River surface water measurements or analyses in both space and time are only available for four of the ten required input parameters. However, the freshwater CCC for the metals chromium *(trivalent form only)*, lead, and zinc -- can be calculated based on site-specific surface water hardness data, if available, using the formula and other information provided in the EPA NRWQC document *(Pages 20 and 21)*. The City of Memphis Stormwater Department has been collecting surface water samples from the Wolf River to be analyzed for hardness and other parameters since July 2004. Consequently, the freshwater CCCs for these three hardness-dependent metals were calculated, in accordance with the NRWQC document, using the arithmetic mean hardness value *(18.8 milligrams per liter [mg/L] as CaCO3)* for monthly surface water samples collected from the Wolf River at locations approximately 4.5 miles upstream and approximately 1.3 miles downstream of the Site between July 2004 and December 2015. The calculated hardness-specific CCC for trivalent chromium was higher than the CCC for hexavalent chromium provided in the EPA NRWQC document based on a hardness of 100 mg/L as CaCO3. Consequently, the CCC for chromium shown in the above table is the lower value published for the hexavalent form of this metal.

8. The EPA only reports a NRWQC for "chlordane." In the above table, this "chlordane" NRWQC has been used to recalculate the ACL for Technical Chlordane. This recalculated ACL for Technical Chlordane is also referenced in the above table as the ACL for the two chlordane isomers *(i.e., alpha-chlordane and gamma-chlordane)* used to calculate the Technical Chlordane concentration.

9. The 3Q20 Daily Mean Flow is the lowest average daily mean flow for a river, stream, or creek over 3 consecutive days with a 20-year recurrence interval. At the time of the 1990 *ROD* daily discharge measurements were not being made on the Wolf River at N. Hollywood Street. Consequently, the ACLs back-calculated from the EPA NRWQC based on the protection of aquatic life *(see Note 6 above)* had to use, in the back-calculation, a 3Q20 Daily Mean Flow *(190 cubic feet per second [cfs])* statistically determined by the U.S. Geological Survey (USGS) for the Wolf River at Germantown Road, which is located approximately 14 miles upstream of the Site and had a record of daily discharge measurements dating back to 1968. In order to determine if a valid 3Q20 Daily Mean Flow value to use in the above recalculation of the ACLs could be statistically determined based on the smaller set of daily discharge measurements collected by the USGS from the Wolf River at N. Hollywood Street beginning in 1995, the North Hollywood Dump Steering Committee (NHDSC) requested that the USGS statistically determine 3Q20 Daily Mean Flow values based on: (A) The N. Hollywood Street data set, (B) the subset of the Germantown Road data set matching the time period covered by the N. Hollywood Street data set, and (C) the complete Germantown Road data set. Based on the 3Q20 Daily Mean Flow values statistically determined for each of the three data sets, and on discussions with the USGS regarding these results, the NHDSC determined that the 3Q20 Daily Mean Flow value of 185 cfs statistically determined from the complete Germantown Road data set was the most valid to use in recalculation of the ACLs. Based on a statistical regression completed by the NHDSC using Wolf River at N. Hollywood Street Daily Mean Flow values reported by the USGS on the same dates as the lowest (0.51 percentile = 188 - 201 cfs) Daily Mean Flow values for the Wolf River at Germantown Road, it appears that, under low flow conditions, the Wolf River at N. Hollywood Street Daily Mean Flow will usually be approximately 10% higher than the corresponding Wolf River at Germantown Road Daily Mean Flow. However, the low flow data set upon which this statistical regression was performed at present appears to be too small to allow the 3Q20 Daily Mean Flow value determined using the complete Germantown Road data set to be adjusted with confidence to produce a corresponding 3Q20 Daily Mean Flow value for the Wolf River at N. Hollywood Street.

10. The 15-Year Average Daily Mean Flow value of 1,159 cubic feet per second *(cfs)* used in the above recalculation of the ACLs from the current NRWQC based on the protection of human health *(see Notes 4 and 5 above)* were determined from the Annual Daily Mean Flow values reported by the USGS for the Wolf River at N. Hollywood Street for Calendar Years 2000 through 2015. These Annual Daily Mean Flow Values are shown in ***Table E-1*** of ***Appendix E.*** As stated above in Note 9, at the time of the 1990 ROD daily discharge measurements were not being made by the USGS on the Wolf River at N. Hollywood Street. Consequently, the 15-Year Average Mean Daily Flow value of 1,050 cfs used to calculate the corresponding ACLs in the 1990 ROD was the value reported by the USGS for the Wolf River at Germantown Road, which is located approximately 14 miles upstream of the Site.

11. The Total Groundwater Flux represents the sum of the individual fluxes across each of the six zones along the downgradient boundary of the Site with the Wolf River. Per ***Table F-2*** of ***Appendix F***, the groundwater flux across each zone is calculated using the following form of Darcy's Law: Q = K x I x A, where Q = groundwater flux *(i.e., discharge)*, K = hydraulic conductivity, I = horizontal hydraulic gradient, and A = cross-sectional area through which the discharge occurs. Also per ***Table D-4*** of ***Appendix D*** in this report, the following values of K, I, and A were used in the above ACL recalculation: K = 3.75 x 10^{-2} centimeters per second = geometric mean of hydraulic conductivity values reported in the *Supplemental Remedial Investigation Report* for the Site dated April 1990; I = 0.0051 foot per foot *(meter per meter)* for the East Sector former disposal area zones and 0.0044 foot per foot *(meter per meter)* for the West Sector former disposal area zones, which are the arithmetic averages of the horizontal hydraulic gradients calculated using the water level measurements made during all sampling events from 1998 to 2010; and A = length of boundary along the Wolf River across which discharge from each zone occurs times the average saturated thickness *(36 feet or 10.97 meters)* of the shallow fluvial sand and gravel unit. The boundary length for each zone is provided in ***Table D-1*** of ***Appendix D*** *(see also **Figure 1** of **Appendix A** of this report)*. The average saturated thickness of the shallow fluvial sand and gravel unit was determined in the Supplemental Remedial Investigation Report for the Site dated April 1990. It is noted that the only components of the groundwater flux calculations known to have changed since the time of the 1990 ROD are the hydraulic gradients, which were reported to be 0.009 and 0.004 foot per foot or meter per meter for the East and West Sector former disposal areas, respectively, in the Supplemental Remedial Investigation Report for the Site dated April 1990.

Key:

ACL	=	Alternate Concentration Limit	NA	=	Not Applicable
BHC	=	Benzene Hexachloride	NC	=	Not Calculated -- See *Note 2* above
cfs	=	Cubic Feet per Second	NE	=	Not Established -- See *Note 2* above
EPA	=	U.S. Environmental Protection Agency	NRWQC	=	National Recommended Water Quality Criteria
m^3/sec	=	Cubic Meters per Second	ROD	=	Record of Decision
µg/day	=	Micrograms per Day	3Q20	=	See *Note 9* above
µg/L	=	Micrograms per Liter			

TABLE B-24
RECALCULATION OF WEIGHTING FACTORS FOR SITE ZONES

North Hollywood Dump / Memphis, Tennessee
2015 Annual Report

Zone Number	Sector	Lateral Distance		Vertical Depth (m)	Cross-Sectional Area (m^2)	Groundwater Horizontal Hydraulic Gradient (ft/ft and m/m)	Groundwater Flux (m^3/sec)		Weighting Factor		Monitoring Wells in Zone
		Feet	Meters				Value	Percent of Total	LTMMP	New	
1	West	600	182.88	10.97	2,006.71	0.0049	0.00369	0.14915	0.108	0.149	TAG-6D, TAG-7S
2	West	480	146.30	10.97	1,605.36	0.0049	0.00295	0.11932	0.087	0.119	OW-14a, OW-14b
3	West	700	213.36	10.97	2,341.16	0.0049	0.00430	0.17401	0.126	0.174	TAG-5S
4	West	700	213.36	10.97	2,341.16	0.0049	0.00430	0.17401	0.126	0.174	OW-11, TAG-4S(R)
5	East	750	228.60	10.97	2,508.38	0.0056	0.00527	0.21307	0.307	0.213	OW-8, TAG-3D
6	East	600	182.88	10.97	2,006.71	0.0056	0.00421	0.17045	0.246	0.170	OW-13
Totals							**0.02472**	**1.00000**	**1.000**	**1.000**	-----

Notes:

1. The location of each zone and the monitoring well or wells included in each zone are shown on ***Figure 1*** of ***Appendix A*** in this *2015 Annual Report*.
2. The 1990 Record of Decision (ROD) for the Site stated that the average concentration for each parameter should be calculated using a weighting factor for each zone based on the groundwater flux from that zone. The original required weighting factors were calculated in conjunction with preparation of the 1997 *Long-Term Monitoring and Maintenance Plan* (LTMMP) for the Site and were provided in *Table 2.3* of *Appendix A (Sampling Plan)* of that document.
3. The lateral distance for each zone represents the length of the downgradient boundary of the zone with the Wolf River *(see **Figure 1** of **Appendix A** in this 2015 Annual Report)*. The vertical depth for each zone is the average saturated thickness of the fluvial sand and gravel unit *(36 feet = 10.97 meters)* reported in the *Supplemental Remedial Investigation Report* for the Site dated April 1990. The cross-sectional area for each zone is calculated by multiplying the corresponding lateral distance for the zone by the vertical depth *(i.e., average saturated thickness)*.
4. The groundwater horizontal hydraulic gradients listed above and used in the calculation of the groundwater flux are the arithmetic average for each of the two Site sectors based on the full set of all measurements made during all of the sampling events completed from 1998 to 2015. The weighting factors listed in the LTMMP *(Table 2.3 of Appendix A [Sampling Plan])* were calculated using the groundwater horizontal hydraulic gradient values of 0.009 and 0.004 foot per foot or meter per meter for the East and West Sector former disposal areas, respectively, calculated in the *Supplemental Remedial Investigation Report* for the Site dated April 1990.
5. The groundwater flux was calculated using the geometric mean hydraulic conductivity value of 3.75×10^{-2} centimeters per second provided in the *Supplemental Remedial Investigation Report* for the Site dated April 1990.
6. Monitoring well OW-11 in Zone 4 *(i.e., West Sector former disposal area)* has not been sampled since July 2007 due to an obstruction in the well casing that prevents the pump from being lowered into the water. Monitoring well TAG-1D, which is located on the East Sector former disposal area, has been sampled in lieu of well OW-11 since September 2009. However, the analytical results for samples from well TAG-1D are not used in calculating either the average concentration or the mass flux to the Wolf River.

Key: ft = Feet; m = Meters; m^2 = Square Meters; m^3/sec = Cubic Meters per Second

TABLE B-27

1990 ROD NATIONAL RECOMMENDED WATER QUALITY CRITERIA (NRWQC) FOR SHALLOW GROUNDWATER VERSUS CURRENT 2015 NRWQC

North Hollywood Dump / Memphis, Tennessee

2015 Annual Report

Site-Specific Indicator Parameter	1990 ROD Value	Current EPA NRWQC	Increase, Decrease, or No Change
National Recommended Water Quality Criteria (µg/L)			
Metals			
Arsenic	0.14	0.14	No Change
Chromium	0.3	11.0	Increase
Lead	3.8	0.39	Decrease
Zinc	47.0	28.5	Decrease
Pesticides			
4,4'-DDT	0.000590	0.000030	Decrease
Aldrin	0.00136000	0.00000077	Decrease
alpha-Chlordane	NL	0.00032	NA
gamma-Chlordane	NL	0.00032	NA
Technical Chlordane	0.00048	0.00032	Decrease
Chlordene	NE	NE	NA
Dieldrin	0.000144	0.0000012	Decrease
Endrin	0.0023	0.03	Increase
Heptachlor	0.000214	0.0000059	Decrease
Heptachlor Epoxide	0.001	0.000032	Decrease
Wolf River Daily Mean Flow (cfs)			
3Q20	190	185	Decrease
15-Year Average	1,050	1,159	Increase
Hydraulic Characteristics			
Hydraulic Conductivity of Fluvial Sand and Gravel Unit	3.75 x 10-2 cm/sec	3.75 x 10-2 cm/sec	No Change
Horizontal Hydraulic Gradient - East Sector	0.009 ft/ft	0.0050 ft/ft	Decrease
Horizontal Hydraulic Gradient - West Sector	0.004 ft/ft	0.0044 ft/ft	Increase

Notes:

1. The *Fourth Five-Year Review* recommended the Alternate Concentration Limits (ACLs) for shallow groundwater to be recalculated using the new U.S. Environmental Protection Agency (EPA) NRWQC published in June 2015, recent hardness data, an updated Wolf River 15-Year Average Daily Mean Flow value, and an updated Wolf River 3Q20 Daily Mean Flow value.
2. See ***Table F-2*** for a discussion of the derivation of each of the current EPA NRWQC cited in the above table.
3. An ACL could not be calculated for chlordene because the EPA has not established any NRWQC for this Site-Specific Indicator Parameter.
4. The EPA only reports a NRWQC for "chlordane." In the above table, this "chlordane" NRWQC has been used to recalculate the ACL for Technical Chlordane. This recalculated ACL for Technical Chlordane is also referenced in the above table as the ACL for the two chlordane isomers *(i.e., alpha-chlordane and gamma-chlordane)* were used to calculate the Technical Chlordane concentration.

Key:

ACL	=	Alternate Concentration Limit
NE	=	Not Established *(see Note 3 above)*
NL	=	Not Listed *(see Note 4 above)*
cfs	=	Cubic Feet per Second
EPA	=	U.S. Environmental Protection Agency
cm/sec	=	Centimeters per Second
µg/L	=	Micrograms per Liter

TABLE F-2
CALCULATION OF GROUNDWATER FLUX THROUGH DOWNGRADIENT MONITORING WELL ZONES

North Hollywood Dump / Memphis, Tennessee
2015 Annual Report

Zone Number	Hydraulic Conductivity (cm/sec)	Horizontal Hydraulic Gradient (m/m)	Lateral Distance		Vertical Depth		Cross-Sectional Area (m^2)	Groundwater Flux (m^3/sec)
			Feet	*Meters*	*Feet*	*Meters*		
1	0.0375	0.0044	600	182.88	36	10.97	2,006.71	0.00331
2	0.0375	0.0044	480	146.30	36	10.97	1,605.36	0.00265
3	0.0375	0.0044	700	213.36	36	10.97	2,341.16	0.00386
4	0.0375	0.0044	700	213.36	36	10.97	2,341.16	0.00386
5	0.0375	0.0050	750	228.60	36	10.97	2,508.38	0.00470
6	0.0375	0.0050	600	182.88	36	10.97	2,006.71	0.00376
Total Groundwater Flux								**0.02215**

Notes:

1. As shown on ***Figure 1*** of ***Appendix A,*** Zones 1 through 4 are located on the West Sector former disposal area, whereas Zones 5 and 6 are located on the East Sector former disposal area. The monitoring well or wells included in each zone are as follows: Zone 1 = TAG-6D and TAG-7S; Zone 2 = OW-14a and OW-14b; Zone 3 = TAG-5S; Zone 4 = TAG-4S(R); Zone 5 = TAG-3D and OW-8; and Zone 6 = OW-13.
2. The hydraulic conductivity value of 3.75×10^{-2} centimeters per second used in the above table represents the geometric mean of the hydraulic conductivity values measured at the Site as reported in the *Supplemental Remedial Investigation Report* dated April 1990.
3. The groundwater horizontal hydraulic gradients listed above and used in calculation of groundwater fluxes are the historically highest values *(i.e., steepest gradients)* for each of the two Site sectors from the total set of values calculated based on water level measurements made during all sampling events since 1998 *(see **Table D-2** of **Appendix D** in this 2015 Annual Report).*
4. The lateral distance of each zone *(in feet or meters)* is measured along its downgradient boundary with the Wolf River. The vertical depth of 36 feet or 10.97 meters represents the average saturated thickness for the fluvial sand and gravel unit reported in the *Supplemental Remedial Investigation Report* for the Site dated April 1990. The cross-sectional area *(in square meters)* through which discharge occurs is calculated as the product of the lateral distance *(in meters)* times the vertical depth *(in meters).*
5. The groundwater flux across each zone is calculated using the following form of Darcy's Law: Q = K x I x A, where Q = groundwater flux *(i.e., discharge),* K = hydraulic conductivity, I = horizontal hydraulic gradient, and A = cross-sectional area through which the discharge occurs.

Key:

cm/sec	=	Centimeters per Second	m^2	=	Square Meters
m/m	=	Meter per Meter	m^3/sec	=	Cubic Meters per Second

APPENDIX D – CURRENT SITE STATUS

Environmental Indicators
- Current human exposures at the Site are under control. *- Current groundwater migration is under control.*

Are Necessary Institutional Controls in Place?
☒ All ☐ Some ☐ None

Has EPA Designated the Site as Sitewide Ready for Anticipated Use?
☒ Yes ☐ No

Has the Site Been Put into Reuse?
☐ Yes ☒ No

APPENDIX E: COC CONCENTRATIONS IN SURFACE WATER AND FISH

COC concentrations at Wolf River Locations – Tables B-20 through B-22 adapted from the 2018 Annual Report

COC concentrations in fish tissue samples of the ADP and Wolf River– Tables G-1 through G-4 adapted from the 2018 Annual Report

TABLE B-20
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – DOWNSTREAM SAMPLE LOCATION SW-1

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Mar-98	*Jun-98*	*Sep-98*	*Nov-98*	*Jun-99*	*Dec-99*	*Jun-00*	*Jan-01*	*Jun-01*	*Feb-02*	*Jul-02*	*Jan-03*	*Jul-03*	*May-04*	*Apr-05*	*Jun-06*	
Metals																	
Arsenic	<10 J ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<5 ♦	<5 ♦	<20 ♦	<5 ♦	<50 ♦	<50 ♦	<10 ♦	<50 ♦	<50 ♦	0.14
Chromium	<10 J	<10	<10	<10	<10	<10	<10	<5	<10	<10	<20 ♦	<5	**27** ●	<10	<10	<5	11.0
Lead	<5 J ♦	<5 ♦	<5 ♦	<5 ♦	**8** ●	**11** ●	<25 ♦	<3 ♦	<5 ♦	<3 ♦	<5 ♦	<5 ♦	**26** ●	<5 ♦	<5 ♦	<5 ♦	0.39
Zinc	**44** ●	<20	**33** ●	<20	**33** ●	**25**	<100 UJ ♦	**67** ●	<20	**93** ●	<20	<20	**158 J** ●	**134 J** ●	<20	**32** ●	28.5
Pesticides																	
4,4'–DDT	<0.10 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.07 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	**0.038 J** ●	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 UJ ♦	<0.02 ♦	<0.02 ♦	0.000030
Aldrin	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 UJ ♦	**0.01** ●	<0.01 ♦	0.00000077
alpha-Chlordane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.00032
gamma-Chlordane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.00032
Technical Chlordane *(see Note 10)*	<0.50 ♦	<1.0 ♦	<0.50 ♦	<0.50 ♦	<1.0 ♦	<0.50 ♦	<0.50 ♦	<0.50 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.10 ♦	0.00032
Chlordene	<0.50	<0.50	<0.05	<0.05	<0.05	**0.14**	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.01**	<0.01	NE
Dieldrin	<0.10 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 UJ ♦	<0.02 ♦	<0.02 ♦	0.0000012
Endrin	<0.10 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03
Heptachlor	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.17 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 UJ ♦	**0.01** ●	<0.01 ♦	0.0000059
Heptachlor Epoxide	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	0.000032

Notes: **See Page 4 of 4**
Key: **See Page 4 of 4**

FISHER ARNOLD

TABLE B-20
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – DOWNSTREAM SAMPLE LOCATION SW-1

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Jul-07	*Oct-08*	*Sep-09*	*Jun-10*	*Sep-11*	*Jun-12*	*Jun-13*		*Sep-14*		*Jun-15*		*Apr-16*		*Oct-17*		
							Method 6010B	*Method 200.8*	*Method 6010B*	*Method 200.8*	*Method 6010B*	*Method 200.8*	*Method 6010C*	*Method 200.8*	*Method 6010C*	*Method 200.8*	
Metals																	
Arsenic	<5	<10	<10	<10	<10	<10	<6	4.12	<7	1.83	<7	2.26	<7	1.80	<7	2.22	0.14
Chromium	<5	<5	<5	<5	<5	<5	4 J	2.31	1 J	1.38	<1	1.48	1 J	2.11	<1	1.77	11.0
Lead	<5	<8	<8	<8	<8	<8	<5 UJ	<4.66 UJ	<5	0.726	<5	1.12	<5	1.35	<5	0.97	0.39
Zinc	<20	<120	10	13	12	12	27 J	15.7 J	<3 UJ	<6.52 UJ	4 J	4.55 J	9 J	5.87	15	15.80	28.5
Pesticides																	
4,4'-DDT	0.04	<0.02	<0.00567	<0.00567	<0.00567	<0.00567	<0.0164		<0.0164		<0.0164		<0.0137		<0.0015		0.000030
Aldrin	<0.01	<0.01	<0.00985	0.0310 J	<0.00985	<0.00985	<0.0060		<0.0060		<0.0060		<0.0098		<0.0005		0.00000077
alpha-Chlordane	NR	<0.05	<0.00472	<0.00633	<0.00472	<0.00633	<0.0081		<0.0081		<0.0081		<0.0195		<0.0020		0.00032
gamma-Chlordane	NR	<0.05	<0.00358	<0.00518	<0.00358	<0.00518 UJ	<0.0073		<0.0073		<0.0073		<0.0194		<0.0006		0.00032
Technical Chlordane *(see Note 10)*	<0.10	<0.10	<0.00830	<0.01151	<0.00830	<0.01151 UJ	<0.0154		<0.0154		<0.0154		<0.0389		<0.0026		0.00032
Chlordene	<0.01	<0.01	<0.0500	<0.0500	<0.0500	<0.0500	<0.0100		<0.0100		<0.0100		<0.0200		<0.0200		NE
Dieldrin	<0.02	<0.02	<0.0101	<0.0101	<0.0101	<0.0101	<0.0070		<0.0070		<0.0070		<0.0094		<0.0004		0.0000012
Endrin	<0.02	<0.02	<0.0120	<0.0120	<0.0120	<0.0120	<0.0197		<0.0197		<0.0197		<0.0102		<0.0015		0.03
Heptachlor	0.03	<0.01	0.184	<0.0124	<0.0124	<0.0124	<0.0076		<0.0076		<0.0076		<0.0086		<0.0009		0.0000059
Heptachlor Epoxide	<0.01	<0.01	<0.0126	<0.0126	<0.0126	<0.0126	<0.0062		<0.0062		<0.0062		<0.0088		<0.0007		0.000032

Notes: **See Page 4 of 4**
Key: **See Page 4 of 4**

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TABLE B-20
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – DOWNSTREAM SAMPLE LOCATION SW-1

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Oct-18																
	Method 6010D	Method 200.8															
Metals																	
Arsenic	<5 ♦	1.2 ●															0.14
Chromium	<3	0.62 J															11.0
Lead	<3 ♦	0.3 J															0.39
Zinc	<8	<1.38															28.5
Pesticides																	
4,4'–DDT	<0.0015 ♦																0.000030
Aldrin	0.0159 JQ ●																0.00000077
alpha-Chlordane	<0.0005 ♦																0.00032
gamma-Chlordane	<0.0007 ♦																0.00032
Technical Chlordane *(see Note 10)*	<0.0012 ♦																0.00032
Chlordene	<0.0200																NE
Dieldrin	<0.0008 ♦																0.0000012
Endrin	<0.0010																0.03
Heptachlor	<0.0019 ♦																0.0000059
Heptachlor Epoxide	<0.0005 ♦																0.000032

Notes: **See Page 4 of 4**
Key: **See Page 4 of 4**

FISHER ARNOLD

TABLE B-20
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – DOWNSTREAM SAMPLE LOCATION SW-1

North Hollywood Dump / Memphis, Tennessee

Notes:

1. Positive detections of Site-specific indicator parameters are shown in **boldface**. Positive detections that are above the corresponding Wolf River Water Quality Criteria (WRWQC) *(see Note 5 below)* are identified by the symbol "•" to the right of the value. None of the Site-specific indicator parameters was detected at a concentration above the corresponding WRWQC. For non-detected parameters, method detection limits (MDL) that are above the corresponding WRWQC are identified by the symbol "♦" to the right of the value. As shown in the above table, the method detection limits for many of the indicator parameters were above the corresponding WRWQC.
2. During this 2018 Surface Water Sampling Event, the downstream sample (SW-1) was incorrectly labeled and recorded as SW-3. The upstream sample (SW-3) was incorrectly labeled and recorded as SW-1. The values in this Table are the rectified sample results for the correct location.
3. Several of the concentration values were qualified by the lab(s). Any results that is between the method quantitation limit (MQL) and the MDL was qualified as "J" to denote that the result should be considered as an estimated value.
4. Beginning with the June 2013 Sampling Event, samples have also been analyzed by Method 200.8 in order to determine if lower detection limits *(i.e., where applicable, below the WRWQC)* could be achieved. See the text for a discussion of the above metal results with regard to this objective.
5. The WRWQC are based upon the U.S. Environmental Protection Agency (EPA) National Recommended Water Quality Criteria (NRWQC) which were revised in June 2015. The 2015 NRWQC are available online at the following address: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table.
6. The EPA NRWQC, where established, for indicator parameters that are known or suspected carcinogens *(i.e., the metal arsenic and all of the pesticides except endrin)* are based on the protection of human health *(1×10^{-6} excess cancer risk)* due to exposure via consumption of organisms *(e.g., fish)*.
7. The EPA has not established NRWQC for the indicator parameter chlordene.
8. Beginning in December 2008, samples have also been analyzed for the three other chlordane-related parameters *(cis-Nonachlor, trans-Nonachlor, and oxychlordane)* that are used to calculate the Total Chlordane concentration in fish tissue samples collected at the Site, but are not included in this table.
9. The EPA NRWQC document only reports an NRWQC for "chlordane." In the above table, this "chlordane" NRWQC has referenced as the WRWQC for Technical Chlordane as well as for both of the two chlordane isomers *(i.e., alpha-chlordane and gamma-chlordane)* used to calculate the Technical Chlordane concentration *(see Note 10 below)*.
10. Technical Chlordane values were calculated as first described in the *2010 Annual Report*.

Key:

•	=	See *Note 1* Above	NE	=	Not Established; No WRWQC -- i.e., EPA NRWQC *(See Note 6 Above)*
♦	=	See *Note 1* Above	J	=	Estimated Concentration -- See *Note 3* Above
µg/L	=	Micrograms per Liter			

FISHER ARNOLD

TABLE B-21
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – ADJACENT SAMPLE LOCATION SW-2

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Mar-98	*Jun-98*	*Sep-98*	*Nov-98*	*Jun-99*	*Dec-99*	*Jun-00*	*Jan-01*	*Jun-01*	*Jun-01 Duplicate Samples*	*Feb-02*	*Feb-02 Duplicate Samples*	*Jul-02*	*Jul-02 Duplicate Samples*	*Jan-03*	*Jan-03 Duplicate Samples*	
Metals																	
Arsenic	<10 J ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<5 ♦	<10 ♦	<10 ♦	<20 ♦	<20 ♦	<5 ♦	<5 ♦	<50 ♦	<50 ♦	0.14
Chromium	<10 J	<10	<10	<10	<10	<10	<10	<5	<10	<10	<10	<10	<20 ♦	<20 ♦	<5	<5	11.0
Lead	<5 J ♦	<5 ♦	<5 ♦	<5 ♦	**8** ●	**8** ●	<25 ♦	<3 ♦	<5 ♦	<5 ♦	<3 ♦	<3 ♦	<5 ♦	<5 ♦	<5 ♦	<5 ♦	0.39
Zinc	**24**	<20	<20	<20	**22**	**22**	**158 J** ●	**30** ●	<20	<20	<20	<20	**25**	<20	<20	<20	28.5
Pesticides																	
4,4'–DDT	<0.01 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	**0.12** ●	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.02 ♦	**0.03 J** ●	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	0.000030
Aldrin	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	0.00000077
alpha-Chlordane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.00032
gamma-Chlordane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.00032
Technical Chlordane *(see Note 9)*	<0.50 ♦	<1.0 ♦	<0.50 ♦	<0.50 ♦	<1.5 ♦	<0.50 ♦	<0.50 ♦	<0.50 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	0.00032
Chlordene	<0.50	<0.50	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NE
Dieldrin	<0.10 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	**0.07** ●	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	0.0000012
Endrin	<0.10 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03
Heptachlor	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.17 U ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	0.0000059
Heptachlor Epoxide	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	0.000032

Notes: **See Page 5 of 5**
Key: **See Page 5 of 5**

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TABLE B-21
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – ADJACENT SAMPLE LOCATION SW-2

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Jul-03		*May-04*		*Apr-05*		*Jun-06*		*Jul-07*		*Oct-08*		*Sep-09*		*Jun-10*		
	Duplicate Samples		*Duplicate Samples*		*Duplicate Samples*		*Duplicate Samples*		*Duplicate Samples*		*Duplicate Samples*		*Duplicate Samples*		*Duplicate Samples*		
Metals																	
Arsenic	<50 ♦	<50 ♦	<10 ♦	<10 ♦	<50 ♦	<50 ♦	<50 ♦	<50 ♦	<5 ♦	<5 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	0.14
Chromium	**16** ●	**21** ●	<10	<10	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	**5**	**5**	11.0
Lead	**12** ●	**18** ●	<5 ♦	<5 ♦	<5 ♦	<5 ♦	<5 ♦	<5 ♦	<5 ♦	<5 ♦	<6 ♦	<6 ♦	<6 ♦	<6 ♦	<6 ♦	<6 ♦	0.39
Zinc	**58 J** ●	**40 J** ●	<20 UJ	<20 UJ	**29**	<20	<20	**20**	<20	<20	**174 J** ●	<120 ♦	**11**	<10	**18**	**16**	28.5
Pesticides																	
4,4'–DDT	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	**0.04** ●	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.00567 ♦	<0.00579 ♦	<0.00567 ♦	<0.00567 ♦	0.000030
Aldrin	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	**0.01** ●	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.00985 ♦	<0.0101 ♦	<0.00985 ♦	<0.00985 ♦	0.00000077
alpha-Chlordane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	<0.05 ♦	<0.05 ♦	<0.00633 ♦	<0.00481 ♦	<0.00633 ♦	<0.00633 ♦	0.00032
gamma-Chlordane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	<0.05 ♦	<0.05 ♦	**0.0189 J** ●	<0.00366 ♦	0.00518 ♦	<0.00518 ♦	0.00032
Technical Chlordane *(see Note 9)*	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.10 ♦	<0.10 ♦	<0.10 ♦	<0.10 ♦	<0.10 ♦	<0.10 ♦	**0.0205 J** ●	<0.00847 ♦	<0.01151 ♦	<0.01151 ♦	0.00032
Chlordene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0500	<0.0510	<0.0500	<0.0500	NE
Dieldrin	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.0101 ♦	<0.0103 ♦	<0.0101 ♦	<0.0101 ♦	0.0000012
Endrin	<0.02	<0.03 U	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.02 J**	<0.02	<0.02	<0.02	<0.0120	<0.0122	<0.0120	<0.0120	0.03
Heptachlor	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	**0.0149 J** ●	<0.0127 ♦	<0.0124 ♦	<0.0124 ♦	0.0000059
Heptachlor Epoxide	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.0126 ♦	<0.0129 ♦	<0.0126 ♦	<0.0126 ♦	0.000032

Notes: **See Page 5 of 5**
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FISHER ARNOLD

TABLE B-21
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – ADJACENT SAMPLE LOCATION SW-2

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Sep-11		Jun-12		Jun-13				Sep-14				Jun-15				
	Duplicate Samples		Duplicate Samples		Duplicate Samples				Duplicate Samples				Duplicate Samples				
					Method 6010B	Method 200.8	Method 6010B	Method 200.8	Method 6010B	Method 200.8	Method 6010B	Method 200.8	Method 6010B	Method 200.8	Method 6010B	Method 200.8	
Metals																	
Arsenic	<10 ♦	<10 ♦	<10 ♦	<10 ♦	10 ●	4.53 ●	10 ●	4.54 ●	<7 ♦	1.65 ●	<7 ♦	1.32 ●	<7 ♦	1.72 ●	<7 ♦	1.75 ●	0.14
Chromium	<5	<5	<5	<5	6	4.74	6	4.49	1 J	1.53	1 J	1.73	<1	1.38	<1	1.32	11.0
Lead	<6 ♦	<6 ♦	<6 ♦	<6 ♦	<4 UJ ♦	<5.20 UJ ♦	<6 UJ ♦	<5.40 UJ ♦	<5 ♦	0.773 ●	<5 ♦	0.813 ●	<5 ♦	0.955 ●	<5 ♦	0.854 ●	0.39
Zinc	12	<10	11	10	30 ●	19.2 J	33 ●	20.6 J	<4 UJ	< 5.54 UJ	<3 UJ	<5.31 UJ	4 J	3.66 J	3 J	4.16 J	28.5
Pesticides																	
4,4'–DDT	<0.00567 ♦	<0.00567 ♦	<0.00567 ♦	<0.00567 ♦	<0.0164 ♦		<0.0164 ♦		<0.0164 ♦		<0.0164 ♦		<0.0164 ♦		<0.0164 ♦		0.000030
Aldrin	<0.00985 ♦	<0.00985 ♦	<0.00985 ♦	<0.00985 ♦	<0.0060 ♦		<0.0060 ♦		<0.0060 ♦		<0.0060 ♦		<0.0060 ♦		<0.0060 ♦		0.00000077
alpha-Chlordane	<0.00633 ♦	<0.00633 ♦	<0.00633 ♦	<0.00633 ♦	<0.0081 ♦		<0.0081 ♦		<0.0081 ♦		<0.0081 ♦		<0.0081 ♦		<0.0081 ♦		0.00032
gamma-Chlordane	0.00518 ♦	0.00518 ♦	0.00518 ♦	0.00518 ♦	<0.0073 ♦		<0.0073 ♦		<0.0073 ♦		<0.0073 ♦		<0.0073 ♦		<0.0073 ♦		0.00032
Technical Chlordane *(see Note 9)*	<0.01151 ♦	<0.01151 ♦	<0.01151 ♦	<0.01151 ♦	<0.0154 ♦		<0.0154 ♦		<0.0154 ♦		<0.0154 ♦		<0.0154 ♦		<0.0154 ♦		0.00032
Chlordene	<0.0500	<0.0500	<0.0500	<0.0500	<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		NE
Dieldrin	<0.0101 ♦	<0.0101 ♦	<0.0101 ♦	<0.0101 ♦	<0.0070 ♦		<0.0070 ♦		<0.0070 ♦		<0.0070 ♦		<0.0070 ♦		<0.0070 ♦		0.0000012
Endrin	<0.0120	<0.0120	<0.0120	<0.0120	<0.0197		<0.0197		<0.0197		<0.0197		<0.0197		<0.0197		0.03
Heptachlor	<0.0124 ♦	<0.0124 ♦	<0.0124 ♦	<0.0124 ♦	<0.0076 ♦		<0.0076 ♦		<0.0076 ♦		<0.0076 ♦		<0.0076 ♦		<0.0076 ♦		0.0000059
Heptachlor Epoxide	<0.0126 ♦	<0.0126 ♦	<0.0126 ♦	<0.0126 ♦	<0.0062 ♦		<0.0062 ♦		<0.0062 ♦		<0.0062 ♦		<0.0062 ♦		<0.0062 ♦		0.000032

Notes: **See Page 5 of 5**
Key: **See Page 5 of 5**

FISHER ARNOLD

TABLE B-21
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – ADJACENT SAMPLE LOCATION SW-2

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Apr-16				*Oct-17*				*Oct-18*								
	Duplicate Samples				*Duplicate Samples*				*Duplicate Samples*								
	Method 6010C	*Method 200.8*	*Method 6010C*	*Method 200.8*	*Method 6010C*	*Method 200.8*	*Method 6010C*	*Method 200.8*	*Method 6010D*	*Method 200.8*	*Method 6010D*	*Method 200.8*					
Metals																	
Arsenic	<7 ♦	1.91 ●	<7 ♦	2.00 ●	<7 ♦	2.01 ●	<7 ♦	2.02 ●	<5 ♦	1.1 ●	<5 ♦	1.30 ●					0.14
Chromium	3 J	2.91	2 J	3.05	1 J	1.71	1 J	1.92	<3	<0.51	<3	0.86 J					11.0
Lead	<5 ♦	1.96 ●	<5 ♦	2.13 ●	<5 ♦	1.19 ●	<5 ♦	1.36 ●	<3 ♦	<0.3	<3 ♦	0.4 J ●					0.39
Zinc	10	8.76	11	11.4	5 UJ	9.88	14	6.81	<8	<1.38	<8	<1.38					28.5
Pesticides																	
4,4'–DDT	<0.0137 ♦		<0.0137 ♦		<0.0015 ♦		<0.0015 ♦		<0.0015 ♦		<0.0015 ♦						0.000030
Aldrin	<0.0098 ♦		<0.0098 ♦		<0.0005 ♦		<0.0005 ♦		<0.0004 ♦		<0.0004 ♦						0.00000077
alpha-Chlordane	<0.0195 ♦		<0.0195 ♦		<0.0020 ♦		<0.0020 ♦		<0.0005 ♦		<0.0005 ♦						0.00032
gamma-Chlordane	<0.0194 ♦		<0.0194 ♦		<0.0006 ♦		<0.0006 ♦		<0.0007 ♦		<0.0007 ♦						0.00032
Technical Chlordane *(see Note 9)*	<0.0389 ♦		<0.0389 ♦		<0.0026 ♦		<0.0026 ♦		<0.0012 ♦		<0.0012 ♦						0.00032
Chlordene	<0.0200		<0.0200		<0.0200		<0.0200		<0.0200		<0.0200						NE
Dieldrin	<0.0094 ♦		<0.0094 ♦		<0.0004 ♦		<0.0004 ♦		<0.0008 ♦		<0.0008 ♦						0.0000012
Endrin	<0.0102		<0.0102		<0.0015		<0.0015		<0.0010		<0.0010						0.03
Heptachlor	<0.0086 ♦		<0.0086 ♦		<0.0009 ♦		<0.0009 ♦		<0.0019 ♦		<0.0019 ♦						0.0000059
Heptachlor Epoxide	<0.0088 ♦		<0.0088 ♦		<0.0007 ♦		<0.0007 ♦		<0.0005 ♦		<0.0005 ♦						0.000032

Notes: **See Page 5 of 5**
Key: **See Page 5 of 5**

FISHER ARNOLD

TABLE B-21
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – ADJACENT SAMPLE LOCATION SW-2

North Hollywood Dump / Memphis, Tennessee

Notes:

1. Positive detections of Site-specific indicator parameters are shown in **boldface**. Positive detections that are above the corresponding Wolf River Water Quality Criteria (WRWQC) *(see Note 5 below)* are identified by the symbol "•" to the right of the value. None of the Site-specific indicator parameters was detected at a concentration above the corresponding WRWQC. For non-detected parameters, method detection limits (MDL) that are above the corresponding WRWQC are identified by the symbol "♦" to the right of the value. As shown in the above table, the method detection limits for many of the indicator parameters were above the corresponding WRWQC.
2. Several of the concentration values were qualified by the lab(s). Any results that is between the method quantitation limit (MQL) and the MDL was qualified as "J" to denote that the result should be considered as an estimated value.
3. Beginning with the June 2013 Annual Sampling Event, samples have also been analyzed by Method 200.8 in order to determine if lower detection limits *(i.e., where applicable, below the WRWQC)* could be achieved. See the text for a discussion of the above metal results with regard to this objective.
4. The WRWQC are based upon the U.S. Environmental Protection Agency (EPA) National Recommended Water Quality Criteria (NRWQC) which were revised in June 2015. The 2015 NRWQC are available online at the following address: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table.
5. The EPA NRWQC, where established, for indicator parameters that are known or suspected carcinogens *(i.e., the metal arsenic and all of the pesticides except endrin)* are based on the protection of human health *(1×10^{-6} excess cancer risk)* due to exposure via consumption of organisms *(e.g., fish)*.
6. The EPA has not established NRWQC for the indicator parameter chlordene.
7. Beginning in December 2008, samples have also been analyzed for the three other chlordane-related parameters *(cis-Nonachlor, trans-Nonachlor, and oxychlordane)* that are used to calculate the Total Chlordane concentration in fish tissue samples collected at the Site, but are not included in this table.
8. The EPA NRWQC document only reports an NRWQC for "chlordane." In the above table, this "chlordane" NRWQC has referenced as the WRWQC for Technical Chlordane as well as for both of the two chlordane isomers *(i.e., alpha-chlordane and gamma-chlordane)* used to calculate the Technical Chlordane concentration *(see Note 9 below)*.
9. Technical Chlordane values were calculated as first described in the *2010 Annual Report*.

Key:

•	=	See *Note 1* Above	NE	=	Not Established; No WRWQC -- i.e., EPA NRWQC *(See Note 6 Above)*
♦	=	See *Note 1* Above	J	=	Estimated Concentration -- See *Note 2* Above
µg/L	=	Micrograms per Liter			

FISHER ARNOLD

TABLE B-22
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – UPSTREAM SAMPLE LOCATION SW-3

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Mar-98	*Jun-98*	*Sep-98*	*Nov-98*	*Jun-99*	*Dec-99*	*Jun-00*	*Jan-01*	*Jun-01*	*Feb-02*	*Jul-02*	*Jan-03*	*Jul-03*	*May-04*	*Apr-05*	*Jun-06*	
Metals																	
Arsenic	<10 J ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<5 ♦	<10 ♦	<20 ♦	<5 ♦	<50 ♦	<50 ♦	<10 ♦	<50 ♦	<50 ♦	0.14
Chromium	<10 J	<10	<10	<10	<10	<10	<10	<5	<10	<10	<20 ♦	<5	13 ●	<10	<10	<5	11.0
Lead	<5 J ♦	<5 ♦	<5 ♦	<5 ♦	8 ●	6 ●	<25 ♦	<3 ♦	<5 ♦	<3 ♦	<5 ♦	<5 ♦	12 ●	<5 ♦	<5 ♦	<5 ♦	0.39
Zinc	<20	<20	<20	<20	<20	22	<100 UJ ♦	<20	<20	<20	25	<20	<20 UJ	<20 UJ	<20	<20	28.5
Pesticides																	
4,4'–DDT	<0.10 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.07 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	0.000030
Aldrin	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	0.00000077
alpha-Chlordane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.00032
gamma-Chlordane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.00032
Technical Chlordane *(see Note 10)*	<0.50 ♦	<1.0 ♦	<0.50 ♦	<0.50 ♦	<1.0 ♦	<0.50 ♦	<0.50 ♦	<0.50 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.25 ♦	<0.10 ♦	0.00032
Chlordene	<0.50	<0.50	<0.05	<0.05	<0.05	0.19 J ●	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NE
Dieldrin	<0.10 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	<0.02 ♦	0.0000012
Endrin	<0.10 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03
Heptachlor	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.17 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	0.0000059
Heptachlor Epoxide	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.05 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	<0.01 ♦	0.000032

Notes: **See Page 4 of 4**
Key: **See Page 4 of 4**

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TABLE B-22
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – UPSTREAM SAMPLE LOCATION SW-3

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Jul-07	Oct-08	Sep-09	Jun-10	Sep-11	Jun-12	Jun-13		Sep-14		Jun-15		Apr-16		Oct-17		
							Method 6010B	Method 200.8	Method 6010B	Method 200.8	Method 6010B	Method 200.8	Method 6010C	Method 200.8	Method 6010C	Method 200.8	
Metals																	
Arsenic	<5 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	<10 ♦	12 ●	7.39 ●	<7 ♦	1.25 ●	<7 ♦	1.68 ●	<7 ♦	1.88 ●	<7 ♦	2.56 ●	0.14
Chromium	<5	<5	<5	<5	<5	<5	7	4.57	1 J	1.79	<1	1.33	2 J	2.41	4 J	3.06	11.0
Lead	<5 ♦	<6 ♦	<6 ♦	<6 ♦	<6 ♦	<6 ♦	<8 UJ ♦	<6.93 UJ ♦	<5 ♦	0.86 ●	<5 ♦	0.837 ●	<5 ♦	1.5 ●	<5 ♦	2.86 ●	0.39
Zinc	<20	133 J ●	<10	12	12	12	48 ●	29 J	<9 UJ	<9.15 UJ	4 J	3.1 J	9 J	6.57	17 J	13.1	28.5
Pesticides																	
4,4'–DDT	0.04 J ●	<0.02 ♦	<0.00579 ♦	<0.00567 ♦	<0.00567 ♦	<0.00567 ♦	<0.0164 ♦		<0.0164 ♦		<0.0164 ♦		<0.0137 ♦		<0.0015 ♦		0.000030
Aldrin	0.01 UJ ♦	<0.01 ♦	<0.0101 ♦	<0.00985 ♦	<0.00985 ♦	<0.00985 ♦	<0.0060 ♦		<0.0060 ♦		<0.0060 ♦		<0.0098 ♦		<0.0005 ♦		0.00000077
alpha-Chlordane	NR	<0.05 ♦	<0.00472 ♦	<0.00633 ♦	<0.00633 ♦	<0.00633 ♦	<0.0081 ♦		<0.0081 ♦		<0.0081 ♦		<0.0195 ♦		<0.0020 ♦		0.00032
gamma-Chlordane	NR	<0.05 ♦	<0.00358 ♦	<0.00518 ♦	<0.00518 ♦	<0.00518 ♦	<0.0073 ♦		<0.0073 ♦		<0.0073 ♦		<0.0194 ♦		<0.0006 ♦		0.00032
Technical Chlordane *(see Note 10)*	<0.10 UJ ♦	<0.10 ♦	<0.00847 ♦	<0.01151 ♦	<0.01151 ♦	<0.01151 ♦	<0.0154 ♦		<0.0154 ♦		<0.0154 ♦		<0.0389 ♦		<0.0026 ♦		0.00032
Chlordene	<0.01 UJ	<0.01	<0.0510	<0.0500	<0.0500	<0.0500	<0.0100		<0.0100		<0.0100		<0.0200		<0.0200		NE
Dieldrin	<0.02 UJ ♦	<0.02 ♦	<0.0103 ♦	<0.0101 ♦	<0.0101 ♦	<0.0101 ♦	<0.0070 ♦		<0.0070 ♦		<0.0070 ♦		<0.0094 ♦		<0.0004 ♦		0.0000012
Endrin	<0.02 UJ	<0.02	<0.0122	<0.0120	<0.0120	<0.0120	<0.0197		<0.0197		<0.0197		<0.0102		<0.0015		0.03
Heptachlor	0.04 J ●	<0.01 ♦	<0.0127 ♦	<0.0124 ♦	<0.0124 ♦	<0.0124 ♦	<0.0076 ♦		<0.0076 ♦		<0.0076 ♦		<0.0086 ♦		<0.0009 ♦		0.0000059
Heptachlor Epoxide	<0.01 UJ ♦	<0.01 ♦	<0.0129 ♦	<0.0126 ♦	<0.0126 ♦	<0.0126 ♦	<0.0062 ♦		<0.0062 ♦		<0.0062 ♦		<0.0088 ♦		<0.0007 ♦		0.000032

Notes: **See Page 4 of 4**
Key: **See Page 4 of 4**

FISHER ARNOLD

TABLE B-22
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – UPSTREAM SAMPLE LOCATION SW-3

North Hollywood Dump / Memphis, Tennessee

Site-Specific Indicator Parameter	Sample Date and Parameter Concentration (µg/L)																Wolf River Water Quality Criteria (µg/L)
	Oct-18																
	Method 6010D	Method 200.8															
Metals																	
Arsenic	<5 ♦	1.2 ●															0.14
Chromium	<3	<0.51															11.0
Lead	<3 ♦	0.3 J															0.39
Zinc	<8	<1.38															28.5
Pesticides																	
4,4'–DDT	<0.0015 ♦																0.000030
Aldrin	<0.0004 ●																0.00000077
alpha-Chlordane	<0.0005 ♦																0.00032
gamma-Chlordane	<0.0007 ♦																0.00032
Technical Chlordane *(see Note 10)*	<0.0012 ♦																0.00032
Chlordene	<0.0200																NE
Dieldrin	<0.0008 ♦																0.0000012
Endrin	<0.0010																0.03
Heptachlor	<0.0019 ♦																0.0000059
Heptachlor Epoxide	<0.0005 ♦																0.000032

Notes: **See Page 4 of 4**
Key: **See Page 4 of 4**

FISHER ARNOLD

TABLE B-22
SUMMARY OF WOLF RIVER SURFACE WATER ANALYTICAL RESULTS – HISTORICAL – UPSTREAM SAMPLE LOCATION SW-3

North Hollywood Dump / Memphis, Tennessee

Notes:

1. Positive detections of Site-specific indicator parameters are shown in **boldface**. Positive detections that are above the corresponding Wolf River Water Quality Criteria (WRWQC) *(see Note 5 below)* are identified by the symbol "•" to the right of the value. None of the Site-specific indicator parameters was detected at a concentration above the corresponding WRWQC. For non-detected parameters, method detection limits (MDL) that are above the corresponding WRWQC are identified by the symbol "♦" to the right of the value. As shown in the above table, the method detection limits for many of the indicator parameters were above the corresponding WRWQC.
2. During this 2018 Surface Water Sampling Event, the downstream sample (SW-1) was incorrectly labeled and recorded as SW-3. The upstream sample (SW-3) was incorrectly labeled and recorded as SW-1. The values in this Table are the rectified sample results for the correct location.
3. Several of the concentration values were qualified by the lab(s). Any results that is between the method quantitation limit (MQL) and the Method Detection Limit (MDL) was qualified as "J" to denote that the result should be considered as an estimated ...t...
4. Beginning with the June 2013 Annual Sampling Event, samples have also been analyzed by Method 200.8 in order to determine if lower detection limits *(i.e., where applicable, below the WRWQC)* could be achieved. See the text for a discussion of the above metal results with regard to this objective.
5. The WRWQC are based upon the U.S. Environmental Protection Agency (EPA) National Recommended Water Quality Criteria (NRWQC) which were revised in June 2015. The 2015 NRWQC are available online at the following address: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table.
6. The EPA NRWQC, where established, for indicator parameters that are known or suspected carcinogens *(i.e., the metal arsenic and all of the pesticides except endrin)* are based on the protection of human health *(1×10^{-6} excess cancer risk)* due to exposure via consumption of organisms *(e.g., fish)*.
7. The EPA has not established NRWQC for the indicator parameter chlordene.
8. Beginning in December 2008, samples have also been analyzed for the three other chlordane-related parameters *(cis-Nonachlor, trans-Nonachlor, and oxychlordane)* that are used to calculate the Total Chlordane concentration in fish tissue samples collected at the Site, but are not included in this table.
9. The EPA NRWQC document only reports an NRWQC for "chlordane." In the above table, this "chlordane" NRWQC has referenced as the WRWQC for Technical Chlordane as well as for both of the two chlordane isomers *(i.e., alpha-chlordane and gamma-chlordane)* used to calculate the Technical Chlordane concentration *(see Note 10 below)*.
10. Technical Chlordane values were calculated as first described in the 2010 Annual Report.

Key:

•	=	See *Note 1* Above	NE	=	Not Established; No WRWQC -- i.e., EPA NRWQC *(See Note 6 Above)*
♦	=	See *Note 1* Above	J	=	Estimated Concentration -- See *Note 3* Above
µg/L	=	Micrograms per Liter			

FISHER ARNOLD

TABLE G-1
SUMMARY OF ANALYTICAL RESULTS FOR FISH TISSUE SAMPLES – CHLORDANE *(TOTAL)*
ABANDONED DREDGE POND AND WOLF RIVER
North Hollywood Dump / Memphis, Tennessee

Trophic Level	Year and Species Sampled								Year and Concentration (µg/g)							
	1992	1999	2001	2006	2009	2012	2015	2018	1992	1999	2001	2006	2009	2012	2015	2018
Abandoned Dredge Pond (ADP)																
Top Predators	Gar Gar Gar Gar Gar Gar Gar Gar Bowfin Bowfin (Dup)	Gar Gar Gar	Gar Gar Gar Gar (Dup)	Bass Bass Bass (Dup) Bass Bass	Bass Bass Bass Bass Bass (Dup) Gar Gar Gar	Bass Bass Bass Bass Bass (Dup)	Bass Bass Bass Bass (Dup) Bass Bass (Dup) Bass Bass Bass Bass Gar Gar Gar Gar Gar Gar Gar (Dup) Gar Gar	Bass Bass (Dup) Bass Bass Bass Bass Bass (Dup) Bass Bass Bass Bass Bass Gar Gar Gar Gar Gar Gar Gar Gar Gar	4.82 ** 5.24 ** 2.70 ** 1.34 ** 1.65 ** 2.38 ** 6.39 ** 1.73 ** 0.58 ** 0.59 **	2.32 ** 3.74 ** 1.14 ** 1.01 **	12.5 ** 10.8 ** 20.2 ** 22.8 ** 19.2 **	0.86 ** 1.96 ** 1.28 ** 1.13 ** 1.38 **	0.374 ** 0.034 ** 0.176 ** 0.718 ** 2.073 ** 0.758 ** 0.052 ** 1.082 ** 0.211 **	0.218 ** 0.153 ** 0.305 ** 0.295 ** 0.121 **	0.308 ** 0.056 ** 0.062 ** 0.743 ** 0.148 ** 0.101 ** 0.243 ** 0.043 ** 0.310 ** 0.101 ** 0.137 ** 0.277 ** 0.044 ** 0.531 ** 0.274 ** 0.305 ** 0.195 ** 0.213 ** 0.228 ** 0.349 ** 0.391 **	0.096 ** 0.295 ** 0.139 ** 0.292 ** 0.159 ** 0.106 ** 0.093 ** 0.295 ** 0.202 ** 0.093 ** 0.105 ** 0.171 ** 0.821 ** 0.009 ** 0.197 ** 0.020 ** 0.003 ** 0.066 ** 0.169 **
	Average Concentration for Top Predators								3.313 **	2.203 **	16.13 **	1.248 **	0.510 **	0.198 **	0.232 **	0.106 **
Foragers	Bluegill Bluegill Bluegill Bluegill Warmouth Sunfish Sunfish Sunfish Sunfish Sunfish Sunfish	Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Mooneye	0.70 ** 0.30 ** 0.78 ** 0.77 ** 0.19 ** 1.33 ** 0.19 ** 6.64 ** 0.95 ** 4.80 ** 0.79 **	0.354 ** 0.289 ** 0.227 ** 0.191 **	0.158 ** 0.263 ** 0.236 ** 0.175 **	0.137 ** 0.201 ** 0.53 ** 0.20 **	0.020 ** 0.061 ** 0.019 ** 0.033 ** 0.014 ** 0.335 ** 0.149 ** 0.080 **	0.059 ** 0.132 ** 0.038 ** 0.034 ** 0.379 ** 0.758 ** 0.478 ** 0.485 **	0.190 ** 0.031 ** 0.019 * 0.048 ** 0.170 ** 0.038 ** 0.028 * 0.160 ** 0.084 ** 0.101 ** 0.129 ** 0.140 ** 0.118 ** 0.143 ** 0.073 ** 0.219 ** 0.148 ** 0.196 **	0.057 ** 0.070 ** 0.128 ** 0.048 ** 0.134 ** 0.073 ** 0.092 ** 0.090 ** 0.096 ** 0.067 ** 0.513 ** 0.833 ** 0.306 ** 0.083 ** 3.140 ** 0.568 ** 1.108 ** 0.773 ** 0.415 **
	Average Concentration for Foragers								1.668 **	0.283 **	0.208 **	0.267 **	0.088 **	0.293 **	0.143 **	1.200 **
Bottom Feeders	Catfish Catfish Catfish Catfish Catfish Carp Carp Carp Buffalo	Catfish Catfish Catfish	Carp Carp Carp Carp	Carp Carp Carp Carp	Buffalo Buffalo Buffalo Buffalo Buffalo (Dup)	Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo	Buffalo Buffalo Buffalo Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Carp	Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo Carp Catfish	5.40 ** 2.19 ** 1.02 ** 1.39 ** 2.16 ** 6.66 ** 3.61 ** 31.3 ** 4.67 ** 0.97 **	1.36 ** 3.65 ** 2.36 ** 1.60 **	14.90 ** 8.13 ** 1.78 ** 5.36 **	2.80 ** 1.99 ** 0.279 ** 1.28 **	1.337 ** 0.561 ** 0.395 ** 0.490 ** 0.830 **	0.392 ** 0.492 ** 0.213 ** 0.149 ** 1.272 **	0.150 ** 1.421 ** 0.628 ** 0.094 ** 0.426 ** 1.610 ** 0.813 ** 1.690 ** 1.330 ** 1.730 ** 0.864 ** 0.294 ** 1.210 **	0.538 ** 0.162 ** 0.307 ** 0.306 ** 0.091 ** 0.064 ** 0.790 ** 0.398 ** 0.479 ** 0.217 ** 0.343 **
	Average Concentration for Bottom Feeders								5.906 **	2.215 **	7.510 **	1.587 **	0.712 **	0.541 **	0.824 **	0.307 **
	Average Concentration for All ADP Trophic Levels Combined								3.591 **	1.580 **	7.950 **	1.034 **	0.382 **	0.331 **	0.314 **	0.538 **
Wolf River																
Top Predators	Gar Drum Sauger Flathead Catfish Flathead Catfish	Gar Gar	Gar Gar Gar Gar	Bass Bass	Bass Gar Gar	Bass Gar Bass (Dup) Gar	Bass Gar Gar Gar Gar Gar Gar Gar Gar Gar	Gar Gar Gar Gar Gar Gar	0.34 ** 0.01 * 0.06 ** 5.47 ** 0.37 **	<0.139 ** 1.01 **	0.064 ** 0.798 ** 0.391 ** 0.780 **	0.093 ** 0.043 **	0.01905 * 0.01953 * 0.891 **	0.005 0.005 0.009 *	0.0084 * 0.0059 ** <0.0109 * <0.0111 * <0.0112 * 0.0221 * 0.141 ** 0.0477 ** 0.030 * <0.0111 *	0.005 * 0.0226 J 0.007 * 0.019 0.012 * 0.013 *
	Average Concentration for Top Predators								1.250 **	0.540 **	0.491 **	0.078 **	0.310 **	0.007	0.031 **	0.008 *
Foragers	Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill	Gizzard Shad	Bluegill Bluegill Bluegill Bluegill	No foragers collected	Gizzard Shad	0.010 * 0.018 * 0.009 * 0.006 0.005	<0.129 ** <0.126 **	<0.0428 ** <0.0443 ** <0.0425 ** <0.0419 **	0.091 ** 0.058 **	0.16425 **	0.0050 0.0051 0.0052 0.0051	No foragers collected	0.0079
	Average Concentration for Foragers								0.009 **	0.064 **	0.021 *	0.069 **	0.164 **	0.0051	—	0.0079
Bottom Feeders	Catfish Catfish Carp Carp Carpsucker Carpsucker (Dup)	Catfish Catfish	Catfish Catfish Catfish Catfish (Dup) Catfish Buffalo Buffalo	Catfish Catfish Catfish (Dup)	Buffalo Buffalo Buffalo (Dup)	Catfish Catfish	Catfish Catfish (Dup) Catfish Catfish Catfish Catfish Catfish Catfish Buffalo Buffalo (Dup)	Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo Buffalo Buffalo (Dup) Buffalo Catfish Catfish (Dup) Catfish Catfish	0.006 0.010 * 0.003 0.030 * 0.060 ** 0.040 **	<0.134 ** <0.136 **	0.101 ** <0.0429 ** 0.202 ** 0.178 ** <0.0435 ** <0.0413 ** 0.071 **	0.10 ** 0.067 ** 0.095 **	0.02150 * 0.02465 * 0.05466 **	0.01191 ** 0.00635	0.0348 ** 0.0149 ** <0.0109 * 0.0166 * 0.0099 * [redacted] * 0.0250 * 0.493 ** 0.101 ** 0.127 **	0.125 ** 0.042 ** 0.011 ** 0.040 * 0.043 ** 0.044 ** 0.060 ** 0.032 * 0.034 ** 0.025 ** 0.029 *
	Average Concentration for Bottom Feeders								0.020 *	0.099 **	0.071 **	0.093 **	0.038 *	0.009 *	0.091 **	0.029 **
	Average Concentration for All Wolf River Trophic Levels Combined								0.426 **	0.224 **	0.177 **	0.054 **	0.036 **	0.005	0.053 **	0.051 **
	APL from Table 24 of the ROD (see Note 1)								0.0083							
	APL from EPA Transmittal Dated June 5, 2012 (see Note 4)								0.03							
	APL calculated by URS in August 2015 (see Note 5)								0.04							

Notes and Key: See Page 2 of 2

FISHER ARNOLD

TABLE G-1
SUMMARY OF ANALYTICAL RESULTS FOR FISH TISSUE SAMPLES -- CHLORDANE *(TOTAL)*
ABANDONED DREDGE POND AND WOLF RIVER
North Hollywood Dump / Memphis, Tennessee

Notes:

1. Positive detections are shown in **boldface**. Concentrations marked with the symbol "♦♦" and method detection limits (MDL) marked with the symbol "♦♦" exceed both the Allowable Contaminant Level in Fish Tissue for chlordane *(0.0083 microgram per gram [µg/g])* from *Table 24* of the 1990 *Record of Decision* (ROD) and the 2015 EPA-recalculated, but not formally adopted, value of 0.03 µg/g *(see Note 6 below)*. Concentrations marked with the symbol "♦" and MDLs marked with the symbol "♦" exceed only the lower of these two values *(i.e., 0.0083 µg/g from Table 24 of the 1990 ROD)*. Hereinafter, the term "Allowable Pesticide Level" (APL) is used instead of "Allowable Contaminant Level" (ACL) because (a) all of the currently relevant contaminants are pesticides and (b) the acronym "ACL" is strictly used to refer to the "Alternate Concentration Limits" for groundwater at the Site.
2. Chlordane *(total)* and the average concentrations for the chlordane isomers were calculated as described in ***Section 3.3*** of this *2018 Annual Report*.
3. For simplicity, the concentration values provided above do not include any qualifiers applied by during the data validation process.
4. In a transmittal dated June 5, 2012, the EPA recalculated a range of Remedial Goal Options (RGOs) -- which, effectively, are the same as the APLs. As shown at the bottom of the table above, the EPA-recalculated RGO for chlordane at the 1×10^{-6} excess cancer risk level used in the 1990 ROD was higher than the previous values. The EPA did not recommend adopting the recalculated RGO for this parameter.
5. In the *Fourth Five-Year Review* of the Site, the EPA also determined that in order for the Site's remedy to be protective in the long-term, calculations of safe levels in edible fish tissue for the COCs identified in the 1990 ROD would need to be updated. In response, NHDSC hired URS Corporation to update the APLs for the Site in August 2015. See the *2015 Annual Report* for more on this discussion.

Key:
APL = Allowable Pesticide Level *(see Note 1)*
Dup = Duplicate Sample
µg/g = Micrograms per Gram

FISHER ARNOLD

TABLE G-2
SUMMARY OF ANALYTICAL RESULTS FOR FISH TISSUE SAMPLES – CHLORDENE
ABANDONED DREDGE POND AND WOLF RIVER
North Hollywood Dump / Memphis, Tennessee

Trophic Level	Year and Species Sampled								Year and Concentration (µg/g)							
	1992	1999	2001	2006	2009	2012	2015	2018	1992	1999	2001	2006	2008	2012	2015	2018
Abandoned Dredge Pond																
Top Predators	Gar Gar Gar Gar Gar Gar Gar Gar Bowfin Bowfin (Dup)	Gar Gar Gar	Gar Gar Gar Gar Gar (Dup)	Bass Bass Bass (Dup) Bass Bass	Bass Bass Bass Bass (Dup) Gar Gar Gar Gar	Bass Bass Bass Bass (Dup) Bass	Bass Bass Bass Bass Bass (Dup) Bass Bass (Dup) Bass Bass Bass Bass Gar Gar Gar Gar Gar Gar Gar (Dup) Gar Gar	Bass Bass (Dup) Bass Bass Bass Bass Bass Bass (Dup) Bass Bass Bass Bass Gar Gar Gar Gar Gar Gar Gar Gar	0.13 ** 0.10 ** 0.26 ** 0.26 ** 0.06 ** 0.13 ** 0.24 ** 0.08 ** 0.01 ** 0.02 **	0.089 ** 0.076 ** 0.025 * 0.045 **	0.301 ** 0.189 ** 0.803 ** 0.297 ** 0.311 **	0.064 ** 0.142 ** 0.102 ** <0.20 ** 0.085 **	0.0432 ** <0.00670 * 0.0238 * 0.0348 ** 0.0697 ** 0.0600 ** <0.00670 * <0.0692 ** <0.0692 **	0.0200 * 0.00928 * 0.0113 * 0.0171 * <0.00556	0.0412 ** 0.0031 0.0062 0.1850 ** 0.0310 ** 0.0205 * 0.0826 ** 0.0077 0.0513 ** 0.0105 * 0.0173 * 0.0127 * 0.0124 * 0.0410 ** 0.0146 * 0.0214 * 0.0285 * 0.0198 * 0.0178 * 0.0483 ** 0.0179 *	0.0123 ** 0.0133 ** 0.0114 ** 0.0140 ** 0.0437 ** 0.0166 ** 0.0152 ** 0.0059 0.0287 ** 0.0111 ** 0.0087 ** 0.0266 ** 0.0037 0.0193 ** 0.0018 J 0.0073 0.0053 0.002 J 0.0040
	Average Concentration for Top Predators								0.151 **	0.088 **	0.347 **	0.111 **	0.047 *	0.012 *	0.027 *	0.014 **
Foragers	Bluegill Bluegill Bluegill Bluegill Wormouth Sunfish Sunfish Sunfish Sunfish Sunfish Crappie	Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Mooneye	0.01 * 0.006 0.02 * 0.05 ** 0.01 * 0.04 * 0.00 0.02 * 0.01 0.01 * 0.02 *	0.007 0.009 * 0.006 0.014 *	0.00712 0.0055 0.00821 <0.00262	0.003 0.005 0.003 * <0.002	<0.00979 * <0.00961 * <0.00979 * <0.00917 * <0.00961 * 0.002 ** <0.00961 * <0.00925 *	<0.00581 <0.00800 <0.00581 <0.00586 0.006 * 0.004 * <0.00586 * 0.018 *	0.00598 <0.00300 <0.00296 <0.00295 0.01030 * <0.00279 <0.00300 0.00637 <0.00309 0.00646 0.01230 0.00750 0.00781 0.00779 0.00574 0.00762 0.00827 0.00819	0.0046 0.0044 0.0039 0.0053 0.0015 0.0074 0.0024 0.0020 0.0023 0.0052 0.0034 0.0292 ** 0.0078 ** 0.0301 ** 0.0170 ** 0.2930 ** 0.0501 ** 0.1100 ** 0.0113 **
	Average Concentration for Foragers								0.010 *	0.008 *	0.004	0.010 *	0.010 *	0.010 *	0.006	0.0330 **
Bottom Feeders	Catfish Catfish Catfish Catfish Catfish Catfish Carp Carp Carp Buffalo	Catfish Catfish Catfish	Carp Carp Carp	Carp Carp Carp	Buffalo Buffalo Buffalo Buffalo Buffalo (Dup)	Buffalo Buffalo Buffalo	Buffalo Buffalo Buffalo Buffalo Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo (Dup) Buffalo Carp	Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo Carp Catfish	0.22 ** 0.11 ** 0.04 ** 0.01 * 0.20 ** 0.06 ** 0.03 * 0.25 ** 0.01 * 0.10 **	0.077 ** 0.206 ** 0.291 ** 0.264 **	0.0662 ** 0.0504 ** 0.0478 ** 0.0693 **	0.26 ** 0.05 ** 0.008 <0.002	0.148 ** 0.0588 ** 0.0679 ** 0.0928 ** 0.105 **	0.713 ** 0.189 ** 0.0037 ** 0.00917 * 0.112 **	0.00914 * 0.001 ** 0.386 ** 0.0588 ** 0.329 ** 0.437 ** 0.207 ** 0.342 ** 0.249 ** 0.065 ** 0.283 ** 0.102 ** 0.0196 *	0.0767 ** 0.0034 ** 0.0440 ** 0.0796 ** 0.0602 ** 0.0068 0.0039 0.0243 ** 0.0103 ** 0.006 0.048 **
	Average Concentration for Bottom Feeders								0.103 **	0.207 **	0.054 **	0.080 **	0.100 **	0.239 **	0.244 **	0.030 **
	Average Concentration for All ADP Trophic Levels Combined								0.103 **	0.091 **	0.135 **	0.067 **	0.043 **	0.060 **	0.066 **	0.027 **
Wolf River																
Top Predators	Gar Drum Sauger Flathead Catfish Flathead Catfish	Gar Gar	Gar Gar Gar Gar	Bass Bass	Bass Gar Gar	Bass Bass (Dup) Gar	Bass Gar Gar Gar Gar Gar Gar Gar Gar Gar Gar	Gar Gar Gar Gar Gar Gar Gar Gar Gar Gar Gar	<0.01 * <0.01 * <0.01 * <0.01 * <0.01 *	<0.0027 <0.0026	<0.00255 <0.00266 0.005 <0.00251	<0.002 <0.002	<0.00917 * <0.00670 * 0.00250 **	<0.00583 <0.00583 <0.00600	<0.00287 <0.00583 <0.00287 <0.00294 <0.00287 <0.00251 <0.00296 <0.00274 <0.00286 <0.00294	0.00624 <0.00023 <0.00023 0.00628 <0.00023 <0.00023
	Average Concentration for Top Predators								0.003	0.0007	0.0011	0.0005	0.0006 *	0.0015	0.0010	0.0001
Foragers	Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill	Gizzard Shad	Bluegill Bluegill Bluegill Bluegill	No foragers collected	Gizzard Shad	<0.01 * <0.01 * <0.01 * <0.01 * <0.01 *	<0.0028 <0.0025	<0.00256 <0.00274 <0.00260 <0.00260	0.002 <0.002	<0.00961 *	<0.00577 <0.00586 <0.00594 <0.00583	No foragers collected	<0.00025
	Average Concentration for Foragers								0.003	0.0006	0.0007	0.0013	0.0498 **	0.0015	—	0.0001
Bottom Feeders	Catfish Catfish Carp Carp Carpsucker Carpsucker (Dup)	Catfish Catfish	Catfish Catfish Catfish Catfish (Dup) Catfish Buffalo Buffalo	Catfish Catfish Catfish (Dup)	Buffalo Buffalo Buffalo (Dup)	Catfish Catfish	Catfish Catfish (Dup) Catfish Catfish Catfish Catfish Catfish Buffalo Buffalo (Dup)	Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo Buffalo (Dup) Buffalo Catfish Catfish (Dup) Catfish Catfish	<0.01 * <0.01 * <0.01 * <0.01 * <0.01 * <0.01 *	<0.0028 <0.0027	<0.00255 <0.00266 <0.00274 <0.00273 <0.00269 <0.00258 <0.00260	<0.002 0.002 0.002	<0.00943 * <0.00961 * <0.00969 *	<0.00581 <0.00586	<0.00295 <0.00295 <0.00287 <0.00296 <0.00291 <0.00300 0.00888 <0.00292 <0.00286 <0.00296	0.0058 0.0060 <0.00023 <0.00023 0.0009 0.0011 0.00942 <0.00023 <0.00023 <0.00023 <0.00023
	Average Concentration for Bottom Feeders								0.003	0.0007	0.0013	0.0013	0.0046	0.0014	0.0014	0.0014
	Average Concentration for All Wolf River Trophic Levels Combined								0.003	0.0007	0.0011	0.0010	0.0252 *	0.0015	0.0013	0.0008
	APL from Table 2d of the ROD (see Note 1)								0.0083							
	APL from EPA Transmittal Dated June 5, 2012 (see Note 4)								0.03							
	APL calculated by URS in August 2015 (see Note 5)								0.04							

FISHER ARNOLD

TABLE G-2
SUMMARY OF ANALYTICAL RESULTS FOR FISH TISSUE SAMPLES -- CHLORDENE
ABANDONED DREDGE POND AND WOLF RIVER

North Hollywood Dump / Memphis, Tennessee

Notes:

1. Positive detections are shown in **boldface**. Concentrations marked with the symbol "♦♦" and method detection limits (MDL) marked with the symbol "♦♦" exceed both the Allowable Contaminant Level in Fish Tissue for chlordene *(0.0083 microgram per gram [µg/g])* from *Table 24* of the 1990 *Record of Decision* (ROD) and the 2015 EPA-recalculated, but not formally adopted, value of 0.03 µg/g *(see Note 5 below)*. Concentrations marked with the symbol "♦" and MDLs marked with the symbol "♦" exceed only the lower of these two values *(i.e., 0.0083 µg/g from Table 24 of the 1990 ROD)*. Hereinafter, the term "Allowable Pesticide Level" (APL) is used instead of "Allowable Contaminant Level" (ACL) because (a) all of the currently relevant contaminants are pesticides and (b) the acronym "ACL" is strictly used to refer to the "Alternate Concentration Limits" for groundwater at the Site.
2. Average concentrations for the values above were calculated as described in ***Section 3.3*** of this *2018 Annual Report*.
3. For simplicity, the concentration values provided above do not include any qualifiers applied by during the data validation process.
4. In a transmittal dated June 5, 2012, the EPA recalculated a range of Remedial Goal Options (RGOs) -- which, effectively, are the same as the APLs. As shown at the bottom of the table above, the EPA-recalculated RGO for chlordene at the 1×10^{-6} excess cancer risk level used in the 1990 ROD was higher than the previous values. The EPA did not recommend adopting the recalculated RGO for this parameter.
5. In the *Fourth Five-Year Review* of the Site, the EPA also determined that in order for the Site's remedy to be protective in the long-term, calculations of safe levels in edible fish tissue for the COCs identified in the 1990 ROD would need to be updated. In response, NHDSC hired URS Corporation to update the APLs for the Site in August 2015. See the *2015 Annual Report* for more on this discussion.

Key: APL = Allowable Pesticide Level *(see Note 1)*
Dup = Duplicate Sample
µg/g = Micrograms per Gram

FISHER ARNOLD

TABLE G-3
SUMMARY OF ANALYTICAL RESULTS FOR FISH TISSUE SAMPLES -- ENDRIN
ABANDONED DREDGE POND AND WOLF RIVER
North Hollywood Dump / Memphis, Tennessee

Trophic Level	Year and Species Sampled								Year and Concentration (µg/g)							
	1992	1999	2001	2008	2009	2012	2015	2018	1992	1999	2001	2008	2009	2012	2015	2018
Abandoned Dredge Pond																
Top Predators	Gar Gar Gar Gar Gar Gar Gar Gar Bowfin Bowfin (Dup)	Gar Gar Gar	Gar Gar Gar Gar Gar (Dup)	Bass Bass Bass (Dup) Bass Bass	Bass Bass Bass Bass Bass (Dup) Gar Gar Gar Gar	Bass Bass Bass Bass (Dup) Bass	Bass Bass Bass Bass (Dup) Bass Bass (Dup) Bass Bass Bass Bass Gar Gar Gar Gar Gar Gar Gar (Dup) Gar Gar	Bass Bass (Dup) Bass Bass Bass Bass (Dup) Bass Bass Bass Bass Gar Gar Gar Gar Gar Gar Gar Gar Gar	0.05 0.15 * 0.09 0.04 0.06 0.13 * 0.10 0.03 0.04 0.04	0.026 0.05 0.021 0.024	0.193 0.139 * 0.345 * 0.329 * 0.269 *	0.06 * 0.15 * 0.071 <0.20 * 0.072	0.0316 <0.0096 R <0.00224 0.0497 0.0094 <0.00226 <0.00226 <0.0230 <0.0230	0.0316 0.0216 0.0300 0.0290 0.0156	0.0643 0.0101 0.0160 0.0903 0.0282 0.0165 0.0633 0.00821 0.0326 0.0126 0.0133 0.0156 <0.000796 0.0634 <0.000772 <0.000753 0.0169 <0.000776 <0.000793 <0.000805 <0.000759	0.0116 0.0137 0.0236 0.0105 0.0215 0.0133 0.0113 0.0012 0.0101 0.0111 0.0089 0.0102 0.0053 0.0540 0.005 0.0133 <0.0012 <0.0012 0.0057
	Average Concentration for Top Predators								0.079	0.030	0.217 *	0.093	0.019	0.026	0.019	0.012
Foragers	Bluegill Bluegill Bluegill Bluegill Warmouth Sunfish Sunfish Sunfish Sunfish Sunfish Sunfish	Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Mooneye	0.03 0.02 0.04 0.12 * 0.01 0.05 0.01 0.12 * 0.01 0.20 * 0.03	0.011 0.012 0.006 0.004	0.0082 0.0104 0.0106 0.00436	0.007 0.016 0.040 0.006	<0.00220 <0.0129 <0.00502 <0.00213 <0.00224 <0.00220 <0.0205 <0.00215	0.00395 <0.00232 0.00255 0.00228 0.0130 0.113 * 0.0227 0.0333	0.0194 0.00321 0.00295 0.00453 0.00996 0.00754 0.00237 0.00982 0.00424 0.0120 0.0176 0.0100 0.0101 0.0104 0.00956 0.00929 0.0100 0.0154 0.0154	0.0092 0.0049 0.0071 0.0124 0.0055 0.0144 0.0043 0.007 0.0053 0.0109 0.0059 0.0439 0.0071 0.0026 0.0154 0.197 * 0.0019 0.143 * 0.0262
	Average Concentration for Foragers								0.050	0.008	0.008	0.017	0.005	0.026	0.010	0.036
Bottom Feeders	Catfish Catfish Catfish Catfish Catfish Carp Carp Carp Buffalo	Catfish Catfish Catfish	Carp Carp Carp Carp	Carp Carp Carp Carp	Buffalo Buffalo Buffalo Buffalo Buffalo (Dup)	Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo	Buffalo Buffalo Buffalo Buffalo Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Carp	Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Buffalo Carp Catfish	0.06 0.04 0.01 0.03 0.06 0.11 * 0.05 0.09 * 0.05 0.37 *	0.023 0.059 0.001 0.046	0.332 * 0.157 * 0.0264 0.0043	<0.20 * 0.091 0.015 0.029	0.191 * 0.0772 0.0420 0.0062 0.0443	0.0016 0.0996 0.0376 0.0156 0.0741	0.00884 0.174 * 0.0490 0.00609 0.0244 0.290 * 0.0092 0.349 * 0.121 * 0.126 * 0.0631 0.0203 <0.000757	0.0603 0.0606 0.0224 0.0415 0.0241 0.006 0.0061 0.050 0.0155 0.0259 0.0112
	Average Concentration for Bottom Feeders								0.179 *	0.045	0.142 *	0.071	0.023	0.052	0.077	0.029
	Average Concentration for All ADP Trophic Levels Combined								0.104 *	0.028	0.124 *	0.062	0.020	0.033	0.029	0.025
Wolf River																
Top Predators	Gar Drum Sauger Flathead Catfish Flathead Catfish	Gar Gar	Gar Gar Gar Gar	Bass Bass	Bass Gar Gar	Bass Bass (Dup) Gar	Bass Gar Gar Gar Gar Gar Gar Gar Gar Gar	Gar Gar Gar Gar Gar Gar Gar Gar Gar Gar	0.02 0.01 0.01 0.004 0.01	0.03 0.06	<0.00257 0.0034 0.0767 0.0061	<0.0025 <0.0025	<0.00445 <0.00422 <0.00213	<0.00236 <0.00236 <0.00232	0.0135 0.0140 0.00177 0.00195 <0.000805 0.00959 0.0094 0.0133 0.00620 0.000942	<0.0012 <0.0012 0.0054 <0.0012 <0.0012 <0.0012
	Average Concentration for Top Predators								0.011	0.045	0.022	0.002	0.0010	0.0011	0.0096	0.0011
Foragers	Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill	Gizzard Shad	Bluegill Bluegill Bluegill	No foragers collected	Gizzard Shad	0.001 0.002 0.0006 0.0008 0.005	<0.0026 <0.0026	<0.00267 <0.00277 <0.00266 <0.00262	0.002 <0.002	<0.0234	<0.00234 <0.00226 <0.00230 <0.00226	No foragers collected	<0.0013
	Average Concentration for Foragers								0.0015	0.0020	0.0013	0.0010	0.0112	0.0011	—	0.0007
Bottom Feeders	Catfish Catfish Carp Carp Carpsucker Carpsucker (Dup)	Catfish Catfish	Catfish Catfish Catfish Catfish (Dup) Catfish Buffalo Buffalo	Catfish Catfish Catfish (Dup)	Buffalo Buffalo Buffalo (Dup)	Catfish Catfish	Catfish Catfish (Dup) Catfish Catfish Catfish Catfish Catfish Buffalo Buffalo (Dup) Buffalo (Dup)	Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo Buffalo (Dup) Buffalo Catfish Catfish (Dup) Catfish Catfish	0.002 0.0003 0.0004 0.005 0.0004 0.002	0.004 <0.0027	<0.00258 <0.00268 <0.00276 <0.00275 <0.00273 <0.00258 <0.00265	0.004 <0.002 <0.002	<0.00219 <0.00221 <0.00232	<0.00217 <0.00219	0.00868 0.00258 <0.000778 0.0206 0.00159 0.00549 0.0100 0.00268 0.0131 0.0164 0.0164	0.0021 0.0739 0.0079 <0.0012 <0.0012 <0.0012 0.0014 <0.0012 <0.0012 <0.0012 <0.0012
	Average Concentration for Bottom Feeders								0.0018	0.0030	0.0016	0.0026	0.0011	0.0011	0.0093	0.0100
	Average Concentration for All Wolf River Trophic Levels Combined								0.0047	0.0187	0.0072	0.0020	0.0021	0.0011	0.0090	0.0053
	APL from Table 34 of the ROD (see Note 1)								3.2							
	APL from EPA Transmittal Dated June 6, 2012 (see Note 4)								0.1							
	APL calculated by URS in August 2015 (see Note 5)								0.2							

Notes and Key: See Page 2 of 2

FISHER ARNOLD

TABLE G-3
SUMMARY OF ANALYTICAL RESULTS FOR FISH TISSUE SAMPLES -- ENDRIN
ABANDONED DREDGE POND AND WOLF RIVER

North Hollywood Dump / Memphis, Tennessee

Notes:

1. Positive detections are shown in boldface. Concentrations marked with the symbol "♦♦" and method detection limits (MDL) marked with the symbol "♦♦" exceed both the Allowable Contaminant Level in Fish Tissue for endrin *(3.2 micrograms per gram [µg/g])* from *Table 24* of the *1990 Record of Decision* (ROD) and the recently EPA-recalculated, but not formally adopted, value of 0.1 µg/g *(see Note 5 below)*. Concentrations marked with the symbol "♦" and MDLs marked with the symbol "♦" exceed only the lower of these two values *(i.e., the recently EPA-recalculated value of 0.1 µg/g)*. Hereinafter, the term "Allowable Pesticide Level" (APL) is used instead of "Allowable Contaminant Level" because (a) all of the currently relevant contaminants are pesticides and (b) the acronym "ACL" is strictly used to refer to the "Alternate Concentration Limits" for groundwater at the Site.
2. Average concentrations for the values above were calculated as described in ***Section 3.3*** of this *2018 Annual Report*.
3. For simplicity, the concentration values provided above do not include any qualifiers applied by during the data validation process.
4. In a transmittal dated June 5, 2012, the EPA recalculated a range of Remedial Goal Options (RGOs). As shown at the bottom of the table above, the EPA-recalculated RGO for endrin with a Chronic Toxicity Hazard Index of 0.1 used in the 1990 ROD was much lower than the previous value.
5. In the *Fourth Five-Year Review* of the Site, the EPA determined that in order for the Site's remedy to be protective in the long-term, calculations of safe levels in edible fish tissue for the COCs identified in the 1990 ROD would need to be updated. In response, NHDSC hired URS Corporation to update the APLs for the Site in August 2015.

Key: APL = Allowable Pesticide Level *(see Note 1)*
Dup = Duplicate Sample
µg/g = Micrograms per Gram

FISHER ARNOLD

TABLE G-4
SUMMARY OF ANALYTICAL RESULTS FOR FISH TISSUE SAMPLES – HEPTACHLOR EPOXIDE
ABANDONED DREDGE POND AND WOLF RIVER
North Hollywood Dump / Memphis, Tennessee

Trophic Level	Year and Species Sampled								Year and Concentration (µg/g)							
	1992	1999	2001	2006	2009	2012	2015	2018	1992	1999	2001	2006	2009	2012	2015	2018
Abandoned Dredge Pond																
Top Predators	Gar Gar Gar Gar Gar Gar Gar Gar Bowfin Bowfin (Dup)	Gar Gar Gar Gar	Gar Gar Gar Gar Gar (Dup)	Bass Bass Bass (Dup) Bass Bass	Bass Bass Bass Bass Bass (Dup) Gar Gar Gar Gar	Bass Bass Bass Bass Bass (Dup) Bass	Bass Bass Bass Bass Bass (Dup) Bass Bass Bass (Dup) Bass Bass Bass Bass Gar Gar Gar Gar Gar Gar Gar Gar (Dup) Gar Gar	Bass Bass (Dup) Bass Bass Bass Bass Bass Bass (Dup) Bass Bass Bass Bass Gar Gar Gar Gar Gar Gar Gar Gar Gar	0.05 ** 0.31 ** 0.05 ** 0.02 ** 0.02 ** 0.06 ** 0.10 ** 0.04 ** 0.03 ** 0.04 **	0.037 ** 0.042 ** 0.018 ** 0.025 **	0.202 ** 0.174 ** 0.354 ** 0.345 ** 0.202 **	<0.002 * <0.002 * <0.002 * <0.002 * <0.002 *	<0.00204 * <0.00202 * <0.00200 * <0.00195 * <0.00193 * <0.00204 * <0.00202 * <0.0200 * <0.0200 *	<0.00189 * <0.00193 * <0.00196 * <0.00196 * <0.00193 *	0.0189 ** 0.00119 * 0.000983 * 0.0192 ** 0.00663 ** 0.0022 * 0.0103 ** 0.00117 * 0.0110 ** 0.00674 ** 0.00607 ** 0.0209 ** 0.00119 * 0.0376 ** 0.00893 ** 0.0203 ** 0.00507 ** 0.00835 ** 0.0105 ** 0.0030 ** 0.0407 **	<0.0011 * <0.0011 * <0.0011 * <0.0011 * <0.0011 * 0.0044 ** <0.0011 * <0.0011 * <0.0011 * <0.0011 * <0.0011 * <0.0011 * <0.0011 * <0.0011 * <0.0011 * <0.0011 *
	Average Concentration for Top Predators								0.075 **	0.031 **	0.243 **	0.0015 *	0.0037 **	0.0010	0.0188 **	0.0004
Foragers	Bluegill Bluegill Bluegill Bluegill Weismouth Sunfish Sunfish Sunfish Sunfish Sunfish Sunfish	Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Bluegill Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Mooneye	0.02 ** 0.02 ** 0.06 ** 0.07 ** 0.01 ** 0.06 ** 0.03 ** 1.70 ** 0.23 ** 1.20 ** 0.02 **	0.012 ** 0.011 ** 0.006 ** 0.003 **	0.00465 ** 0.00492 ** 0.00567 ** 0.00464 **	0.004 ** 0.004 ** <0.002 * <0.002 *	<0.00204 * <0.00200 * <0.00343 * <0.00191 * <0.00200 ? * <0.00204 * 0.0142 * 0.00944 *	<0.00195 * <0.00205 * <0.00195 * <0.00196 * <0.00193 * <0.00206 * <0.00204 * <0.00196 *	0.00998 ** <0.000939 * 0.00109 * 0.000926 * 0.00574 ** 0.00239 * 0.00171 * 0.00952 ** 0.00175 * 0.00196 * 0.00544 ** 0.00584 ** 0.00539 ** 0.00434 ** 0.00262 ** 0.00271 ** 0.00458 ** 0.00699 **	<0.0011 * <0.0019 * <0.0014 * <0.0011 * <0.0011 * <0.0011 * <0.0018 * <0.0038 ** 0.0020 ** 0.002 ** <0.0011 * 0.0137 ** <0.0011 * <0.0011 * <0.0011 * 0.123 ** <0.0011 * <0.0011 * 0.0197 **
	Average Concentration for Foragers								0.310 **	0.006 **	0.005 **	0.003 **	0.0042 **	0.0010	0.0039 **	0.0005 **
Bottom Feeders	Catfish Catfish Catfish Catfish Catfish Catfish Carp Carp Carp Buffalo	Catfish Catfish Catfish	Carp Carp Carp Carp	Carp Carp Carp Carp	Buffalo Buffalo Buffalo Buffalo Buffalo (Dup)	Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo	Buffalo Buffalo Buffalo Buffalo Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo (Dup) Buffalo Carp Catfish	Buffalo Buffalo (Dup) Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo Carp Catfish	0.10 ** 0.05 ** 0.01 ** 0.02 ** 0.02 ** 0.11 ** 0.06 ** 0.06 ** 0.04 ** 0.24 **	0.023 ** 0.058 ** 0.053 ** 0.038 **	0.296 ** 0.169 ** 0.0329 ** 0.0744 **	0.003 ** 0.021 ** 0.006 ** <0.002 *	0.0257 ** <0.00191 * <0.00195 * <0.00204 * <0.00200 *	0.00769 ** 0.00577 ** 0.00290 ** <0.00191 * 0.0116 **	0.00425 ** 0.0113 ** 0.0166 ** 0.00530 ** 0.0123 ** 0.0307 ** 0.0100 ** 0.0410 ** 0.0207 ** 0.0408 ** 0.0309 ** 0.00960 ** 0.0333 **	0.0290 ** 0.0216 ** <0.0011 * 0.0069 ** 0.0062 ** <0.0011 * <0.0011 * 0.0187 ** 0.0036 ** 0.0096 ** <0.0011 *
	Average Concentration for Bottom Feeders								0.159 **	0.042 **	0.143 **	0.008 **	0.0075 **	0.0061 **	0.0245 **	0.0062 **
	Average Concentration for All ADP Trophic Levels Combined								0.190 **	0.027 **	0.130 **	0.004 **	0.0047 **	0.0023 *	0.0139 **	0.0053 **
Wolf River																
Top Predators	Gar Drum Sauger Flathead Catfish Flathead Catfish	Gar Gar	Gar Gar Gar Gar	Bass Bass	Bass Gar Gar	Bass Bass (Dup) Gar	Bass Gar Gar Gar Gar Gar Gar Gar Gar Gar	Gar Gar Gar Gar Gar Gar Gar Gar Gar Gar	0.005 ** 0.01 ** 0.001 ** 0.19 ** 0.02 **	0.006 ** 0.015 **	<0.00257 * 0.0092 ** 0.0133 ** 0.0133 **	0.004 ** 0.003 **	<0.00191 * <0.00202 * 0.0283 **	<0.00202 * <0.00202 * <0.00206 *	<0.000900 0.00111 * <0.000899 <0.000920 <0.000931 0.00142 * 0.00878 ** 0.00273 ** 0.000921 <0.000922	<0.0011 * <0.0011 * <0.0011 * <0.0011 * <0.0011 * <0.0011 *
	Average Concentration for Top Predators								0.045 **	0.010 **	0.0092 **	0.0035 **	0.0091 **	0.0010	0.0017 *	0.0006
Foragers	Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad Gizzard Shad	Bluegill Bluegill	Bluegill Bluegill Bluegill Bluegill	Bluegill Bluegill	Gizzard Shad	Bluegill Bluegill Bluegill Bluegill	No foragers collected	Gizzard Shad	0.0056 ** 0.007 ** 0.0006 ** 0.0004 ** 0.0006 **	<0.0026 ** <0.0026 **	<0.00267 ** <0.00277 ** <0.00266 ** <0.00262 **	0.004 * 0.003 *	<0.0200 *	<0.00200 * <0.00204 * <0.00206 * <0.00202 *	No foragers collected	<0.0012 *
	Average Concentration for Foragers								0.0018 **	0.0013 *	0.0013 *	0.0035 **	0.0100	0.0010	—	0.0006
Bottom Feeders	Catfish Catfish Carp Carp Carpsucker Carpsucker (Dup)	Catfish Catfish	Catfish Catfish Catfish Catfish (Dup) Catfish Buffalo Buffalo	Catfish Catfish Catfish (Dup)	Buffalo Buffalo Buffalo (Dup)	Catfish Catfish	Catfish Catfish (Dup) Catfish Catfish Catfish Catfish Catfish Buffalo Buffalo (Dup)	Buffalo Buffalo (Dup) Buffalo Buffalo Buffalo Buffalo (Dup) Buffalo Catfish Catfish (Dup) Catfish Catfish	0.001 ** 0.0003 0.002 * 0.002 * 0.003 ** 0.002 *	<0.0027 ** <0.0027 **	<0.00253 ** <0.00268 ** <0.00278 ** <0.00275 ** <0.00272 ** <0.00258 ** <0.00283 **	<0.002 * 0.003 ** 0.002 *	<0.00196 * 0.00991 ** <0.00206 *	<0.00195 * <0.00196 *	0.00192 * <0.000923 <0.000900 <0.000927 <0.000912 0.00119 * 0.00162 * 0.0207 ** 0.00233 ** 0.00301 **	0.0007 ** 0.0096 ** 0.0013 * <0.0011 * <0.0011 * <0.0011 * 0.0018 * <0.0011 * 0.0017 * 0.0012 * <0.0011 *
	Average Concentration for Bottom Feeders								0.0016 *	0.0027	0.0013 *	0.0019 *	0.0022 *	0.0010	0.0036 **	0.0020 *
	Average Concentration for All Wolf River Trophic Levels Combined								0.0182 *	0.0040 **	0.0036 **	0.0029 **	0.0049 **	0.0010	0.0026 **	0.0013 *
	APL from Table 24 of the ROD (see Note 1)								0.0034							
	APL from EPA Transmittal Dated June 5, 2013 (see Note 4)								0.001							
	APL calculated by URS in August 2015 (see Note 5)								0.001							

Notes and Key: See Page 2 of 2

TABLE G-4
SUMMARY OF ANALYTICAL RESULTS FOR FISH TISSUE SAMPLES -- ENDRIN
ABANDONED DREDGE POND AND WOLF RIVER

North Hollywood Dump / Memphis, Tennessee

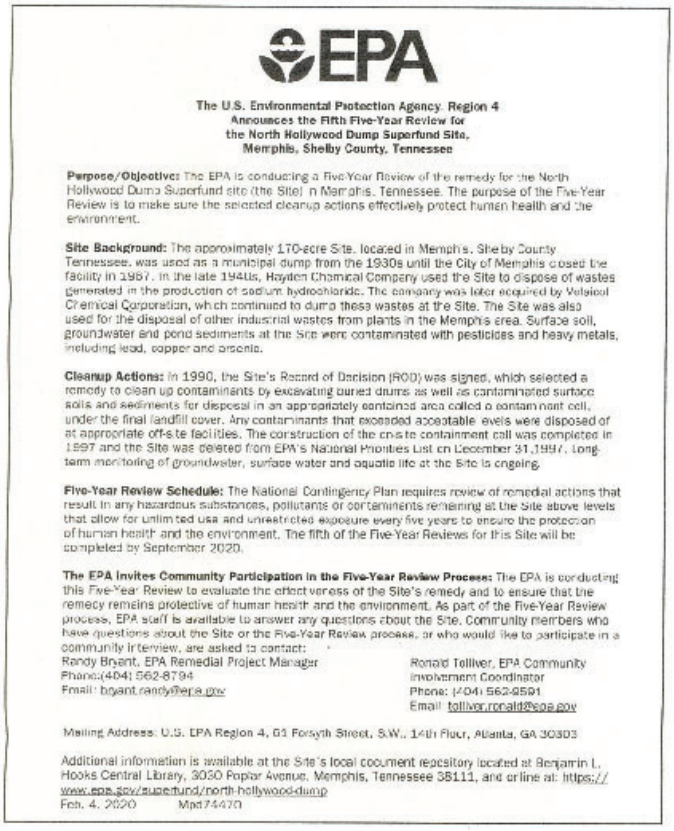
Notes:

1. Positive detections are shown in **boldface**. Concentrations marked with the symbol "♦♦" and method detection limits (MDL) marked with the symbol "♦♦" exceed both the Allowable Contaminant Level in Fish Tissue for heptachlor epoxide *(0.0024 microgram per gram [µg/g])* from *Table 24* of the 1990 *Record of Decision* (ROD) and the recently EPA-recalculated, but not formally adopted, value of 0.001 µg/g *(see Note 8 below)*. Concentrations marked with the symbol "♦" and MDLs marked with the symbol "♦" exceed only the lower of these two values *(i.e., the recently EPA-recalculated value of 0.001 µg/g)*. Hereinafter, the term "Allowable Pesticide Level" (APL) is used instead of "Allowable Contaminant Level" because (a) all of the currently relevant contaminants are pesticides and (b) the acronym "ACL" is strictly used to refer to the "Alternate Concentration Limits" for groundwater at the Site.
2. Average concentrations for the values above were calculated as described in ***Section 3.3*** of this *2018 Annual Report*.
3. For simplicity, the concentration values provided above do not include any qualifiers applied by during the data validation process.
4. In a transmittal dated June 5, 2012, the EPA recalculated a range of Remedial Goal Options (RGOs) -- which, effectively, are the same as the APLs. As shown at the bottom of the table above, the EPA-recalculated RGO for heptachlor epoxide at the 1 x 10^{-6} excess cancer risk level used in the 1990 ROD is lower than the previous values. The EPA did not recommend adopting the recalculated RGO for this parameter.
5. In the *Fourth Five-Year Review* of the Site, the EPA determined that in order for the Site's remedy to be protective in the long-term, calculations of safe levels in edible fish tissue for the COCs identified in the 1990 ROD would need to be updated. In response, NHDSC hired URS Corporation to update the APLs for the Site in August 2015.

Key: APL = Allowable Pesticide Level *(see Note 1)*
Dup = Duplicate Sample
µg/g = Micrograms per Gram

FISHER ARNOLD

APPENDIX F – PRESS NOTICE



The U.S. Environmental Protection Agency, Region 4
Announces the Fifth Five-Year Review for
the North Hollywood Dump Superfund Site,
Memphis, Shelby County, Tennessee

Purpose/Objective: The EPA is conducting a Five-Year Review of the remedy for the North Hollywood Dump Superfund site (the Site) in Memphis, Tennessee. The purpose of the Five-Year Review is to make sure the selected cleanup actions effectively protect human health and the environment.

Site Background: The approximately 170-acre Site, located in Memphis, Shelby County Tennessee, was used as a municipal dump from the 1930s until the City of Memphis closed the facility in 1987. In the late 1940s, Hayden Chemical Company used the Site to dispose of wastes generated in the production of sodium hydrochloride. The company was later acquired by Velsicol Chemical Corporation, which continued to dump these wastes at the Site. The Site was also used for the disposal of other industrial wastes from plants in the Memphis area. Surface soil, groundwater and pond sediments at the Site were contaminated with pesticides and heavy metals, including lead, copper and arsenic.

Cleanup Actions: In 1990, the Site's Record of Decision (ROD) was signed, which selected a remedy to clean up contaminants by excavating buried drums as well as contaminated surface soils and sediments for disposal in an appropriately contained area called a contaminant cell, under the final landfill cover. Any contaminants that exceeded acceptable levels were disposed of at appropriate off-site facilities. The construction of the on-site containment cell was completed in 1997 and the Site was deleted from EPA's National Priorities List on December 31,1997. Long-term monitoring of groundwater, surface water and aquatic life at the Site is ongoing.

Five-Year Review Schedule: The National Contingency Plan requires review of remedial actions that result in any hazardous substances, pollutants or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure every five years to ensure the protection of human health and the environment. The fifth of the Five-Year Reviews for this Site will be completed by September 2020.

The EPA Invites Community Participation in the Five-Year Review Process: The EPA is conducting this Five-Year Review to evaluate the effectiveness of the Site's remedy and to ensure that the remedy remains protective of human health and the environment. As part of the Five-Year Review process, EPA staff is available to answer any questions about the Site. Community members who have questions about the Site or the Five-Year Review process, or who would like to participate in a community interview, are asked to contact:

Randy Bryant, EPA Remedial Project Manager
Phone:(404) 562-8794
Email: bryant.randy@epa.gov

Ronald Tolliver, EPA Community Involvement Coordinator
Phone: (404) 562-8591
Email: tolliver.ronald@epa.gov

Mailing Address: U.S. EPA Region 4, 61 Forsyth Street, S.W., 14th Floor, Atlanta, GA 30303

Additional information is available at the Site's local document repository located at Benjamin L. Hooks Central Library, 3030 Poplar Avenue, Memphis, Tennessee 38111, and online at: https://www.epa.gov/superfund/north-hollywood-dump

Feb. 4, 2020 Mpd74470

COST OF PUBLICATION

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PROOF OF PUBLICATION

THE DAILY NEWS PUBLISHING COMPANY, the Publisher of THE DAILY NEWS, a daily newspaper of general circulation, printed in the City of Memphis. County of Shelby and State of Tennessee and distributed throughout Shelby Counties in Tennessee. and states that the hereto attached publication appeared in THE DAILY NEWS on the following dates:

February 4, 2020

THE DAILY NEWS PUBLISHING COMPANY

By: _____
Kendra Wooten, Administrative Specialist

STATE OF TENNESSEE
COUNTY OF SHELBY

On this **4th** day of **February 2020,** the individual above appeared before me, personally known (or proved to me on the basis of satisfactory evidence), who, being by me sworn did say that she is an authorized agent of the corporation (or association) of the Daily News Publishing Company, that the instrument was signed and sealed on behalf of the corporation (or association). by authority of its Board of Directors and **Kendra Wooten** acknowledged the instrument to be the free act and deed of the corporation (or association) and that the corporation has no corporate seal.

WITNESS my hand and Official Seal at office this **4th** day of **February 2020.**

_____
Notary Public

WHITNEY C. LOGAN
STATE OF TENNESSEE
NOTARY PUBLIC
COUNTY OF SHELBY
MY COMM. EXP. JUNE 29, 2021

APPENDIX G – SITE INSPECTION CHECKLIST AND SITE PHOTOS

Site Inspection Checklist

I. SITE INFORMATION	
Site name: North Hollywood Dump	**Date of inspection: November 6, 2019**
Location and Region: Memphis, TN Region 4	**EPA ID: TND 980558894**
Agency, office, or company leading the five-year review: EPA-Randy Bryant, Fisher Arnold-Dave Backus, TDEC-Klarissa Kahill and Don Sprinkle	**Weather/temperature: cloudy, 57°F**

Remedy Includes: (Check all that apply)

x□ Landfill cover/containment □ Monitored natural attenuation

x□ Access controls □ Groundwater containment

x□ Institutional controls □ Vertical barrier walls

□ Groundwater pump and treatment

□ Surface water collection and treatment

x□ Other Surface water and groundwater monitoring and sampling; Fish tissue and sediment sampling of the ADP.

Attachments: □ Inspection team roster attached □ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____

Name Title Date

Interviewed □ at site □ at office □ by phone Phone no. _____

Problems, suggestions; □ Report attached

2. **O&M staff** _____ _____ _____

Name Title Date

Interviewed □ at site □ at office □ by phone Phone no. _____

Problems, suggestions; □ Report attached

_____

_____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____

Contact _____ _____ _____
Name Title Date Phone no.

Problems; suggestions; □ Report attached

_____

_____

_____

Agency _____

Contact _____ _____ _____

_____
Name Title Date Phone no.

Problems; suggestions; □ Report attached

_____

_____

_____

Agency _____

Contact _____ _____ _____

_____
Name Title Date Phone no.

Problems; suggestions; □ Report attached

_____

_____

_____

Agency _____

Contact _____ _____ _____

_____

4. **Other interviews** (optional) □ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

□ O&M manual □ Readily available x□ Up to date □ N/A

□ As-built drawings □ Readily available x□ Up to date □ N/A

□ Maintenance logs □ Readily available x□ Up to date □ N/A

Remarks_____

_____

_____

2. **Site-Specific Health and Safety Plan** □ Readily available □ Upto date □ N/A

□ Contingency plan/emergency response plan □ Readily available □ Up to date □ N/A

Remarks_____

_____

_____

_____

3. **O&M and OSHA Training Records** □ Readily available □ Up to date □ N/A

Remarks_____

_____

_____

_____

4. Permits and Service Agreements

□ Air discharge permit □ Readily available □ Up to date x□ N/A

□ Effluent discharge □ Readily available □ Up to date x□ N/A

□ Waste disposal, POTW □ Readily available □ Up to date □ N/A

□ Other permits_____ □ Readily available □ Upto date x□ N/A

Remarks_____

_____

_____

_____

_____

5.	**Gas Generation Records**	□ Readily available □ Up to date x□ N/A
	Remarks	
6.	**Settlement Monument Records**	□ Readily available □ Upto date x□ N/A
	Remarks	
7.	**Groundwater Monitoring Records**	□ Readily available x□ Up to date □ N/A
	Remarks	
8.	**Leachate Extraction Records**	□ Readily available □ Up to date x□ N/A
	Remarks	
9.	**Discharge Compliance Records**	
	□ Air	□ Readily available □ Up to date x□ N/A
	□ Water (effluent)	□ Readily available □ Up to date x□ N/A
	Remarks	

10. **Daily Access/Security Logs** □ Readily available x□ Up to date □ N/A

Remarks_____

_____

_____

_____

IV. O&M COSTS	
1. O&M Organization	
□ State in-house	□ Contractor for State
□ PRP in-house	□ Contractor for PRP
□ Federal Facility in-house	□ Contractor for Federal Facility
□ Other_____	

2. O&M Cost Records

□ Readily available □ Up to date

□ Funding mechanism/agreement in place

Original O&M cost estimate_____ □ Breakdown attached

Total annual cost by year for review period if available

From_____To_____ _____ □ Breakdown attached

Date Date Total cost

From_____To_____ _____ □ Breakdown attached

Date Date Total cost

From_____To_____ _____ □ Breakdown attached

Date Date Total cost

From_____To_____ _____ □ Breakdown attached

Date Date Total cost

From_____To_____ _____ □ Breakdown attached

Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

V. ACCESS AND INSTITUTIONAL CONTROLS □ Applicable □ N/A

A. Fencing

1. **Fencing damaged** x□ Location shown on site map □ Gates secured □ N/A

Remarks_____

_____

_____

_____

B. Other Access Restrictions

1. **Signs and other security measures** x□ Location shown on site map □ N/A

Remarks_____

_____

_____

_____

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented □ Yes x□ No □ N/A

Site conditions imply ICs not being fully enforced □ Yes x□ No □ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _Self-reporting, weekly and daily walk through inspections _____

Frequency - Weekly, when weather conditions are conducive to fishing or when there is an increased frequency of trespassing, inspections are conducted daily._____

Responsible party/agency _Barry Levine - North Hollywood Dump Steering Committee_____

Contact_____ Project Coordinator_____ _____ _____

Name Title Date Phone no.

Reporting is up-to-date x□ Yes □ No □ N/A

Reports are verified by the lead agency x□ Yes □ No □ N/A

Specific requirements in deed or decision documents have been met x□ Yes □ No

Violations have been reported x□ Yes □ No □ N/A

Other problems or suggestions: □ Report attached

2. **Adequacy** x□ ICs are adequate □ ICs are inadequate □ N/A

Remarks - Due to multiple parties owning the parcels that make up the Site, land use restrictions need to be established on 5 of the 7 parcels to ensure that parcels do not change ownership without purchasers aware of the Site and relevant restrictions on land use

D. General

1. **Vandalism/trespassing** x□ Location shown on site map □ No vandalism evident

Remarks

2. **Land use changes on site** □ N/A

Remarks – Most recently, a land use and temporary construction easement was established for Phase 6 of the Wolf River Greenway Trail on one of the privately-owned parcels

3. **Land use changes off site x** x□ N/A

Remarks

VI. GENERAL SITE CONDITIONS

A. Roads x□ Applicable □ N/A

1. **Roads damaged** □ Location shown on site map x□ Roads adequate □ N/A

Remarks_An access road on the East sector of the Site was recently repaired. This road gives City worker access to the on-site sewer line.

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS □ Applicable □ N/A

A. Landfill Surface

1. **Settlement** (Low spots) □ Location shown on site map x□ Settlement not evident

   Areal extent_____ Depth_____

   Remarks_____

   _____

2. **Cracks** □ Location shown on site map x□ Cracking not evident

   Lengths_____Widths_____ Depths_____

   Remarks_____

   _____

3. **Erosion** □ Location shown on site map x□ Erosion not evident

   Areal extent_____ Depth_____

   Remarks - There was some ponding/standing water on vegetated cap of the east sector._____

   __

4. **Holes** □ Location shown on site map x□ Holes not evident

Areal extent_____ Depth_____

Remarks_____

_____

_____

_____

5. **Vegetative Cover** □ Grass □ Cover properly established x□ No signs of stress

□ Trees/Shrubs (indicate size and locations on a diagram)

Remarks

_____

_____

6. **Alternative Cover (armored rock, concrete, etc.)** **x**□ N/A

Remarks_____

_____

_____

_____

7. **Bulges** □ Location shown on site map x□ Bulges not evident

Areal extent_____ Height_____

Remarks_____

_____

_____

_____

8. **Wet Areas/Water Damage** □ Wet areas/water damage not evident

□ Wet areas □ Location shown on site map Areal extent_____

x□ Ponding □ Location shown on site map Areal extent_____

□ Seeps □ Location shown on site map Areal extent_____

□ Soft subgrade □ Location shown on site map Areal extent_____

Remarks Some ponding on the vegetated cap of the East Sector disposal area_____

_

_____

_____

9. **Slope Instability** □ Slides □ Location shown on site map x □ No evidence of slope instability

Areal extent_____

Remarks_____

_____

_____

_____

B. Benches □ Applicable x□ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** □ Location shown on site map □ N/A or okay

Remarks_____

_____

_____

_____

2. **Bench Breached** □ Location shown on site map □ N/A or okay

Remarks_____

_____

_____

_____

3. **Bench Overtopped** □ Location shown on site map □ N/A or okay

Remarks_____

_____

_____

_____

C. Letdown Channels □ Applicable x□ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** □ Location shown on site map □ No evidence of settlement

Areal extent_____ Depth_____

Remarks_____

_____

_____

_____

2. **Material Degradation** □ Location shown on site map □ No evidence of degradation

Material type_____Areal extent_____

Remarks_____

_____

_____

_____

3. **Erosion** □ Location shown on site map □ No evidence of erosion

Areal extent_____ Depth_____

Remarks_____

_____

_____

_____

4. **Undercutting** □ Location shown on site map □ No evidence of undercutting

Areal extent_____ Depth_____

Remarks_____

_____

_____

_____

5. **Obstructions** Type_____ □ No obstructions

□ Location shown on site map Areal extent_____

Size_____

Remarks_____

_____

_____

_____

6. **Excessive Vegetative Growth** Type_____

□ No evidence of excessive growth

□ Vegetation in channels does not obstruct flow

□ Location shown on site map Areal extent_____

Remarks_____

_____

_____

_____

D. Cover Penetrations x□ Applicable □ N/A

1. **Gas Vents** □ Active □ Passive

□ Properly secured/locked □ Functioning □Routinely sampled □ Good condition

□ Evidence of leakage at penetration □ Needs Maintenance

x□ N/A

Remarks_____

_____

_____

_____

2. Gas Monitoring Probes

□ Properly secured/locked □ Functioning □Routinely sampled □ Good condition

□ Evidence of leakage at penetration □ Needs Maintenance x□ N/A

Remarks_____

_____

_____

_____

3. **Monitoring Wells** (within surface area of landfill)

x□ Properly secured/locked x□ Functioning x□Routinely sampled x□ Good condition

□ Evidence of leakage at penetration □ Needs Maintenance □ N/A

Remarks_____

_____

4. Leachate Extraction Wells

□ Properly secured/locked □ Functioning □Routinely sampled □ Good condition

□ Evidence of leakage at penetration □ Needs Maintenance x□ N/A

Remarks_____

_____

_____

_____

5. **Settlement Monuments** □ Located □ Routinely surveyed x□ N/A

Remarks_____

_____

_____

_____

E. Gas Collection and Treatment □ Applicable x □ N/A

1. Gas Treatment Facilities

□ Flaring □ Thermal destruction □ Collection forreuse

□ Good condition □ Needs Maintenance

Remarks_____

_____

_____

_____

2. **Gas Collection Wells, Manifolds and Piping**

□ Good condition □ Needs Maintenance

Remarks_____

_____

_____

_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)

□ Good condition □ Needs Maintenance □ N/A

Remarks_____

_____

_____

_____

F. Cover Drainage Layer □ Applicable x□ N/A

1. **Outlet Pipes Inspected** □ Functioning □ N/A

Remarks_____

_____

_____

_____

2. **Outlet Rock Inspected** □ Functioning □ N/A

Remarks_____

_____

_____

_____

G. Detention/Sedimentation Ponds □ Applicable x□ N/A

1. **Siltation** Areal extent_____ Depth_____ □ N/A

□ Siltation not evident

Remarks_____

_____

_____

_____

2. **Erosion** Areal extent_____Depth_____

□ Erosion not evident

Remarks_____

_____

_____

_____

3. **Outlet Works** □ Functioning □N/A

Remarks_____

_____

_____

_____

4. **Dam** □ Functioning □N/A

Remarks_____

_____

_____

_____

H. Retaining Walls □ Applicable x□ N/A

1. **Deformations** □ Location shown on site map □ Deformation not evident

   Horizontal displacement_____ Vertical displacement_____

   Rotational displacement_____

   Remarks_____

   _____

   _____

   _____

2. **Degradation** □ Location shown on site map □ Degradation not evident

   Remarks_____

   _____

   _____

   _____

I. Perimeter Ditches/Off-Site Discharge x□ Applicable □ N/A

1. **Siltation** □ Location shown on site map x□ Siltation not evident

   Areal extent_____ Depth_____

   Remarks_____

   _____

   _____

   _____

2. **Vegetative Growth** □ Location shown on site map □ N/A

   x□ Vegetation does not impede flow

   Areal extent_____ Type_____

   Remarks_____

   _____

   _____

   _____

3. **Erosion** □ Location shown on site map x□ Erosion not evident

Areal extent_____ Depth_____

Remarks_____

_____

_____

_____

4. **Discharge Structure** □ Functioning □N/A

Remarks_____

_____

_____

_____

VIII. VERTICAL BARRIER WALLS □ Applicable x □ N/A

1. **Settlement** □ Location shown on site map □ Settlement not evident

Areal extent_____ Depth_____

Remarks_____

_____

_____

_____

2. **Performance Monitoring** Type of monitoring_____

□ Performance not monitored

Frequency_____ □ Evidence of breaching

Head differential_____

Remarks_____

_____

_____

_____

IX. GROUNDWATER/SURFACE WATER REMEDIES x □ Applicable □ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines □ Applicable □ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**

□ Good condition x□ All required wells properly operating □ Needs Maintenance □ N/A

Remarks

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**

□ Good condition □ Needs Maintenance

Remarks

3. **Spare Parts and Equipment**

□ Readily available □ Good condition □ Requires upgrade □ Needs to be provided

Remarks

B. Surface Water Collection Structures, Pumps, and Pipelines □ Applicable x□ N/A

1. **Collection Structures, Pumps, and Electrical**

□ Good condition □ Needs Maintenance

Remarks

2.	**Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** □ Good condition □ Needs Maintenance Remarks_____ _____ _____
3.	**Spare Parts and Equipment** □ Readily available □ Good condition □ Requires upgrade □ Needs to be provided Remarks_____ _____ _____

C. Treatment System □ Applicable x□ N/A

1. **Treatment Train** (Check components that apply)

□ Metals removal □ Oil/water separation □ Bioremediation

□ Air stripping □ Carbon adsorbers

□ Filters_____

□ Additive (*e.g.*, chelation agent, flocculent)_____

□ Others_____

□ Good condition □ Needs Maintenance

□ Sampling ports properly marked and functional

□ Sampling/maintenance log displayed and up to date

□ Equipment properly identified

□ Quantity of groundwater treated annually_____

□ Quantity of surface water treated annually_____

Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)

□ N/A □ Good condition □ Needs Maintenance

Remarks_____

3. **Tanks, Vaults, Storage Vessels**

□ N/A □ Good condition □ Proper secondary containment□ Needs Maintenance

Remarks_____

4. **Discharge Structure and Appurtenances**

□ N/A □ Good condition □ Needs Maintenance

Remarks_____

_____

_____

5. Treatment Building(s)

□ N/A □ Good condition (esp. roof and doorways) □ Needs repair

□ Chemicals and equipment properly stored

Remarks_____

_____

_____

_____

6. **Monitoring Wells** (pump and treatment remedy)

□ Properly secured/locked □ Functioning □Routinely sampled □ Good condition

□ All required wells located □ Needs Maintenance □ N/A

Remarks_____

_____

_____

_____

D. Monitoring Data

1. Monitoring Data
□ Is routinely submitted on time x□ Is of acceptable quality

2. Monitoring data suggests:
□ Groundwater plume is effectively contained x□ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

x□ Properly secured/locked x□ Functioning x□ Routinely sampled □ Good condition

□ All required wells located □ Needs Maintenance □ N/A

Remarks_____

_____

_____

_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The selected remedy for the Site included de-watering and dredging of contaminated sediments. Consolidation of contaminated sediments in the landfill area, and placement of a 2-foot clay-cover over the entire landfill area. In addition, a 3- to 7-foot-thick clean soil cover was placed over remaining sediments in portions of the ADP area. Site remedial activities were completed in September 1997 and the Site is currently in a long-term monitoring and maintenance phase. The remedy is currently functioning as designed. The initial main pathway of concern was human consumption of ADP fish tissue. Monitoring data suggest decreased concentrations of Site COCs in ADP fish tissue. With increased daily monitoring of the site and the addition of fish consumption warning signs decreased trespassing onto the Site for fishing from the ADP has been observed.

_____

_____

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Due to an unexpected increase in fish tissue toxicity levels in 2001. additional activities were undertaken to protect the public from the health risks associated with consuming fish from the ADP. These activities included the installation of additional fencing, increased inspection frequency and a harvest of fish in the pond. Recent 2012 sampling data show that fish tissue contaminant levels have declined since 2001 but remain elevated above action levels. Site inspections are conducted weekly and more frequently in weather when people may be inclined to try fishing at the ADP. Efforts to control and document trespassing are adequate and limit exposure.

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.
	EPA and City of Memphis have chosen not to open any area of the Site for public access until fish levels have declined below action levels. Given the extensive connectivity within the Site, access to any portion of the property would allow easy access to the ADP and the health risks associated with consuming fish from the pond. This access restriction should he maintained. The She is large, covering an estimated 170 acres, and parcels are owned by multiple parties. including private citizens who are not considered site PRPs. At present property deeds for Site parcels do not include any information about parcels' inclusion in the Site or the Site's history, nor do they include any necessary restrictions on access and land use to protect the remedy in place. Land use restrictions need to be documented or enacted for these property parcels to ensure long term protectiveness of the Site. Construction of Phase 6 of the Wolf River Greenway Trail near the Site has begun. Public access to the trail will increase traffic near the Site and could potentially increase trespassing onto the Site and ADP.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Site Photos

Cluster of wells located on the vegetated cap of the East Sector disposal area.

Fish consumption warning sign on the fencing of the ADP

Slope of the East Sector vegetated cap leading to the Wolf River. No visible erosion on slope.

Wolf River at East Sector

No trespassing sign on perimeter fencing of the Site.

Vegetated cap and gravel road at the West Sector disposal area.

Well cluster located at the West Sector disposal area

Overlooking ADP

Entrance to the West Sector. Signage for the gravel company located West of the West Sector former disposal area.

Discarded tires and trash along nearby street south of the West sector former disposal area.

APPENDIX H – ARARS REVIEW

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment."
The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. In performing the FYR for compliance with ARARs,
only those ARARs that address the protectiveness of the remedy are reviewed.

According to the ROD, cleanup goals for the 15 groundwater COCs were based on Site-specific ACLs. Given that institutional controls were in place prohibiting access to the Fluvial Sands Aquifer for use as a drinking water source, the Federal Safe Drinking Water Act was not applied to Site groundwater at the time the ROD was signed. On the other hand, contaminated groundwater in the Fluvial Sands Aquifer underlying the Site discharges directly to the Wolf River. Consequently, it was necessary to develop groundwater ACLs for the Site that would be protective of Wolf River water quality from both the perspective of human health (i.e., because the local population consumed fish caught in the river) and the perspective of the aquatic life in the river. To achieve the required protection of Wolf River water quality, the ROD back-calculated the groundwater ACLs from the lowest of the applicable NRWQC values (i.e., protection of human health or protection of aquatic life). For COCs that were known or potential carcinogens, the selected NRWQC and resulting calculated ACL were based on a 10^{-6} excess cancer risk level due to the consumption of fish from the Wolf River.

A detailed discussion of the ACL calculation process can be found in Appendix C of this document.
In summary, to calculate the ACL, the applicable NRWQC is multiplied by either the Wolf River 15-Year Average Daily Mean Flow (for NRWQC based on the protection of human health) or the
Wolf River 3Q20 Daily Mean Flow (for NRWQC based on the protection of aquatic life) and then divided by the Total Mass Flux from the Site discharging into the Wolf River.

Revisions to the NRWQC were proposed in May 2014 and finalized in the Federal Register on June 29, 2015. The current ACLs and calculation components are based on the most recent EPA 2015 NRWQC, recent hardness data and updated Wolf River 15-Year Average Daily Mean Flow value, and an updated Wolf River 3Q20 Daily Mean Flow value.

The following table shows the current values of the various ACL calculation components compared to the calculated in the 1990 ROD.

TABLE B-27

1990 ROD NATIONAL RECOMMENDED WATER QUALITY CRITERIA (NRWQC) FOR SHALLOW GROUNDWATER VERSUS CURRENT 2015 NRWQC

North Hollywood Dump / Memphis, Tennessee

2015 Annual Report

Site-Specific Indicator Parameter	1990 ROD Value	Current EPA NRWQC	Increase, Decrease, or No Change
National Recommended Water Quality Criteria (µg/L)			
Metals			
Arsenic	0.14	0.14	No Change
Chromium	0.3	11.0	Increase
Lead	3.8	0.39	Decrease
Zinc	47.0	28.5	Decrease
Pesticides			
4,4'-DDT	0.000590	0.000030	Decrease
Aldrin	0.00136000	0.00000077	Decrease
alpha-Chlordane	NL	0.00032	NA
gamma-Chlordane	NL	0.00032	NA
Technical Chlordane	0.00048	0.00032	Decrease
Chlordene	NE	NE	NA
Dieldrin	0.000144	0.0000012	Decrease
Endrin	0.0023	0.03	Increase
Heptachlor	0.000214	0.0000059	Decrease
Heptachlor Epoxide	0.001	0.000032	Decrease
Wolf River Daily Mean Flow (cfs)			
3Q20	190	185	Decrease
15-Year Average	1,050	1,159	Increase
Hydraulic Characteristics			
Hydraulic Conductivity of Fluvial Sand and Gravel Unit	3.75 x 10-2 cm/sec	3.75 x 10-2 cm/sec	No Change
Horizontal Hydraulic Gradient - East Sector	0.009 ft/ft	0.0050 ft/ft	Decrease
Horizontal Hydraulic Gradient - West Sector	0.004 ft/ft	0.0044 ft/ft	Increase

Notes:

1. The *Fourth Five-Year Review* recommended the Alternate Concentration Limits (ACLs) for shallow groundwater to be recalculated using the new U.S. Environmental Protection Agency (EPA) NRWQC published in June 2015, recent hardness data, an updated Wolf River 15-Year Average Daily Mean Flow value, and an updated Wolf River 3Q20 Daily Mean Flow value.
2. See ***Table F-2*** for a discussion of the derivation of each of the current EPA NRWQC cited in the above table.
3. An ACL could not be calculated for chlordene because the EPA has not established any NRWQC for this Site-Specific Indicator Parameter.
4. The EPA only reports a NRWQC for "chlordane." In the above table, this "chlordane" NRWQC has been used to recalculate the ACL for Technical Chlordane. This recalculated ACL for Technical Chlordane is also referenced in the above table as the ACL for the two chlordane isomers *(i.e., alpha-chlordane and gamma-chlordane)* were used to calculate the Technical Chlordane concentration.

Key:

ACL	=	Alternate Concentration Limit
NE	=	Not Established *(see Note 3 above)*
NL	=	Not Listed *(see Note 4 above)*
cfs	=	Cubic Feet per Second
EPA	=	U.S. Environmental Protection Agency
cm/sec	=	Centimeters per Second
µg/L	=	Micrograms per Liter

Appendix I - Deed Notices

North Hollywood Dump Deed Notices

- 11/01/88 Notice of Haz. Substance Site
  - -all of west parcel (072045 00066) Instrument # H20086
  - -SW piece of east parcel (042068 00076) Instrument # H20086

- 06/20/13 Notice of Haz. Substance Site
  - -west portion of east parcel (072119 000011) Instrument # M5 2098
  - -east portion of east parcel (072119 00025) Instrument # J6 8391
  - -SE piece of east parcel (042068 00077) Instrument # 06075130

Parcels not part of landfill

- Parcel between river and ADP(072119 00009) Instrument # AW 4911

  conservation easement in place prohibits agricultural, commercial, or industrial land use

- Pond not included in land notices
  - -ADP (042068 00078)

Tennessee Department of Health and Environment
Division of Superfund
4th Floor, Customs House
701 Broadway
Nashville, Tennessee 37219-5403

AV 3540

NOTICE
OF
HAZARDOUS SUBSTANCE SITE

Pursuant to Chapter 46 of the Tennessee Code Annotated entitled Part 2- Hazardous Waste Management Act of 1983, as amended, notice is hereby given that the property described hereinbelow has been placed on the Tennessee List of Inactive Hazardous Substance Sites compiled in accordance with T.C.A. Section 68-46-212.

NAME OF TITLEHOLDERS:

City of Memphis

DESCRIPTION OF PROPERTY:

A certain tract or parcel of land located at Memphis in Shelby County, State of Tennessee, the same being more particularly described in a deed of record as Instrument Number H20086 in the Register's Office of said County.

TENNESSEE SUPERFUND SITE NUMBER:

79-598, North Hollywood Dump

Executed this 1st day of November, 1988.

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
J. W. LUNA, COMMISSIONER

BY: _____
Terry K. Cothron, Director
Division of Superfund
4th Floor, Customs House
701 Broadway
Nashville, Tennessee 37219-5403

STATE OF TENNESSEE

COUNTY OF DAVIDSON

Before me, the undersigned Notary Public in the State and County aforesaid, personally appeared Terry K. Cothron, with whom I am personally acquainted, and who, upon oath acknowledged himself to be Director of the Division of Superfund, Tennessee Department of Health and Environment, and that he as such Director, executed the foregoing instrument by his signature for the purpose therein contained, by delegated authority from the Commissioner of the Department of Health and Environment.

WITNESS, my hand and Official Seal at office this 1st day of November, 1988.

NOTARY PUBLIC

Prepared by Evans, Petree, Cobb & Edwards
900 Memphis Bank Building
Memphis, Tennessee 38103

H2 0086

QUIT CLAIM DEED

THIS INDENTURE, made and entered into this 2nd day of August, 1972, by and between E. J. CURRY, individually, MARY CURRY, individually, and PAULINE CURRY, individually, parties of the first part, and W. J. CURRY & SON, a partnership composed of PAULINE CURRY, MARY CURRY, E. J. CURRY, WILLIAM G. CURRY and JULIAN CURRY, party of the second part;

WITNESSETH:

WHEREAS, the owners of record in the Register's Office of Shelby County, Tennessee, of the property hereinafter described are E. J. CURRY, individually, as to an undivided one-half (1/2) interest, MARY CURRY, individually, as to an undivided one-fourth (1/4) interest, and PAULINE CURRY, individually, as to an undivided one-fourth (1/4) interest; and

WHEREAS, by partnership agreement dated September 30, 1971 and an amendment to the partnership agreement dated January 3, 1972, the parties of the second part have declared that the property hereinafter described is owned by the partnership and that the interest owned by the parties of the second part therein are as reflected in said partnership agreement; and

WHEREAS, the puspose of this Quit Claim is to have the owners of record in accordance with the actual ownership as indicated by the partnership agreement.

NOW, THEREFORE, in consideration of Ten ($10.00) Dollars cash in hand paid, the receipt of which is hereby acknowledged and the premises hereinabove recited, the parties of the first part hereby transfer, convey and confirm unto W. J. CURRY & SON, a partnership composed of PAULINE CURRY, MARY CURRY, E. J. CURRY, WILLIAM G. CURRY and JULIAN CURRY, the following described real estate situated and being in the County of Shelby, State of Tennessee, except Parcel No. 1 which is in the First Civil District of Shelby County, Tennessee.

(1) PARCEL I: A part of the Anthony Washington Tract, same being part of the West 92.86 acres of the Sanderlin 102 acre entry #247, more particularly described as follows:

BEGINNING at a point in the west line of said tract 477.44 feet south of the Northwest corner of said tract; thence running south along the Allen Road, 50 feet to a stake; thence running east 120 feet to a stake; thence North 50 feet to a stake; thence west 120 feet to a stake, the point of beginning. Said Parcel I is unimproved.

(2) PARCEL II: The west 40 feet of Lot 3, Sims and Nelson Subdivision in Country Lot 472 in the City of Memphis, Shelby County, Tennessee, more particularly described as follows:

BEGINNING at a point in the south line of Exchange Avenue (66 feet wide) 168 feet east of the first alley (24.75 feet wide) east of North Third Street, said point of beginning being the northeast corner of Lot 2 of said Subdivision as described in deed to J. F. Shelton and wife, V. O. Shelton recorded in Book 2866, Page 531, in the Register's Office of Shelby County, Tennessee; thence south along the east line of said Lot 2 a distance of 148.5 feet to a point in the north line of an alley (16.5 feet wide); thence eastwardly along the north line of said alley 40 feet to a point; thence north 148.5 feet to a point in the south line of Exchange Avenue 40 feet east of the point of beginning; thence westwardly along the south line of Exchange Avenue 40 feet to the point of beginning, and improved by premises known as 211 Exchange Avenue.

(3) PARCEL III: The east 30 1/3 feet of south half of Lot 13, Johnson and Murphy Subdivision in Country Lot 503, more particularly described as follows:

BEGINNING on the north side of Exchange Street Extended at the southeast corner of the south half of Lot 13; thence westwardly along the north line of Exchange Street Extended 30 1/3 feet; thence northwardly parallel with the east line of Lot 13, 100 feet, more or less to line between the north and south portions of Lot 13; thence eastwardly with said dividing line 30 1/3 feet; more or less to the east line of Lot 13; thence southwardly with the east line of Lot 13, 87 feet to the beginning, and improved by premises known as 604 Exchange Avenue.

(4) PARCEL IV: Lot 50 and the north 24.75 feet of Lot 49, Greenlaw (Chelsea) Subdivision, being more particularly described as follows:

BEGINNING at an iron pin in the east line of North Second Street (66 feet wide) a distance of 49.5 feet north, as measured along said east line, from its intersection with the north line of Greenlaw Avenue (66 feet wide); running thence northwardly along the east line of North Second Street, a distance of 99 feet to a cross chiseled in the concrete sidewalk in the south line of a 16.5 foot alley; running thence eastwardly along the south line of said alley and parallel with Greenlaw Avenue a distance of 148.5 feet to its intersection with the west line of a 24.75 foot alley; running thence southwardly along the west line of the last mentioned alley a distance of 99 feet to an iron pipe; thence westwardly and parallel with Greenlaw Avenue a distance of 148.5 feet to the point of beginning, and improved by premises known as 582 and 588 North Second Street, and 584 and 586 North Second Street.

(5) PARCEL V: Lot 19 of Haynes Subdivision as shown on plat of record in Plat Book 5, Page 33, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1350 Rayburn.

(6) PARCEL VI: Lots 1, 3, 5, 7 and North 40 feet of Lot 9, Block 13, Brinkley & Snowden Subdivision, more particularly described as follows:

BEGINNING at a stake in the intersection of the south line of Saffarans Avenue with the east line of Hastings Street; thence south with the east line of Hastings Street 280 feet to a stake; thence east parallel with Saffarans Avenue 182.5 feet to a stake; thence north parallel with Hastings Street 280 feet to a stake in the south line of Saffarans Avenue; thence west with said south line 182.5 feet to the beginning, and improved by premises known as 688 Hastings, 955 through 974 Baby Row and 951 through 974 Hix Street.

(7) PARCEL VII: Part of Lots 3 and 4 (lots 3 and 4 less east 20 feet for New Hastings Street) of J. C. Jones Subdivision of Lot 8, Ralston Subdivision, more particularly described as follows:

BEGINNING at a point in the west line of New Hastings Street 200 feet south of the south line of Looney Avenue; thence south with said west line of New Hastings Street 100 feet to a point; thence west parallel with Looney Avenue 171.2 feet to a point; thence north parallel with New Hastings Street 100 feet to a point; thence east 171.2 feet to the point of beginning, and improved by premises known as 725 and 727 Hastings Street.

(8) PARCEL VIII: Lots 88, 89, 90 and the north 2 feet of Lot 91, Block 5 of E. E. Meachams Olympic Park Subdivision, as shown on plat of record in Plat Book 3, Page 122, in the Register's Office of Shelby County, Tennessee, to which plat reference is herein made for a more particular description of said property, and improved by premises known as 817 Olympic.

(9) PARCEL IX: Lots 17 and 22, Block A, Lavon Place Subdivision, as shown on plat of record in Plat Book 6, Pages 28 and 29, in the Register's Office of Shelby County, Tennessee, to which plat reference is herein made for a more particular description of said property. Lot 17 of said subdivision is an unimproved lot and Lot 22 is improved by premises known as 886 Lewis.

(10) PARCEL X: Part of Lot 9, Block 1, of the John L. Cocke Subdivision, as shown on plat thereof of record in Plat Book 3, Page 91, in the Register's Office of Shelby County, Tennessee, said property being more particularly described as follows:

BEGINNING at a point in the north line of Ashby Avenue 24.9 feet west of the northwest corner of the intersection of Ashby Avenue and Adelaide Street; thence northwardly parallel with Adelaide Street 50 feet more or less to the north line of said Lot 9; thence westwardly parallel with Ashby Avenue 36.85 feet; thence southwardly parallel with Adelaide Street 50 feet more or less to a point in the north line of Ashby Avenue; thence eastwardly along the north line of Ashby Avenue 36.85 feet to the point of beginning, and improved by premises known as 24-26 Ashby Avenue.

(11) PARCEL XI: Lots 184, 185, 186 and 187, Addition to Randolph's Florida Subdivision, as shown on plat of record in Plat Book 8, Page 29, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property. Lot 184 of said subdivision is improved by premises known as 135 Farrow and Lots 185, 186 and 187 of said subdivision are unimproved lots.

(12) PARCEL XII: Lots 141 and 141 1/2 of E. E. Meacham's

Subdivision of the Bailey and Turley Tract, as shown on plat of record in Plat Book 2, Page 102, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 276 West Trigg Avenue and 278 West Trigg Avenue.

(13) PARCEL XIII: Part of the Lucy J. Stockley 30 acres in part of the John Trigg Tract in Division 5 of the Ramsey Grant, 70 x 84 feet on the east side of Kansas Street at the northeast corner of West Trigg Avenue, more particularly described as follows:

BEGINNING at a cross cut in the side walk at the point where the east line of Kansas and the north line of Trigg Avenue intersect; thence east with the north line of Trigg, a distance of 84.0 feet to a cross cut in the existing sidewalk, said cross being located 0.5 foot due south of an iron pipe; thence north parallel with the east line of Kansas 70.0 feet to an iron pipe; thence west parallel with the north line of Trigg Avenue a distance of 84.0 feet to an iron pipe in the east line of Kansas; thence south with the east line of Kansas a distance of 70.0 feet to the point of beginning, and improved by premises known as 92-94 West Trigg Avenue.

(14) PARCEL XIV: Lots 4, 5 and 6, Block 2, of Factory Highland Subdivision, as shown on plat of record in Plat Book 3, Page 123, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1414 South Main Street.

(15) PARCEL XV: Lots 41, 42 and 43, Block 2, of Factory Highland Subdivision, as shown on plat of record in Plat Book 3, Page 123, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1411 Horace.

(16) PARCEL XVI: All of Lot 2, Block B of Anna Stephens Subdivision, more particularly described as follows:

BEGINNING at the intersection of the west line of Mississippi Avenue and the dividing line of Lots 1 and 2; thence running west 172 feet; thence south 68 feet 4 inches; thence east 204.5/12 feet; thence north 76.5 feet to the point of beginning, and improved by premises known as 658, 660, 662, 664 and 666 Wicks Alley.

(17) PARCEL XVII: Part of Lot 21 of the Goodloe and Martin Subdivision of Lot 1 of the Talbot Subdivision of Lot 95 of the Willie Williams Subdivision, said property being more particularly described as follows:

BEGINNING at a point in the north line of Saxon, formerly Laurel Avenue, 161½ feet east of the east line of Somerville Street, formerly Elmwood Avenue; running thence east along the north line of Saxon Avenue 37½ feet; running thence northwardly parallel with the east line of Somerville Street 145 feet; running thence westwardly parallel with the north line of Saxon Avenue 37½ feet; thence running southwardly parallel with the east line of Somerville Street 145 feet to the point of beginning, and improved by premises known as 1092 Saxon Avenue.

(18) PARCEL XVIII: The north part of Lot 15 Cole & Hampton's Subdivision as shown on plat of record in Plat Book 1, Page 128, in the Register's Office of Shelby County, Tennessee, and being more particularly described as follows:

Said property fronts 40 feet on the south side of Hampton Street, its beginning point being 120 feet west of the west line of South Orleans Street, and extends back southwardly between parallel lines 75 feet, and being the north one-half of the property conveyed to Robert T. Prothro by Warranty Deed dated May 22, 1925, and recorded in Book 980, Page 533 of the Register's Office of Shelby County, Tennessee, and improved by premises known as 585-587 Hampton Street.

(19) PARCEL XIX: Lot 63 and 64, Block 2, Meacham and Gilchrist's East End Place Subdivision as shown on plat of record in Plat Book 4, Page 8, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 753-755 Baltimore.

(20) PARCEL XX: Lots 1, 2, 3, 4 and 5, Block "B", Belt Line Subdivision, as shown on plat of record in Plat Book 2, Page 88, in the Register's Office of Shelby County, Tennessee, less and except that portion of said property taken to widen Southern Avenue, and said lots are unimproved.

(21) PARCEL XXI: Lots 57 and 58, Block "B", Stratton and Gilchrist's Belt Line Subdivision as shown on plat of record in Plat Book 2, Page 88, in the Register's Office of Shelby County, Tennessee, less and except that portion of said property taken to widen Southern Avenue. Said lots are unimproved.

(22) PARCEL XXII: Lots 22 and 23, Block "C", Belt Line Subdivision, as shown on plat of record in Plat Book 2, Page 88, in the Register's Office of Shelby County, Tennessee, and improved by premises known as 543 Buntyn.

(23) PARCEL XXIII: Lots 58, 59, 60, 61 and 62 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and all lots being unimproved.

(24) PARCEL XXIV: Lot 5, Harris' Evelyn & McLean Avenue Subdivision as shown on plat of record in Plat Book 5, Pages 100 and 101, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1758 Evelyn Avenue.

(25) PARCEL XXV: Lots 45, 46, 47, Block 2, North Annesdale Subdivision as shown on plat of record in Plat Book 3, Page 76, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1773 Euclid and 908 Emmie Street.

(26) PARCEL XXVI: Part of the East 2 1/2 acres of West 5 acres of Lot 10 Whitmore Subdivision, being more particularly described as follows:

BEGINNING at point in south line Glenview Avenue 418 feet west of west line Kyle Street; thence west with south line of Glenview Avenue 56.5 feet to a point; thence south 205 feet to a point; thence east parallel with Glenview Avenue 56.5 feet to a point; thence north 205 feet to point of beginning, and improved by premises known as 1679 Glenview Avenue.

(27) PARCEL XXVII: Located at the southeast corner of East Parkway North and Van Horn Avenue, and being more particularly described as follows:

BEGINNING at the point of intersection of the east line of East Parkway North with the south line of Van Horn Avenue; thence southwardly with said east line of East Parkway North 86.3 feet to a point; thence eastwardly parallel with Van Horn Avenue 250 feet to a point; thence northwardly parallel with East Parkway North 86.3 feet to the south line of Van Horn Avenue; thence westwardly with said south line of Van Horn Avenue 250 feet to point of beginning, and improved by premises known as 370 East Parkway North.

(28) PARCEL XXVIII: Part of Lots 81 and 82, Flippin Subdivision, being more particularly described as follows:

BEGINNING at a stake in the east line of Monsarrat Street 430.06 feet southwardly from the south line of South Parkway West; thence southwardly with said east line of Monsarrat Street 21.9 feet to a stake; thence eastwardly parallel with South Parkway West 160 feet to a stake in the west line of an alley; thence northwardly with the west line of said alley 21.9 feet to a stake; thence westwardly 160 feet to the point of beginning, and improved by premises known as 1606 Monsarrat Street.

(29) PARCEL XXIX: The south 37 1/2 feet of Lot 65 of the W. S. Flippin Subdivision of Lots 61 and 62 of the Kerr Tract, and more particularly described as follows:

BEGINNING at a point in the east line of Monsarrat Street 262 1/2 feet south of the south line of Wilkinson Avenue; and runs thence south with the east line of Monsarrat Street 37 1/2 feet; thence east parallel to Wilkinson Avenue 160 feet; thence north parallel to Monsarrat Street 37 1/2 feet; thence west 160 feet to the point of beginning, and improved by premises known as 1598 Monsarrat Street.

(30) PARCEL XXX: Lot 39, E. L. Roger's Oak Park Subdivision, as shown on plat of record in Plat Book 7, Page 51, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 308 Harrell.

(31) PARCEL XXXI: Lots 22 and east 2.5 feet of Lot 21, Prescott & DeShaza Scott Avenue Subdivision as shown on plat of record in Plat Book 8, Page 53, in the Register's Office of Shelby County, Tennessee, and which plat reference is hereby made for a more particular description of said property, improved by premises known as 2812 Amsden.

(32) PARCEL XXXII: Lot 31 Prosperity Park Subdivision as shown on plat of record in Plat Book 9, Page 68, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, less and except that portion of said property conveyed to the City of Memphis by deed of record in Book 5480, Page 349, in said Register's Office, and improved by premises known as 2980 Mimosa Avenue.

(33) PARCEL XXXIII: Lot 162, Prosperity Park Subdivision as shown on plat of record in Plat Book 9, Page 68, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 278 Carpenter.

(34) PARCEL XXXIV: Lots 219, 220 and 221, Prosperity Park Subdivision, as shown on plat of record in Plat Book 9, Page 68, in the Register's Office of Shelby County, Tennessee, less and except part of Lot 221 conveyed to the City of Memphis by deed of record in Book 5480, Page 347, in the

Register's Office of Shelby County, Tennessee, and improved by premises known as 2894-2896 Mimosa.

(35) PARCEL XXV: Lot 267, Prosperity Park Subdivision, as shown on plat of record in Plat Book 9, Page 68, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 291 Red Oak.

(36) PARCEL XXXVI: Lot 11, Carpenter Fraser Maple Ridge Subdivision, as shown on plat of record in Plat Book 7, Page 113, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 433 Carpenter.

(37) PARCEL XXXVII: The North 55 feet of Lot 16, R. N. Lloyd Subdivision, as shown on plat of record in Plat Book 6, Page 113, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 605 Ivory.

(38) PARCEL XXXVIII: Lot 42 and the East 20 feet of Lot 41, J. F. Graham's Subdivision, Block "K", as shown on plat of record in Plat Book 5, Page 7, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 701-703 Lyman.

(39) PARCEL XXXIX: Lot 55, Union Heights Subdivision as shown on plat of record in Plat Book 5, Page 39, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1216 Merchant.

(40) PARCEL XXXX: Lots 41 and 42, Block "3", of F. M. Guthrie's North Breedlove Subdivision as shown on plat of record in Plat Book 7, Page 21, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1342 North Decatur Street.

(41) PARCEL XXXXI: Lot 3, Block 2, of F. M. Guthrie's Addition to North Breedlove Subdivision as shown on plat of record in Plat Book 7, Page 116, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1342 Breedlove.

(42) PARCEL XXXXII: Lot 97, Section "C" of Hyde Park Subdivision as shown on plat of record in Plat Book 7, Page 62, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 2163 Clayton.

(43) PARCEL XXXXIII: Lot 29, Section "E" of Hyde Park Subdivision as shown on plat of record in Plat Book 7, Page 62, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1404 Tunica.

(44) PARCEL XXXXIV: Lots 77 and 78 of West Model Park Subdivision as shown on plat of record in Plat Book 10, Page 70, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property and improved by premises known as 2115-17 and 2119 Hunter.

(45) PARCEL XXXXV: Part of the W. J. Curry Property; being more particularly described by metes and bounds as follows:

Tract 1:

BEGINNING at a point in the northwest line of Belmont Circle (50 feet wide) a distance of 1321.67 feet southwestwardly as measured along the northwest line of Belmont Circle from its tangent intersection with the west line of Hollywood Street (80 feet wide) said point of beginning being a point in the north line of Lot 22 in Wm. F. Harden Subdivision; thence north 89 degrees, 09 minutes west along the north line of said Lot 22 a distance of 964.73 feet to an old iron pipe at the southeast corner of the property of Frieda M. Reiff, Et. Al. ; thence north 00 degrees, 21 minutes west along the east line of the property of Frieda M. Reiff, Et. Al. a distance of 1309.61 feet to a point in the south line of the Wolf River Channel Improvement R.O.W.; thence along the south line of said R.O.W. six (6) courses as follows: north 76 degrees, 23 minutes east a distance of 124.60 feet to a point; thence north 75 degrees, 52 minutes east a distance of 404.55 feet to a point; thence north 78 degrees, 17 minutes east a distance of 437.77 feet to a point; thence north 85 degrees, 21 minutes east a distance of 233.06 feet to a point; thence south 70 degrees, 07 minutes east a distance of 291.54 feet to a point; thence south 66 degrees, 56 minutes east a distance of 223.45 feet to a point in the west line of Hollywood Street (120 feet wide); thence south 1 degree, 35 minutes east along the west line of Hollywood Street a distance of 179.04 feet to a point; thence north 88 degrees, 25 minutes east a distance of 20.00 feet to a point in the west line of Hollywood Street (80 feet wide); thence south 1 degree, 35 minutes east along the west line of Hollywood Street (80 feet wide) a distance of 244.99 feet to a point; thence southwardly along the west line of Hollywood Street along a curve to the left having a radius of 1240 feet a distance of 33.23 feet to a point; thence along a curve to the right having a radius of 20 feet a distance of 29.94 feet to a point in the northwest line of Belmont Circle (50 feet wide); thence southwestwardly along the northwest line of Belmont Circle seven (7) courses as follows: southwestwardly along a curve to the left having a radius of 285.50 feet a distance of 209.45 feet to a point; thence southwestwardly along a curve to the left having a radius of 168.25 feet a distance of 205.36 feet to a point; thence southwestwardly along a curve to the right having a radius of 229.67 feet a distance of 172.90 feet to a point; thence south 13 degrees, 49 minutes west a distance of 69.90 feet to a point; thence southwestwardly along a curve to the right having a radius of 247.86 feet a distance of 220.70 feet to a point; thence south 64 degrees, 50 minutes, west a distance of 258.10 feet to a point; thence southwestwardly along a curve to the left having a radius of 465.80 feet a distance of 166.69 feet to the point of beginning.

Tract 2:

BEGINNING at a point in the east line of Hollywood Street (80 feet wide) a distance of 297.27 feet northwardly as measured along the east line of Hollywood Street from its tangent intersection with the north line of Belmont Circle (50 feet wide); thence north 88 degrees, 25 minutes east a distance of 20.00 feet to a point in the east line of Hollywood Street (120 feet wide); thence north 1 degree, 35 minutes west along the east line of Hollywood Street (120 feet wide) a distance of 123.96 feet to a point in the south line of the Wolf River Channel Improvement R.O.W.; thence eastwardly along the south line of said R.O.W. Three (3) courses as follows: south 66 degrees, 56 minutes east a distance of 75.00 feet to a point; thence south 82 degrees,

59 minutes east a distance of 418.96 feet to a point; thence south 79 degrees, 21 minutes east a distance of 293.32 feet to a point in the west line of the Lanahan Property; thence south 00 degrees, 05 minutes east a distance of 1649.07 feet; thence south 89 degrees, 42 minutes west along the north boundary line of East Belmont Park Subdivision a distance of 373.20 feet to a point; thence north 00 degrees, 06 minutes west along the boundary line of said subdivision a distance of 100.00 feet to an angle point in said boundary line; thence south 89 degrees, 42 minutes west along the north boundary line of East Belmont Park Subdivision a distance of 160.00 feet to a point in the east line of Hollywood Street (80 feet wide); thence north 00 degrees, 06 minutes west along the east line of Hollywood Street a distance of 266.27 feet to a point; thence northwardly along the east line of Hollywood Street along a curve to the left having a radius of 1240 feet a distance of 178.31 feet to a point, said point being the intersection of the east line of Hollywood Street with the east line of Belmont Circle (50 feet wide); thence along the east line of Belmont Circle six (6) courses as follows: northeastwardly along a curve to the right having a radius of 496 feet a distance of 69.91 feet to a point; thence north 22 degrees, 48 minutes east a distance of 73.70 feet to a point; thence northwardly along a curve to the left having a radius of 483.40 feet a distance of 313.01 feet to a point; thence northwestwardly along a curve to the left having a radius of 661.70 feet a distance of 296.61 feet to a point; thence north 39 degrees, 59 minutes west a distance of 29.80 feet to a point; thence northwestwardly along a curve to the left having a radius of 285.50 feet a distance of 172.49 feet to a point; thence along a curve to the right having a radius of 20 feet a distance of 24.83 feet to a point in the east line of Hollywood Street (80 feet wide); thence northwardly along the east line of Hollywood Street along a curve to the right having a radius of 1160 feet a distance of 37.98 feet to a point; thence north 1 degree, 35 minutes west along the east line of Hollywood Street a distance of 244.99 feet to the point of beginning. Said Tracts 1 and 2 above described are unimproved.

(46) PARCEL XXXXVI: Lot 1, Block 1 of Belmont Park Subdivision as shown on plat of record in Plat Book 6, Page 114, in the Register's Office of Shelby County, Tennessee; to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 2438 Blue Road.

(47) PARCEL XXXXVII: Lot 18, Block 1, of Belmont Park Subdivision as shown on plat of record in Plat Book 6, Page 114 in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, less and except that portion of said lot acquired by the City of Memphis by deed of record in Book 4420, Page 516, in the Register's Office of Shelby County, Tennessee. Said property is improved by premises known as 1794-96 N. Hollywood.

(48) PARCEL XXXXVIII: Lot 26, Block 4 of the Belmont Park Subdivision as shown on plat of record in Plat Book 6, Page 114, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1681 Oakwood.

(49) PARCEL XXXXIX: Lot 14, of East Belmont Park Subdivision as shown on plat of record in Plat Book 10, Page 59, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, said lot being improved by premises known as 2492-94 Hanwood Road.

(50) PARCEL L: Lots 40 and 41, Block 23, Ville Land Company's Douglas Place Subdivision as shown on plat of record in Plat Book 6, Pages 2 and 3 in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1645 Ellington.

(51) PARCEL LI: Lot 5 of the West Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 2 in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1659 Carpenter.

(52) PARCEL LII: The North one-half of the East one-half of Lot 40, of the West Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 2, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1655 Warford.

(53) PARCEL LIII: Lot 47 of the West Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 2 in the Register's Office of Shelby County, Tennessee; to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1620 Carpenter.

(54) PARCEL LIV: Lot 57 of the West Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 2, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1578-80 Carpenter.

(55) PARCEL LV: Lot 63, of the West Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 2, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1619 Warford.

(56) PARCEL LVI: Lot 1, South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and said lot is unimproved.

(57) PARCEL LVII: Lots 3 and 4 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, less and except that part of said lots conveyed to the City of Memphis by deed of record in Book 2030, Page 426, in said Register's Office, and improved by premises known as 2946-2948 Chelsea Avenue.

(58) PARCEL LVIII: Lots 5 and 6 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63 in the Register's Office of Shelby County, Tennessee, less and except that portion of said lots taken to widen Chelsea Avenue. The said Lots 5 and 6 are unimproved.

(59) PARCEL LIX: Lot 8 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, less and except that portion of said lot conveyed to the City of Memphis for the widening of Chelsea Avenue, and said lot is improved by premises known as 2966 Chelsea Avenue.

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(60) PARCEL LX: Lot 11 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and being an unimproved lot.

(61) PARCEL LXI: Lot 22 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, less and except that part of said lot conveyed to the City of Memphis by deed of record in Book 1988, Page 390, in said Register's Office, and improved by premises known as 3010 Chelsea Avenue.

(62) PARCEL LXII: Lot 23 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, less and except that part of said lot conveyed to the City of Memphis by deed of record in Book 2029, Page 455, in said Register's Office, and being an unimproved lot.

(63) PARCEL LXIII: Lot 35 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, less and except that part of said lot conveyed to the City of Memphis by deed of record in Book 2029, Page 454, in said Register's Office, and improved by premises known as 3032 Chelsea Avenue.

(64) PARCEL LXIV: Lot 76 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 1537 Pope Street.

(65) PARCEL LXV: Lots 106, 115, 116, 117, 118 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots, and said lots being unimproved.

(66) PARCEL LXVI: Lot 122 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, less and except that part of said lot conveyed to the City of Memphis by deed of record in Book 1989, Page 280, in said Register's Office, and improved by premises known as 3097-3099 Chelsea Avenue.

(67) PARCEL LXVII: Lot 162 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot less and except that part of said lot conveyed to the City of Memphis by deed of record in Book 1935, Page 629, in said Register's Office. The said lot 162 is an unimproved lot.

(68) PARCEL LXVIII: Lot 197 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 1459 Oriole.

(69) PARCEL LXIX: Lot 210 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, less and except that part of said lot conveyed to the City of Memphis by deed of record in Book 1989, Page 285, in said Register's Office, and being unimproved.

(70) PARCEL LXX: Lot 228 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and being improved by premises known as 1432 Sunset.

(71) PARCEL LXXI: Lot 243 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, less and except that part conveyed to the City of Memphis by deed of record in Book 2031, Page 170, in said Register's Office, and being improved by premises known as 3013 Chelsea Avenue.

(72) PARCEL LXXII: The West one-third of Lots 87, 88 and 89 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots, less and except that part conveyed to the City of Memphis by deed of record in Book 2030, Page 455, in said Register's Office, and improved by premises known as 3114 Chelsea Avenue.

(73) PARCEL LXXIII: Lot 244 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, less and except that part of said lot conveyed to the City of Memphis by deed of record in Book 2030, Page 537, in said Register's Office. The said lot is unimproved.

(74) PARCEL LXXIV: Lot 277 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 1488-1490 Lake Grove.

(75) PARCEL LXXV: Lot 285 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 1475 Lake Grove.

(76) PARCEL LXXVI: Lot 290 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 1495 Lake Grove.

(77) PARCEL LXXVII: Lot 293 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 1507 Lake Grove.

(78) PARCEL LXXVIII: Lots 294, 295, 296, 297, 298 and 299 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots, less and except that part of said lots conveyed to the City of Memphis by deed of record in Book 2031, Page 96, in said Register's Office. All of said lots are unimproved.

(79) PARCEL LXXIX: Lot 76 of Bungalow Park Subdivision as shown on plat of record in Plat Book 8, Page 198, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 1628-1630 Lake Grove.

(80) PARCEL LXXX: Lot 274 of Bungalow Park Subdivision as shown on plat of record in Plat Book 8, Page 198, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 1591-1591½ Locust.

(81) PARCEL LXXXI: Lot 357 of Bungalow Park Subdivision as shown on plat of record in Plat Book 8, Page 198, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 1654 Pope Street.

(82) PARCEL LXXXII: Lot 390 of Bungalow Park Subdivision as shown on plat of record in Plat Book 8, Page 198, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot, and improved by premises known as 2989-2991 Mt. Olive.

(83) PARCEL LXXXIII: Lots 28 and 29, Block "A", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots, less and except that part of said lots conveyed to the City of Memphis by deed of record in Book 5266, Page 271, in said Register's Office. Said lots are unimproved.

(84) PARCEL LXXXIV: Lots 41 and 42, Block "A", Magnolia Blossom Subdivision, as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots, less and except that part of said lots conveyed to the City of Memphis by deed of record in Book 5267, Page 446, in said Register's Office. The said lots are improved by premises known as 2114 Person.

(85) PARCEL LXXXV: Lots 16 and 17, Block "B", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2151 Goff.

(86) PARCEL LXXXVI: Lots 24, Block "B", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 2158 Lowell.

(87) PARCEL LXXXXVII: Lots 35 and 36, Block "B", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2126 Lowell.

(88) PARCEL LXXXXVIII: Lots 23 and 24, Block "C", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2158 Goff.

(89) PARCEL LXXXXIX: Lot 33, Block "C", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 2134 Goff.

(90) PARCEL LC: Lot 38, Block "C", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 2122 Goff.

(91) PARCEL LCI: Lot 15, Block "E", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 2147 Turner.

(92) PARCEL LCII: Lots 2 and 3, Block "F", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2115-2117 Dublin.

(93) PARCEL LCIII: Lots 12 and 13, Block "F", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots. Said lots are unimproved.

(94) PARCEL LCIV: Lots 33 and 34, Block "F", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2132 Turner.

(95) PARCEL LCV: Lots 12 and 13, Block "G", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2139-2141 Ethlyn.

(96) PARCEL LCVI: Lots 14 and 15, Block "G", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2143-2145 Ethlyn.

(97) PARCEL LCVII: Lots 22 and 23, Block "G", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2158 Dublin.

(98) PARCEL LCVIII: Lots 34 and 36, Block "H", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2128 Ethlyn.

(99) PARCEL LCIX: Lot 3, Block "I", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 2115 Bennett.

(100) PARCEL C: Lots 24 and 25, Block "I", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots and improved by premises known as 2154 Farmar.

(101) PARCEL CI: Lot 15, Block "A", Yale Subdivision as shown on plat of record in Plat Book 9, Page 60, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and being an unimproved lot.

(102) PARCEL CII: Lot 300 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and being an unimproved lot.

(103) PARCEL CIII: Lots 22, 23, 24, 25, 26, 27, and 28, Block "F", Magnolia Blossom Subdivision as shown on plat of record in Plat Book 8, Page 187, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots. All of said lots are unimproved.

(104) PARCEL CIV: Lots 20, 21 and 22, Block "A", Yale Subdivision as shown on plat of record in Plat Book 9, Page 60, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lots, less and except that part of said lots conveyed to the City of Memphis by deed of record in Book 5267, Page 446, in the Register's Office of Shelby County, Tennessee, and being improved by premises known as 1659-71 South Cooper Street.

(105) PARCEL CV: Lot 1 of Hat Subdivision as shown on plat of record in Plat Book 25, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 2225 Riley.

(106) PARCEL CVI: Lot 2 of Hat Subdivision as shown on plat of record in Plat Book 25, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 2229 Riley.

H20086

(107) PARCEL CVII: Lot 12 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1485-1487 South Cooper.

(108) PARCEL CVIII: Lot 13 of West Magnolia Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1479-87 S. Cooper Street.

(109) PARCEL CIX: Lot 14 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1473-1475 South Cooper Street.

(110) PARCEL CX: Lot 15 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1467-1469 South Cooper Street.

(111) PARCEL CXI: Lot 16 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1463-1465 South Cooper Street.

(112) PARCEL CXII: Lot 17 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1457-1459 South Cooper Street.

(113) PARCEL CXIII: Lot 18 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1451-53 South Cooper Street.

(114) PARCEL CXIV: Lot 37 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1605 Livewell Circle.

(115) PARCEL CXV: Lot 39 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1615 Livewell Circle.

(116) PARCEL CXVI: Lot 56 of West Magnolia Heights Subdivision as shown on plat of record in Plat Book 12, Page 66, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and improved by premises known as 1496 Castalia.

H2 0086

(117) PARCEL CXVII: Lots 21, 20, and 22 of the Fairgrounds Subdivision and being more particularly described as follows:

BEGINNING at a point in the north line of Cable (formerly Foster Avenue) 124.8 feet west of the west line of Garfield Street; running thence westwardly with said north line of Cable Avenue 75 feet; thence northwardly with the west line of Lot 20 a distance of 110 feet to a stake; thence eastwardly parallel with Cable Avenue 75 feet to a stake; thence southwardly 110 feet more or less to the point of beginning, less and except Lot 20 and the west one-half of Lot 21 of said subdivision conveyed to John D. Lott and Minnie G. Lott by deed of record in Book 5157, Page 230, in the Register's Office of Shelby County, Tennessee. The said lots are improved by premises known as 2304 Cable Avenue.

H2 0086

(118) PARCEL CXVIII: Lot 15 of the East Belmont Park Subdivision, a plat of which is of record in Plat Book 10, Page 59 of the Register's Office of Shelby County, Tennessee, and being improved with a duplex known as 2500-02 Hanwood Road.

(119) PARCEL CXIX: Lots 302 and 303 of the South Bungalow Park Subdivision, as per plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, and being unimproved lots.

(120) PARCEL CXX: Lot 311 of the South Bungalow Subdivision, as per plat of record in Plat Book 9, Page 63 in the Register's Office of Shelby County, Tennessee, and being unimproved lot. Subject to permanent easement for Workhouse Bayou Interceptor and generally encompassing Lot 311 in entirety.

(121) PARCEL CXXI: The 5th. 40 feet from the west line of Lot 5 of the Bungalow Park Subdivision, as per plat which is of record in Plat Book 8, Page 198 in the Register's Office of Shelby County, Tennessee, and improved by premises known as 3049 Calvert Avenue.

(122) PARCEL CXXII: Lots 5 and 6, W. G. Curry Subdivision as shown in Plat Book 8, Page 172, as recorded in the Register's Office of Shelby County, Tennessee, improved with duplexes known as 2225-27 Eldridge and 2229-31 Eldridge.

(123) PARCEL CXXIII: Lot 42 of W. G. Curry Subdivision of North 5.16 acres of Lot 13, F. S. Latham Subdivision as recorded in Plat Book 8, Page 172, in the Register's Office of Shelby County, Tennessee, and a one foot strip east of and adjoining said Lot 42, improved with duplex known as 2261-63 Hunter Avenue.

(124) PARCEL CXXIV: Part of Lot 41, being the Northeast 1/4 of Lot 41 of the West Bungalow Park Subdivision, of record in Plat Book 9, Page 2 in the Register's Office of Shelby County, Tennessee, and improved with House #1647 Warford.

(125) PARCEL CXXV: Lots 33 and 34, Block "B", of the Magnolia Blossom Subdivision, a plat of which is recorded in Plat Book 8, Page 187 in the Register's Office of Shelby County, Tennessee, and improved with premises known as 2132 Lowell.

(126) PARCEL CXXVI: Lot 22, Block "C", of the Magnolia Blossom Subdivision, a plat of which is of record in Plat Book 8, Page 187 in the Register's Office of Shelby County, Tennessee, and improved with premises known as 2162 Goff Avenue.

(127) PARCEL CXXVII: Part of Lot 36 in the Warfield Second Subdivision (unrecorded) located on the East side of Castalia Street South of Quinn Avenue, and improved with premises known as 1432 South Castalia Street.

(128) PARCEL CXXVIII: Part of Lots 40 and 41, McKeon and Cross Subdivision, of record in Will Book 134, Page 285 in the Office of the Clerk of the Probate Court of Shelby County, Tennessee, and being the same property conveyed by Susie Holt Pegues and Helen Holt Robinson to E. J. Curry, Pauline Curry, and Mary Curry by Warranty Deed F48787, recorded May 14, 1970, and improved with premises known as 1042 Overton Park Avenue.

H2 0086

(129) PARCEL CXXIX: Lots 45, 46, and 47 of the McKeon and Cross Subdivision, as shown and designated on plat of said subdivision of record in Plat Book 2, Page 28, in the Register's Office of Shelby County, Tennessee, and improved with four duplexes known as 1062-1064, 1066-1068, 1070-1072 and 1074-1076 Overton Park Avenue.

(130) PARCEL CXXX: Being a part of Lot 49, Chelsea Greenlaw Subdivision by deed of record in Book 2791, Page 164, in the Register's Office of Shelby County, Tennessee, improved with premises known as 578 N. Second Street.

(131) PARCEL CXXXI: Lot 69, North Poplar Park Subdivision as shown on plat of record in Plat Book 12, Page 7, in the Register's Office of Shelby County, Tennessee, and improved with premises known as 3228 Highland Park Place.

(132) PARCEL CXXXII: Lots 188 and 209, Mayfield Subdivision as shown on plat of record in Plat Book 7, Page 41 in the Register's Office of Shelby County, Tennessee. Lot 188 is improved by premises known as 2329 and 2331 Golden Avenue. Lot 209 is improved with premises known as 2419-21 Golden Avenue, subject to restrictions of record in Book 871, Page 249 and in Book 1153, Page 85 in the Register's Office, Shelby County, Tennessee.

(133) PARCEL CXXXIII: Lot 126 of South Bungalow Park Subdivision as shown on plat of record in Plat Book 9, Page 63, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said lot and being an unimproved lot.

TO HAVE AND TO HOLD the aforesaid real estate, together with all the appurtenances and hereditaments thereunto belonging or in any wise appertaining unto the said parties of the second part, their heirs and assigns in fee simple forever. And the said parties of the first part do hereby covenant with the said parties of the second part that they are lawfully seized in fee of the aforedescribed real estate, that they have a good right to sell and convey the same; that the same is unencumbered, except for 1972 City and County taxes, and Trust Deed of record in Book 5602, Page 145, in the Register's Office of Shelby County, Tennessee, and affecting Parcel XXVII (27) hereinabove described, which the parties of the second part assume and agree to pay; and this conveyance is subject to all enforceable restrictions, to all easements and leases, and that the title and quiet possession thereto they will warrant and forever defend against the lawful claims of all persons, claiming the same by, through and under them, but not further or otherwise.

WITNESS the signatures of the said parties of the first part, the day and year first above written.

H2 0086

E. J. CURRY

MARY CURRY

PAULINE CURRY

STATE OF TENNESSEE)
COUNTY OF SHELBY)

Before me, a Notary Public in and for said State and County, duly commissioned and qualified, personally appeared E. J. CURRY, MARY CURRY and PAULINE CURRY, to me known to be the persons described in and who executed the foregoing instrument, and acknowledged that they executed the same as their free act and deed.

WITNESS my hand and Notarial Seal at office this the 2 day of August, 1972.

Notary Public

My Commission Expires:
My Commission Expires Sept. 24, 1975

H20086

STATE TAX
REGISTER'S FEE 2.80
AUG 16 12 11 PM '72
STATE OF TENNESSEE
SHELBY

We, E. J. Curry, Mary Curry and Pauline Curry the undersigned, hereby swear that to the best of affiants' knowledge, information and belief, the actual consideration for this transfer is less than $50.00.

Sworn and subscribed to before me this 2 day of ~~July~~ Aug, 1972.

Notary Public

My Commission Expires: My Commission Expires Sept. 24, 1975

LEGIBILITY OF WRITING, TYPING OR PRINTING UNSATISFACTORY IN THIS DOCUMENT WHEN MICROFILMED.
REGISTER

This instrument was prepared by:
Tennessee Department of Environment & Conservation
Division of Remediation
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243

AMENDED
NOTICE OF HAZARDOUS SUBSTANCE SITE

REMEDIATION SITE NUMBER: 79-598

NAME OF TITLE HOLDERS: W.J. Curry & Son

Whereas, a Notice of Hazardous Substance Site was filed in the Office of the Register of Deeds for Shelby County, Tennessee upon property so described in Instrument Number H20086 and recorded in Instrument Number AV3540 on December 9, 1988.

The Tennessee Department of Environment and Conservation has determined that all parcels included in the above noted Instrument #H20086, with the exception of the two parcels listed below, are not included in this notification.

NOW, Therefore, the Tennessee Department of Environment and Conservation does hereby amend the above noted Notice to include only those parcels noted as Tract 1 and Tract 2, on Page 8 and 9, of said Instrument Number H20086. All other tracts and parcels included in said instrument are excluded from this Notice.

Executed this 20th day of June, 2013

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
ROBERT J. MARTINEAU, JR.

BY: Robert A Binford

Robert A. Binford, Director
Division of Remediation
Tennessee Department of Environment and Conservation
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243

STATE OF TENNESSEE

Before me, the undersigned Notary Public in the State aforesaid, personally appeared Robert A. Binford, with whom I am personally acquainted, and who, upon oath acknowledged himself to be Director of the Division of Remediation, Tennessee Department of Environment and Conservation, and that he as such Director, executed the foregoing instrument by his signature for the purpose therein contained, by delegated authority from the Commissioner of the Department of Environment and Conservation.

WITNESS, my hand and official seal of office this 20th day of June, 2013

Teresa H. Lewis
NOTARY PUBLIC

TERESA H. LEWIS
NOTARY PUBLIC AT LARGE
WILSON CO. TENN.

My Commission Expires: November 8, 2015

(45) PARCEL XXXXV: Part of the W. J. Curry Property; being more particularly described by metes and bounds as follows:

Tract 1:

BEGINNING at a point in the northwest line of Belmont Circle (50 feet wide) a distance of 1321.67 feet southwestwardly as measured along the northwest line of Belmont Circle from its tangent intersection with the west line of Hollywood Street (80 feet wide) said point of beginning being a point in the north line of Lot 22 in Wm. F. Harden Subdivision; thence north 89 degrees, 09 minutes west along the north line of said Lot 22 a distance of 964.73 feet to an old iron pipe at the southeast corner of the property of Frieda M. Reiff, Et. Al. ; thence north 00 degrees, 21 minutes west along the east line of the property of Frieda M. Reiff, Et. Al. a distance of 1309.51 feet to a point in the south line of the Wolf River Channel Improvement R.O.W.; thence along the south line of said R.O.W. six (6) courses as follows: north 76 degrees, 23 minutes east a distance of 124.60 feet to a point; thence north 75 degrees, 52 minutes east a distance of 404.55 feet to a point; thence north 78 degrees, 17 minutes east a distance of 437.77 feet to a point; thence north 85 degrees, 21 minutes east a distance of 233.06 feet to a point; thence south 70 degrees, 07 minutes east a distance of 291.54 feet to a point; thence south 66 degrees, 56 minutes east a distance of 223.45 feet to a point in the west line of Hollywood Street (120 feet wide); thence south 1 degree, 35 minutes east along the west line of Hollywood Street a distance of 179.04 feet to a point; thence north 88 degrees, 25 minutes east a distance of 20.00 feet to a point in the west line of Hollywood Street (80 feet wide); thence south 1 degree, 35 minutes east along the west line of Hollywood Street (80 feet wide) a distance of 244.99 feet to a point; thence southwardly along the west line of Hollywood Street along a curve to the left having a radius of 1240 feet a distance of 33.23 feet to a point; thence along a curve to the right having a radius of 20 feet a distance of 29.94 feet to a point in the northwest line of Belmont Circle (50 feet wide); thence southwestwardly along the northwest line of Belmont Circle seven (7) courses as follows: southwestwardly along a curve to the left having a radius of 286.50 feet a distance of 209.45 feet to a point; thence southwestwardly along a curve to the left having a radius of 168.25 feet a distance of 205.36 feet to a point; thence southwestwardly along a curve to the right having a radius of 229.67 feet a distance of 172.90 feet to a point; thence south 13 degrees, 49 minutes west a distance of 69.90 feet to a point; thence southwestwardly along a curve to the right having a radius of 247.86 feet a distance of 220.70 feet to a point; thence south 64 degrees, 50 minutes, west a distance of 258.10 feet to a point; thence southwestwardly along a curve to the left having a radius of 465.80 feet a distance of 166.69 feet to the point of beginning.

Tract 2:

BEGINNING at a point in the east line of Hollywood Street (80 feet wide) a distance of 297.27 feet northwardly as measured along the east line of Hollywood Street from its tangent intersection with the north line of Belmont Circle (50 feet wide); thence north 88 degrees, 25 minutes east a distance of 20.00 feet to a point in the east line of Hollywood Street (120 feet wide); thence north 1 degree, 35 minutes west along the east line of Hollywood Street (120 feet wide) a distance of 123.96 feet to a point in the south line of the Wolf River Channel Improvement R.O.W.; thence eastwardly along the south line of said R.O.W. Three (3) courses as follows: south 66 degrees, 56 minutes east a distance of 75.00 feet to a point; thence south 82 degrees,

59 minutes east a distance of 418.96 feet to a point; thence south 79 degrees, 21 minutes east a distance of 293.32 feet to a point in the west line of the Lanahan Property; thence south 00 degrees, 05 minutes east a distance of 1649.07 feet; thence south 89 degrees, 42 minutes west along the north boundary line of East Belmont Park Subdivision a distance of 373.20 feet to a point; thence north 00 degrees, 05 minutes west along the boundary line of said subdivision a distance of 100.00 feet to an angle point in said boundary line; thence south 89 degrees, 42 minutes west along the north boundary line of East Belmont Park Subdivision a distance of 160.00 feet to a point in the east line of Hollywood Street (80 feet wide); thence north 00 degrees, 05 minutes west along the east line of Hollywood Street a distance of 266.27 feet to a point; thence northwardly along the east line of Hollywood Street along a curve to the left having a radius of 1240 feet a distance of 178.31 feet to a point, said point being the intersection of the east line of Hollywood Street with the east line of Belmont Circle (50 feet wide); thence along the east line of Belmont Circle six (6) courses as follows: northeastwardly along a curve to the right having a radius of 496 feet a distance of 69.91 feet to a point; thence north 22 degrees, 48 minutes east a distance of 73.70 feet to a point; thence northwardly along a curve to the left having a radius of 483.40 feet a distance of 313.01 feet to a point; thence northwestwardly along a curve to the left having a radius of 661.70 feet a distance of 296.61 feet to a point; thence north 39 degrees, 59 minutes west a distance of 29.80 feet to a point; thence northwestwardly along a curve to the left having a radius of 285.50 feet a distance of 172.49 feet to a point; thence along a curve to the right having a radius of 20 feet a distance of 24.83 feet to a point in the east line of Hollywood Street (80 feet wide); thence northwardly along the east line of Hollywood Street along a curve to the right having a radius of 1160 feet a distance of 37.98 feet to a point; thence north 1 degree, 35 minutes west along the east line of Hollywood Street a distance of 244.99 feet to the point of beginning. Said Tracts 1 and 2 above described are unimproved.

(46) PARCEL XXXXVI: Lot 1, Block 1 of Belmont Park Subdivision as shown on plat of record in Plat Book 6, Page 114, in the Register's Office of Shelby County, Tennessee; to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 2438 Blue Road.

(47) PARCEL XXXXVII: Lot 18, Block 1, of Belmont Park Subdivision as shown on plat of record in Plat Book 6, Page 114 in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, less and except that portion of said lot acquired by the City of Memphis by deed of record in Book 4420, Page 616, in the Register's Office of Shelby County, Tennessee. Said property is improved by premises known as 1794-96 N. Hollywood.

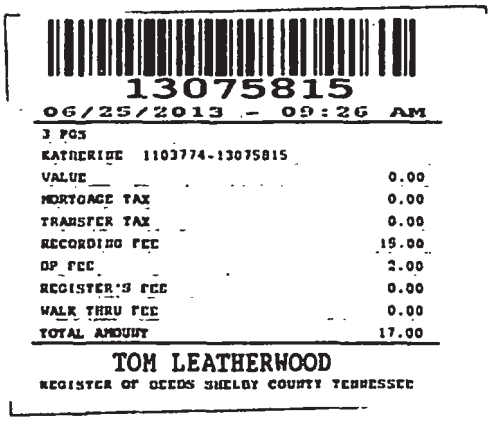
(48) PARCEL XXXXVIII: Lot 26, Block 4 of the Belmont Park Subdivision as shown on plat of record in Plat Book 6, Page 114, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, and improved by premises known as 1681 Oakwood.

(49) PARCEL XXXXIX: Lot 14, of East Belmont Park Subdivision as shown on plat of record in Plat Book 10, Page 59, in the Register's Office of Shelby County, Tennessee, to which plat reference is hereby made for a more particular description of said property, said lot being improved by premises known as 2492-94 Hanwood Road.

Tom Leatherwood

Shelby County Register

As evidenced by the instrument number shown below, this document has been recorded as a permanent record in the archives of the Office of the Shelby County Register.



13075815

06/25/2013 - 09:26 AM

3 PGS	
KATHERINE 1103774-13075815	
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	15.00
DP FEE	2.00
REGISTER'S FEE	0.00
WALK THRU FEE	0.00
TOTAL AMOUNT	17.00

TOM LEATHERWOOD

REGISTER OF DEEDS SHELBY COUNTY TENNESSEE

1075 Mullins Station, Suite W 165 ~ Memphis, Tennessee 38134 (901) 222-8100
Website: http://register.shelby.tn.us Email: Tom.Leatherwood@shelbycountytn.gov

This instrument was prepared by:
Tennessee Department of Environment and Conservation
Division of Remediation
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243

NOTICE OF HAZARDOUS SUBSTANCE SITE

Pursuant to 68-212-212(d), of the Tennessee Code Annotated being a portion of the Hazardous Waste Management Act of 1983, as amended, notice is hereby given that the property described herein below has been placed on the Tennessee List of Inactive Hazardous Substance Sites complied in accordance with T.C.A. Section 68-212-206.

TENNESSEE REMEDIATION SITE NUMBER and NAME:

79-598 NORTH HOLLYWOOD DUMP

NAME OF TITLEHOLDERS: E.G. STEPHENSON AND WIFE, RUTH STEPHENSON

DESCRIPTION OF PROPERTY:

A certain tract or parcel of land located in Shelby County, State of Tennessee, the same being more particularly described in Instrument Number J6 8391 in the Office of Register of Deeds for said County.

Executed this 20th day of June, 2013.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
ROBERT J. MARTINEAU, JR., COMMISSIONER

BY: Robert A Binford

Robert A. Binford, Director
Division of Remediation
Tennessee Department of Environment and Conservation
401 Church Street, 4th Floor, L & C Annex
Nashville, Tennessee 37243

STATE OF TENNESSEE

Before me, the undersigned Notary Public in the State and County aforesaid, personally appeared Robert A. Binford, with whom I am personally acquainted, and who, upon oath acknowledged himself to be Director of the Division of Remediation, Tennessee Department of Environment and Conservation, and that he as such Director, executed the foregoing instrument by his signature for the purpose therein contained, by delegated authority from the Commissioner of the Department of Environment and Conservation.

WITNESS, my hand and Official Seal of office this 20th day of June, 2013.

Teresa H. Lewis

NOTARY PUBLIC

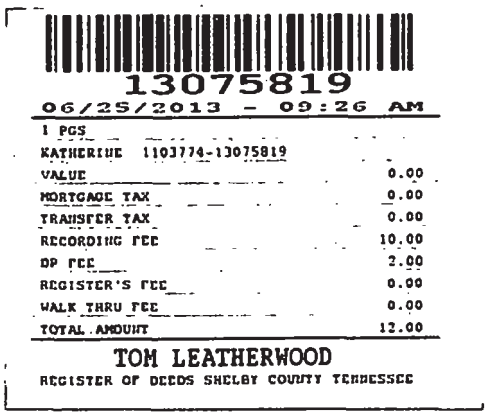
TERESA H. LEWIS NOTARY PUBLIC AT LARGE WILSON CO. TENN.

My Commission Expires: November 8th, 2015.

Tom Leatherwood

Shelby County Register

As evidenced by the instrument number shown below, this document has been recorded as a permanent record in the archives of the Office of the Shelby County Register.



13075819

06/25/2013 - 09:26 AM

1 PGS	
KATHERINE 1103774-13075819	
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	10.00
DP FEE	2.00
REGISTER'S FEE	0.00
WALK THRU FEE	0.00
TOTAL AMOUNT	12.00

TOM LEATHERWOOD

REGISTER OF DEEDS SHELBY COUNTY TENNESSEE

1075 Mullins Station, Suite W 165 ~ Memphis, Tennessee 38134 (901) 222-8100
Website: http://register.shelby.tn.us Email: Tom.Leatherwood@shelbycountytn.gov

This instrument was prepared by:
Tennessee Department of Environment and Conservation
Division of Remediation
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243

NOTICE OF HAZARDOUS SUBSTANCE SITE

Pursuant to 68-212-212(d), of the Tennessee Code Annotated being a portion of the Hazardous Waste Management Act of 1983, as amended, notice is hereby given that the property described herein below has been placed on the Tennessee List of Inactive Hazardous Substance Sites complied in accordance with T.C.A. Section 68-212-206.

TENNESSEE REMEDIATION SITE NUMBER and NAME:

79-598 NORTH HOLLYWOOD DUMP

NAME OF TITLEHOLDERS: CITY OF MEMPHIS

DESCRIPTION OF PROPERTY:

A certain tract or parcel of land located in Shelby County, State of Tennessee, the same being more particularly described in Instrument Number M5 2098 in the Office of Register of Deeds for said County.

Executed this 20th day of June, 2013.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
ROBERT J. MARTINEAU, JR., COMMISSIONER

BY: _____
Robert A. Binford, Director
Division of Remediation
Tennessee Department of Environment and Conservation
401 Church Street, 4th Floor, L & C Annex
Nashville, Tennessee 37243

STATE OF TENNESSEE

Before me, the undersigned Notary Public in the State and County aforesaid, personally appeared Robert A. Binford, with whom I am personally acquainted, and who, upon oath acknowledged himself to be Director of the Division of Remediation, Tennessee Department of Environment and Conservation, and that he as such Director, executed the foregoing instrument by his signature for the purpose therein contained, by delegated authority from the Commissioner of the Department of Environment and Conservation.

WITNESS, my hand and Official Seal of office this 20th day of June, 2013.

_____
NOTARY PUBLIC

TERESA H. LEWIS NOTARY PUBLIC AT LARGE WILSON CO. TENN.

My Commission Expires: November 8th, 2015.

Tom Leatherwood

Shelby County Register

As evidenced by the instrument number shown below, this document has been recorded as a permanent record in the archives of the Office of the Shelby County Register.

13075818

06/25/2013 - 09:26 AM

1 PGS	
KATHERINE 1103774-13075818	
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	10.00
DP FEE	2.00
REGISTER'S FEE	0.00
WALK THRU FEE	0.00
TOTAL AMOUNT	12.00

TOM LEATHERWOOD

REGISTER OF DEEDS SHELBY COUNTY TENNESSEE

1075 Mullins Station, Suite W 165 ~ Memphis, Tennessee 38134 (901) 222-8100
Website: http://register.shelby.tn.us Email: Tom.Leatherwood@shelbycountytn.gov

This instrument was prepared by:
Tennessee Department of Environment and Conservation
Division of Remediation
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243

NOTICE OF HAZARDOUS SUBSTANCE SITE

Pursuant to 68-212-212(d), of the Tennessee Code Annotated being a portion of the Hazardous Waste Management Act of 1983, as amended, notice is hereby given that the property described herein below has been placed on the Tennessee List of Inactive Hazardous Substance Sites complied in accordance with T.C.A. Section 68-212-206.

TENNESSEE REMEDIATION SITE NUMBER and NAME:

79-598 NORTH HOLLYWOOD DUMP

NAME OF TITLEHOLDERS: SHELBY COUNTY GOVERNMENT

DESCRIPTION OF PROPERTY:

A certain tract or parcel of land located in Shelby County, State of Tennessee, the same being more particularly described in Instrument Number AW 4911 in the Office of Register of Deeds for said County.

Executed this 20th day of June, 2013.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
ROBERT J. MARTINEAU, JR., COMMISSIONER

BY: Robert A Binford

Robert A. Binford, Director
Division of Remediation
Tennessee Department of Environment and Conservation
401 Church Street, 4th Floor, L & C Annex
Nashville, Tennessee 37243

STATE OF TENNESSEE

Before me, the undersigned Notary Public in the State and County aforesaid, personally appeared Robert A. Binford, with whom I am personally acquainted, and who, upon oath acknowledged himself to be Director of the Division of Remediation, Tennessee Department of Environment and Conservation, and that he as such Director, executed the foregoing instrument by his signature for the purpose therein contained, by delegated authority from the Commissioner of the Department of Environment and Conservation.

WITNESS, my hand and Official Seal of office this 20th day of June, 2013.

Teresa H. Lewis

NOTARY PUBLIC

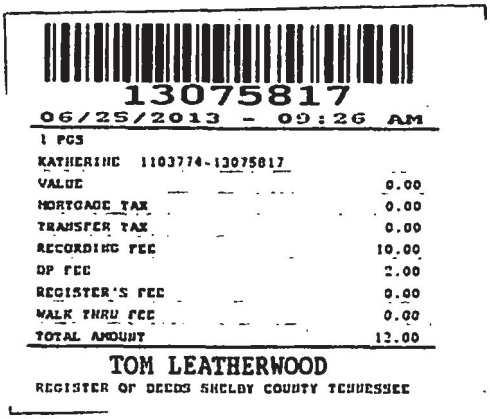
TERESA H. LEWIS NOTARY PUBLIC AT LARGE WILSON CO. TENN.

My Commission Expires: November 8th, 2015.

Tom Leatherwood

Shelby County Register

As evidenced by the instrument number shown below, this document has been recorded as a permanent record in the archives of the Office of the Shelby County Register.



13075817

06/25/2013 - 09:26 AM

1 PGS	
KATHERINE 1103774-13075817	
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	10.00
DP FEE	2.00
REGISTER'S FEE	0.00
WALK THRU FEE	0.00
TOTAL AMOUNT	12.00

TOM LEATHERWOOD

REGISTER OF DEEDS SHELBY COUNTY TENNESSEE

1075 Mullins Station, Suite W 165 ~ Memphis, Tennessee 38134 (901) 222-8100
Website: http://register.shelby.tn.us Email: Tom.Leatherwood@shelbycountytn.gov

This instrument was prepared by:
Tennessee Department of Environment and Conservation
Division of Remediation
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243

NOTICE OF HAZARDOUS SUBSTANCE SITE

Pursuant to 68-212-212(d), of the Tennessee Code Annotated being a portion of the Hazardous Waste Management Act of 1983, as amended, notice is hereby given that the property described herein below has been placed on the Tennessee List of Inactive Hazardous Substance Sites complied in accordance with T.C.A. Section 68-212-206.

TENNESSEE REMEDIATION SITE NUMBER and NAME:

79-598 NORTH HOLLYWOOD DUMP

NAME OF TITLEHOLDERS: CITY OF MEMPHIS

DESCRIPTION OF PROPERTY:

A certain tract or parcel of land located in Shelby County, State of Tennessee, the same being more particularly described in Instrument Number 06075130 in the Office of Register of Deeds for said County.

Executed this 20th day of June, 2013.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
ROBERT J. MARTINEAU, JR., COMMISSIONER

BY: Robert A Binford

Robert A. Binford, Director
Division of Remediation
Tennessee Department of Environment and Conservation
401 Church Street, 4th Floor, L & C Annex
Nashville, Tennessee 37243

STATE OF TENNESSEE

Before me, the undersigned Notary Public in the State and County aforesaid, personally appeared Robert A. Binford, with whom I am personally acquainted, and who, upon oath acknowledged himself to be Director of the Division of Remediation, Tennessee Department of Environment and Conservation, and that he as such Director, executed the foregoing instrument by his signature for the purpose therein contained, by delegated authority from the Commissioner of the Department of Environment and Conservation.

WITNESS, my hand and Official Seal of office this 20th day of June, 2013.

Teresa H. Lewis

NOTARY PUBLIC

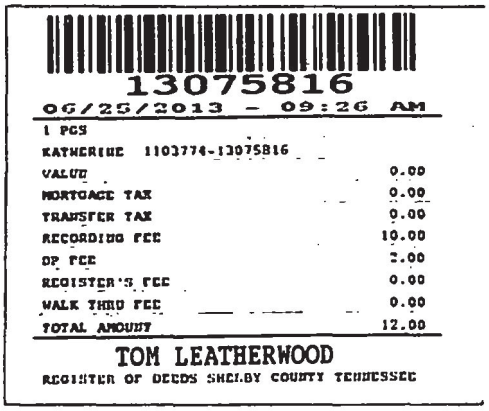
TERESA H. LEWIS NOTARY PUBLIC AT LARGE WILSON CO. TENN.

My Commission Expires: November 8th, 2015.

Tom Leatherwood

Shelby County Register

As evidenced by the instrument number shown below, this document has been recorded as a permanent record in the archives of the Office of the Shelby County Register.



13075816

06/25/2013 - 09:26 AM

1 PGS	
KATHERINE 1103774-13075816	
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	10.00
DP FEE	2.00
REGISTER'S FEE	0.00
WALK THRU FEE	0.00
TOTAL AMOUNT	12.00

TOM LEATHERWOOD

REGISTER OF DEEDS SHELBY COUNTY TENNESSEE

1075 Mullins Station, Suite W 165 ~ Memphis, Tennessee 38134 (901) 222-8100
Website: http://register.shelby.tn.us Email: Tom.Leatherwood@shelbycountytn.gov

M5 2098

This Instrument Prepared by
Department of Transportation
Legal Division
Nashville, Tennessee

Project No. I-240-1(83)4
Shelby County
Tracts No.711,712 &713

D E E D

WHEREAS the Department of Transportation of the State of Tennessee, and the City of Memphis, entered into a verbal contract.

WHEREAS, said road is a public road, or thoroughfare of the City of Memphis, and is not a part of the system of highways belonging to or maintained by the Department of Transportation, and;

WHEREAS, the tracts were acquired by the State of Tennessee for the use and benefit of the Department of Highways of said state, and it is now desirable that said rights-of-way acquired by the State of Tennessee be vested in the true owner thereof, the City of Memphis.

NOW THEREFORE, for and in consideration of Three Thousand, Three Hundred & 20/100 ($3,300.20) Dollars, receipt of which is hereby acknowledged, the State of Tennessee by and through it's Commissioner of Finance & Administration does hereby transfer, convey and deliver unto the City of Memphis, the following described tracts, parcels and easements acquired in connection with Project No. I-240-1(83)4. Said parcels are located in Shelby County, Tennessee; and, are described as follows:

TRACT NO.711:

Being part of Lot 14, Belmont Park Subdivision as conveyed to Fred Shaw, et ux, as per deed of record, Book 3423, Page 588, of the Shelby County Register's Office, less the portion sold to the City of Memphis (right-of-way for Hollywood Street) as recorded in Book 4420, page 136 and Book 4635, Page 423, of the Shelby County Register's Office, and being more particularly described as follows:

ACQUISITION PARCEL-ACCESS NOT CONTROLLED

Beginning at a point in the east line of North Hollywood Street (80 feet wide), said point being the northwest corner of Lot 15, Belmont Park Subdivision; thence along the east line of North Hollywood Street on a curve to the right having a radius of 1,160 feet a distance of 51.20 feet to a point, said point being the southwest corner of Lot 12, Belmont Park Subdivision; thence on a Tennessee Lambert Grid Bearing of North 88 degrees 48 minutes 40 seconds East a distance of 2.22 feet to a point; thence southwardly on a curve to the left having a radius of 720.70 feet a distance of 51.72 feet to a point in the north line of Lot 15; thence South 88 degrees 48 minutes 40

seconds West along the north line of Lot 15 a distance of 0.10 feet to the point of beginning.

CONTAINING: 51 square feet.

TRACT NO.712:

Being portions of Lots 12 and 13 Belmont Park Subdivision, as conveyed to J.R. Curry as per deed of record, Book 3690, Page 130, of the Shelby County Register's Office, less the portions of these lots sold to the City of Memphis (right-of-way for North Hollywood Street) as per deed of record Book 4472, Page 558, of the Shelby County Register's Office and being more particularly described as follows:

ACQUISITION PARCEL-ACCESS NOT CONTROLLED

Beginning at a point in the east line of North Hollywood Street (30 feet wide), said point being the northwest corner of Lot 14, Belmont Park Subdivision; thence along the east line of North Hollywood Street on a curve to the right having a radius of 1,160 feet a distance of 73.1 feet to a point in the south line of Belmont Circle; thence along the south line of Belmont Circle on a curve to the right having a radius of 20 feet a distance of 18.79 feet to a point in the new east line of North Hollywood Street; thence southwardly along the said line on a curve to the left having a radius of 709.79 feet a distance of 78.74 feet to a point in the north line of Lot 14, Belmont Park Subdivision; thence along said north line on a Tennessee Lambert Grid Bearing of South 68 degrees 46 minutes 46 seconds West a distance of 2.22 feet to the point of beginning.

CONTAINING: 342 square feet.

TRACT NO.713:

Being a portion of Parcel 46, Tract 2, conveyed to E. J. Curry, et al, per deed of record, Book 5790, Page 386 of the Shelby County Register's Office and being more particularly described as follows:

ACQUISITION PARCEL-ACCESS NOT CONTROLLED:

Beginning at a point in the east line of North Hollywood Street (30 feet wide) 297.27 feet northwardly as measured along the east line of North Hollywood Street from its tangent intersection with the north line of Belmont Circle (50 feet wide); thence on a Tennessee Lambert Grid Bearing of South 87 degrees 34 minutes 45 seconds East a distance of 14.5 feet to a point in the new east line of North Hollywood Street; thence South 02 degrees 25 minutes 14 seconds West along the new east line of North Hollywood Street a distance of 301.35 feet to a point in the north line of Belmont Circle; thence with said north line on a curve to the right having a radius of 20 feet a distance of 24.55 feet to a point of compound curvature; thence northwardly with the east line of North Hollywood Street along a curve to the right having a radius of 1,160 feet a distance of 37.98 feet to a point of tangency; thence following said east line North 02 degrees 25 minutes 14 seconds East a distance of 244.99 feet to the point of beginning.

CONTAINING: 4,280 square feet.

M5 2098

TO HAVE AND TO HOLD said tracts, parcels and easements unto Shelby County, Tennessee, for public highway or street right-of-way purposes only.

The State of Tennessee, acting through the Department of Finance & Administration, makes no warranty of tile, either actual or implied; however, the said grantor hereby conveys all title it has received from the prior owners by reason of the instruments of record herein referenced.

IN TESTIMONY WHEREOF, I William L. Jones, Commissioner of Finance & Administration under authority of Section 12-212 of Tennessee Code Annotated in my official capacity do hereby set my hand this 11th day of February, 1977, for and on behalf of the State of Tennessee

STATE OF TENNESSEE

BY: William L. Jones
Commissioner of Finance & Administration

wjs of Ese

Approved:

BY: Ray Blanton
Governor

BY: Brooks McLemore
Attorney General

BY: Eddie Shaw 12/21/76
Commissioner of Transportation

M 2098

STATE OF TENNESSEE

COUNTY OF DAVIDSON

Personally appeared before me, a Notary Public in and for said County and State, William L. Jones, with whom I am personally acquainted and who acknowledged himself to be the Commissioner of Finance and Administration of the State of Tennessee and that he, as such Commissioner as authorized by T.C.A., Section 12-212, executed the within instrument for and on behalf of the State of Tennessee for the purpose therein contained.

WITNESS My hand and Official seal at Nashville, Tennessee, on the 11th day of February, 1977.

Notary public

My Commission Expires: May 23 1977

M 52098

STATE TAX ____
REG.FEE ____
REC.FEE 8.00

SEP 6 1 06 PM 77

STATE OF TENNESSEE
SHELBY COUNTY

8.00

J6 8391
4

CLERK AND MASTER'S DEED

THIS DEED made by ELIZABETH MOORE, CLERK AND MASTER of the Chancery Court of Shelby County, Tennessee to E.G.STEPHENSON AND WIFE, RUTH STEPHENSON OF Memphis, Shelby County, Tennessee, WITNESSETH:

THAT WHEREAS, a bill was filed in the Chancery Court of Shelby County, Tennessee on November 6, 1972, by E.G. STEPHENSON, RUTH STEPHENSON, AND ROY W. HENDRIX, JR., Substitute Trustee, Plaintiffs vs. VIRGINIA KARLA SPRUILL AND KELLY O'BRYAN SPRUILL, Minors; WILLIAM K. WELDON, Executor of the Estate of Marvin L. Spruill, Deceased; and the UNITED STATES OF AMERICA, Defendants, being cause No. 77081-1 R.D. to foreclose lien of Deed of Trust and for sale.

AND WHEREAS, a decree duly rendered in said cause by said Court at its October Term, 1973, recorded in Minute Book 308, Page 288, commanding me to sell the one-third undivided interest in and to the following described property, situated in the City of Memphis, Shelby County, Tennessee, to-wit:

A 61.55 Acre Tract lying 690' north of the centerline of Hanwood Avenue and 482' east of the centerline of Hollywood Street in Memphis, Shelby County, Tennessee, more particularly described as follows: Beginning at a point which is 690.0' north of the centerline of Hanwood Avenue and 482.0' east of the centerline of Hollywood Street (as projected northwardly from south of Heard Avenue), said beginning point being the southwest corner of this 61.55 acres; thence eastwardly 722.0' to a point which is 1025.2' north of the north line of Heard Avenue as measured along the west line of Hollywood Sand and Gravel Co. property; thence continuing eastwardly along the eastward projection

of the preceding line, 903.0' to a point in the west line of the Fisher Lime and Cement Co. property, and said point being a northeast corner of Hollywood Sand and Gravel Co. property; thence northwardly, at a right angle to the preceding line and thus along the west line of Fisher Lime and Cement Co. property, 1180.0' to a point in the center line of Wolf River, said point being on the north boundary of Fisher Lime and Cement Co. property and on the south boundary of the Miss. Valley Corp. property; thence continuing northwardly along the northward projection of the preceding line, 470.0' along the west line of Miss. Valley Corp. property to a point in the south line of Harry W. Walker property; thence westwardly, at a right angle to the preceding line 1625.0' along the south line of Harry W. Walker property to the northeast corner of the W.J. Curry property; thence southwardly, at a right angle to the preceding line, 1650.0' along the east line of W.J. Curry property to the point of Beginning; containing 61.55 acres, LESS AND EXCEPT the portion thereof conveyed to the City of Memphis and County of Shelby by Warranty Deed of correction, recorded in Book 5024, page 238, Register's Office of Shelby County, Tennessee, being more particularly described as follows: BEGINNING At a point, said point being the northwest corner of the Lanahan Tract; thence along the North property line of said tract on a bearing of South 89 degrees 56 minutes East a distance of 700 feet to a point; thence on a bearing of South 54 degrees 46 minutes East a distance of 619.75 feet to a point; thence on a bearing of South 43 degrees 25 minutes East a distance of 511.87 feet to a point in the East property line of said tract; thence along the East property line South a distance of 841.00 feet to a point; thence on a bearing of North 53 degrees 10 minutes West a distance of 290.67 feet to a point; thence on a bearing of North 44 degrees 37 minutes West a distance of 788.83 feet to a point; thence on a bearing of North 52 degrees 49 minutes west a distance of 487.27 feet to a point; thence on a bearing of North 78 degrees 08 minutes West a distance of 390.45 feet to a point in the West property line of said tract. Thence along the West property line North a distance of 460.00 feet to a point; said point being the point of BEGINNING. The above described area containing 26.51 acres, more or less.

AND WHEREAS, said tract of land was by me sold accordingly, and the said E.G. STEPHENSON AND WIFE, RUTH STEPHENSON became the purchasers, and said sale was duly confirmed by the Court at its April Term, 1974, by decree recorded May 17, 1974, in Minute Book 308, Page 545, and all of the right, title and interest of the defendants in this cause, VIRGINIA KARLA SPRUILL AND KELLY O'BRYAN SPRUILL, MINORS AND WILLIAM K. WELDON, Executor of the Estate of Marvin L. Spruill, deceased and of the United States of America was divested out of them and each of them and vested in E.G. STEPHENSON AND WIFE, RUTH STEPHENSON.

AND WHEREAS, I was, by said decree, directed to execute and deliver a deed conveying said property to E.G. STEPHENSON AND WIFE, RUTH STEPHENSON.

NOW THEREFORE, IN CONSIDERATION OF THE PREMISES AND OF THE SUM OF SEVENTEEN THOUSAND SIX HUNDRED EIGHTY SEVEN DOLLARS AND TWELVE CENTS ($17,687.12) paid by E.G. STEPHENSON AND WIFE, RUTH STEPHENSON by taking credit against said amount, the amount of their lien.

I, ELIZABETH MOORE, Clerk and Master of the Chancery Court of Shelby County, Tennessee, by virtue of the power and authority conferred upon me by said decree, do by this deed, grant, convey and confirm unto the said E.G. STEPHENSON AND WIFE, RUTH STEPHENSON, all of the right, title and interest of VIRGINIA KARLA SPRUILL AND KELLY O'BRYAN SPRUILL, MINORS AND WILLIAM K. WELDON, Executor of the Estate of Marvin L. Spruill, Deceased and of the UNITED STATES OF AMERICA in and to the above described parcel of real estate: and all of the

J6 8391

right, title and interest is hereby divested out of said defendants, VIRGINIA KARLA SPRUILL AND KELLY O'BRYAN SPRUILL, MINORS and WILLIAM K. WELDON, Executor of the Estate of Marvin L. Spruill, Deceased and of the United States of America, and any and all of them, and is hereby vested in E.G. STEPHENSON AND WIFE, RUTH STEPHENSON in fee simple absolute.

WITNESS MY HAND AND SEAL OF THE CHANCERY COURT OF SHELBY COUNTY, TENNESSEE, THIS 10th DAY OF JUNE, 1974.

Elizabeth Moore

ELIZABETH MOORE, CLERK AND MASTER

STATE OF TENNESSEE

COUNTY OF SHELBY

Personally appeared before me, the undersigned authority, ELIZABETH MOORE, Clerk and Master of the Chancery Court of Shelby County, Tennessee, with whom and whose official position I am personally acquainted and who acknowledged the execution of the foregoing deed, consisting of four (4) pages, on the day it bears date and for the purposes therein expressed.

WITNESS my hand and seal of office, this 10th day of JUNE, 1974.

J68391

COUNTY COURT CLERK

By: Betty M. [illegible] D.C.

Valuation: $17,687.12

Transfer Tax: $46.02
Clerk's Fee: .50
Recording Fee: 8.00
TOTAL $54.52

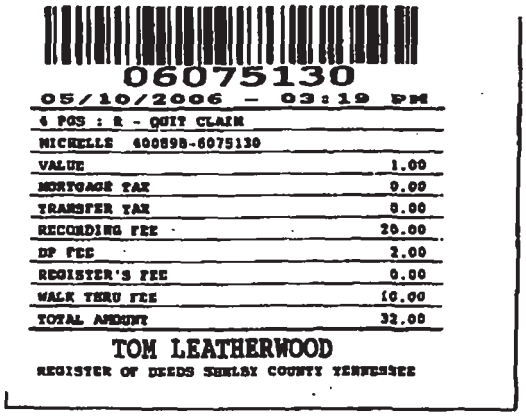
Address of Property: Vacant
Send Tax Notices To: E. G. Stephenson and Ruth Stephenson
54 North Bingham
Memphis, Tennessee 38112

Return To: [illegible]

Tom Leatherwood

Shelby County Register

As evidenced by the instrument number shown below, this document has been recorded as a permanent record in the archives of the Office of the Shelby County Register.



06075130

05/10/2006 - 03:19 PM

6 POS : R - QUIT CLAIM	
NICHELLE 600898-6075130	
VALUE	1.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	20.00
DP FEE	2.00
REGISTER'S FEE	0.00
WALK THRU FEE	10.00
TOTAL AMOUNT	32.00

TOM LEATHERWOOD

REGISTER OF DEEDS SHELBY COUNTY TENNESSEE

QUITCLAIM DEED

THIS INDENTURE, made and entered into this 3rd day of May, 2006 by and between the Custodial Trust, by and through LePetomane III, Inc., an Illinois Corporation, not individually, but solely in its representative capacity of Custodial Trust Trustee, having an address at 35 East Wacker Drive, Suite 1550, Chicago, Illinois 60601, party of the first part; and the CITY OF MEMPHIS, a municipal corporation of the State of Tennessee, party of the second part, in accordance with the Settlement Agreement Rescinding the 1990 Participation Agreement for the Hollywood Dump Site in Memphis, Tennessee (hereafter "Settlement Agreement") and the Revised Participation Agreement Regarding Environmental Response Activities at the Hollywood Dump Site in Memphis, Tennessee (hereafter "Revised Participation Agreement").

WITNESSETH: That said party of the first part for and in consideration of the sum of ONE AND NO/100 ($1.00) DOLLAR and other good and valuable considerations to it in hand paid by the party of the second part, receipt of which is hereby acknowledged, conveys and quitclaims unto the party of the second part all of its right, title and interest in and to the property, which is a part of the property commonly known as the Hollywood Dump Site in Memphis Tennessee (the "Property"), in its as is and where is condition with all faults, including but not limited to the environmental and other conditions of the property, and with no representations or warranties, express or implied and subject to the terms and conditions hereof, and the terms and conditions of the Settlement Agreement, the Revised Participation Agreement and the Fruit of the Loom, Inc. Settlement Agreement as approved by the Order of Court dated August, 9, 2002 entered in the Fruit of the Loom, Inc., Bankruptcy, case No. 99-4497, being more particularly described as follows:

Part of Lots 13 and 14 of Wm. F. HARDIN SUBDIVISION (un-recorded) and Part of Lot 20 of A.B. WARFORD SUBDIVISION (un-recorded), in Memphis, Shelby County, Tennessee, and being more particularly described as follows:

Beginning at a point on the West Right-of-way Line of the I.C.R.R. and the Centerline of Peres Avenue; thence North, along the West Right-of-Way Line of I.C.R.R. a distance of 1068.50 feet; thence Westerly, a distance of 946.00 feet to a point on the West Line of Lot 20 in A.B. WARFORD SUBDIVISION and the East Line of Lot 13 in Wm. F. HARDIN SUBDIVISION; thence North, along said East line of Lot 13, a distance of 670.00 feet to the Northeast Corner of Lot 13; thence West, along the North Line of said Lot 13, a distance of 895.00 feet; thence West, parallel with the North Line of EAST BELMONT PARK SUBDIVISION (Plat Book 10, Page 59), a distance of 618.98 feet; thence South, parallel with the East Line of said EAST BELMONT PARK SUBDIVISION a distance of 465.12 feet to a point on the North Line of Lot 17 of said EAST BELMONT PARK SUBDIVISION; thence East, along the North Line of EAST BELMONT PARK SUBDIVISION, a distance of 618.98 feet; thence South, along the East Line of EAST BELMONT PARK SUBDIVISION and the East Line of HANOVER

HEIGHTS SUBDIVISION (Plat Book 9, Page 46), a distance of 573.48 feet to a point on the North Line of the JOHN TARTERA Property (Book 652, Page 41), said point being 11.60 feet North of the centerline of Heard Avenue; thence East, parallel with the Centerline of Heard Avenue and along the North Line of JOHN TARTERA Property, a distance of 97.00 feet; thence Southeasterly, along the East Line of JOHN TARTERA Property, a distance of 482.80 feet (Deed. 483.20 feet) to a point on the North Line of OTIS LAMMEY Property (Book 3623, Page 405); thence Northeasterly, along the North Line of OTIS LAMMEY Property, a distance of 108.00 feet; thence Southeasterly, along LAMMEY's east Line, a distance of 179..00 feet; thence Southwesterly, along LAMMEY's South Line, a distance of 49.93 feet; thence Southeasterly, parallel with the East Line of the JOHN TARTERA Property, a distance of 109.14 feet to a point on the North Right-of-Way Line of Peres Avenue; thence Northeasterly, along said North Right-of-Way Line, a distance of 700.66 feet; thence Southeasterly, leaving the North Right-of-Way Line an converging into the centerline of Peres Avenue, a distance of 714.00 feet to the point of beginning. Containing 59.39 Acre, more or less. Subject to Easements and Restrictions of record.

Being the same Property conveyed to LePetomane III, Inc., an Illinois Corporation, not individually, but solely in its representative capacity of Custodial Trustee, having an address at 330 N. Wabash Avenue, 34th Floor, Chicago, Illinois 60611, pursuant to Order of Court dated August 9, 2002 entered by the United States Bankruptcy Court, District of Delaware, case number 99-4497 (PJW), FRUIT OF THE LOOM, INC., et al, by Quit Claim Deed from NWI Land Management Corp., of record as Instrument No. 02170947 in the Register's Office for Shelby County, Tennessee.

By accepting this Deed, party of the second part, for itself and its successors, assigns, officers, directors, managers, agents, employees and affiliates (collectively, the "Releasors") hereby (a) release the Custodial Trust, LePetomane III, Inc., the Custodial Trustee, the Successor Liquidation Trust, LePetomane II, Inc., and the Successor Liquidation Trustee, and all of their directors, officers, shareholders, employees, agents, representatives, attorneys, Trusts, Trustees, together with any of their successors and assigns (collectively, the "Releasees") of and from any and all claims and causes of actions, known and unknown, at law or equity, direct, indirect or derivative, that Releasors have, may have had or may in the future have that in any way concerns or is related to the Property conveyed hereunder, including but not limited to, the environmental and other conditions, and any impacts on the environment, other property or any persons of the Property conveyed hereunder or any activities, occurrences or conditions at, on, in, under, or emanating from such Property and the party of the second part's acquisition of the Property conveyed hereunder (the "Released Causes of Action"), (b) waive the right to bring any claim or cause of action against and affirmatively covenant not to sue any of the Releasees with respect to the Released Causes of Action and (c) except as noted below, assume all the Releasee's rights, future liability and responsibility for, the condition, character or quality of the Property described in this Deed and its environs, including without limitation, the environmental condition of the Property, of any one or more Releasees, regardless whether that condition resulted, or in the future results, from onsite or offsite activities, or the migration from or onto or under the Property of hazardous substances, wastes or other materials, and regardless whether the claim or cause of action is hereafter created under common law or federal, state, county or municipal statute, ordinance or regulation, including, without limitation, such statutes, ordinances and

regulations relating to hazardous substances and/or wastes and the use, generation, handling, storage, treatment, or disposal and/or investigation and remediation thereof, the closure or transfer of ownership or control of businesses or real property, flood plains, stream encroachment, wetlands and natural resource damages. The foregoing provision shall be deemed a covenant running with the land in perpetuity and shall be deemed binding upon party of the second part, its successors and assigns and subsequent grantees.

Nothing in this quitclaim deed shall be deemed an assignment of any claim the party of the first part has relating to that certain Pollution Legal Liability Select Policy Number PLS 267 53 70 issued by American International Specialty Lines Insurance Company (the "Policy"). The party of the first part specifically retains all rights to coverage it has or ever had relating to the Policy.

IN WITNESS WHEREOF, the said party of the first part has caused this instrument to be executed by the affixing thereto of the signature of the duly authorized officer.

The Custodial Trust

By and through LePetomane III, Inc., an Illinois Corporation,
not individually, but solely in its representative capacity of Custodial Trust Trustee

By: Jay A. Steinberg, Not Individually But Solely as President
Jay A. Steinberg, not individually but solely
as the President of the Custodial Trust Trustee

STATE OF ILLINOIS
COUNTY OF COOK

Before me, Cynthia Lynn Bartnik the undersigned, a Notary Public, within and for said State and County, duly commissioned and qualified, appeared Jay A. Steinberg, not individually but solely in his representative capacity of President of the Custodial Trust Trustee, with whom I am personally acquainted and who upon oath acknowledged himself to be the President of LePetomane III, Inc., an Illinois Corporation, not individually, but solely in its representative capacity of Custodial Trust Trustee, the within named bargainor, a corporation and that he as such President, being authorized so to do, execute the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as President.

WITNESS my hand and Notarial Seal, at Chicago, IL. in the County aforesaid, this 9th day of May, 2006.

Cynthia Lynn Bartnik
Notary Public

OFFICIAL SEAL
CYNTHIA LYNN BARTNIK
Notary Public - State of Illinois
My Commission Expires Jun 3, 2008

My Commission Expires:

I, or we, hereby swear or affirm that to the best affiant's knowledge, information, and belief, the actual consideration of this transfer is $ 100

Affiant

Subscribed and sworn to before me this 10th day of May, 2006.

My Commission Expires July 11, 2006

Property Address: East Belmont Park and Peres Avenue

Property Owner: City of Memphis (Exempt)

Property Owner Address: 125 N. Main
Memphis, TN 38103

Mail Tax Bills to: City of Memphis (Exempt)

Address: 125 N. Main
Memphis, TN 38103

Ward: 042 Block: 068 Parcel: 077, 078 & 079

This instrument prepared by:

Name: City of Memphis Real Estate Department
125 N. Main, Room 568
Address: Memphis, Tennessee 38103