FINAL
DECISION DOCUMENT
FORMER NIKE C-32 SITE
PORTER, INDIANA

(FUDS NO. G05IN000102)

Prepared by:

U.S. Army Corps of Engineers
Louisville District
600 Dr. M.L. King Jr. Pl.
Louisville, KY 40202-2232

August 2018

FINAL

DECISION DOCUMENT

FORMER NIKE C-32 SITE

PORTER, INDIANA

(FUDS NO. G05IN000102)

Prepared by:

U.S. Army Corps of Engineers
Louisville District
600 Dr. M.L. King Jr. Pl.
Louisville, KY 40202-2232

August 2018

This page intentionally left blank

ACRONYMS AND ABBREVIATIONS

µg/kg	microgram(s) per kilogram
µg/L	microgram(s) per liter
AR	administrative record
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
CELRL	U.S. Army Corps of Engineers – Louisville District
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DCE	dichloroethene
COC	contaminants of concern
CVOC	chlorinated volatile organic compound
DCA	dichloroethane
DoD	Department of Defense
EC	environmental covenant
EPA	U.S. Environmental Protection Agency
FUDS	Formerly Used Defense Site
HHRA	human health risk assessment
IC	institutional controls
IDEM	Indiana Department of Environmental Management
MCL	maximum contaminant level
MNA	monitored natural attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	operation and maintenance
PID	photoionization detector
RAO	remedial action objective
RG	remediation goal
RI	remedial investigation
SARA	Superfund Amendments and Reauthorization Act
TCE	trichloroethene
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
VOC	volatile organic compound
USDA	U.S. Department of Agriculture
yd^3	cubic yard(s)
ZVI	zero valent iron

CONTENTS

Section Page

Figures

Table

Attachments

DECISION DOCUMENT EXECUTIVE SUMMARY
FUDS G05IN000102

The Former Nike C-32 site, which encompassed approximately 15 acres in Porter, Indiana, was owned by the United States and under the jurisdiction of the Secretary of the Department of Defense (DoD). The Nike C-32 site was operated from 1956 to 1974. The Nike C-32 site was transferred from DoD control prior to 17 October 1986 and meets the definition of Formerly Used Defense Site. The U.S. Army has been designated as the Executive Agent on behalf of DoD for execution of an environmental restoration program at facilities under the jurisdiction of the Secretary; this program is implemented in accordance with Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments Reauthorization Act of 1986. The U.S. Army Corps of Engineers Louisville District is responsible for the environmental restoration program and has determined that further action is warranted.

The Former Nike C-32 site was comprised of the Launch area and the Control area. This Decision Document applies to the Launch area portion of the site. During these investigations, it was determined that the Nike C-32 site presents an unacceptable human health risk to residents and construction workers that come into contact with the groundwater. Therefore, a remedial action comprised of limited excavation and offsite disposal, in situ chemical reduction via soil mixing with zero valent iron, monitored natural attenuation, and land use controls has been selected to remediate the groundwater.

Because the property does pose an unacceptable risk to human health, the U.S. Army, in coordination with the Indiana Department of Environmental Management determined that the Selected Remedy is protective of human health and the environment, complies with applicable or relevant and appropriate requirements (ARARs), and best meets the nine evaluation criteria specified in the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300.430(e)(9)). Environmental remediation will be performed by the Army.

Point of Contact Project Manager: Brooks Evens CELRL-PM-M-E, Andrew.B.Evens @usace.army.mil, Phone Number: (502) 315-6335

This page intentionally left blank

1.0 DECLARATION

1.1 Site Name and Location

This Decision Document presents the selected remedy for the Former Nike C-32 site in Porter, Indiana. The Former Nike C-32 site is approximately 30 miles southeast of Chicago, Illinois, and 3 miles northwest of Chesterton, Indiana, in Section 26 of Township 37 North, Range 6 West (Figure 1). The Department of Defense (DoD) acquired the site between 1956 and 1957 and used it as an Ajax missile battery from 1957 through 1959, and as a Hercules missile battery from 1959 until the site was deactivated in 1974. The Launch Area was sold to a private party in 1976. The Former Nike C-32 site was comprised of the Launch area and the Control area. This Decision Document applies to the Launch Area portion of the site.

1.2 Statement of Basis and Purpose

The Remedy was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in the administrative record (AR) for the Former Nike C-32 site. Information not specifically summarized in this Decision Document or its references, but contained in the AR, has been considered and is relevant to selection of the remedy at the site.

1.3 Assessment of the Former Nike C-32 Site

This Decision Document declares that further action is necessary to protect human health and the environment from actual or threatened releases of hazardous substances, pollutants, or contaminants from the Former Nike C-32 site.

1.4 Description of Selected Remedy

At the former Nike C-32 site, the selected remedy for addressing chlorinated volatile organic compounds (CVOCs) in groundwater is limited excavation and offsite disposal, in situ chemical reduction via soil mixing with zero valent iron (ZVI), monitored natural attenuation (MNA), and institutional controls (ICs), defined as Alternative 4b in the *Feasibility Study* (CH2M, 2016) and identified as the preferred alternative in the Proposed Plan (CH2M, 2017). The current land owner is a private owner whose activities could lead to contact with site groundwater, which involves unacceptable risk. The risk for onsite construction workers is unacceptable if a well were installed within the plume boundary. Therefore, the selected remedy addresses the possible risk to human health associated with potable use of contaminated groundwater at the site. In addition, it mitigates the potential for direct contact with contaminated groundwater during construction work at the site. Specifically, the remedy for former Nike C-32 site consists of:

- *Limited Excavation and Offsite Disposal.* This alternative would use limited excavation that would reduce the volume of soil to be transported and disposed offsite. The soil volume reduction would result in the excavation of the most contaminated soil within a trichloroethene (TCE) plume footprint, corresponding to a TCE concentration of 760 micrograms per kilogram (μg/kg) and a total excavation volume of 1,450 cubic yards

(yd^3) with shoring around the excavation. Existing infrastructure inside the excavation footprint, such as wells, fences, and pavement, would need to be demolished before or during excavation. For safety precautions, temporary fencing will need to be installed to prevent access to the remedial action area. The excavation would likely be performed with an excavator and haul trucks. The excavator would remove soil from the excavation and place it directly into bins for dewatering and/or transport. Trucks would remove the bins from the site and transport them to a permitted offsite disposal facility. Excavated soil may require dewatering because more than half of the excavated soil is below the groundwater surface and expected to be saturated. Based on test results, however, the lean clay expected in the excavation is likely to have a low permeability, which would limit the presence of free water and the rate at which water drains from the soil. Water draining from the soil would need to be managed and ultimately disposed of at a permitted offsite facility. Decontamination measures would be implemented to prevent contaminated material from being tracked or spilled outside the site. The excavation would be backfilled with uncontaminated soil from offsite locations. Confirmation samples would be taken before placing backfill. After placement of backfill, monitoring wells will be installed. Laboratory samples of site groundwater would be completed after the excavation to demonstrate fulfillment of the established remediation goals (RG).

- *Soil Mixing with ZVI.* Following excavation and backfill activities, the remaining TCE-impacted soil around the perimeter of the former excavation would be treated in situ by mixing soil with ZVI. The remedy under this alternative would use mechanical soil mixing to effectively distribute chemical amendments throughout the soil to treat contaminants. Soil mixing would create a homogeneous mixture of soil, iron, and target contaminants considering the tight nature of the clay soils at the site. Although the tight clay geology may limit the overall effectiveness of the soil mixing, the soil-mixing process would allow contact of the ZVI and target contaminants of concern (COCs) and distribute chemical amendments by homogenizing the soil over the remaining volatile organic compound (VOC)-impacted plume area; therefore, increasing the probability of success and effectiveness of the remedy. The addition of ZVI can create fluff or increase in soil volume. To contain the fluff and ensure adequate mixing depth, the top 8 feet of soil would be excavated prior to mixing. This soil is not anticipated to contain VOCs. The excavated material would be stored at the site and used for site grading and restoration.

  Other components of this alternative include: temporary fencing, monitoring well abandonment, installation of sediment and erosion control measures, construction of containment berms, air monitoring, and site restoration.

  Treated soil would be sampled and analyzed for iron content in the field to ensure adequate mixing throughout the treatment area. If the results of field testing indicate that thorough mixing throughout the treatment area has not been achieved, the mixing approach would be adjusted. In addition, laboratory analysis of samples of site soil and groundwater would be completed before and after completion remedial operations to demonstrate fulfillment of the established numeric treatment standards as part of the groundwater monitoring.

- *Monitored Natural Attenuation.* MNA includes groundwater monitoring to evaluate the effectiveness of natural attenuation processes at reducing COC concentrations in site groundwater within the impacted groundwater. The monitoring program will be defined in a long-term monitoring plan, which will include installation of new monitoring wells to better demonstrate plume stability and account for the variable groundwater flow directions. Groundwater monitoring data will be used to verify that COC concentrations are decreasing; that the affected area or plume is not expanding; that no changes in hydrogeological, geochemical, biological parameters that might reduce the effectiveness of the remedial action occur; and whether additional corrective actions are needed to ensure protection of public health and welfare.

- *Land Use Controls*. An IC in the form of an environmental covenant (EC; Porter County record number 2018-014167) is currently in place to restrict the current and future use of onsite groundwater in a manner to prevent exposure to groundwater (by not allowing the installation or use of wells within the EC restricted area) and the protection of monitoring wells installed (by prohibiting their damage or removal). Therefore, an interim IC will not be a component of the final selected remedial alternative, although it was part of the description of the preferred alternative in the Proposed Plan. Only engineering controls will be needed. Interim engineering controls will be implemented, including security fencing and placarding to enclose the remediation area and prevent exposure to the contamination and response action activities such as groundwater monitoring. Once remedial goals are achieved, USACE, IDEM and the property owner will cooperate to modify the EC in accordance with Indiana Code 13-14-2-9(c), as amended.

1.5 Statutory Determinations

The selected remedy is protective of human health and the environment, complies with the nine evaluation criteria specified in the NCP 40 CFR 300.430(e)(9), and satisfies the statutory requirements of CERCLA §121(b). The selected remedy complies with applicable or relevant and appropriate requirements (ARARs), is cost-effective, and uses permanent solutions. The remedy does satisfy the statutory preference for treatment as a principal element. Although the site does exhibit minor indications of natural attenuation processes that reduce the volume and toxicity of COCs in groundwater, without active treatment this could take a long time. The VOC contaminant plumes appear to be stable, with very slowly decreasing concentrations in the source area.

Statutory reviews will be conducted every 5 years after initiation of the remedial action to ensure the remedy remains protective of human health and the environment. In accordance with Section 121 of CERCLA, as amended in 1986 by the SARA, 5-year reviews will be completed as long as hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

1.6 Decision Document Certification Checklist

The following information is included in this Decision Document, Part 2: Decision Summary.

- Site characteristics and COCs (Section 2.6)
- Baseline risk represented by the COCs (Section 2.8)
- Remedial Action Objectives (RAOs) established for COCs and the basis for these objectives (Section 2.9)

- Current and reasonably anticipated future land use assumptions used in the baseline risk assessment (Section 2.7)
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (Section 2.7)
- Cost-effectiveness and permanence of selected remedy (Section 2.14)

Additional information can be found in the AR file for the Former Nike C-32 site.

1.7 Authorizing Signatures

The Former Nike C-32 site was owned by the United States and under the jurisdiction of the Secretary of the DoD from 1956 through 1974. The former Nike C-32 site was transferred from DoD control prior to 17 October 1986 and meets the definition of a Formerly Used Defense Site (FUDS).

This Decision Document presents the selected remedy (limited excavation and offsite disposal, in situ chemical reduction via soil mixing with ZVI, MNA, and ICs) for the site, located in the City of Porter, Porter County, Indiana. USACE is the execution agent under the Defense Environmental Restoration Program at the Former Nike C-32 site, and has developed this Decision Document consistent with the CERCLA, as amended, and the NCP. The remedy proposed for selection by USACE received preliminary concurrence from IDEM on 21 December 2017.

IDEM's formal concurrence letter for this Decision Document is provided in Attachment A. The public was given an opportunity to review the selected remedy. The statutory review time ended 2 February 2018. Two public comments were sent to USACE for the selected remedy at the site. This Decision Document will be incorporated into the larger AR file for the Former Nike C-32 site, which is available for public review at the Thomas Library located at 200 W. Indiana Avenue, Chesterton, Indiana 46304. Likewise, it is available at the USACE, Louisville District. 600 Dr. Martin Luther King Jr. Place, Louisville, Kentucky.

This document, verifying further action is necessary, is approved by the undersigned, pursuant to memorandum DAIM-ZA. 9 February 2017, Subject: Policy for Staffing and Approving Decision Documents, and to Engineer Regulation 200-3-1, FUDS Program Policy.

Approved:

Stephen G. Durrett, P.E. — 5 Sep 18
Regional Programs Director — DATE

2.0 DECISION SUMMARY

2.1 Name, Location, and Description

The Former Nike C-32 site (FUDS No. G05IN000102) is approximately 30 miles southeast of Chicago, Illinois, and 3 miles northwest of Chesterton, Indiana, in Section 26 of Township 37 North, Range 6 West (Figure 1). The Department of Defense (DoD) acquired the site between 1956 and 1957 and used it as an Ajax missile battery from 1957 through 1959, and as a Hercules missile battery from 1959 until the site was deactivated in 1974. The former Launch Area (shown on Figure 1) consisted of several areas of interest, including the ready building, missile test and assembly building, generator building, warheading building, water treatment, acid storage shed, storage and pump building, three underground storage magazines within the missile magazine area, and a sewage treatment plant.

2.2 FUDS Program Summary

The Former Nike C-32 site was located on real property that was formerly owned by the U.S. government and under the jurisdiction of the DoD. In 1976, the Launch Area parcel was sold to a private party. Private parties have owned the parcel since the U.S. government terminated its ownership.

Since jurisdiction of the property was transferred from DoD prior to October 17, 1986, the property meets the definition of a FUDS. USACE, with support from IDEM, has executed environmental site investigations for the property as execution agent for DoD as specified in the Defense Environmental Restoration Program and authorized by Title 10 of the U.S. Code Section 2701 et. seq. (10 USC 2701 et. seq.). The law authorizes the DoD to take remedial action at eligible FUDS properties. (10 USC 2701 (c)(1)(B)).

2.3 History and Enforcement Activities

The Nike C-32 site is located near the intersection of Route 20 and Wagner Road in Porter, Porter County, Indiana, as shown on Figure 1. The property is surrounded on the west, south, north, and east by residential properties. The Nike C-32 site was operated from 1956 to 1974. The Launch Area was sold to a private party in 1976 and has had several private owners since then.

The Former Nike C-32 site was investigated for environmental impacts beginning in 2007 when a preliminary assessment was issued for the site. Information from the investigations can be found in the following documents:

GEO Consultants. 2007. Preliminary Assessment, Report for Formerly Used Defense Site Nike C-32—Indiana Dunes (FUDS Site #G05IN0001), Porter, Indiana. November.

CH2M HILL, Inc. (CH2M). 2009. Final Site Inspection Report, Former Nike Site C-32 Launch Area, Porter County, Indiana. November.

CH2M HILL, Inc. (CH2M). 2012. Final Uniform Federal Policy Quality Assurance Project Plan, Former Nike Site C-32 Launch Area, Porter County, Indiana. August.

CH2M HILL, Inc. (CH2M). 2014. Final Public Involvement Plan, Former Nike Site C-32 Launch Area, Porter, Porter County, Indiana. December.

CH2M HILL, Inc. (CH2M). 2015. Final Remedial Investigation Report, Former Nike Site C-32 Launch Area, Porter, Porter County, Indiana. February.

CH2M, Inc. 2016. Final Feasibility Study, Former Nike Site C-32 Launch Area, Porter, Porter County, Indiana. December.

No actions, federal or state enforcement actions, lawsuits or other pending actions apply to the Former Nike C-32 site.

2.4 Community Participation

A Public Involvement Plan was developed to be implemented for use during completion of the necessary investigation activities at the Former Nike C-32 site. The community relations requirements were followed as described below:

- An AR has been maintained by USACE at the Louisville District office and at the Thomas Library in Chesterton, Indiana since 2012.
- Upon agreement of the IDEM, a Proposed Plan was placed in the Former Nike C-32 site AR on January 5, 2018.
- Public comments on the Proposed Plan were solicited through a notice placed in the Chesterton Tribune on January 2, January 10, and January 15, 2018. A public meeting was held at the Chesterton Town Hall meeting room, 790 Broadway in Chesterton, Indiana on January 17, 2018. The Responsiveness Summary of this Decision Document notes that comments were received both through the public meeting and via email communication.

2.5 Scope and Role of Remedial Action

USACE serves as DoD execution agent for cleanup of FUDS nationwide. The USACE Louisville District (CELRL) is responsible for the environmental restoration program at the Former Nike C-32 site. In accordance with the environmental restoration process as prescribed by CERCLA, CELRL has determined that further action is warranted for the Former Nike C-32 property. This determination is supported by the findings of the *Final Remedial Investigation Report, Former Nike Site C-32 Launch Area, Porter, Porter County, Indiana*. (CH2M HILL, 2015).

The selected remedy presented in this Decision Document applies to the real property used for the Former Nike C-32 site.

2.6 Project Characteristics

2.6.1 Groundwater Pathway

The preliminary assessment report (GEO Consultants, 2007) states that four aquifers are in the Lake Michigan basin near the site. The surficial sand-and-gravel aquifer in the northern part of Lake Michigan basin (where the site is located) is rarely used because of the proximity to Lake Michigan, which is the main drinking water source in the area. The shallow sand-and-gravel aquifer that is present in this portion of the Lake Michigan basin is not present at the site. The Antrim shale unit is not a likely source of water, and while deeper Devonian and Silurian carbonate rocks can serve as aquifers, they are used mostly in the far western part of the Lake Michigan basin.

Both the Blount and Morley soil series are within the Group C hydrologic soil category (U.S. Department of Agriculture [USDA], 1981). Group C soils have the characteristics of a slow infiltration rate when thoroughly wet and have a slow rate of water transmission because of the fine soil texture. These types of soils show evidence of perched water at a depth of 1 to 3 feet below ground surface (bgs) for Blount series soils and at a depth of 3 to 6 feet bgs for the Morley series soil.

Groundwater elevation measurements collected during the remedial investigation (RI) show the groundwater potentiometric surface flow to the east, northeast, and north. Site soil samples collected during the RI were analyzed for soil properties, including permeability to water. Permeability values range from less than 1.9×10^{-7} to 5.0×10^{-5} centimeters per second, with an average permeability of 1.4×10^{-6} centimeters per second. The average shallow groundwater velocity was reported as 1.4 feet per year with a corresponding average hydraulic gradient of approximately 0.261 feet per foot.

2.6.2 Surface Water Pathway

The approximate elevation for the former Nike C-32 Launch Area is 680 feet above mean sea level. The elevation drops to approximately 640 feet above mean sea level about 0.25 to 0.5 mile north of the site. South of the site, the topography slopes gently toward tributaries of the Little Calumet River–East Arm (GEO Consultants, 2007). The site is relatively flat, and the area is drained primarily by ditches that terminate at the north part of the site. No storm drains or control structures are located on the site.

2.6.3 Soil Pathways

The geology of the area surrounding the site is characterized by 150 to 200 feet of heterogeneous Quaternary sediments overlying 400 to 1,000 feet of Devonian and Silurian sedimentary rocks. The site lies in the Lake Michigan basin where there are heterogeneous unconsolidated deposits that resulted from a variety of processes, including glacial, glaciofluvial, lacustrine, and wetland sedimentation. Local soil survey information indicates soils at the site are composed of Blount and Morley series soils (USDA, 1981). The Blount soils are characterized as nearly level and gently sloping, somewhat poorly drained soils on glacial till plains. The Blount surface soil profile is dark grayish brown silt loam approximately 1 foot thick, while the subsoil is light olive brown silty clay loam to a depth of approximately 5 feet. The Morley series soil is characterized as gently sloping, moderately drained soils. The Morley surface layer is approximately 8 inches of dark grayish brown silt loam, and the subsurface is yellowish brown silty clay loam to a depth of approximately 5 feet (USDA, 1981). The shallowest bedrock unit in the area surrounding the site is the Devonian Antrim shale. Locally, site investigation work concluded the overburden soils were comprised of tight, lean clay from the ground surface to the depth of the site borings, approximately 70 feet bgs.

2.6.4 Details Obtained from Former Nike C-32 Site Investigations

A removal action was conducted in September 2003. Three underground storage tanks (one located west of the fallout shelter and two located outside the generator building) and two aboveground storage tanks (one located inside the generator building and one located outside the missile test and assembly building) were removed. Because initial confirmation soil samples exceeded screening criteria, additional soil was removed. The results were below the screening criteria after the soil removal. In addition, one transformer (located next to the generator building) was removed. There was no visual evidence of leaks and transformer oil sampling indicated no polychlorinated biphenyls were present. Finally, groundwater and sediment sampling from the underground missile magazines indicated the presence of VOC (cis-1,2-dichloroethene [cis-DCE]) in the far northern missile magazine. (GEO Consultants, 2007).

From 2005 to 2006, the missile magazines were demolished. The magazines were dewatered, demolished, and backfilled. An investigation was conducted of the electrical substation located along West Oak Hill Road, which contained one pad-mounted and three pole transformers. The transformers and soil were removed and backfilled (GEO Consultants, 2007).

GEO Consultants conducted the preliminary assessment to assess whether the site posed a potential threat to human health or the environment, or whether further investigations were required. GEO Consultants concluded that soil, sediment, and sand filter sampling should be conducted at the missile test and assembly building, warheading building, sand filter bed and associated sewer lines, and the ditches along the launch pad. In addition, it was concluded that groundwater sampling should be conducted from the well at the former Launch Area, seepage south of the generator building, in the subsurface filter bed, and sediment where the former Launch Area sewage treatment system discharges.

A site inspection was documented in November 2008. The focus of the fieldwork was the areas specified in the preliminary assessment. The field investigation consisted of collecting soil samples near the areas of concern (see Figure 2), and collecting sediment samples from ditch areas. Results indicated the presence of VOCs (TCE and 1,2-dichloroethane [1,2-DCA]) in soil at the missile magazine area exceeded the IDEM residential screening criteria at 24 feet bgs, and the presence of lead in one sediment sample that exceeded screening criteria.

Based on this investigation, supplemental site inspection was documented in July 2010. During this activity, a 3-foot by 3-foot by 1-foot deep area was excavated to remove the sediment that previously exceeded the screening criteria for lead. Confirmation samples were collected and results indicated the lead contamination was sufficiently removed. The excavation subsequently was regraded to the existing ground surface. Additional soil borings were installed and six locations were converted to monitoring wells. Soil concentrations exceeded IDEM residential screening criteria for TCE and 1,2-DCA. The vertical contamination profile indicated that the soil concentrations likely did not originate from the ground surface, but more likely came from the missile magazine operations at depth. In addition, the soil concentrations were below the groundwater table. Monitoring well data indicated groundwater concentrations exceeded IDEM residential screening groundwater criteria in MW-1 and MW-4.

Based on the site inspection, an RI field investigation was conducted in September 2011 and

September 2012. Activities included:

- September 2011
  - Redeveloped six existing monitoring wells and advanced 13 soil borings, eight to a depth of 24 feet bgs and five to a depth of 50 to 55 feet bgs; converted 10 of the borings to monitoring wells; sampled the monitoring wells for three quarters from October 2011 to April 2012 for VOCs and MNA parameters (nitrate, sulfate, chloride, iron, methane, ethane, and ethene); slug testing conducted on several of the newly installed monitoring wells. Figure 3 shows the monitoring well locations.

- September 2012
  - Installed 12 offsite membrane interface probe locations to assess the subsurface conditions and select offsite monitoring well locations. Installed 5 offsite soil gas points and sampled for three quarters from September 2012 to August 2013 for TCE and breakdown products; redeveloped 13 existing monitoring wells and installed four new onsite wells and three new offsite monitoring wells; sampled onsite and offsite monitoring wells quarterly from September 2012 to May 2013 for VOCs and MNA parameters (nitrate, sulfate, chloride, iron, methane, ethane, and ethene); slug testing was performed on several of the newly installed and existing monitoring wells.

Because residents adjacent to the property had private drinking water wells, tap water sampling was conducted to evaluate whether VOC contamination was present and determine if the residential water wells had been impacted by the site COCs. The data indicate no TCE or breakdown products were detected in any of the drinking water well samples.

2.7 Current and Potential Former Nike C-32 Site Resource Uses

The Former Nike C-32 site is owned by a private landowner who is currently clearing certain areas of the property and is proposing to start a business. While it uncertain whether the business will be realized, the property may be redeveloped for residential use as properties to the east, west, north, and south are currently being used as residential property. Current or anticipated future use of groundwater as a potable water supply is possible at the former Nike C-32 site.

2.8 Summary of Former Nike C-32 Site Risks

This subsection presents an overview of the risks associated with the current and future use of the former Nike C-32 site. The human health risk was evaluated for both industrial and residential use.

2.8.1 Human Health Risk

A human health risk assessment (HHRA) was conducted to evaluate potential risks to human health from contaminants detected in soil and groundwater at the site. The HHRA focused on potential human exposures to onsite soil and groundwater concentrations and the potential for future residential (adult and child) and construction worker receptor populations. In addition, adjacent downgradient residences have private wells used for groundwater consumption. Therefore, potential offsite groundwater exposure for current/future residents through drinking water use and vapor intrusion exposure also were considered. Soil gas data along with shallow groundwater data were evaluated to determine if there were potential vapor intrusion pathways to residences located near the site. Multiple lines of evidence were evaluated, including groundwater and soil gas concentrations within 100 feet of the residences, and site-specific soil conditions. Evaluation of the groundwater and soil gas concentrations offsite indicated the concentrations were below vapor intrusion screening level values. Onsite exposure points included soil and groundwater, and the offsite exposure point is groundwater downgradient from the site.

The land use exposure routes for quantitative evaluation included the following:

- **Onsite future resident (adult and child):** Incidental ingestion of and dermal contact with soil; ingestion of and dermal contact with shallow groundwater; and inhalation of volatile contaminants of potential concern from shallow groundwater while showering (adult exposure).
- **Onsite future construction worker:** Incidental ingestion of and dermal contact with soil; dermal contact with shallow groundwater; and inhalation of volatile emissions from shallow groundwater in an open excavation.

The cumulative reasonable maximum exposure noncarcinogenic hazard for potential future direct contact with groundwater for the adult resident, child resident, and construction worker is orders of magnitude above the target hazard index of 1, and is driven primarily by TCE, cis-1,2-DCE, and trans-1,2-DCE. Although 1,2-DCA concentrations are greater than the maximum contaminant level (MCL), based on the findings of the HHRA, this compound was not a primary risk driver.

Carcinogenic risks were calculated for the lifetime of a child/adult resident following U.S. Environmental Protection Agency (EPA) guidance. The cumulative reasonable maximum exposure carcinogenic risk to the potential lifetime child/adult resident and construction worker exceeds the target risk range of 1 person in 1,000,000 to 1 person in 10,000 getting cancer (acceptable range of risk of 1×10^{-6} to 1×10^{-4}) by at least two orders of magnitude, and is driven primarily by TCE in groundwater.

Soil and vapor intrusion were also evaluated for risk. The contaminant concentrations in soil are not present at a magnitude to significantly influence potential risks for receptor populations from direct contact exposure. As there was not a complete pathway for vapor intrusion, this was not evaluated further.

The results of the HHRA indicate there is potential for cancer risk and noncancer hazards above the target threshold levels for future residents and construction workers based on groundwater exposure. The former land use for the former Nike C-32 site was industrial, and the parcel of land was vacant and unused. However, the land was sold recently, and the site owner has begun redeveloping the site. As the adjacent properties are residential, it is appropriate to evaluate the site risks and remedial alternatives based on a residential land use scenario.

The HHRA findings indicate that risk exposure due to direct contact to site soil was insignificant. However, soil concentrations could potentially contribute to groundwater contamination based on an evaluation of EPA soil screening levels (risk-based and MCL-based screening levels in the soil-to-groundwater concentration tables, dated November 2015), soil and groundwater equilibrium calculations, and site-specific soil data for fraction of organic carbon content. Therefore, soil contamination would need to be addressed within each groundwater alternative.

Based on the HHRA results, TCE, cis-1,2-DCE, trans-1,2-DCE, and 1,2-DCA were constituents with concentrations above EPA MCL screening criteria. Results of the HHRA indicate the potential for cancer risks and noncancer hazards above the target threshold levels for future residents and construction workers based on groundwater exposure. The greatest contributions to potential groundwater exposure risks and hazards are primarily from TCE, and to a lesser degree, cis-1,2-DCE, and trans-1,2-DCE concentrations. Concentrations of 1,2-DCA are not a significant contributor to human health risks.

2.8.2 Ecological Risks

A screening-level ecological risk assessment for the former Launch Area was documented in the RI report (using the 2008 data) to determine if there is the potential for risk to ecological receptors (plants and animals) from the presence of chemicals in surface soil and/or sediment of the onsite drainages (CH2M, 2015). The site is developed and provides a habitat for only a limited number of soil invertebrates, urban-adapted avian and mammalian species, and aquatic invertebrates capable of withstanding periods of drying.

Maximum chemical concentrations detected in site surface soil (ground surface to 3 feet bgs) and sediment (ground surface to 1 foot bgs), within the areas identified as having potentially viable terrestrial habitat, were screened using EPA Region 5 Resource Conservation and Recovery Act ecological screening values. Sediment concentrations from ground surface to 1 foot bgs were also used for this comparison because benthic invertebrates are likely to occur within the sediment depth. Chemicals in soils having maximum detected concentrations exceeding ecological screening values were further screened against background concentrations to determine whether those chemicals are site-related.

Although results of the surface soil and sediment screening indicated the presence of inorganic chemicals and polynuclear aromatic hydrocarbons at concentrations exceeding EPA Region 5 ecological screening values, none were detected in surface soil at concentrations exceeding those present in onsite-impacted background soil, and concentrations in sediment were typical of urban areas. Therefore, it was concluded that chemicals in surface soil and sediment do not pose a site-related risk to ecological receptors.

2.9 Remedial Action Objectives

Remedial action must be taken to protect human health from exposure to the site-related COCs in groundwater at the former Nike C-32 site. RAOs are site-specific goals for protecting human health and the environment that specify contaminants and media of interest, exposure pathways, and RGs. RGs are developed on the basis of chemical-specific risk factors. The following RAOs were established for the former Nike C-32 site:

1. To prevent human exposure to the COCs in excess of the RGs.

2. To reduce concentrations of COCs to RG levels and potential risks associated with

exposure to groundwater to allow future residential land use of the site.

The RGs are as follows: the primary COC is TCE at 5 micrograms per liter (µg/L); the TCE degradation product concentrations currently include cis-DCE at 70 µg/L, and trans-DCE at 100 µg/L. Other TCE degradation products will be monitored and, if they exceed the MCL in the future, will also be remediated to RG levels.

The RGs for the CVOCs in groundwater are based on the MCLs established under the Safe Drinking Water Act and would allow for unlimited use of the property and unrestricted exposure onsite.

2.10 Description of Alternatives

The following remedial alternatives were developed for the former Nike C-32 site to address unacceptable risks due to potential exposure to COCs in groundwater. Seven remedial alternatives were developed for the site: Alternative 1a—No Action; Alternative 1b—MNA and ICs; Alternative 2—In situ Thermal Treatment, MNA, and ICs; Alternative 3—In situ Chemical Reduction via Soil Mixing with ZVI, MNA, and ICs; Alternative 4a—Excavation and Offsite Disposal, MNA, and ICs; Alternative 4b—Limited Excavation and Offsite Disposal, In situ Chemical Reduction via Soil Mixing with ZVI, MNA, and ICs; and Alternative 4c—Limited Excavation and Offsite Disposal, MNA, and ICs. The major components of the remedial alternatives are defined below.

2.10.1 Alternative 1a—No Action

Alternative 1a is required under CERCLA to provide a baseline for comparing remedial alternatives. Under Alternative 1a, no activities would be completed at the site to change the current conditions, and no action would be taken to restrict potential human exposures. There is no cost associated with Alternative 1a.

2.10.2 Alternative 1b—MNA and ICs

Alternative 1b uses monitoring to evaluate the effectiveness of natural attenuation processes at reducing contaminant concentrations in site groundwater. Monitoring includes collecting and analyzing groundwater from site monitoring wells. Sampling details would be included in a long-term monitoring plan. Groundwater monitoring data would be used to verify that COC concentrations are decreasing, the affected area or plume is not expanding, and no changes in hydrogeological, geochemical, or biological parameters occur that might reduce the effectiveness of the remedial action. The former Nike C-32 site does exhibit some indicators of a natural attenuation process, albeit a slow one. These indicators include the degradation of TCE, and the presence of degradation products. Furthermore, the VOC contaminant plume appears to be stable. Given the lack of abundant organic matter in the water-bearing units, and the high clay content in soil, the physical processes of dilution, sorption, and volatilization will likely be the primary mechanisms of natural attenuation.

Alternative 1b includes land use controls to place limitations on what activities can take place on a property and thereby limit exposure to site contamination. An IC in the form of an EC (Porter County record number 2018-014167) is currently in place to restrict the current and future use of onsite groundwater in a manner to prevent exposure to groundwater (by not allowing the installation or use of wells within the EC restricted area) and the protection of monitoring wells installed (by prohibiting their damage or removal). Therefore, an interim IC will not be a component of the final selected remedial alternative, although it was part of the description of the preferred alternative in the Proposed Plan. Only engineering controls will be implemented, including security fencing and placarding to enclose the remediation area and prevent exposure to the contamination and response action activities such as groundwater monitoring.

The estimated time required to achieve RGs is 50 years. This timeframe was selected because estimating beyond 50 years is assumed to have a negligible cost impact on the present value analysis (EPA, 2000). The estimated costs for Alternative 1b are:

- Capital Cost: $24,000
- Operation and Maintenance (O&M) Present Value Cost: $1,173,000
- Total Present Value Cost: $1,197,000

2.10.3 Alternative 2—In situ Thermal Treatment, MNA, and ICs

Alternative 2 consists of heating the target treatment zone below the surface by installing subsurface heaters spaced to conservatively contain the soil and groundwater VOC plumes. VOC reductions are permanent and irreversible. In addition, subsurface conditions after thermal treatment are conducive to biological transformation, which reduces the potential for back-diffusion processes in the event aquifer materials were not fully treated by in situ heating operations. In addition to subsurface heaters, a robust vapor extraction system would be installed and operated during in situ thermal treatment system operation. During system operation, subsurface heating above the boiling point of the COCs (approximately 82 degrees Celsius) would drive the COCs into a vapor phase. Buoyancy forces would drive vapors upward and toward the extraction wells. Due to the geologic conditions that exist onsite, vapor collection could be limited, which may delay the remedial process and, thus, prolong the thermal treatment in the area, resulting in higher cost.

The majority of site COCs would be present in the vapor extracted from the wellfield; COCs present in extracted groundwater or steam condensate therefore represent a small portion of the total contaminant mass removed by the thermal treatment system. Condensate generated during cooling would be collected and conveyed to a conventional gravity separator for removal. Groundwater containing dissolved COCs would be treated using granular activated carbon and temporarily stored onsite. Treated groundwater would be sampled and transported for offsite disposal in accordance with applicable regulations. Vapor exiting the heat exchanger would be conditioned by heating and routed for subsequent treatment using onsite vapor-phase granular activated carbon. Spent carbon used in vapor and liquid treatment systems would be transported, disposed, or regenerated offsite in accordance with manufacturer’s acceptance requirements and applicable disposal regulations. Fixed laboratory samples of site soil and groundwater would be completed before, during, and after completion of thermal treatment operations to demonstrate fulfillment of the established numeric treatment standards as part of the MNA.

Interim land use controls would have to be in place during the in situ thermal treatment process until the RAOs are met as described previously. The estimated time required to achieve this is 150 days, plus 2 years of quarterly monitoring to assure VOCs remain compliant with applicable RGs. An IC in the form of an EC (Porter County record number 2018-014167) is currently in place to restrict the current and future use of onsite groundwater in a manner to prevent exposure to groundwater (by not allowing the installation or use of wells within the EC restricted area) and the protection of monitoring wells installed (by prohibiting their damage or removal). Therefore, an interim IC will not be a component of the final selected remedial alternative, although it was part of the description of the preferred alternative in the Proposed Plan. Only engineering controls will be implemented, including security fencing and placarding to enclose the remediation area and prevent exposure to the contamination and response action activities such as groundwater monitoring. The estimated costs for Alternative 2 are shown below:

- Capital Cost: $3,534,000
- O&M Present Value Cost: $412,000
- Total Present Value Cost: $3,946,000

2.10.4 Alternative 3—In situ Chemical Reduction via Soil Mixing with ZVI, MNA, and ICs

Alternative 3 would use soil mixing with ZVI, which has been shown to be effective based on TCE groundwater concentration reductions at monitoring well MW-8SR following the pilot test. The full-scale remedy under this alternative would use mechanical soil mixing to effectively distribute chemical amendments throughout the soil to treat contaminants. Soil mixing would create a homogeneous mixture of soil, iron, and target contaminants considering the tight nature of the clay soils at the site. The tight clay geology may limit the overall effectiveness of the soil mixing. The soil-mixing process would allow contact of the ZVI and target COCs and distribute chemical amendments by homogenizing the soil over the VOC-impacted plume area, therefore, increasing the probability of success and effectiveness of the remedy.

The top 8 feet of soil would be excavated prior to mixing. This soil is not anticipated to contain VOCs. The excavated material would be stored at the site and used for site grading and restoration. Other components of this alternative include: monitoring well abandonment, installation of sediment and erosion control measures, construction of containment berms, air monitoring, and site restoration. Treated soil would be sampled and analyzed for iron content in the field to ensure adequate mixing throughout the treatment area. The estimated time required to achieve this is 10 days for soil mixing, plus 10 years of quarterly monitoring to assure VOCs remain compliant with applicable RGs. Interim land use controls would have to be in place during the MNA process until the RAOs are met as described previously. An IC in the form of an EC (Porter County record number 2018-014167) is currently in place to restrict the current and future use of onsite groundwater in a manner to prevent exposure to groundwater (by not allowing the installation or use of wells within the EC restricted area) and the protection of monitoring wells installed (by prohibiting their damage or removal). Therefore, an interim IC will not be a component of the final selected remedial alternative, although it was part of the description of the preferred alternative in the Proposed Plan. Only engineering controls will be implemented, including security fencing and placarding to enclose the remediation area and prevent exposure to the contamination and response action activities such as groundwater monitoring. The estimated costs for Alternative 3 are:

- Capital Cost: $1,651,000
- O&M Present Value Cost: $543,000
- Total Present Value Cost: $2,194,000

2.10.5 Alternative 4a—Excavation and Offsite Disposal, MNA, and ICs

Alternative 4a would remove soils that could act as a continuing source of contamination to groundwater, not because soil poses a risk to human health or the environment. This would result in excavating soil corresponding to TCE concentrations of 76 µg/kg and greater, with a total excavation volume of 8,650 yd^3 with sloping around the excavation (see Figure 4). This alternative would remove TCE and the TCE degradation products to concentrations below EPA regional screening levels for residential soils.

These activities cover mobilization to the site and development of preconstruction documents, including, but not limited to, a safety plan, dust control plan, excavation plan, and a stormwater pollution prevention plan. Because of the required side slope requirement during excavation, a portion of the excavation area may extend onto neighboring property in the east direction. An access agreement would be needed to access the neighboring property. Prior field tasks and discussions with the property owner suggest the property owner is amenable to providing access for activities required for cleaning up the site contamination. Existing infrastructure inside the excavation footprint, such as wells, fences, and pavement, would need to be demolished before or during excavation. Temporary fencing will need to be installed to prevent access to the remedial action area.

The volume of soil from the top 8 feet of the excavation area would be screened with a photoionization detector (PID) to confirm it is suitable for use as backfill at the site. The excavation would likely be performed with an excavator and haul trucks. The excavator would remove soil from the excavation and place it directly into bins for dewatering and/or transport. Trucks would remove the bins from the site and transport them to a permitted offsite disposal facility. Excavated soil may require dewatering because more than half of the excavated soil is below the groundwater surface and expected to be saturated. Water draining from the soil would need to be managed and ultimately disposed of at a permitted offsite facility. Decontamination measures would be implemented to prevent contaminated material from being tracked or spilled outside the site. The excavation would be backfilled with uncontaminated soil from offsite locations. Confirmation samples would be taken before placing backfill. After placement of backfill, monitoring wells will be installed.

The estimated time required to achieve this alternative is 120 days for excavation, plus 10 years of quarterly monitoring to assure VOCs remain compliant with applicable RGs. An IC in the form of an EC (Porter County record number 2018-014167) is currently in place to restrict the current and future use of onsite groundwater in a manner to prevent exposure to groundwater (by not allowing the installation or use of wells within the EC restricted area) and the protection of monitoring wells installed (by prohibiting their damage or removal). Therefore, an interim IC will not be a component of the final selected remedial alternative, although it was part of the description of the preferred alternative in the Proposed Plan. Only engineering controls will be implemented, including security fencing and placarding to enclose the remediation area and prevent exposure to the contamination and response action activities such as groundwater monitoring. The costs associated with Alternative 4a are:

- Capital Cost: $1,771,000
- O&M Present Value Cost: $543,000

  Total Present Value Cost: $2,314,000

2.10.6 Alternative 4b—Limited Excavation and Offsite Disposal, In situ Chemical Reduction via Soil Mixing with ZVI, MNA, and ICs

Alternative 4b would use limited excavation that would reduce the volume of soil to be transported and disposed offsite. Site activities would involve the excavation of the most contaminated soil within the TCE plume footprint, corresponding to a TCE concentration of 760 µg/kg and a total excavation volume of 1,450 yd^3 with shoring around the excavation. After soil removal, soil mixing with ZVI within the 76 µg/kg soil TCE plume footprint would be conducted. This alternative would also treat TCE degradation products. These activities would be the same as described for Alternatives 3 and 4a, with the exception of shoring activities, the excavation would likely be performed as described for Alternative 4a.

The volume of soil from the top 8 feet of the excavation area would be screened with a PID to confirm it is suitable for use as backfill at the site. Following excavation and backfill activities, the remaining TCE-impacted soil would be treated in situ by mixing soil with ZVI as described for Alternative 3. At the completion of the soil mixing activities, the shoring materials would be removed and the site would be graded and restored. Groundwater would be controlled and managed as described for Alternative 4a.

Transportation and disposal would be managed as described for Alternative 4a.

The excavation would be backfilled with uncontaminated soil imported from offsite locations and clean overburden material, and finished as described for Alternative 4a. Confirmation samples would be taken before placing backfill. After placement of backfill, monitoring wells will be installed. The estimated time required to achieve this is 30 days for excavation, 10 days for soil mixing, plus 10 years of quarterly monitoring to assure VOCs remain compliant with applicable RGs. An IC in the form of an EC (Porter County record number 2018-014167) is currently in place to restrict the current and future use of onsite groundwater in a manner to prevent exposure to groundwater (by not allowing the installation or use of wells within the EC restricted area) and the protection of monitoring wells installed (by prohibiting their damage or removal). Therefore, an interim IC will not be a component of the final selected remedial alternative, although it was part of the description of the preferred alternative in the Proposed Plan. Only engineering controls will be implemented, including security fencing and placarding to enclose the remediation area and prevent exposure to the contamination and response action activities such as groundwater monitoring. The costs associated with Alternative 4b are:

- Capital Cost: $1,873,000
- O&M Present Value Cost: $543,000

- Total Present Value Cost: $2,416,000

2.10.7 Alternative 4c—Limited Excavation and Offsite Disposal, MNA, and ICs

Alternative 4c would use limited excavation that would reduce the volume of soil to be transported and disposed offsite. Site activities would involve the excavation of soil corresponding to a TCE concentration of 760 µg/kg with a total excavation volume of 5,780 yd^3 with sloping around the excavation. This alternative would also remove TCE degradation products.

Activities necessary to implement Alternative 4c would be the same as described for Alternative 4a. The volume of soil from the top 8 feet of the excavation area would be screened with a PID to confirm it is suitable for use as backfill at the site. The excavation would likely be performed as described for Alternative 4a. Groundwater would be controlled and managed as described for Alternative 4a. Transportation and disposal would be managed as described for Alternative 4a.

The excavation would be backfilled with uncontaminated soil imported from offsite locations and finished as described for Alternative 4a. Confirmation samples would be taken before placing backfill. After placement of backfill, monitoring wells will be installed. The estimated time required to achieve this is 80 days for excavation, plus 10 years of quarterly monitoring to assure VOCs remain compliant with applicable RGs.

An IC in the form of an EC (Porter County record number 2018-014167) is currently in place to restrict the current and future use of onsite groundwater in a manner to prevent exposure to groundwater (by not allowing the installation or use of wells within the EC restricted area) and the protection of monitoring wells installed (by prohibiting their damage or removal). Therefore, an interim IC will not be a component of the final selected remedial alternative, although it was part of the description of the preferred alternative in the Proposed Plan. Only engineering controls will be implemented, including security fencing and placarding to enclose the remediation area and prevent exposure to the contamination and response action activities such as groundwater monitoring. The costs associated with Alternative 4c are:

- Capital Cost: $1,087,000
- O&M Present Value Cost: $1,044,000
- Total Present Value Cost: $2,131,000

2.11 Summary of Comparative Analysis of Alternatives

CERCLA uses nine criteria to evaluate remedial alternatives individually and comparatively to help select a preferred alternative. They are classified as threshold, balancing, and modifying criteria.

Threshold criteria are standards that an alternative must meet for it to be eligible for selection as a remedial action. Threshold criteria are:

- Overall protection of human health and the environment
- Compliance with ARARs

Balancing criteria weigh the tradeoffs among alternatives. They represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. In general, a high rating on one balancing criterion can offset a low rating on another. Five of the nine criteria are balancing criteria:

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying criteria consider the concerns of state regulator and the local community's acceptance of a proposed remedial action. Modifying criteria are:

- State/support agency acceptance
- Community acceptance

Table 1 summarizes how well each alternative satisfies each evaluation criterion and indicates how it compares to the other alternatives under consideration. Table 1 evaluates each alternative with respect to the criteria listed above for the Former Nike C-32 site.

2.12 Principal Threat Wastes

The NCP [NCP 300.430(a)(1)(iii)(A)] expects treatment to be used to address principal threat wastes to the extent practicable to reduce their toxicity, mobility, or volume. The term "principal threat wastes" refers to source materials that are highly toxic or highly mobile. No highly toxic or highly mobile contaminants are present at the former Nike C-32 site. Therefore, no principal threat waste is present at the site.

2.13 Selected Remedy

The selected remedy for the former Nike C-32 site is Alternative 4b—Limited Excavation and Offsite Disposal, In situ Chemical Reduction via Soil Mixing with ZVI, MNA, and ICs. This alternative is expected to satisfy the following statutory requirements of CERCLA Section 121(b): be protective of human health and the environment; comply with ARARs; be cost-effective; and use permanent solutions and sustainable options to the maximum extent practicable.

2.14 Statutory Determinations

Based on the findings of investigations and risk assessments that have been completed, further action is necessary by the U.S. Army. Hazardous substances, pollutants or contaminants identified at the site present risk to residential and construction worker use. The statutory determinations of the selected remedy are outlined below.

2.14.1 Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment and satisfies the statutory requirements of CERCLA §121(b).

2.14.2 Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with the following chemical and specific ARARs shown in the tables 2-1 and 2-2 below. No location specific ARARs were identified.

TABLE 2-1

Chemical-specific Applicable or Relevant and Appropriate Requirements and To-Be-Considered Material
Former Nike C-32 Site, Porter, Porter County, Indiana

Requirement	Status	Requirement Synopsis
SDWA MCLs for Organic Contaminants 40 CFR 141.61	Applicable	MCLs will be used as the cleanup goals for groundwater. The MCL for cis-DCE is 70 µg/L; the MCL for trans-DCE is 100 µg/L; and the MCL for TCE is 5 µg/L. The MCL for 1,1-DCE is 7 µg/L and the MCL for vinyl chloride is 2 5 µg/L.
IDEM VRP Resource Guide, July 1996	TBC	IDEM's VRP provides risk-based, chemical-specific cleanup goals designed to protect human receptors. Cleanup goals are not promulgated, but are a technical reference, which can be considered a TBC. Cleanup Goals for the residential subsurface soil scenario are found in Table 15. The cleanup goals can be found at (accessed 3/23/2015): https://www.in.gov/idem/cleanups Subsurface soil Residential Scenario TCE 0.076 mg/Kg 1,2-DCA 0.025 mg/Kg cis-DCE 17.140 mg/Kg

Notes:
CFR = Code of Federal Regulation
IDEM = Indiana Department of Environmental Management
MCL = Maximum Contaminant Level
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
SDWA = Safe Drinking Water Act
TBC = To-Be-Considered material
µg/L = micrograms per liter
VRP = Voluntary Remediation Program

TABLE 2-2
Action-specific Applicable or Relevant and Appropriate Requirements
Former Nike C-32 Site, Porter, Porter County, Indiana

Requirement	Status	Requirement Synopsis
Fugitive Dust Emissions 326 IAC 6-4-2	Applicable	Defines fugitive emission dust limitations. For the excavation alternative, fugitive dust containing concentrations of TCE in excess of substantive cleanup standards must be controlled.

Notes:
IAC = Indiana Administrative Code

2.14.3 Cost-Effectiveness

This remedy is cost effective.

2.14.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The remedy was chosen because limited excavation at the site will permanently remove the source of contamination and ZVI mixing will permanently remove the residual impacts to groundwater.

2.14.5 Preference for Treatment as a Principal Element

The preference for treatment as a principal element of the remedy has been satisfied as soil mixing with ZVI is included as part of this remedy.

2.14.6 Five-Year Review Requirements

Statutory reviews will be conducted every 5 years after initiating the remedial action to ensure the remedies remain protective of human health and the environment. In accordance with Section 121 of CERCLA, as amended in 1986 by SARA, 5-year reviews will be completed as long as hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. The current landowner has placed a groundwater restriction land use control on the Former Nike C-32 site.

2.15 Documentation of Significant Changes from Preferred Alternative of Proposed Plan

This Decision Document contains no significant changes from the Proposed Plan. The only change from the preferred alternative identified in the Proposed Plan is the exclusion of the institutional control as a component of the remedy because an existing EC already restricts access to groundwater within and around the plume. However, this change is not considered significant because the selected remedy, without the interim institutional control, is equivalent to the preferred alternative and equally protective.

3.0 RESPONSIVENESS SUMMARY

CELRL placed a public notice in the Chesterton Tribune soliciting comments on the Proposed Plan for the Former Nike C-32 site. A 30-day public comment period (January 2 to February 2, 2018) was provided. Several comments were received during the public meeting (January 17, 2018). The IDEM and several members of the community were present at the public meeting. During the meeting, comments and questions were expressed by the local community members and verbal responses were provided by representatives of USACE and its contractor. A transcript of the public meeting is presented in Attachment B. The selected remedy was not revised based on comments received during the public meeting.

This section presents responses to comments during the public meeting. Any responses herein are also documented in the meeting transcript presented in Attachment B.

3.1 Stakeholder Comments and Execution Agent Responses

This section presents responses to comments via email communications outside of the public meeting. Comments and responses received during the public meeting are documented in the meeting transcript presented in Attachment B.

3.1.1 Comment from Ms. Donna Beckham (Community Member- via email)

Comment: Ms. Beckham asked “I am a resident of the subdivision of the location of the above-mentioned base since 1993. I am also an army brat. My Dad is Major Michael L. Cain, now residing in Arlington. I and several of my six siblings have been diagnosed with several cancers and three out of the five who have been diagnosed have since died. I have six siblings. My three oldest were stationed in Guam with my parents back in the early 50's. I was born in Alaska in 1954. I have two cancers. I am wondering if my current resident, adjacent to this base had anything to do with my having the cancers I have and if there is any information you can provide to help me determine that. I have a well on my property and have been using the ground water for the 25 years I have lived here. Any help would be greatly appreciated as I do want to inform my children and my nieces and nephews of any additional information for their records.

Response: Ms. Beckham’s property is side gradient to the plume meaning that there is no chance of the plume getting to her well. Wells have been monitored for 8 years between the plume and her residence and they have never had any detections of contaminates. The plume is near the northern silo. The plume is moving north northeast away from her well.

3.1.2 Comment from Mr. Michael Barry (Director of Development, Building Commissioner, Town of Porter – via email)

Comment: Mr. Barry asked “As a follow up to the public meeting on January 17th in Chesterton, I wanted to email some comments. The slide in the presentation (#35) that described the mitigation process says this:

Alternative 4b: Limited Excavation and Offsite Disposal, In-situ Chemical Reduction via Soil Mixing with ZVI, MNA, and ICs

- Excavation of contaminated soil (concentrations of TCE of 760 µg/kg or greater) within the plume footprint
- The remaining contaminated soil with TCE concentrations at or above 76 µg/kg would then be mixed and treated with ZVI
- Trucks would haul soil to a permitted offsite disposal facility
- Excavation would then be backfilled with certified clean soil
- Site would be monitored for 10 years after excavation was complete
- Would implement storm water and soil erosion controls before excavating
- Temporary fencing would be installed around the perimeter of the excavation
- A restriction on groundwater use would be implemented
- Benefits: Implementation of treatment method would be over a short time frame; Soils with the highest contamination concentrations would be hauled offsite

My concerns would be as follows:

1. The number and size of trucks that would go onto Wagner Road. The vehicle size you mentioned sounded good. It would be roughly around 110 or more trucks.
2. I am concerned that contaminated soil does not spill or blow off the trucks onto the roadway coming out of the property as well as onto the surrounding roads.
3. Roads would need to be swept as needed.
4. Any damage to road paving would need to be repaired.
5. Once the disposal facility is determined, the truck route can be determined.
6. I assume the backfill would be sourced locally.
7. Once the soil is removed, the materials mixed in and the excavation backfilled, is there any need to keep the area fenced? I was thinking not as the material in question is about 20’ deep.

You covered my questions on fencing and securing the site. Please feel free to contact me for anything you may need and thank you.”

Response: 1. Trucks will be tri-axle, thirteen cubic yard capacity; 2. Dust control measures will be used on trucks to knock down the dust before the trucks leave the site and truck beds will be tarped; 3. Roads will be swept if needed; 4. roads damage will be repaired; 5. USACE will notify the Town of Porter once the landfill has been determined; 6. Backfill will be sourced locally to reduce the distance traveled; 7. After the area is backfilled, monitoring wells will be installed to collect groundwater samples. In order to protect the groundwater monitoring area, a security fence will be used.

3.2 Technical and Legal issues

No technical or legal issues exist regarding the selected remedial alternative decision at the former Nike C-32 site.

4.0 REFERENCES

CATI Inc. (CATI) 2004. *Final Draft, Closure Report, Removal and Disposal of USTs and ASTs with Associated Soils.* Prepared for U.S. Army Corp of Engineers, Louisville District. May.

GEO Consultants. 2007. Preliminary Assessment, Report for Formerly Used Defense Site Nike C-32—Indiana Dunes (FUDS Site #G05IN0001), Porter, Indiana. November.

Tetra Tech EM Incorporated. 2003. Polynuclear Aromatic Hydrocarbon Background Study, City of Chicago, Illinois.

CH2M HILL, Inc. (CH2M). 2009. *Final Site Inspection Report, Former Nike Site C-32 Launch Area, Porter County, Indiana*. November.

CH2M HILL, Inc. (CH2M). 2012. Final Uniform Federal Policy Quality Assurance Project Plan, Former Nike Site C-32 Launch Area, Porter County, Indiana. August.

CH2M HILL, Inc. (CH2M). 2014. Final Public Involvement Plan, Former Nike Site C-32 Launch Area, Porter, Porter County, Indiana. December.

CH2M HILL, Inc. (CH2M). 2015. Final Remedial Investigation Report, Former Nike Site C-32 Launch Area, Porter, Porter County, Indiana. February.

CH2M, Inc. (CH2M). 2016. Final Feasibility Study, Former Nike Site C-32 Launch Area, Porter, Porter County, Indiana. December.

CH2M, Inc. (CH2M). 2017 Final Proposed Plan, Former Nike Site C-32 Launch Area, Porter, Porter County, Indiana. December.

Department of Defense. 2004. *Formerly Used Defense Sites Program Policy, ER 200-3-1*. May.

U.S. Army Corps of Engineers (USACE). 1996. *Engineering Manual 200-1-4, Risk Assessment Handbook: Volume II – Environmental Evaluation.*

U.S. Department of Agriculture (USDA). 1981. *Soil Survey of Porter County, Indiana*. February.

U.S. Environmental Protection Agency (EPA). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*. EPA/540/G-89/004. OSWER Directive 9355.3-01. October.

U.S. Environmental Protection Agency (EPA). 1989. *Risk Assessment Guidance for Superfund (RAGS)*, Volume I: Human Health Evaluation Manual, Part A. EPA/540/1-89/002. Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency (EPA). 1990. *National Oil and Hazardous Substances Pollution Contingency Plan*. 40 Code of Federal Regulations Part 300. March.

U.S. Environmental Protection Agency (EPA). 2000. *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study*. EPA 540-R-00-002, Office of Solid Waste and Emergency Response 9355.0-75. July.

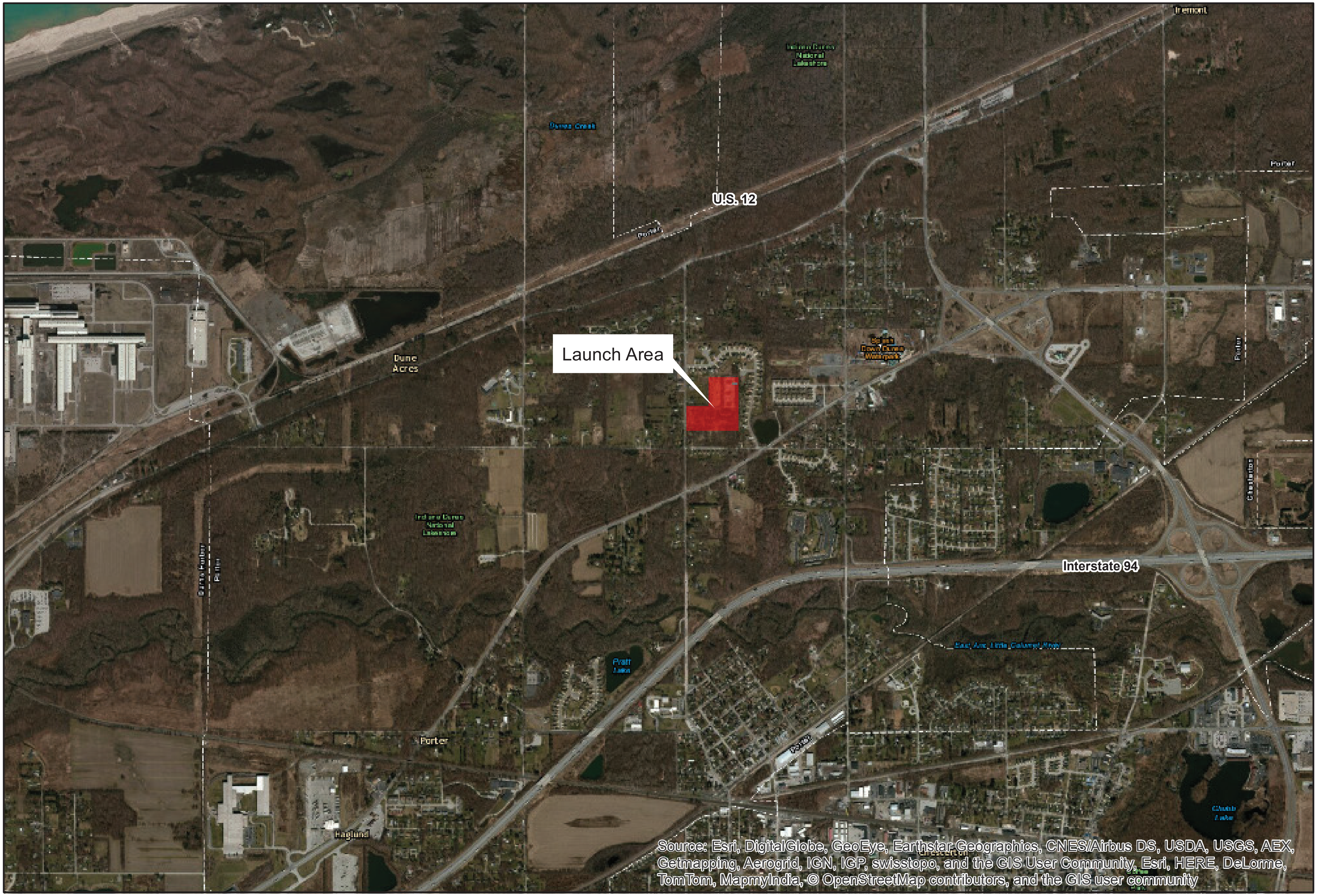
U.S. Environmental Protection Agency (EPA). 2003. *Region 5, RCRA, Ecological Screening Levels.* August.

U.S. Environmental Protection Agency (EPA). 2016. U.S. Environmental Protection Agency Regional Screening Levels. November.

U.S. Environmental Protection Agency (EPA). 1998. *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater*. EPA/600/R-98/128. Office of Research and Development. September.

This page intentionally left blank

FIGURES



Legend

Launch Area

0 0.5 1
Miles

N

Figure 1
Site Location
Former Nike C-32 Site Launch Area Feasibility Study
Porter County, Indiana

CH2MHILL

EN0427151056WDC Figure_1-1_Site_Location_v2 04/29/2015 bp

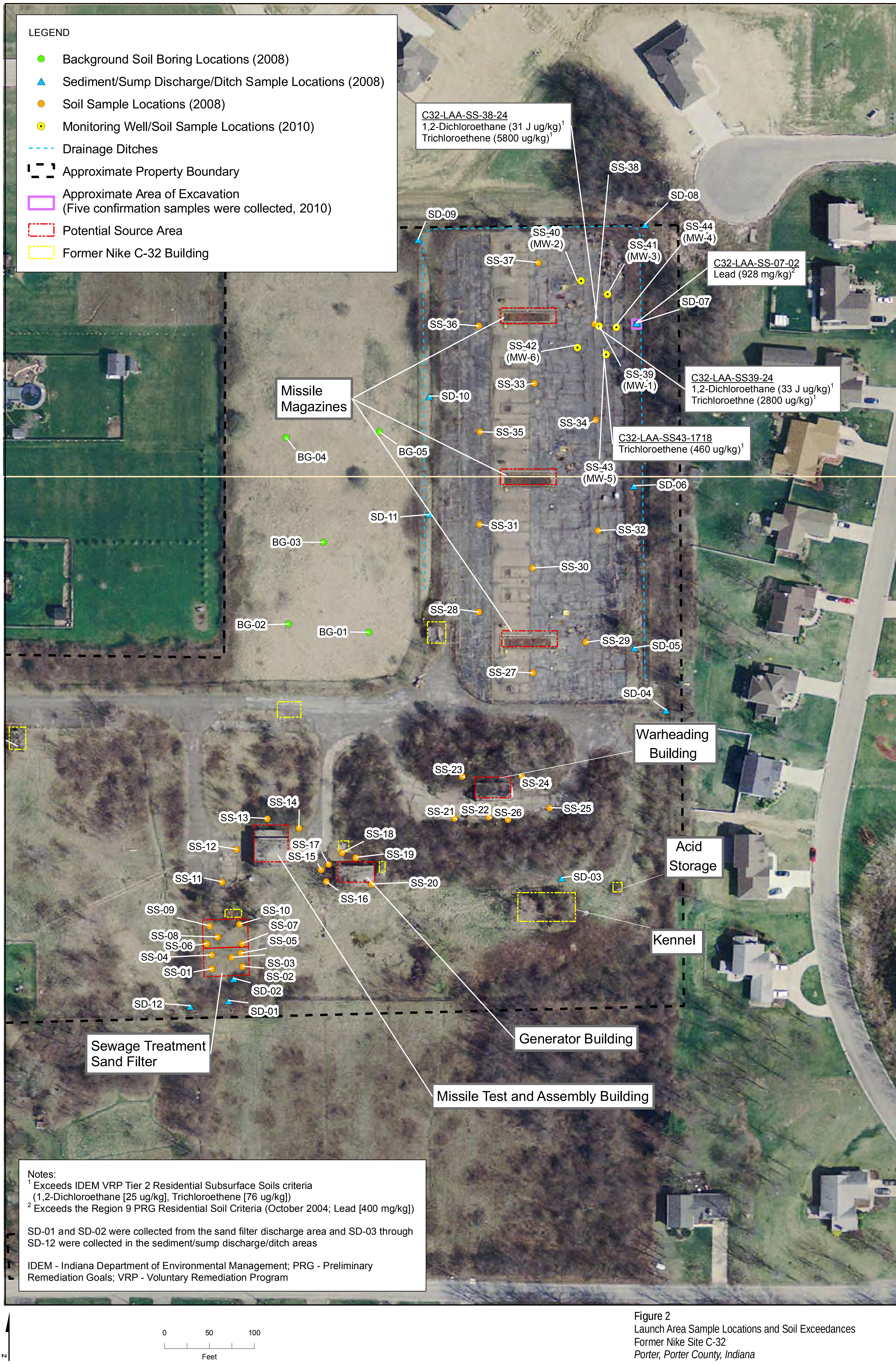
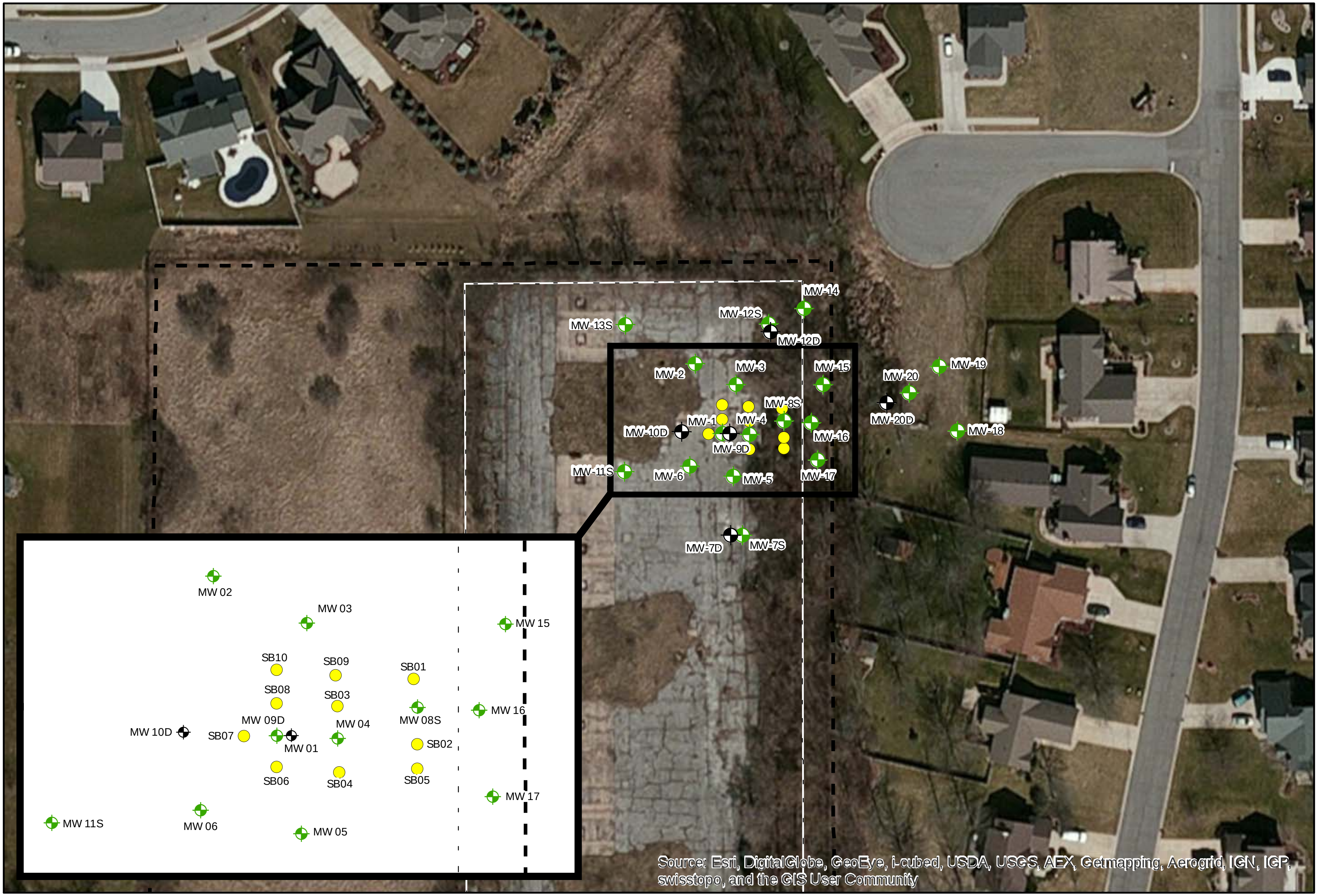


Figure 2
Launch Area Sample Locations and Soil Exceedances
Former Nike Site C-32
Porter, Porter County, Indiana

CH2MHILL

\\NORTHEND\PROJ\USACE\LOUISVILLEDISTRICT\371435PORTER\MAPFILES\CLIENT_REVIEW\FIGURE 1 - LAUNCH AREA SAMPLE LOCATIONS & SOIL EXCEED.MXD BHATHAWA 10/4/2010 10:44:05



Deep Monitoring Well

Shallow Monitoring Well

FS Soil Boring Location

Approximate Inner Fence Location

Approximate Property Boundary

N

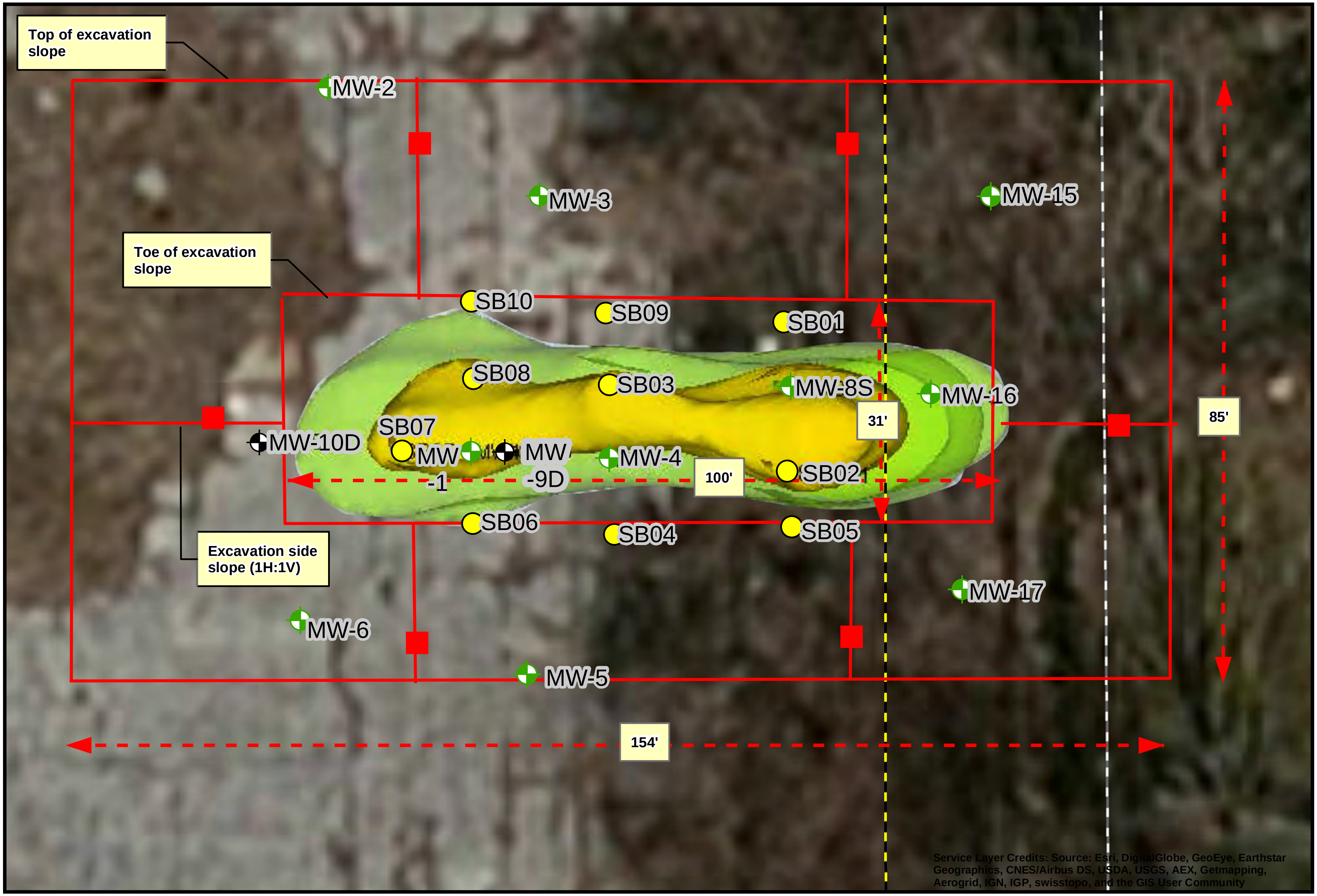
0 25 50 75

Feet

Figure 3
RI/FS Soil Boring Location Map
July 2014
Former Nike Site C-32
Porter, Porter County, Indiana

\\antigone\proj\USACELouisvilleDist\USACE_Louisville_ENV\419476_Porter\GIS\MapFiles\2014

CH2MHILL



FS Soil Boring Location
Deep Monitoring Well
Shallow Monitoring Well
Approximate Inner Fence Location
Approximate Property Boundary

0 12.5 25 50
Feet
N

Figure **4**
Conceptual Excavation Plan, Alternative 4a
Former Nike Site C-32 Site Feasibility Study
Porter, Porter County, Indiana

CH2MHILL

R:\GIS\NWO\Nike\419476_Porter\GIS\MapFiles\2015\Figure 3-5 - Conceptual Excavation Plan.mxd 4/27/2016 CGauthier_ch2mhillen

TABLE

Table 1. Comparative Analysis of Alternatives

Criteria	Alternative 1b	Alternative 2	Alternative 3	Alternative 4a	Alternative 4b	Alternative 4c
Threshold Criteria						
Protection of human health and the environment	Pass	Pass	Pass	Pass	Pass	Pass
Compliance with ARARs	Fail	Pass	Pass	Pass	Pass	Pass
Balancing Criteria						
Long-term effectiveness and permanence	◑	●	◎	●	●	●
Reduction in toxicity, mobility, or volume through treatment	◑	●	●	◑	◎	◑
Short-term effectiveness	◑	◎	◎	◎	◎	◎
Implementability	●	●	●	●	●	●
Cost	$1,197,000 [a]	$3,946,000	$2,194,000	$2,314,000 [a]	$2,416,000	$2,131,000 [a]
Modifying Criteria						
State/Support Agency Acceptance	⊘	●	●	●	●	●
Community Acceptance	To Be Determined					

[a] Alternative does not include active treatment.

Notes:

The two threshold criteria are evaluated with pass/fail.

The primary balancing criteria are rated as qualitative descriptions of the relative compliance of each alternative with the criteria

Ratings:

● Satisfies criterion ◎ Moderately satisfies criterion ◑ Poorly satisfies criterion ⊘ Does not meet criterion

Attachment A
IDEM Concurrence Letter

IDEM

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We Protect Hoosiers and Our Environment.

100 N. Senate Avenue • Indianapolis, IN 46204

(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Eric J. Holcomb
Governor

Bruno L. Pigott
Commissioner

August 1, 2018

Mr. Clayton Hayes
U.S. Army Corps of Engineers
Louisville District
Attn: CELRL-PMM-E
600 Dr. Martin Luther King, Jr. Place
Louisville, KY 40202

Dear Mr. Hayes:

Re: Decision Document, Former Nike Site C-32, Launch Area, Indiana Dunes, Porter County, Indiana

Thank you for the final Decision Document (DD) for Nike Site C-32. We concur with the selected remedy of limited excavation and offsite disposal; in-situ chemical reduction via soil mixing with ZVI; MNA; and Institutional Controls (ICs). We also agree that because an environmental restrictive covenant (ERC) restricting use of the groundwater has already been recorded to maintain the ICs, the ICs component of the selected remedial alternative can be excluded. Engineering Controls to control access to the remediation area still needs to be implemented. Please provide me with a signed electronic copy for my records. I look forward to the next phase of the project. Please do not hesitate to contact me at (317) 234-0358 should you have any questions.

Sincerely,

Stephanie Andrews
Senior Environmental Manager
Federal Programs Section
Office of Land Quality

SA:tr
cc: Rex Osborn, IDEM
ec: Brooks Evens, USACE
Traylor Richardson, USACE
Michael DeRosa, CH2M

Attachment B
Public Meeting Transcript

U.S. ARMY CORPS OF ENGINEERS

Meeting Regarding

FORMER NIKE C-32 SITE

PROPOSED PLAN

January 17, 2018

6:00 p.m.

Chesterton Police Station

790 Broadway

Chesterton, Indiana 46304

MR. HAYES: Okay. We will get started.

Good evening, folks. Welcome to the meeting here tonight. We are going to talk about Nike C-32. And some familiar faces here. I heard it's going to be sunny and 80 degrees tomorrow, just not here. (Gesturing)

(Everyone laughing out loud.)

A VOICE: Yeah.

MR. HAYES: I want to welcome you to the meeting.

We have key representatives from different areas. You, of course, are the stakeholders, very important, we want to be able to talk with you and explain to you about what our project is about. Some have heard already as we have talked to some folks individually. And we have representatives from the Corps of Engineers, myself, Clayton Hayes, Project Manager. And Brooks Evens, our technical manager, environmental engineer, our A&E contractor CH2M. We have --

COURT REPORTER: I'm sorry, our A&E

contractor --

MR. HAYES: AE, A slash E, or A&E, architectural/engineering contractor.

Michael DeRosa, Project Manager. Steve Bigda, Assistant Project Manager.

And we have also our representative from Indiana Department of Environment, IDEM we call it, I-D-E-M, Stephanie Andrews and Christy McIntire. And, of course, you folks. Private owner, land owners, any key stakeholders. And so I want to welcome you, again.

And our agenda is to discuss the purpose of the meeting and go through some acronyms. Acronyms in the government, actually you know that, and discuss the CERCLA Process. We will explain what that is.

We will give you a brief history of the site and a lot of you folks know probably more about the site than we do, but we will talk about the initial site activities that we have been doing.

This project has been going on for several years, many years, in fact. And we will discuss some of those key activities that we have accomplished already. Including starting with the site inspection and we will go through the remedial investigation process and talk about groundwater.

COURT REPORTER: Groundwater?

MR. HAYES: That is all one word, by the way, groundwater, not two separate words.

And we will talk about some of the reports that are going to come out of this, and timelines, and schedules.

And we are presenting this meeting to get your stakeholder feedback and input. And, also to inform you again of what we are intending to do and address any of your questions that you will have.

And if you think of something right off that's good, you probably have seen the sheets up here. (Gesturing) One of those sheets -- Well, hopefully everybody signed in when you came in. One of those sheets is a question sheet and you can just address your question right on there, and you can give it to Brooks at this time, you know, at the end of the meeting, or if you want to mail it in you can, whichever you prefer, and we will be prompt at getting back and addressing all of your questions that you have. So with that. And of course, after the fact, after this meeting and you decide, or you think of something, feel free to call in, there is a number, a couple of numbers on there. Again, Brooks Evens' number, and we have a PAO representative. That is Public Affairs Office, by the way. Sorry. (Gesturing)

Public affairs office representative, Katie Newton, you may see her name on some of the documents. And she can help you address those questions. She will probably bring those questions back to Brooks and I and we will address those questions.

We want to keep an open forum here, this is not to be contentious or anything. We want to be able to support you, that's the purpose of this is to really come together.

This is the first meeting that we

have had on this project, actually, in terms of a public meeting. And we want to be able to best represent you, as well, and try to accomplish our goals.

The goal, of course, is to clean up the site and as you know there is some contamination in groundwater and that's when we get into more of the details we will discuss what that means. (Gesturing)

And with that in mind, I think I am going to turn it over to Brooks and he can go through the rest of this.

And, again, if you think of something as we are talking to you just jot your notes down if you like and then we can also address questions towards the end of the briefing here that we are going to present to you and we will be happy to -- and happy to speak with you one-on-one, as well, towards the end. Okay?

Thank you.

MR. EVENS: All right. Thank you.

Our acronyms.

My name is Brooks Evens. I have been on this project since 2008. I am

the project manager -- not project manager,
project geologist for the Global District
Environmental --
COURT REPORTER: I'm sorry, Global
District --
MR. EVENS: Louisville District --
MR. HAYES: Louisville --
MR. EVENS: L-o-u-i --
COURT REPORTER: Hold on. I can only
take one of you at a time.
MR. EVENS: Louisville District --
(Brief off-the-record discussion had in
the proceedings.)
MR. EVENS: Louisville District, Army
Corps of Engineers Environmental Branch.
Okay?
COURT REPORTER: (Nodding.)
MR. EVENS: Okay. And so I want to
first thank the adjacent property owners
that are adjacent to this site for being
very cooperative in working with the Army,
and our contractors, and IDEM. They have
allowed us to have full access to the site
and --
COURT REPORTER: I'm sorry, you are

going to have to speak up. I'm having a hard time hearing you.

MR. EVENS: Okay.

COURT REPORTER: Okay. So let's just scratch that and start over.

MR. EVENS: I would like to thank the adjacent property owners for their cooperation in conducting the investigation. They have been very cooperative with IDEM, the contractor.

As we go out to these sites, quite often, we go out to the site every quarter and we have to talk with the contractors. And the contractors go out there and they talk with the owners. But we are going to -- We are not going to go through the whole acronym list. We are closing this site under CERCLA which is Comprehensive Environmental Response, Compensation, and Liability Act. And that's what almost all the Army sites get closed under because it's a federal program.

We have ICs, which are institutional controls. You will see that later in the presentation. And Mike DeRosa will explain those a little bit further, institutional controls means that the government is going to put some sort of restriction on that property to be protective. Some of these institutional controls can go for a long time, (gesturing) some of them are put on there for a short time while we do the remediation. (Gesturing)

MNA is monitored natural attenuation. It's mother nature's natural way of cleaning up contamination. The subsurface has bugs and microbes and they like to chew on contamination. So that is already occurring at the site, but we hope to enhance that with part of the remediation. The primary contaminant of concern is TCE, solvent used in the 60s, it's used to clean parts, used to clean equipment, good degreaser, and so that's the primary contaminant of concern.

We will go on to the next one.

Closing under CERCLA. The CERCLA has several processes that you go through. They could be broken up into five categories.

The first stage that we started back in 2007 was a preliminary assessment. And now that preliminary assessment areas of potential concerns were identified. IDEM reviewed the report and between the Army and IDEM we came to an agreement on what sites would move into the next phase.

The next phase is called the site investigation. And that is basically to determine (gesturing) yes or no there is contaminant of concern out there.

You can see on the one photograph (gesturing) we put a lot of borings in the ground. All of this was done in conjunction with IDEM and they reviewed the work plan and they finally got approval from IDEM to go out and do the field work, so we go out and do the field work and develop a report.

And now that report comes what we actually have to really investigate to see what that contaminant is. So we move into what is called the remedial investigation and that's a more in-depth investigation. It involves groundwater, air, soil, and then once we get all this information we move into what's called the risk assessment that's under this remedial investigation.

And that finally says, "Yes, Army you have a risk at the site." And so we have got a risk so we move forward into what's called the feasibility study. And the feasibility study you can do what is called pilot studies or bench scale studies. And we ended up doing a bench scale study here because of the type of soils. We thought it would be beneficial to see if this type of technology should move forward to be considered a remedial alternative.

And so IDEM was in on this wherever we said, "Hey, we would like to put borings, here, (gesturing) here, (gesturing) here. (Gesturing) Ground monitoring wells here." (Gesturing)

IDEM was involved with -- through the whole process and so finally we get to the final feasibility study and that says, "Here are your alternatives." So we come out to the proposed plan and that is where we are today. Proposed plan has gone through legal reviews, gone through IDEM's review, and so we are at the last part of the proposed plan and that's the public meeting and that's where we come to present to the public the remedial alternative that the Army is proposing to do.

In the proposed plan there are two criteria that -- there's nine criteria. Seven of them involve the Army and IDEM as they go through the process of like implementability, long-term effect, short-term effect, and all these get played out.

Some of the alternatives get thrown out because they just don't meet the criteria that we're going through the process.

The last two criteria are public input and costs. I know everybody likes to say costs cost. Depending on the public input and depending on what goes along the Army, along with IDEM, will decide where we are going to go with the alternatives.

And then we get down to the decision document. And that's the formal document that says Army is going to do this, we are going to spend this much money, and we move off.

In that decision document you have what is called a responsiveness summary. And that's all the comments that we get from the public, we will formally respond to that person individually, but it will also be formalized. All your comments will get formalized in the decision document so there is a track record of, "Bob had a question on how tall is a monitoring well going to be," or whatever the question is going to be. (Gesturing)

COURT REPORTER: I'm sorry, how tall is the --

MR. EVENS: Monitoring well.

COURT REPORTER: (Nodding.)

MR. EVENS: It could be a variety of questions, whatever the public comments we have a responsibility to respond to the public. So those will all get formally documented into the decision document.

Then we move into executing what we propose we are -- what we decide that we are going to do, which is remedial design, remedial action, and then depending on the remedial action there is usually monitoring at the back end to make sure that we have achieved the goals and IDEM's involved throughout the whole process and when we -- when the Army says, "Hey, we have met our cleanup goals," the reports go into IDEM and IDEM checks them all and IDEM says, "Yes, you need it. You are done Army," or it's like we can't get it down to the MCL, which is maximum contaminant level for groundwater like five parts per billion. Let's say we are at ten parts per billion we have to continue to monitor to try to get that contaminant below the MCL that is out there for groundwater. That is the CERCLA process. And this we hope to have signed by the end of this fiscal year for the government by the end of September and then we hope to get the remedial design. It has got to go through IDEM, and so we hope that next summer that we will be doing remedial action based on what we propose to do. (Gesturing)

All right. Next.

Okay. Everybody knows that Nike C-32 Site is composed of two areas. The launch area and then the control area. Nike C-32, this proposal is just for the launch area. (Gesturing)

And next.

So here is a brief history. You all probably know this history as well as we do. But the 1930 what we call the FUDS site, which was Formerly Used Defensive Sites, and these Nike sites were constructed anywhere from '52 to the early '60s and then they were closed because of technology and we never -- didn't need to use surface-to-air missiles. As you all know, we built these things to protect the United States from Russian bombers coming over the north pole. That's why these areas are all around Detroit, Cleveland, Cincinnati, Chicago, St. Louis, Milwaukee, and they are also out in Seattle and all these different areas.

Now, again, the Nike C-32 sites originally comprised of a launch area, control area. We are dealing with the launch area, it's approximately fifteen acres and it still has some original buildings on it. The building -- The

missile test building is still there. They
have an assembly building still there, the
war-heading building there, the generator
building, and then the sand filters, which
was commonly called the sewer, go in through
the sand filter and then be discharged.
And so in 1976 the government conveyed
that piece of property to a private
landowner. That landowner died and it went
into a -- the parcel went into a tax sale
and it was recently purchased in 2015 by one
of the property owners out there in The
Meadows. And currently that person is not
using it as residential, but he has ideas
on how he wants to use the land and that's
not for the Army to decide how he uses his
land.
Next.
So prior to going through that whole
CERCLA Process there are different areas
that the Army can move ahead on. And so
the Army moved ahead in 2003 on removal
action and that's where we took the
underground silos, we excavated and
collapsed the silos. We collapsed the silos

and they are filled in, they are backfilled. And then we did transformer removal action out there at the corner of Oakdale and Wagner Road. There is a little fence that is maybe ten by twenty that was a PCB substation for the launch area that we cleaned up. All the transformers out there would be potentially PCB, have all been removed.

And then we did underground storage tanks, aboveground storage tanks. So all of the aboveground stuff we took care of. The underground storage tanks we have taken care of.

And so we moved in and this is where I am going to turn it over to Mike DeRosa to go over the site inspections and remedial investigation --

COURT REPORTER: I'm sorry, site inspections and investigation --

MR. EVENS: -- and remedial investigations.

Okay. Mike. Next.

MR. DeROSA: Thanks, Brooks.

My name is Mike DeRosa, I am with the

contractor for the Army Corps of Engineers with the CH2M and we did a lot of this environmental investigation work out here. (Gesturing)

MR. HAYES: Could you speak up for the folks in the back.

MR. DeROSA: Sure.

So you will see up here in the right corner (gesturing) you have those boxes that Brooks had referred to (gesturing) so you can follow along where we were in the process for each one of the activities that we conducted.

One of the first things that we did was we performed the site inspection, also called site investigation and we looked at the areas where activities had been conducted. Where they did something on the site.

So we looked at the missile assembly area, the warheading area, the generator area, the sand filter, and the ditches along the launch area.

And we will get into that in a second. (Gesturing)

We did some sediment sampling and some groundwater sampling by installing monitor wells. Okay. And this was conducted in 2008.

The next slide.

What we found, you can see here on this map that there is a generator building. All of these borings were installed, the same with the missile test and assembly area, the sand filters as well collecting quite a few soil samples.

Up here we have the missile magazine areas (gesturing) where we collected soil samples throughout in this launch area. (Gesturing) And the result of this site inspection work showed that surface soil concentrations were not above residential screening criteria. However, subsurface soil concentrations were above residential criteria.

In addition, there was one lead sample right in this area here (gesturing) in a sediment. Okay. So the sediment, there is a discharge channel running around this area. (Gesturing) Okay. And we collected samples around that area. And one of those had a lead exceeds.

Okay. Next slide.

So based on all of that data we conducted a supplemental SI in 2010. We went back out and one of the things that we did was we investigated that lead concentration in the sediment. We removed that lead concentration, collected some samples to confirm that there was no more lead contamination in that soil area. In addition, we installed more monitoring wells and more borings and we found that the sediment concentrations were good, but the subsurface concentrations in a couple of the borings had -- we were above residential criteria for the TCE, trichloroethene.

Okay. And the one groundwater well had concentrations above that residential criteria, as well.

Not only did the TCE, but also for what we call daughter products, or degradation products, and cis 1, 2 dichloroethene --

COURT REPORTER: I'm sorry, and cis

1, 2 --

MR. DeROSA: And cis 1, 2 dichloroethene, these would be degradation products. Okay.

So as a result of all of the SI work that was conducted in 2008 and 2010 we moved forward with a remedial investigation.

Okay. So next slide.

So as part of the remedial investigation we have conducted -- or we conducted these project tasks. And I am going to go through each one of these project tasks, but the overall project objective was to define the nature and extent of these chlorinated VOCs that were detected during the site investigation work.

Okay. So we are getting more data and more information through these different project tasks.

The first project task was soil and groundwater sampling and something called slug testing. Slug testing is a procedure that's used to determine how quickly is the groundwater moving through the subsurface. (Gesturing) Okay. So it actually lets us know how fast the groundwater can move. That's an important point.

Okay. The next slide.

So we focused on the area of impact which was right here. (Gesturing) And you can see all the additional soil borings and monitoring wells that were installed. And we found out that the TCE did show up in the soil up to seventy-six thousand micrograms per kilogram. But it occurred at a relatively deeper depth, eighteen to nineteen feet.

Okay. The groundwater we found three wells that had TCE concentrations as high as one hundred and twenty thousands micrograms per liter and those three wells existed right in a line through here. (Gesturing) Now, why would those exist right in the line through there? That is part of something that we call the conceptual site model. (Gesturing)

COURT REPORTER: Conceptual site model?

MR. DeROSA: Yes.

COURT REPORTER: Thank you.

MR. DeROSA: Why would those three wells in that line be contaminated? Each one of these missile silo areas (gesturing) contained a sump. And the sump was used to keep the silo clean. You know, water free. And that sump discharge, which was around twenty feet below ground surface, you will notice the contamination is found around eighteen to nineteen, (gesturing) that sump discharges across here (gesturing) and daylight comes to the surface right about there. (Gesturing) And we actually found the discharge pipe. So it was discharging to the surface and the highest concentration was actually found right there (gesturing) where the pipe came up from the surface. (Gesturing) So the contamination was most likely transmitted through a decayed sump that -- a decayed sump discharge pipe. (Gesturing)

Next slide.

So we looked at the onsite impacts and found some issues. So we moved forward to evaluate some of the offsite impacts and further look at the chlorinated VOC

impacts.
What we did was we performed something called Membrane Interface Probe Sampling. And this work involves a mobile laboratory (gesturing) that is connected to a probe that is pushed into the ground. And we were able to get data from the subsurface to tell us is there any subsurface impacts in this area. And you can see we were working offsite in the backyards adjacent to the site. (Gesturing)
We also conducted soil gas sampling in this same area.
And if you go -- just go back a slide for a moment. I'm sorry. Go to the map.
(Brief pause had in the proceedings.)
A VOICE: This one?
MR. DeROSA: Yeah. Thank you. So this area right here we conducted soil gas sampling (gesturing) and we conducted membrane interface probe work to see if there were any impacts coming from this contamination (gesturing) right here.
And what we found is that there were no TCE impacts from -- uh -- for soil gas

offsite and for the MIP work. We did find a couple of onsite locations showing impacts at eight to sixteen feet, and once again, those were right in this area, (gesturing) but there was nothing offsite. So offsite was very clean and everything focused right back to this area here. (Gesturing)

Okay. Next slide.

So the next activity that we conducted was tap water sampling of the three residences that were immediately east of the site. Also, to make sure that the groundwater was not being impacted. And we conducted it twice, (gesturing) in 2012 and 2015, and there were no impacts to the tap water from any site constituents, so that was also very good information. (Gesturing)

The next slide.

Finally, we have been doing quarterly groundwater sampling out there. And basically to evaluate long-term stability of these contaminants, the TCE and the daughter products. Okay.

And go to the next slide, please.

(Gesturing)

And so you can see here (gesturing) again the area we are looking at, okay, all of the green dots are wells and all of the yellow dots are soil borings. (Gesturing) So we did a substantial amount of collection of soil and groundwater to understand this area. And we have defined a shallow groundwater plume, shallow being approximately eighteen to twenty-four feet. Okay.

And the groundwater concentrations are very stable. Okay. The TCE and the daughter products. And the daughter products that you see here, the cis, dichloroethene, and the vinyl chloride which we have been monitoring.

Okay. Next slide.

This is a chart of the work that we have been doing. (Gesturing) This is TCE concentrations in a couple of those wells which I said were contaminated. (Gesturing) And initially we -- the dates run from 2014 through 2017. And you can see that initially the TCE concentration in this well (gesturing) was about six-hundred micrograms per liter. Right now the concentrations are around four-hundred micrograms per liter. (Gesturing) So they have come down somewhat, however, the MCL, Maximum Contaminant Level, which Brooks mentioned earlier is five micrograms per liter. So although the concentration is decreasing it is decreasing at a rather slow rate.

Okay. You can imagine, if it took three years to go from six hundred to four hundred, how long it might take to get to five.

Okay. So next slide.

All right. So the RI Report is prepared and as part of the RI Report, as Brooks mentioned, we do a human health risk assessment. And the human health risk assessment looked at those concentrations in the groundwater and concluded that there is a risk to future residents and construction workers who may come in contact with the groundwater. So there is a risk with groundwater. And an ecological risk assessment was performed and there was no risk to any ecological receptors. We have defined the TCE plume, it is an area of approximately eighty feet by twenty feet and it includes daughter products as there is degradation going on. There were no deep groundwater impacts. And we installed several wells at fifty feet below the ground surface and all of those wells showed no impacts, so you know that we have the groundwater -- the impacted groundwater bounded. (Gesturing)

As I mentioned, the former sump pump is --

(Brief pause had in the proceedings while the train is going by.)

COURT REPORTER: I'm sorry, the former sump pump --

MR. DeROSA: The former sump pump is the reason that we have this contamination there, the piping system, and that groundwater is moving extremely slowly. The slug test showed us that groundwater moves extremely slow there. If you could imagine a bathtub, you know, where it's holding water, (gesturing) you might get some water coming out from time to time, but the water stays in the bathtub. (Gesturing) This is a similar situation that it moves very, very slowly through that soil. It is a very tight clay that exists out there. (Gesturing)

And then as we mentioned natural attenuation, okay, it is occurring, concentrations are decreasing on their own, but at a very slow rate. (Gesturing)

So those are the conclusions from the RI, and this is a plume model. (Gesturing) This is a model based on all of the groundwater data that was collected. And you can see this edge right here at the boundary (gesturing) is what the model predicts is five micrograms per liter.

Okay. So right here (gesturing) is the area of highest concentration as I mentioned earlier. (Gesturing) This right here (gesturing) was the former inside fence of the property and this is the former outside fence of the property. (Gesturing) So you can see that contamination has

stayed within the property boundary.
(Gesturing)

Okay. Next slide.

So with the conclusions of the remedial investigation we now move on to a feasibility study.

And the feasibility study the objective is to look at technologies that will -- that will remediate the site and evaluate them. Okay.

As part of that evaluation process we conducted something called soil mixing. And as a pilot study -- You do pilot studies to see is it possible that this technology could be used at the site. The soil mixing was chosen, because as I mentioned earlier, the geology is very tight. And will mixing the soil be able to provide enough impetus or action for a remediation. Okay.

So we used something called zero valent iron. It's essentially iron granules that are introduced into the subsurface. Okay. And they work to reduce chlorinated VOCs. That is what they do.

The next slide.

So we have right here an excavator (gesturing) and right here something called a super sack. (Gesturing) The super sack is filled with solid iron particles. It is introduced into an excavation, we opened up an excavation area. And then we put an attachment on the excavator, (gesturing) this is a mixer, so this rotates. (Gesturing) So we introduce the material and then we rotate the mixer through the subsurface so that the particles mix with the soil. (Gesturing)

So this pilot test was conducted in September of 2014. The data, and now the area in which this area -- the area in which we performed the mixing was that red dot, (gesturing) that area of very high concentration in the groundwater.

Okay. And post mixing we backfilled the area and we installed monitoring wells to monitor the groundwater. (Gesturing) Post mixing pilot tests we saw concentrations initially of about 5,500 micrograms per liter. If you remember the concentration was closer to one-hundred and twenty thousand. So we initially got a really good reduction in the TCE concentration from a hundred and twenty thousand down to five thousand five hundred. But, again, our criteria is five.

So in 2014 here we are. (Gesturing) Now, our last data point in November of 2017 we have got 3.9 micrograms per liter in the groundwater, again, the criteria is five micrograms per liter. So we met our objective. Okay. We showed that soil mixing is effective in this tight clay and we can use it effectively to remediate the groundwater and the soil impact area. (Gesturing)

Okay. Next slide.

So understanding that now we have to come up with remedial objectives for the site.

Okay. What are we trying to accomplish?

And there are two remediation -- remedial action objectives. The first is make sure we don't have any offsite migrations of these contaminants. We haven't in the past, we want to make sure that continues. And to reduce the concentrations and the risk associated with the exposure to that groundwater. Okay. (Gesturing) But not only TCE, but the daughter products. So you can see here (gesturing) these are the remediation goals, the TCE five, as I mentioned, micrograms per liter and then cis, and trans, and dichloroethene. Okay. These are the target remediation levels we are trying to achieve once we start doing our remedial action.

So as part of the feasibility study you now create alternatives, as I mentioned. (Gesturing) And feasibility study created these alternatives. The proposed plan presents these alternatives and selects a chosen alternative. Okay.

So I am going to briefly describe each one of these seven alternatives. (Gesturing)

Now, the no action alternative, 1a, is mandated by CERCLA. Okay. And that's why it's here. But understand that no action is not an acceptable alternative, because it will not take care of the impacts that we have at the site. (Gesturing) Okay. So I am not going to discuss it any further. (Gesturing)

The next slide.

But Alternative 1b is Monitored Natural Attenuation and Institutional Controls.

And as Brooks mentioned earlier the groundwater unto itself, on its own, will remediate the site. The real question becomes how long will it take.

And because the groundwater is in a very tight matrix, okay, and it just sits in that bathtub (gesturing) the ability to remediate that groundwater on its own could result in a fifty plus year timeframe for remediation. That would be too long. (Gesturing) Okay. So although it's low cost, the timeframe doesn't quite work. (Gesturing)

We would need something called institutional controls, again, those are ways of protecting the area (gesturing)

during the remedial action.
So, for example, you would not be able to extract the groundwater. You would not be able to consume the groundwater. (Gesturing) And wells would be installed so that we could monitor the groundwater. (Gesturing)
Okay. Next slide.
Alternative 2.
This would utilize In Situ thermal treatment monitored natural attenuation and institutional controls. And this concept works on heating the subsurface to a temperature where the contamination -- the volatile contamination turns into a vapor and is literally sucked out of the ground, extracted out of the ground, collected, and disposed of offsite. (Gesturing)
Okay. So for this type of system you would have power at the site, you would need to protect the site by a fence. Okay. (Gesturing)
Now, the timeframe for implementation would be very short. Okay. The issue would be implementing this system may not

remediate the COCs the first time. It may need to be revisited a second time to do more extraction. (Gesturing)

Okay. Next slide.

And this is a schematic of what it would look like. The blue dots are the vapor extraction wells where you would be removing the vapor from the subsurface. The green dots are the heating borings, so that you would be heating the subsurface and then removing material from it. (Gesturing)

Alternative three is soil mixing, like we have discussed. Combined with MNA and ICs, monitoring natural attenuation and institutional controls. So this is very similar to the pilot test, (gesturing) the mixing mechanism. We bring in a full scale unit, however, a bigger unit and we perform the mixing. We would have to fence off the treatment area so, again, that would be an institutional control. And the mixing would take a short time. The issue, as you saw on the chart, (gesturing) would be how long it would take to remediate the soil. Okay. I am sorry, the impacted area.

Okay. Next slide.

This alternative is excavation and offsite disposal. So you would literally go in and excavate all of the impacted material. We estimate there is about eighty-six hundred cubic yards that would need to be removed.

This material would -- The trucks would be coming in and hauling off the material to an offsite landfill. We would backfill with clean materials, (gesturing) and then we would have to install some monitoring wells for some period of time, estimated to be ten years to monitor whether the impacted groundwater has been cleaned up. (Gesturing)

So we would definitely reach remediation goals eventually, we know this, the question would be how long. The issue would be -- is that if --

Show the next slide.

This is a rectangle of the bottom of the excavation. (Gesturing) So here is the impacted material, (gesturing) and here is the excavation bottom. (Gesturing) In order to achieve an excavation bottom of this size (gesturing) we would have to slope the -- or bench the soil to this dimension (gesturing) and, therefore, as I mentioned earlier, this former inside fence line (gesturing) and this former outside fence line (gesturing) we would actually be benching soil outside of the original boundary of the site. (Gesturing) Okay. So that would be an issue that we would have to disrupt this private property (gesturing) to remove that -- to remove all of that material if we sloped it.

Okay. Next slide.

Alternative 4b, Limited Excavation. Limited excavation (gesturing) offsite disposal and then In Situ chemical reduction via soil mixing combined with monitored natural attenuation and ICs. This alternative is effectively a combination of alternatives 3 and 4a, which we just discussed. (Gesturing) Okay. So we are doing both the soil mixing that we talked about previously, and we are doing the excavation (gesturing) as a 4a, but a limited excavation. We would only take out about 1,400 cubic yards instead of 8,000 cubic yards, so a much lower number of yards, a much -- fewer trucks. Okay. But we, again, backfill the excavation, install the monitoring wells, (gesturing) do groundwater sampling for, again, ten years is proposed through this alternative. And we would have temporary fencing as an institutional control and a groundwater use restriction. Okay. Again, to protect exposure to the groundwater. But with the combination of the limited excavation taking out the source, okay, taking out the most contaminated material combined with a soil mixing (gesturing) to allow mixing and then the sampling of that groundwater after the mixing, (gesturing) that combination could work really well.

Next slide.

So our final remedial action, 4c, is a limited excavation, okay, and nothing else. We are not doing the full excavation, we are just doing the limited 1,400 yards, and we are not doing the soil mixing afterwards. (Gesturing) And this limited excavation has some of the same features that we discussed previously with fewer trucks and backfilling with clean material, (gesturing) but then the site monitoring has to take over.

We believe that because you are not going to do the soil mixing, right, (gesturing) it's probably going to upwards of thirty years for monitoring to complete the remedial action. Okay. Again, temporary fencing, groundwater restriction, as we talked about, but it's that extended timeframe that we see as an issue. Okay. (Gesturing) Thirty years is a long time. (Gesturing)

So in short, these are our alternatives. Okay. (Gesturing) And now the Corps takes these alternatives and says, "Okay, which one are we going to do?"

Next slide.

So for the proposed alternative and the next steps I am going to turn it back over to Brooks.

MR. EVENS: All right. So based on reviewing all those alternatives and timelines on monitoring, (gesturing) and balancing the costs with everything else that goes along with doing these executions, you know, pulling out eighty-six hundred cubic yards of trucks is going to be very dusty and disturb the local residents, and that just becomes a big, big mess. (Gesturing)

So based on all the criteria going through the nine criteria and discussions with IDEM, and Army, and Army legal, and CX, the Army is proposing to do alternative 4b which is the limited excavation, takes the most hot contaminants soil out of there, which that is what is called point source. That is what continues to be released to the groundwater. So we are going to pull that material out, do the In Situ mixing, which will be along the fringe of that bowl (gesturing) to reduce the contaminant and get that area cleaned up in the shortest amount of time.

Part of IDEM's requirement is we got

to have eight quarters of groundwater samples below the MCL, so that previous chart that had five, seventy, a hundred, we all -- all of those contaminant concerns have to be below that criteria. So we will monitor it for eight quarters and, hopefully, the numbers come down and get several consecutive rounds below the MCL so we can say we are done at this site, response complete and that is our ultimate goal is to get to response complete as quickly as possible so the neighbors can move on with their lives.

Once response is complete we come back, we pull out all the wells out of the backyards of the residents that are adjacent so that they can have free use of their area and are not being hassled by us every quarter.

So that's our presentation.

Going to the next one.

The next step is we are here at the public meeting. If you have any comments at the end of this feel free to come up and put a comment on the recorder. What that is, it is a court reporter and there will be a document of everything that I said, Clayton, Mike said, and we will go into the public records.

Comment sheets over there (gesturing) if you want to write down, just put your name and what your comment is and we will respond. Like I said earlier, we have to respond to the public comments and so we will respond individually and then they will all go into the decision document. And like I said, that decision document, the Army is the lead agency on this project as part of FUDS, but we do everything in conjunction with IDEM and they will become the signature or signee to the decision document saying that, "Yes, we agree with all this, Army, move forward and go forth with your remedial action." (Gesturing)

So, now we got questions. We like to not get into a whole lot of the discussion, if you can keep it towards what the Army is proposing to do that would be wonderful, but feel free to say anything and everything that you have to say.

Okay. Comments?
(No response by the audience.)
MR. EVENS: Questions?
(Brief pause had in the proceedings.)
MR. EVENS: Yes, sir.
A VOICE: What is the size of the excavation? Is it the red rectangle above the bullseye?
MR. EVENS: Yes. And that excavation -- Is that the excavation -- the full excavation?
A VOICE: That is the full.
MR. EVENS: The smaller, the limited with the limited excavation it will be where we don't have to go off to the adjacent property.
A VOICE: I understand.
MR. EVENS: It will smaller, it will probably be twenty by eighty, or maybe even is it twenty by sixty?
A VOICE: Yes, tops --
COURT REPORTER: I can't see who is talking behind me.
MR. DeROSA: Yes, tops twenty by eighty, could be shorter.

MR. EVENS: Yeah, it will be much shorter and smaller.

MR. BARRY: For people who don't know me, I am Michael Barry from the Town of Porter.

MR. EVENS: (Nodding.)

MR. BARRY: Number one, is there a way I can get a copy of the slide presentation to get it on the town website so when people ask me what happened at the meeting it would be nice to pop it.

MR. EVENS: We will get you those.

MR. BARRY: For the limited excavation, when you get to that part and figure out what kind of trucks that you are going to use and how many trucks are going to be running in and out, it would be nice to know --

MR. EVENS: When.

MR. BARRY: -- when and how many trucks, just so we can coordinate that with the town, and traffic, and what not. And my question, I guess would be about the size of the trucks for the weight purposes. We just

repaved --
COURT REPORTER: I'm sorry, for the lake purposes --
MR. BARRY: For the weight --
A VOICE: Weight.
COURT REPORTER: Okay.
MR. EVENS: Weight.
MR. BARRY: We just repaved Wagner Road and I am assuming that you would use Wagner Road?
MR. EVENS: Yes.
MR. BARRY: So, hopefully, we wouldn't damage the road.
MR. EVENS: I would imagine that they would probably be tri axles, probably thirteen cubic yards, which is like eighteen-ton trucks.
MR. BARRY: So if you are 1,400 yards, a hundred trucks.
MR. EVENS: Yes.
MR. BARRY: A little over a hundred trucks.
MR. EVENS: Yeah. And the reason we probably wouldn't use like the big huge ones is because the roads are so small --

MR. BARRY: Yeah.

MR. EVENS: -- and those truck drivers we don't want to be running over anybody at the mailboxes, or running through their yards.

MR. BARRY: Yeah.

MR. EVENS: It just causes problems, so we would probably keep the trucks manageable where they can fit on the road comfortably and everybody can feel safe with what's going on.

MR. BARRY: And I don't know if you would know the answer yet, but where would that soil be hauled off to?

MR. EVENS: (No response.)

MR. BARRY: You don't have to know the answer to that.

MR. EVENS: Okay. It would --

MR. BARRY: I am sure you will let us know where that will be.

MR. EVENS: Yeah, it will go -- Given what the contaminant is it will go to a special waste landfill that's permitted to handle that type of contaminant. And as we go through the design -- As part of the remedial design IDEM reviews all of them, so they will like be sweeping the road and that will be part of the contractor's requirement is to keep mud and all that stuff off the road.

MR. BARRY: Right.

MR. EVENS: Dust control because depending when we have to do it it will be dusty, so it will keep the dust down for the neighbors. The timeframe on (gesturing) the thermal one will about one hundred and fifty days because it takes time and there is going to be generators that need to be generated, so being where we are at, the remedy that we chose is trying to be as least impactful on the neighborhood because heating up that soil is going to take a lot of energy.

MR. BARRY: Okay.

MR. EVENS: And generators would be going, so you would have the generator sound. Even putting up barricades and fences there would still be this constant hum.

Now, the noise, if you are in your

house you probably wouldn't hear it, but if
you are sitting on your back porch you are
probably going to hear this hmmmmm, which
is irritating for four months for the
neighbors.

MR. BARRY: (Nodding.)

MR. EVENS: So that was something with
that. This limited excavation, it will take
about a week to get the soil out, about a
week to mix it, and a week to get the soil
back in and compacted. So as far as impact
to the neighborhood, we are hoping to shrink
it down to like a three-week, maybe
four-week depending on what our weather is
like impact. And we will definitely
probably try to hit it during the summer
months just because it's dryer and we don't
want to deal with water. If we get a
ten-inch rain in April we got a whole lot
of water to deal with because the water does
not move out of this soil. (Gesturing) It
is tight --

MR. BARRY: Okay.

MR. EVENS: -- but we will stay more
in contact with you, Mike. We will give

you the remedial design so you know what is
going on.
MR. BARRY: And that would be more essentially like a construction site like you build a house?
MR. EVENS: Yes, basically.
MR. BARRY: Similar equipment and sound.
MR. EVENS: Yes, very similar.
MR. BARRY: Once that is excavated and cleaned up and we have the monitoring wells in there.
MR. EVENS: Uh-huh.
MR. BARRY: And this is really kind of a question for the gentleman in front of me, (gesturing) who owns the empty lot that's there, that's actually a buildable lot, and it's, I think, the last buildable lot there.
MR. EVENS: Uh-huh.
MR. BARRY: So if Mr. Behrens wanted to sell his lot to build a house on what timeframe are we looking at before that could even be possible? We have to monitor for ten years.

MR. EVENS: Yeah, we have got two wells in his backyard --

MR. BARRY: Right now.

MR. EVENS: Okay.

MR. BARRY: Yeah.

MR. EVENS: And you know, I don't want to say that it would be two years, five years, ten years --

MR. BARRY: Yeah, it's going to be awhile.

MR. EVENS: -- but it would just have to be disclosed to that future buyer that --

MR. BARRY: Yeah.

MR. EVENS: -- there is two monitoring wells on this site.

MR. BARRY: Uh-huh.

MR. EVENS: Those monitoring wells have never had any detections in them.

MR. BARRY: Right.

MR. EVENS: Given where we are at, working with IDEM, (gesturing) and we will know really, really quick how effective our treatment is going because as you saw on the previous one -- (gesturing) it initially what IDEM will want is to see that we don't get anything that is called a rebound where it drops down. It's like, "Oh, this baby is going down. We are going to be to cleaned up in a year and a half." (Gesturing) And then somewhere along the line it jumps back up and it goes back above. And it's like, "Darn." That's a rebound and that's very common. (Gesturing) So when we design this we are going to over-design it that we treat outside from the clean area (gesturing) so everything that's in that bathtub gets treated either by the excavation or by the soil mixing. (Gesturing)

MR. BARRY: And then this last comment.

MR. EVENS: Oh, sure.

MR. BARRY: Based on this crowd size, I would like the next time that you need to have a meeting let's have it in the town, please.

COURT REPORTER: I'm sorry, let's have it in town?

MR. BARRY: Let's have it in the Town of Porter, please.

MR. EVENS: We will do that.
MR. BARRY: Yeah.
MR. EVENS: We will do that.
MR. BARRY: We have a beautiful town hall and we would more than happy to have you over there.
MR. EVENS: Thank you.
MR. BARRY: Especially with our residents in the town that are affected by it.
COURT REPORTER: I'm sorry, especially with our -- You are going to have to speak up. (Gesturing)
MR. BARRY: Especially with our residents in town that are affected by it.
A VOICE: You said that you would like to do it this summer, which is fine. Are you talking summer of '18 or summer of '19?
MR. EVENS: The summer of '19.
A VOICE: Okay.
MR. EVENS: We have got to get -- We can't expend any money until we get to the decision document, but what Clayton and I will end up doing is we will prep what is called a request for proposal package. We

will start preparing that this year so that once we get that DD signed we can issue that and get it awarded, remedial design is probably going to take four to six months. And then once IDEM approves the design we can get to the field. There being the contractor will have his subcontractors on standby, sort of saying, "Hey, we are ninety days away, start getting the equipment together." (Gesturing) And so it could be the August timeframe that we hit the field.

A VOICE: Okay. Now, one last question.

MR. EVENS: Sure.

A VOICE: And it's more technical. Now, you created this bathtub.

MR. EVENS: Uh-huh.

A VOICE: And you are going to backfill it.

MR. EVENS: Yes.

A VOICE: You are never going to get the same compaction that it is compacted with right now.

MR. EVENS: Correct.

A VOICE: Therefore, you are -- you technically still have a bathtub there.

MR. EVENS: (Nodding.)

A VOICE: And I can tell you that because that's the way that I feel my house is sitting in a bathtub.

MR. EVENS: Yes.

A VOICE: Even though it's backfilled I still have water coming in on the sump lines leaps -- on draining lines.

(Brief pause had in the proceedings while the train is going by.)

A VOICE: Do you think that any contamination that may be just on the outside edge is going to want to then just come into this bathtub where you are going to have your wells?

MR. EVENS: It's very possible. So that's why we are going to do the excavation to get the highest. If we go from like seven-hundred and sixty down to seventy-six the loading on the groundwater system is greatly reduced. (Gesturing) The amount of contaminants that can get into the groundwater leaks into it, be taken into it, it is greatly reduced. So if we have this excavation we are going to be soil mixing outside and we have got --

(Brief pause had in the proceedings.)

MR. EVENS: And if you remember that one figure that had the yellow dots and we have got this plume really well defined and we really know that the top eight feet of the soil there is not contaminated. So it will get stripped off and set aside. (Gesturing)

A VOICE: (Nodding.)

MR. EVENS: So as far as vertical, horizontal, and having something really defined we have got it really, really tight -- uh -- and it's tight because of the type of clay it is. I mean, that is the best thing to have out here. I mean, if we were in sand we would have a much more greater issue going on, but we are in glacial till, it's ten to the minus seven, ten to the minus eight, that landfill cap material, that water just does not get there. It would have been really interesting to age date the water. And to see what age that water actually is that is contaminated. (Gesturing)

A VOICE: Here.

MR. EVENS: Yes, sir.

A VOICE: You mentioned something to me on the phone the other day that was interesting, how far that has moved in how many years.

MR. EVENS: Yeah, okay.

A VOICE: That's interesting.

MR. EVENS: Okay. So we don't know when the source actually happened.

A VOICE: (Nodding.)

MR. EVENS: We don't know when the spill occurred. I have a feeling that it probably occurred, like Mike said, the piping out of the sump up to the ground. (Gesturing) Either during installation, or settlement, or something went on and a microcrack occurred at one of the joints and that's where we got the contamination.

A VOICE: (Nodding.)

MR. EVENS: But the piping came up right here, (gesturing) and ran straight out to this area. (Gesturing) And the discharge is somewhere right in here. So the contaminants might have moved fifty feet over the past fifty, fifty-five years.

A VOICE: Wow.

MR. EVENS: So it is just not going anywhere. If we had ten to the minus four, ten to the minus three type soils contaminant would be off in the adjacent property.

A VOICE: Uh-huh.

MR. EVENS: So we have been in -- it has been very beneficial to have the glacial type till and not be up by the Dunes, you know.

A VOICE: Right.

MR. EVENS: If we had contaminants and were up at the Dunes (gesturing) we would be in a lot of -- a lot of hurting and a lot of problems, but this material on one of the field events and IDEM has been out to the field with us, doing the site inspection, this has been actually a really good project to work on (gesturing) because everybody has been involved with it and everybody has pretty much known their stuff.

(Gesturing)
But while we were doing some of our borings a new house was going up. And they excavated the basement and there was no water coming into that basement. (Gesturing) There was just these little micro fissures in the basement walls and it wouldn't seep out it would just moisten the side of that fracture in the soil. (Gesturing) And it was open for a week and there was no water in that basement. And that is basically what we have here. (Gesturing) Even when we open that excavation there is not going to be a lot of water that comes flowing in (gesturing) because it is so tight. (Gesturing)
After we mix we will actually add water to the system (gesturing) as we mix it to get the soil -- to break the soil up pretty good and to get the co-valent iron excited and moving. And the bugs all excited and start chewing up on the TCE.
A VOICE: Okay.
MR. EVENS: Okay. Any more questions? (Gesturing)

ALL: (No response.)

MR. EVENS: All right. And we are going to stick around. If you have got any comments now. Like your all comments (gesturing) we will respond or -- we will respond to your comments. (Gesturing)

We will be here for another forty minutes, I guess. Thirty minutes.

A VOICE: Okay.

MR. EVENS: We are good, or until whenever we leave.

A VOICE: Uh-huh.

MR. EVENS: Thank you all for coming out on such a cold night.

(Brief pause had in the proceedings while the train is going by.)

MR. EVENS: I hope we addressed comments, issues, and I hope you are happy with what we presented. And --

A VOICE: Uh-huh.

MR. EVENS: -- hopefully, we will be done in three to four years.

MR. DeROSA: And if you haven't had a chance to sign in on the sign-in sheet, please do so.

Thank you.

MR. EVENS: So with no further comments or questions that concludes the public meeting.

Thank you all.

A VOICE: Thank you.

MR. EVENS: Sure.

(AND THERE WERE NO FURTHER PROCEEDINGS.)

* * * * * * *

C E R T I F I C A T E

I, PAMELA C. MOKRZYCKI, a competent and duly qualified Court Reporter, C.S.R., do hereby certify that I did report in machine shorthand, the foregoing proceedings and that my shorthand notes so taken at said time and place were thereafter reduced to typewritten transcript under my personal direction.

I further certify that the foregoing typewritten transcript constitutes a complete record of the said proceedings taken at said time and place, so ordered to be transcribed.

Dated at Valparaiso, Indiana, this 2nd day of February, 2018.

Pamela C. Mokrzycki