United States Environmental Protection Agency

PROPOSED PLAN
GENERAL DYNAMICS LONGWOOD SUPERFUND SITE
LONGWOOD, SEMINOLE COUNTY, FLORIDA

July 2022

This Proposed Plan is not a technical document. The EPA prepared it to provide the community with an update on site activities and to present the EPA's Preferred Alternative for site cleanup.

Introduction

The U.S. Environmental Protection Agency is releasing this Proposed Plan for the environmental cleanup at the General Dynamics Longwood Superfund site (Site), which is located at 1333 North U.S. Highway 17/92 in Longwood, Seminole County, Florida. Figures 1 and 2 at the end of the Proposed Plan show the location of the Site. The Proposed Plan identifies the EPA's Preferred Alternative for cleaning up contaminated groundwater beneath the Site. It also provides the rationale for the Preferred Alternative. The Preferred Alternative, Alternative 5, described in this Proposed Plan includes in-situ treatment of groundwater with reagent injections and institutional controls to prevent exposure to contaminated groundwater.

The Proposed Plan also summarizes the other remedial alternatives evaluated in a detailed analysis in the Site's Feasibility Study (FS). For more information about the Site, the EPA encourages the community to review the Remedial Investigation (RI)/FS Report, the Baseline Risk Assessment, and other documents in the Site's Administrative Record. The information box on this page lists the locations of the Site's Administrative Record.

The EPA is the lead agency for site activities. The Florida Department of Environmental Protection (FDEP) is the support agency in this effort. The EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The EPA, in consultation with FDEP, will select a final remedy for the Site after reviewing and considering all information submitted during the 30-day public comment period.

PUBLIC COMMENT PERIOD
July 29, 2022, to August 28, 2022
EPA invites the community to submit written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING
August 16, 2022, at 6:00 p.m.
Browser: https://video.epa.gov/webapp/?conference=1159184815@video.epa.gov
Call in (audio only): 470-705-2279
Phone Conference ID: 951 571 899

The EPA invites the community to a virtual public meeting where EPA staff will present the EPA's understanding of site conditions and discuss cleanup alternatives evaluated in the FS. The EPA staff will provide the EPA's rationale for the Preferred Alternative presented in the Proposed Plan. The community will have the opportunity to ask EPA staff questions about the Preferred Alternative as well as site activities and findings.

For more information about the Site, see the Administrative Record file at these information repositories:

West Branch Public Library (Reference Section)
245 North Hunt Club Boulevard
Longwood, Florida 32279
407-665-1670
Visit the library's website for hours:
www.seminolecountyfl.gov/locations/West-Branch-Library.stml

U.S. EPA Records Center, Region 4
61 Forsyth Street, S.W.
Atlanta, Georgia 30303
404-562-8946
Hours: Mon. to Fri., 8:30 a.m. to 4:30 p.m.

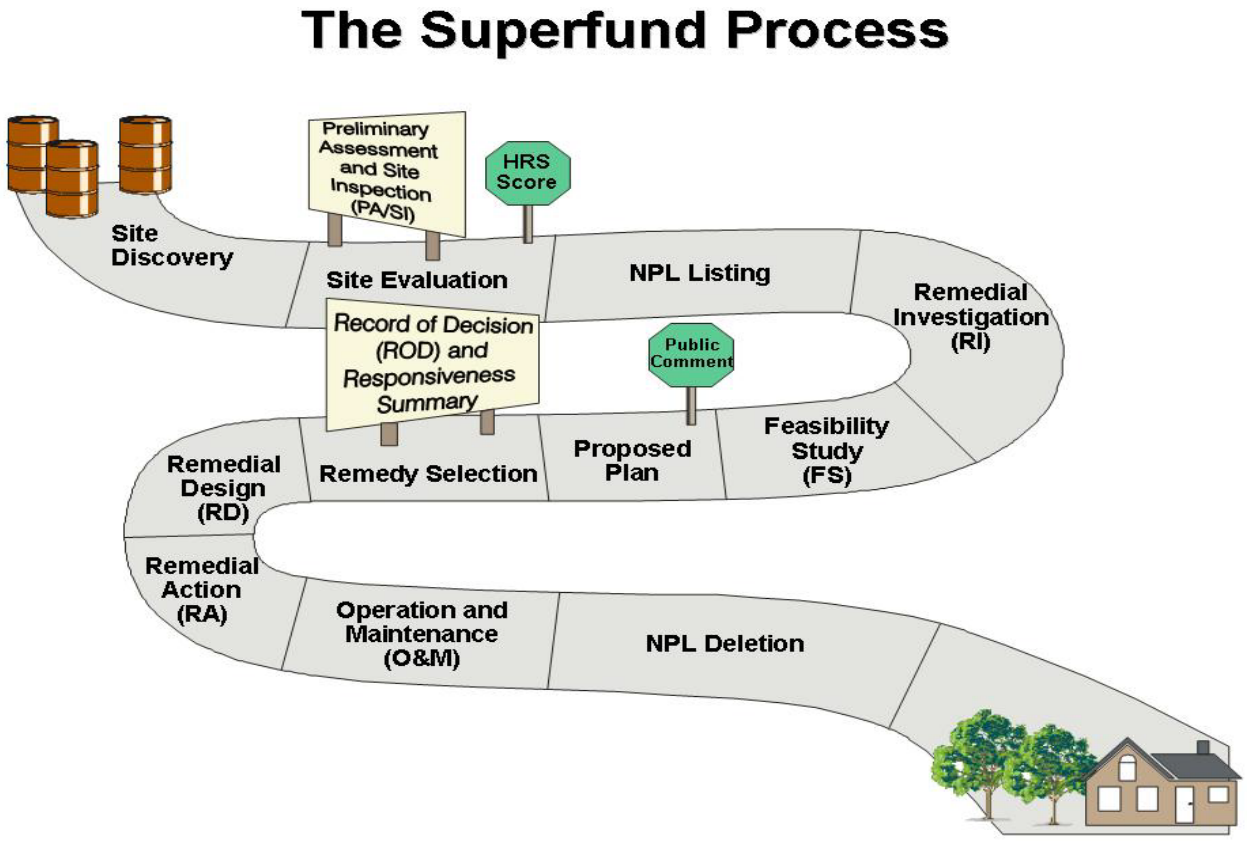
EPA site profile page: www.epa.gov/superfund/general-dynamics-longwood

Send comments on the Proposed Plan to:
Rusty Kestle
Superfund & Emergency Management Division
U.S. EPA, Region 4
61 Forsyth Street
Atlanta, Georgia 30303
kestle.rusty@epa.gov

Public participation is an important part of the site cleanup decision process. Based on public comments, the EPA, in consultation with FDEP, may modify the Preferred Alternative or select another alternative presented in the Proposed Plan. Therefore, the EPA encourages the public to review and comment on all the cleanup alternatives presented in this Proposed Plan.

What Is a Proposed Plan?

A Proposed Plan presents the EPA's preferred alternative to address contamination at a site. It also presents other alternatives that were evaluated and provides the rationale for the EPA's preferred alternative. In addition, a Proposed Plan solicits public involvement and comment on a site's remedy selection process. Issuance of a Proposed Plan is part of the Superfund process (shown below).



What Are the Next Steps in the Superfund Process?

The EPA will hold a virtual public meeting on August 16, 2022, at 6:00 p.m. The purpose of the meeting is to present the Proposed Plan for cleaning up the Site. This meeting will provide an opportunity for the community to ask questions of the EPA staff. The EPA will record questions and answers to assist in the final selection of the remedy and in preparation of the Site's Record of Decision (ROD).

The public comment period for the Proposed Plan starts on July 29, 2022 and ends on August 28, 2022. During this 30-day period, the community is encouraged to review the findings of the RI and the details of the cleanup alternatives presented in the Site's RI/FS Report. These materials and other documents are available at the information repositories listed on page 1 of this document and on the EPA's website at www.epa.gov/superfund/general-dynamics-longwood. The community is encouraged to submit written or emailed comments to the EPA at the address listed on page 1 of this Proposed Plan.

After the public comment period, the EPA will carefully consider all public comments before selecting the remedy for the Site. All comments submitted in writing and postmarked by August 28, 2022, will be addressed in the Responsiveness Summary of the ROD, as will the questions and answers discussed at the public meeting. To be added to the Site's mailing list, please contact the EPA project manager, Rusty Kestle, by phone at 404-562-8819 or 1-800-435-9234, or by email at kestle.rusty@epa.gov. The community may also contact the EPA Region 4 community involvement coordinator (CIC), L'Tonya Spencer-Harvey, by phone at 404-562-8463, or by email at spencer.latonya@epa.gov.

A ROD, which summarizes the remedy decision process and announces the remedy, will be prepared and signed by the EPA. Once the EPA issues the Site's ROD, the design of the remedy will be scheduled and conducted. Implementation of the remedy will follow.

Site Background

Site Description

The Site is in a commercial and light industrial area in Longwood, Seminole County, Florida (Figure 2). The Site encompasses a significant portion, but not all, of the former Gould Publishing Inc. property (Property) (Figure 3). The Site includes about 8 acres of the 10-acre Property.

The remaining two acres of the western part of the Property are part of operable unit 2 (OU-2) at the adjacent Sprague Electric Company Superfund Alternative Site (Sprague Site). Operable unit 1 (OU-1) of the Sprague Site is defined by the parcel boundaries of property formerly owned by the Sprague Electric Company. The EPA selected an in-situ remedy for the groundwater at OU-1 of the Sprague Site in 2010, which is reducing contamination as expected and may soon reach cleanup goals. OU-2 of the Sprague Site encompasses any contamination in groundwater beyond the boundaries of OU-1. The EPA will address cleanup of Sprague Site OU-2 in a future EPA decision document.

An asphalt parking area is present on the east side of the Site. U.S. Highway 17/92 is just west of the Property. Spring Hammock State Park borders the Site to the north. Industrial properties border the Site to the east. A drainage ditch, running generally in an east-west direction, is located on the southern property boundary between the Site and OU-1 of the Sprague Site. The drainage ditch discharges into Soldier Creek about 0.4 miles northeast of the Site.

The Property contains several existing buildings (Buildings 1, 2, and 3), driveways and parking lots (Figure 3). Several smaller buildings, including a former paint and plating building, are also located across the Property. The Property is zoned for commercial and industrial use.

In August 2015, ownership of the Property transferred to Gould Property Expansion, LLC, which is managed by the Foundation for Seminole State College of Florida, Inc. The college uses the Property for warehousing.

History of Contamination

Electronics manufacturing took place on site from 1959 to 1988. Manufacturing operations primarily occurred in Building 3 and in the paint and plating building. Operations included use of a vapor degreaser in Building 3. Chlorinated solvents for electronics degreasing were stored and used at the Site. Nearly 30 years of electronics manufacturing operations resulted in groundwater contamination at the Site.

Spent solvents containing volatile organic compounds (VOCs) are considered Resource Conservation and Recovery Act (RCRA) F-listed hazardous waste (e.g., F001, F002) under 40 Code of Federal Regulations (CFR) 261.31. Groundwater contamination at the Site containing the RCRA listed waste from past disposal and releases is subject to certain RCRA applicable or relevant and appropriate requirements (ARARs),

depending on the waste management activity unless the EPA makes a "no longer contains" determination for the media (soil and groundwater) consistent with its policy/guidance.

Previous Investigations and Response Actions

Since 2000, several parties have performed environmental investigations and response actions at the Site:

- Sampling occurred on the Property as part of the RI for the adjacent Sprague Site. Chlorinated VOCs were identified in groundwater during the investigation. Surface water and sediment in the unnamed drainage ditch were not affected by contamination from either site.
- A January 2008 National Priorities List (NPL) Site Inspection Report (SI Report), prepared by MACTEC on behalf of FDEP, documented investigation work conducted on the Property in 2007. The SI Report identified four areas of concern (AOCs):
    - AOC-A: former vapor degreaser location.
    - AOC-B: former paint and plating building.
    - AOC-C: septic tank on east side of the Site.
    - AOC-D: septic tank on east side of the Site.

  The investigation identified chlorinated VOCs in groundwater above Florida groundwater cleanup target levels (GCTLs) and/or federal maximum contaminant levels (MCLs). The former vapor degreaser (AOC-A) was identified as a potential source of the groundwater impacts. Chromium and lead were detected in one surface soil sample near the former paint and plating building (AOC-B) at concentrations above Florida soil cleanup target levels (SCTLs).
- General Dynamics conducted a limited investigation around the former vapor degreaser location (AOC-A) in April 2009. Chlorinated VOCs and 1,4-dioxane were detected in groundwater near AOC-A.

In 2010, the Site was placed on the NPL based on soil and groundwater contamination. The EPA completed a potentially responsible party (PRP) search for the Site and issued Special Notice Letters in 2013. The EPA and the PRPs (collectively General Dynamics and United Technologies Corporation (now Raytheon Technologies) entered into an Administrative Settlement Agreement and Order on Consent (Consent Order) on May 27, 2014. The Consent Order and accompanying Statement of Work required that the PRPs complete an RI/FS. The PRPs conducted the RI/FS from 2014 to 2021.

The RI focused investigation on the four AOCs, and included a sewer line investigation, surface and subsurface soil and groundwater sampling, and evaluation of potential dense non-aqueous phase liquid (DNAPL). Soil samples were analyzed for VOCs or total chromium, hexavalent chromium, and lead, depending on the AOC and previous investigation results. Groundwater samples were analyzed for field parameters, VOCs, metals, 1,4-dioxane, and natural attenuation parameters. Surface water and sediment samples were not collected during the RI because previous investigations determined these media were not affected by site contamination.

During the RI, concentrations of total chromium, hexavalent chromium, and lead in surface soil samples near the former paint and plating building (AOC-B) were detected above the Florida SCTLs for industrial properties. Based on these exceedances, PRPs performed a soil excavation in November 2015. An area of about 200 square feet was excavated to about 1 to 2 feet below ground surface. About 20 tons of soil was removed and taken off site for disposal at a permitted disposal facility. PRPs collected two post-excavation confirmation samples and analyzed them for total lead, total chromium, and hexavalent chromium. The results of the confirmation samples were below Florida SCTLs for industrial properties.

Community Participation

The public meeting for the Proposed Plan will be the first major community participation activity for the Site. No other community participation events have occurred.

Nature and Extent of Contamination

The January 2022 RI/FS Report describes the nature and extent of contamination at the Site, based on data collected during the RI and previous investigations. Groundwater is the medium of primary concern at the Site. The RI identified chlorinated VOCs and 1,4-dioxane in groundwater above Florida GCTLs and/or federal MCLs. The 2015 soil excavation at the former paint and plating building (AOC-B) removed metals-contaminated surface soil from the Site. Principal threat waste (i.e., DNAPL) was not identified during the RI. Based on the sewer investigation, there is no evidence of any source material at the two former septic systems (AOC-C and AOC-D). There is no evidence of source material at the former vapor degreaser (AOC-A). Chlorinated VOCs were not detected in subsurface soil.

There are two groundwater zones in the shallow aquifer at the Site. They include a shallow zone about 5 feet below the surface (i.e., the upper surficial aquifer) and a deeper zone about 15 feet below the surface (i.e., the lower surficial aquifer). These zones are separated by a clay layer that varies from 5 feet thick to less than 1 foot thick. The clay layer is not present in some areas of the Site. Dissolved-phase groundwater contamination from the Site is limited to a relatively small area in the upper and lower zones of the shallow aquifer. Figure 4 shows the 2021 concentrations of primary VOCs and 1,4-dioxane in the upper surficial aquifer at the Site. Figure 5 shows the 2021 concentrations of primary VOCs and 1,4-dioxane in the lower surficial aquifer at the Site. The groundwater flow direction in the area is generally to the northwest. A large, low-level comingled dissolved-phase groundwater contamination plume extends over the Site and adjacent Sprague Site.

There is also an active groundwater cleanup that has been ongoing under EPA supervision for OU-1 at the adjacent Sprague Site. Some of the groundwater contamination from sources within the Sprague Site OU-1 source area appears to have contributed to the extended dissolved-phase groundwater contamination plume that is comingled with groundwater contamination from the Site.

The shallow aquifer and the contamination it contains are underlain by 30 feet of relatively impermeable material. This impermeable material separates site groundwater contamination from the deeper groundwater that is used for drinking water in the area (the Floridan aquifer). No groundwater samples collected from the eight Floridan aquifer wells on and around the Site have shown concentrations of any contaminants of concern (COCs) above drinking water standards.

Principal Threat Waste

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Contaminated groundwater generally is not considered to be a source material.

The RI included soil sampling and investigation for the presence of DNAPL, which is considered principal threat waste. Principal threat waste was not identified. Contaminated groundwater is the medium of concern at the Site.

Scope and Role of Response Action

The EPA is managing cleanup of the Site as a sitewide operable unit (OU). Groundwater is the primary medium of concern. No further action for soil is needed following the 2015 soil excavation at the former paint and plating building (AOC-B). Principal threat waste was not identified during the RI or previous investigations at the Site.

The overall cleanup strategy for the Site is to restore groundwater to its beneficial use within a reasonable timeframe. FDEP classifies both the shallow aquifer and the Floridian aquifer at the Site as Class G-II under Florida Administrative Code (FAC) Chapter 62-520.410 for potable water use. It is anticipated that a groundwater use restriction will be placed on the Site property to prevent installation of wells for potable use. Public water is available at the Site.

The Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in this plan, is necessary to protect public health, welfare, or the environment from actual or threatened releases of hazardous substances into the environment.

Summary of Site Risks

Risk assessments were conducted to determine the current and future effects of contaminants on human health and the environment. "What Is Risk and How Is It Calculated?" presented below, provides general information on assessing risk. The Proposed Plan is based on risk assessment estimates presented in the following documents:

- EPA Memorandum, Evaluation of Potential for Ecological Risk for the General Dynamics Site in Longwood, Florida, dated July 23, 2019.
- EPA Memorandum, General Dynamics Longwood Superfund Site, Remedial Investigation and Risk Assessment, Longwood, Seminole County, Florida, dated January 4, 2022.
- Baseline Human Health Risk Assessment: General Dynamics Longwood Superfund Site, dated January 10, 2022, and included as Appendix L in the 2022 RI/FS Report.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund human health risk assessment (HHRA) estimates the baseline risk. This is an estimate of the likelihood of potential health problems occurring if no cleanup action were taken at a site. To estimate the baseline risk at a Superfund site, the EPA undertakes a four-step process:

Step 1: Analyze Contamination.
Step 2: Estimate Exposure.
Sept 3: Assess Potential Health Dangers.
Step 4: Characterize Site Risk.

In **Step 1**, the EPA looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects of these contaminants on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and concentrations reported in past studies help the EPA determine which contaminants are most likely to pose a potential threat to human health.

In **Step 2**, the EPA considers the different ways that people might be exposed to contamination, and the potential frequency and duration of the exposure. Using the information, the EPA calculates a reasonable maximum exposure scenario, which portrays the highest level of human exposure that could reasonably be expected to occur.

In **Step 3**, the EPA uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential health risks. The EPA considers two types of risk: cancer risk and noncancer risk. The likelihood of any kind of cancer resulting from a Superfund site is generally expressed as an upper bound of probability (for example, a "1 in 10,000 chance"). In other words, the exposed individual would have an excess cancer risk of 1 in 10,000 due to site contaminants. This excess risk would be over and above the existing cancer risk for the individual. For noncancer health effects, the EPA calculates a hazard index (HI). The key concept here is that there is a threshold level (usually measured as an HI of less than 1) below which noncancer health effects are not expected.

In **Step 4**, the EPA determines whether site risks are excessive for people at or near the Superfund site. The results of the three previous steps are combined, evaluated, and summarized. The EPA adds up the potential risks for each receptor.

The results of the risk assessments provide the basis for taking action and identify contaminants and exposure pathways that need to be addressed by the remedial action. This section of the Proposed Plan summarizes the results of the human health and ecological risk assessments. Based on the risk assessment, COCs include VOCs and 1,4-dioxane in groundwater.

The current and reasonably anticipated future land uses for the Site are commercial, industrial, and recreational uses. The Site is currently used for warehousing purposes, with no full-time employees. Historically, it was used for industrial purposes. The land is zoned for commercial and industrial uses. The Site has several buildings, driveways, and parking lots. There were previously four water wells on site that were screened in the Floridan aquifer. These wells were abandoned in 2020. The Site is connected to the City of Winter Springs' public water supply.

Human Health Risk

The baseline human health risk assessment (HHRA) evaluated non-residential current and reasonably foreseeable exposure scenarios. Groundwater is not used at the Site for water supply. However, potable use of groundwater was included in the evaluation as a hypothetical exposure scenario because FDEP classifies both the shallow aquifer and the Floridian aquifer at the Site as Class G-II under FAC Chapter 62-520.410 for potable water use. Although there are no residences on site, residential use of groundwater and vapor intrusion were also evaluated, and soil concentrations were compared to residential screening levels.

The HHRA evaluated the following current and future receptors and routes of exposure:

- **Current/future adolescent trespasser** – ingestion of and dermal contact with surface soil; inhalation of particulate matter from surface soil.
- **Future indoor site worker** – inhalation of indoor air due to soil vapor intrusion from shallow aquifer groundwater; hypothetical ingestion of shallow or Florida aquifer groundwater as a potable supply.
- **Future outdoor site worker** – ingestion of and dermal contact with surface soil; inhalation of particulate matter from surface soil.
- **Construction worker** – ingestion of and dermal contact with subsurface soil; inhalation of particulates from subsurface soil; inhalation of VOCs from shallow aquifer groundwater while working in a trench; dermal contact with shallow aquifer groundwater while working in a trench.
- **Future hypothetical resident** – Ingestion and dermal contact with shallow and Floridan aquifer groundwater; inhalation of VOCs transferred from water to indoor air.

Table 1 summarizes the results of the HHRA.

Table 1: HHRA Summary

Receptor	Total Cancer Risk	Total Noncancer Hazard Index (HI)
Current/future adolescent trespasser	3×10^{-7}	0.002
Future indoor site worker	**9×10^{-4} (shallow aquifer)[a]** 8×10^{-6} (Floridan aquifer)[b]	**3 (shallow aquifer)[a]** 0.3 Floridan aquifer)[b]
Future outdoor site worker	3×10^{-6}	0.005
Construction Worker	1×10^{-6}	0.2
Future hypothetical resident	**2×10^{-2} (shallow aquifer)[a]** 1×10^{-4} (Floridan aquifer)[b]	**30 (shallow aquifer)[a]** 1 (Floridan aquifer)[b]

Notes:

a) For indoor site workers and residents, total risk/HI was based on using shallow aquifer system groundwater plus indoor air due to soil vapor intrusion.

b) For indoor site workers and residents, total risk/HI was based on using Floridan aquifer system groundwater plus indoor air due to soil vapor intrusion.

Bold result indicates excess cancer risk and/or noncancer hazard exceeding the EPA's acceptable risk range.

Source: Tables 16 and 17 of the January 2022 Baseline Human Health Risk Assessment.

Estimated cancer risk exceeds the EPA's acceptable risk range (1×10^{-6} to 1×10^{-4}) for an indoor site worker and hypothetical resident using shallow aquifer groundwater and exposed via soil vapor intrusion. The noncancer hazard index (HI) for both scenarios also exceeds 1. Estimated cancer risk to a hypothetical resident using Floridan aquifer groundwater and exposure via soil vapor intrusion was also at the upper limit of 1×10^{-4}. 1,1-Dichloroethylene, vinyl chloride, and trichloroethylene were detected above their respective federal MCLs in several shallow aquifer system wells. Further, 1,4-dioxane was detected above its state GCTL in several shallow aquifer system wells.

As part of the risk assessment, upper concentration limits (UCLs) for detected constituents in vadose zone soil were compared to residential screening levels. Arsenic and hexavalent chromium UCLs exceeded respective residential screening levels.

The EPA further evaluated potential risks associated with potable use of groundwater, using groundwater data from 2020 and 2021. Iron, 1,1-dichloroethylene, 1,4-dioxane, vinyl chloride, and trichloroethylene were each detected above their respective screening levels in the most recent sampling events in 2020 and 2021. Calculated carcinogenic risk (2×10^{-3}) was above the EPA's acceptable risk range, and the noncarcinogenic HI (6) was above EPA's acceptable HI of 1. Trichloroethylene and vinyl chloride are the primary drivers of noncancer and carcinogenic risks. More information is in the EPA Memorandum, General Dynamics Longwood Superfund Site, Remedial Investigation and Risk Assessment, Longwood, Seminole County, Florida, dated January 4, 2022.

Ecological Risk

Based on information in the RI/FS Report, the EPA determined that unacceptable ecological risk is unlikely on site or in areas potentially affected by the Site, including the drainage ditch and Soldier Creek. Though residual/post-removal lead and chromium were detected in surface soil at the former paint and plating building (AOC-B), the area affected is small, is highly disturbed and contains no native substrate. The area affected is fully contained on site, in an area with reportedly no ecological attractiveness. The Site is zoned for commercial and industrial uses. It is not anticipated that the residual metals in soil would pose an appreciable ecological risk. The EPA also determined that there is not a concern regarding adverse effects to aquatic receptors due to the potential exposure to groundwater if it were to discharge to the surface. More information is in the EPA Memorandum, Evaluation of Potential for Ecological Risk for the General Dynamics Site in Longwood, Florida, dated July 23, 2019.

Basis for Taking Action

It is the EPA's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Groundwater is contaminated with VOCs and 1,4-dioxane above levels that present an unacceptable risk to a future site worker or hypothetical resident using groundwater as a source of drinking water, and exposed via soil vapor intrusion. Several contaminants in groundwater also currently exceed or historically exceeded federal MCLs or the more stringent FDEP GCTLs (listed in Table 2).

Remedial Action Objectives (RAOs) and Cleanup Goals

RAOs for the Site are based on the current understanding of available data identified in the FS. RAOs describe what a proposed site cleanup is expected to accomplish in terms of addressing unacceptable exposure(s) or site risks identified in contaminated media and achieving remediation goals. Site RAOs are to:

- Prohibit use of, direct contact with, and ingestion of groundwater with COC concentrations above cleanup levels that present an unacceptable risk to human health.

- Prevent exposure to COCs through the vapor intrusion pathway, that could result in an unacceptable risk to human health.
- Restore groundwater quality throughout the plume to meet federal primary drinking water standards or more stringent FDEP GCTLs based on classification of the aquifer as a potential source of drinking water (Class G-II).

This proposed action will reduce the excess cancer and noncancer hazard associated with exposure to contaminated groundwater and attain ARARs. Remediation of groundwater should also mitigate any possible unacceptable risk to human health from the vapor intrusion pathway. In the interim, institutional controls to prevent exposure will be implemented.

The proposed action will clean up the entire impacted shallow aquifer to attain the more stringent of the EPA or FDEP primary drinking water standards – MCLs or FDEP GCTLs at FAC Chapter 62-777, Table I. These concentrations are considered "relevant and appropriate" chemical-specific requirements consistent with Section 121(d)(2) of CERCLA and are the basis for groundwater cleanup levels.

Table 2 presents the highest historical COC concentrations detected in groundwater at the Site and the site-specific cleanup levels for those COCs.

Table 2: Site Groundwater Cleanup Levels

COC	Highest Historical Concentration Detected at the Site (ppb)	Regulatory Basis for Cleanup Level	Cleanup Level (ppb)
Groundwater			
TCE	25,100	State of Florida GCTLs FAC Chapter 66-777	3
1,1,1-Trichloroethane	561	State of Florida GCTLs FAC Chapter 66-777	200
cis-1,2-Dichloroethene	6,200	State of Florida GCTLs FAC Chapter 66-777	70
trans-1,2-Dichloroethene	8.8	State of Florida GCTLs FAC Chapter 66-777	100
1,1-Dichloroethene	1,470	State of Florida GCTLs FAC Chapter 66-777	7
Vinyl chloride	251	State of Florida GCTLs FAC Chapter 66-777	1
1,1-Dichloroethane	99.7	State of Florida GCTLs FAC Chapter 66-777	70
Tetrachloroethylene	44	State of Florida GCTLs FAC Chapter 66-777	3
Chloroethane	1.9	State of Florida GCTLs FAC Chapter 66-777	12
Chloroform	18.7	State of Florida GCTLs FAC Chapter 66-777	5.7
1,4-Dioxane	9.6[a]	State of Florida GCTLs FAC Chapter 66-777	3.2

Notes:
a) Maximum concentration reported in Table 3 of the 2022 baseline HHRA.
ppb = parts per billion

Remedial Alternatives

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with applicable or relevant and appropriate requirements (ARARs), and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) of CERCLA also establishes a preference for remedial actions that employ, as a principal element, treatment to reduce permanently and significantly the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. Section 121(d)(2) of CERCLA, 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).

The January 2022 RI/FS Report presents detailed descriptions of the remedial alternatives considered for the Site. Summaries of the alternatives are presented below. The numbering of the alternatives corresponds to the numbering in the RI/FS Report. There are uncertainties with any investigation. Confirmation sampling and monitoring are anticipated as common activities for all of the alternatives considered for the Site. The RI/FS Report notes that the remedial alternatives were developed with the assumption that property use remains commercial/industrial.

Alternative 1: No Action
Capital Cost: $11,000
Annual Operation and Maintenance (O&M) Cost: $0
Periodic Cost: $0
Total Present Worth: $11,000
Estimated Construction Timeframe: none
Estimated Time to Achieve RAOs: >100 years
ARARs Met: none

Regulations governing the Superfund program require consideration of a "no action" alternative as a baseline to compare other alternatives. The no-action alternative can include an optional sampling and analysis task to characterize site conditions for a site's Five-Year Review Report. However, the "no action" alternative means that no remedial action would be undertaken, and that no institutional controls, containment, removal, or other mitigating actions would be implemented to control exposure to COCs.

Alternative 2: Institutional Controls
Capital Cost: $11,000
Annual O&M Cost: $0
Total Present Worth: $11,000
Estimated Construction Timeframe: <1 year
Estimated Time to Achieve RAOs: >100 years
ARARS Met: none

Institutional controls are an administrative-based remedy designed to minimize the potential for human exposure to contaminants. Institutional controls may be implemented using a legal document that places legal restrictions on the use of the property. Institutional controls are designed to prevent harm to workers, residents, and other users. The institutional controls for the Site would prohibit use of groundwater for a drinking water supply, irrigation, or other purpose. Installation of wells would be prohibited.

This alternative does not include groundwater monitoring but assumes that natural attenuation processes reducing COC concentrations in groundwater will continue.

Alternative 3: Monitored Natural Attenuation (MNA) with Institutional Controls
Capital Cost: $11,000
Annual O&M Cost: $28,000
Total Present Worth: $345,086
Estimated Construction Timeframe: <1 year
Estimated Time to Achieve RAOs: >10 years
ARARs Met: this alternative meets chemical-specific, action-specific, and location-specific ARARs

Alternative 3 includes monitoring the natural processes that are already actively reducing COC concentrations in groundwater at the Site. These natural processes may include biodegradation, chemical degradation, sorption, dispersion, and other processes. In addition, institutional controls to prohibit use of groundwater for a drinking water supply, irrigation, or other purpose, would be included in this alternative to prevent human exposure to affected groundwater until RAOs are attained.

MNA would include sampling groundwater to verify COC attenuation over 10 years. The monitoring well network, frequency of sampling, and laboratory analytes may be refined and finalized during the remedial design and subject to EPA approval. In addition, the remedial design would include development of pre-defined decision criteria for modifying the monitoring program over time as COC concentrations decrease, and contingency measures that could be implemented if COC concentrations do not decrease as anticipated or do not stabilize.

Alternative 4: Hydraulic Containment by Extraction Wells, Ex-Situ Treatment, and Institutional Controls
Capital Cost: $136,000
Annual O&M Cost: $35,000
Total Present Worth: $678,267
Estimated Construction Timeframe: <1 year
Estimated Time to Achieve RAOs: >10 years
ARARs Met: this alternative meets chemical-specific, action-specific, and location-specific ARARs

Alternative 4 would include the design, installation, operation, maintenance, and monitoring of an engineered system to extract and treat contaminated groundwater. The number of extraction wells and monitoring wells and the locations of these wells would be finalized prior to implementation based on a pre-design engineering evaluation that would include an aquifer pump test and other hydraulic evaluations. The engineering evaluation results, and the hydraulic test data would be used to size the extraction well(s), determine appropriate pumping rates, evaluate contaminant loads, size the groundwater treatment system equipment, and reaffirm preliminary capture-zone estimates.

Alternative 4 would include construction of an on-site groundwater treatment system building next to Building 3. The treatment process may include an advanced oxidation process or catalytic reduction process to treat VOCs and 1,4-dioxane. The alternative assumes treated groundwater can be discharged to the drainage ditch, but other options to manage effluent would be considered during remedial design. Monthly discharge monitoring reports would be submitted to the appropriate agencies under the terms and conditions of a discharge permit. Groundwater quality monitoring would be performed using existing monitoring wells and possibly an additional well to gauge aquifer response to pumping and COC attenuation over time and to confirm containment of COCs.

This alternative would also include institutional controls to prevent installation of groundwater supply wells and to restrict groundwater use.

Alternative 5: In-Situ Treatment with Reagent Injection and Institutional Controls
Capital Cost: $95,000
Annual O&M Cost: $91,000
Total Present Worth: $560,784
Estimated Construction Timeframe: <1 year
Estimated Time to Achieve RAOs: <5 years
ARARs Met: this alternative meets chemical-specific, action-specific, and location-specific ARARs

Alternative 5 involves the injection of reagents into the aquifer to enhance the rate of reactions in groundwater at the Site that are designed to destroy the groundwater contamination. In addition, institutional controls to prevent drilling of groundwater supply wells and to restrict groundwater use would be implemented to preclude human exposure to contaminated groundwater until RAOs are attained. The institutional controls would be implemented prior to finalizing the remedial design.

In-situ groundwater treatment may include using bioremediation techniques to stimulate the native or augmented microorganisms in the ground to treat the COCs. Reagents injected into the ground to stimulate the degradation may include primary substrates, cometabolites, nutrients, or other microorganisms. In-situ chemical oxidation may also be considered. The type of in-situ treatment would be further refined in the remedial design. The injection program would consist of a grid of injection points either inside Building 3 or just outside its south wall. Groundwater monitoring would be conducted during and after the injection program.

Evaluation of Alternatives

In evaluating the remedial alternatives, each alternative is assessed against nine evaluation criteria set forth in the NCP at 40 CFR § 300.430(e)(9)(iii) (see The Nine Superfund Evaluation Criteria box on the next page). The remedial alternative selected for a Superfund site must meet the two threshold criteria, as well as attain the best balance among the five balancing criteria. State and community acceptance are evaluated after the close of the public comment period. The EPA, after considering state acceptance and public comments received on this Proposed Plan, will select the final remedy in the Site's ROD. The EPA's Preferred Alternative may be altered or changed based on the two modifying criteria.

This section of the Proposed Plan profiles each alternative's relative performance against the nine evaluation criteria. It notes how each remedial alternative compares to other options under consideration. The RI/FS Report includes a detailed analysis of the alternatives and information about the evaluation process.

After the Site's FS, the EPA determined that Alternative 1 (no action), Alternative 2 (institutional controls), and Alternative 3 (MNA with institutional controls) are not viable alternatives for remedy selection. Alternative 1 was rejected because it does not eliminate the hazard posed to receptors by on-site contamination. Alternative 1 would not require any well abandonment, groundwater monitoring, site fencing, or institutional controls. Groundwater contamination would remain. Natural attenuation, if occurring, would not be monitored. Alternative 2 (institutional controls) was rejected because it cannot meet site RAOs and would not restore groundwater to meet cleanup levels. Alternative 3 (MNA with institutional controls) was rejected because, based on groundwater data and analysis, the EPA determined that restoration to attain cleanup levels was not practicable in a reasonable timeframe. The EPA's analysis of groundwater quality data did not show probable declining concentration trends at all wells for all monitored constituents. Accordingly, the summary of the comparative analysis below only includes the two alternatives retained. These alternatives are Alternative 4 (hydraulic containment by extraction wells, ex-situ treatment, and institutional controls) and Alternative 5 (in-situ treatment with reagent injection and institutional controls).

THE NINE SUPERFUND EVALUATION CRITERIA

Threshold Criteria:

1. **Overall Protectiveness of Human Health and the Environment** evaluates whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
2. **Compliance with ARARs** evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to a site, or whether a waiver is justified.

Balancing Criteria:

3. **Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time.
4. **Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
5. **Short-term Effectiveness** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.
6. **Implementability** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
7. **Cost** includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50% to -30%.

Modifying Criteria:

8. **State/Support Agency Acceptance** considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI Report, FS Report, and Proposed Plan.
9. **Community Acceptance** considers whether the local community agrees with the EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

1. Overall Protectiveness of Human Health and the Environment

The two active remedial alternatives considered (Alternatives 4 and 5) would protect human health and the environment by removing all groundwater contamination, although over markedly different timeframes. Both alternatives would also limit exposure to contaminated groundwater by placing restrictions on groundwater use at the Site until groundwater cleanup goals are attained.

2. Compliance with ARARs

Alternatives 4 and 5 would comply with chemical-specific ARARs by reducing contaminant mass in groundwater to meet groundwater cleanup levels. The two alternatives could be ranked similarly in their success at achieving chemical-specific ARARs at the Site over the long term. Alternative 4 would also comply with chemical-specific, location-specific and action-specific ARARs in the short term associated with operation of an active remedial system and discharge of treated effluent to the drainage ditch. Alternative 5 would comply with chemical-specific, location-specific and action-specific ARARs in the short term associated with underground injection control.

3. Long-Term Effectiveness and Permanence

Alternatives 4 and 5 would provide long-term protectiveness and permanence through eliminating the groundwater contamination at the Site. Alternative 4 would achieve long-term effectiveness and permanence by pumping contaminated groundwater to the surface and treating it. Alternative 5 would

achieve long-term effectiveness and permanence at the Site by treating contaminated groundwater in-situ. Both alternatives would reduce COC concentrations to below groundwater cleanup levels.

4. Reduction of Mobility, Toxicity, or Volume of Contaminants Through Treatment
Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that a remedy may employ in their ability to reduce toxicity, mobility, or volume of contamination. Alternatives that reduce mobility, toxicity, and volume in some way must: (a) slow the migration of contaminants by lowering concentration gradients within the media, or increase the strength of attachment to some solid substrate; (b) chemically alter the toxicity characteristics of the original contaminant or prevent receptors from being exposed to toxic doses of the contaminant; and (c) reduce the mass of contaminant(s) or the volume of environmental media associated with the contaminant(s). Alternative 4 would reduce the mobility and volume of contaminants by pumping contaminated groundwater to the surface. The toxicity of the COCs in groundwater would be eliminated upon treatment, by reducing the COC concentrations to applicable criteria. Alternative 5 would include injecting reagents directly into the groundwater to enhance the natural breakdown of contaminants, thus reducing the toxicity, mobility, and volume of contaminants. Both Alternatives 4 and 5, if successfully implemented, would provide similar reduction in mobility, toxicity, and volume of contaminants.

5. Short-term Effectiveness
Alternatives 4 and 5 involve a temporary increase in risk to site workers, the community, and the environment during initial construction activities at the Site (i.e., installation of a groundwater extraction and treatment system [Alternative 4] or reagent injections into the ground [Alternative 5]). Initial construction work is expected to be completed within one year for both alternatives. The risks would be managed by establishing appropriate engineering controls, security measures, and defined working areas, including an exclusion zone.

6. Implementability
Implementing remedial alternatives involves design, planning, construction, or installation, and operation of the various machine and human components of remedial actions. The efficiency with which an alternative can be installed and operated affects how well an alternative achieves its level of protection (the first threshold criterion) and attains ARARs (the second threshold criterion). In some cases, implementation of the alternative could be technically difficult or impossible given site-specific limitations.

Alternatives 4 and 5 are readily implementable. Both technologies are proven and widely used to clean up contaminated groundwater. Specialized equipment may be needed for the groundwater treatment system in Alternative 4, but the required equipment is expected to be readily available. Operators would need to be trained to operate and maintain the system over time, but this is considered standard practice for pump-and-treat systems. Alternative 4 may also require complying with additional requirements associated with the discharge of treated effluent. Alternative 5 would involve management of reagent materials. If injections are needed inside Building 3, this may be more difficult to implement than injections outside of the building.

7. Cost
Cost is the simplest criterion to rank. Table 3 presents cost estimates for the two alternatives considered. Cost estimates for implementing these alternatives are provided in terms of present worth cost. Alternative 4 would also incur longer-term operation and maintenance costs.

Table 3: Cost Estimates for Alternatives Considered

Alternative	Estimated Cost
Alternative 4: Hydraulic Containment by Extraction Wells, Ex-Situ Treatment, and Institutional Controls	$678,267
Alternative 5: In-Situ Treatment with Reagent Injection and Institutional Controls	$560,784

8. State/Support Agency Acceptance
The State of Florida supports the Preferred Alternative.

9. Community Acceptance
Community acceptance of the Preferred Alternative will be evaluated after the public comment period of this Proposed Plan and will be part of the Responsiveness Summary in the Site's ROD. Although the exact end use of the Site is not known at this time, the implementation of the Preferred Alternative would allow for unrestricted use and unlimited exposure once cleanup levels and ARARs have been met.

Preferred Alternative

The EPA's Preferred Alternative is Alternative 5 (in-situ treatment with reagent injection and institutional controls). Alternative 5 will achieve site RAOs by restoring contaminated groundwater to cleanup levels and preventing exposure to contaminated groundwater until cleanup levels are attained. Alternative 5 will reduce the excess cancer and noncancer hazard associated with exposure to contaminated groundwater and attain ARARs. Remediation of groundwater should also mitigate any possible unacceptable risk to human health from the vapor intrusion pathway. The State of Florida supports the Preferred Alternative.

The Preferred Alternative was selected over the other alternatives because of its overall potential effectiveness and efficiency in addressing site contamination. Alternative 5 will likely take less time to achieve RAOs and at less cost than Alternative 4, which would incur more long-term O&M costs.

Although this alternative is considered the best-suited alternative for the Site, preliminary engineering tests and pilot studies may be necessary for this alternative or any other alternative to verify that the technology is applicable to site-specific conditions. If, for some reason, the remedy does not perform satisfactorily in a bench-scale test and/or pilot test, the other remedial alternatives discussed in the Proposed Plan would be re-evaluated and a modification to the selected remedy may be required.

The EPA believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the alternatives evaluated with respect to the balancing and modifying criteria. The EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA §121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element. The Preferred Alternative can change in response to public comment or new information.

Five-Year Reviews

Because COCs will remain at the Site above levels that allow for unlimited use and unrestricted exposure while the remedy is being implemented, the EPA will review the final remedial action no less than every five years after initiation of the remedial action, in accordance with CERCLA Section 121(c) and the NCP at 40 CFR 300.430(f)(4)(ii), until the levels of COCs allow for unlimited use and unrestricted exposure. If the results of the Five-Year Review show that remedy integrity is compromised and protection of human health is insufficient, the EPA and FDEP will evaluate additional remedial actions. No Five-Year Review will be necessary if the remedial action achieves cleanup goals within the first five years.

Community Participation

The EPA provides information to the community regarding site cleanup through fact sheets, public meetings, a local site information repository, a website, and the Administrative Record file. The EPA and FDEP encourage the community to learn more about the Site and Superfund activities conducted at the Site by visiting the EPA's website or site information repositories listed below and on page 1 of this Proposed Plan.

Public Meeting
The EPA will hold a virtual public meeting to present the Proposed Plan at 6:00 p.m. on August 16, 2022.

Written Comments
Written comments on this Proposed Plan will be accepted until August 28, 2022**.** Comments should be postmarked no later than August 28, 2022, and should be mailed or emailed to:

Rusty Kestle
Superfund & Emergency Management Division
U.S. EPA, Region 4
61 Forsyth Street
Atlanta, Georgia 30303
1-800-435-9234 or 404-562-8819
kestle.rusty@epa.gov

Mailing List
To be placed on the Site's mailing list, submit a request to the EPA project manager Rusty Kestle (contact information above) or to:

L'Tonya Spencer, Community Involvement Coordinator
U.S. EPA, Region 4
61 Forsyth Street
Atlanta, Georgia 30303
1-800-435-9234 or 404-562-8469
spencer.latonya@epa.gov

Information Repositories
Site information is available at:

The EPA's site profile page: www.epa.gov/superfund/general-dynamics-longwood

West Branch Public Library (Reference Section)
245 North Hunt Club Boulevard
Longwood, Florida 32279
407-665-1670
Visit the library's website for hours: www.seminolecountyfl.gov/locations/West-Branch-Library.stml

U.S. EPA Records Center, Region 4
61 Forsyth Street, S.W.
Atlanta, Georgia 30303
404-562-8946
Hours: Monday to Friday, 8:30 a.m. to 4:30 p.m.

GLOSSARY

Administrative Record: Material documenting the EPA's selection of cleanup remedies at Superfund sites, usually placed in the **information repository** near the Site.

Applicable or Relevant and Appropriate Requirements (ARARs): Federal and state requirements that a selected remedy must attain, which vary from site to site.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Also known as **Superfund**, CERCLA is a federal law passed in 1980 and modified in 1986 by the Superfund Amendment and Reauthorization Act (SARA). The act created a trust fund to investigate and clean up abandoned and uncontrolled hazardous waste sites. The law authorizes the federal government to respond directly to releases of hazardous substances that may endanger public health or the environment. The EPA is responsible for managing the **Superfund** program.

Contaminants of Concern (COCs): Constituents associated with a site that have been released into the environment.

Feasibility Study (FS): Study conducted after the **remedial investigation** to identify alternatives and technologies that could be applicable to site COCs.

Groundwater: The supply of fresh water found beneath the Earth's surface (usually aquifers) that is often used for supplying wells and springs.

Human Health or Ecological Baseline Risk Assessment: A qualitative and quantitative evaluation performed to define the risk posed to human health and the environment by the presence or potential presence and use of specific pollutants.

Information Repository: A library or other location where documents and data related to a **Superfund** project are placed to allow public access to the material.

Monitored Natural Attenuation (MNA): A remedial technology involving monitoring the natural attenuation processes that are actively reducing contaminant concentrations in groundwater, including biodegradation, chemical degradation, sorption, dispersion, and other processes.

Institutional Control (IC): A restriction that prevents a property owner from inappropriately developing site property. The restriction could be implemented as a restrictive covenant and is designed to prevent harm to workers or potential residents.

National Oil and Hazardous Substance Pollution Contingency Plan (NCP): The federal regulation that guides the **Superfund** program. The NCP was revised in February 1990.

Operation and Maintenance (O&M): Activities conducted at sites after cleanup remedies are in place to ensure they are functioning properly.

Proposed Plan: Public participation fact sheet that summarizes a Superfund site's preferred cleanup strategy and the rationale as well as findings of a site's **RI/FS**.

Record of Decision (ROD): A public document describing the EPA's rationale or selection of a Superfund cleanup alternative.

Remedial Investigation (RI): Part one of a two-part investigation conducted to fully assess the nature and extent of a release, or threat of a release, of hazardous substances, pollutants, or contaminants, and to identify alternatives for cleanup. The RI gathers the necessary data to support the corresponding **FS**.

Responsiveness Summary: A summary of oral and written comments received by the EPA during a comment period on key EPA documents, and the EPA's responses to those comments. The responsiveness summary is a key part of the **ROD**, highlighting community concerns for the EPA decision-makers.

Superfund: The common name used for the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (**CERCLA**), the federal law that mandates cleanup of abandoned hazardous waste sites.

GENERAL DYNAMICS LONGWOOD SUPERFUND SITE
PUBLIC COMMENT SHEET

Your input on the Proposed Plan for the General Dynamics Longwood Superfund Site helps the EPA select a remedy for the Site. Please use the space below to share your comments, then fold the sheet, add a stamp, and mail it to the EPA. A response to your comment(s) will be included in the Responsiveness Summary of the Site's ROD.

Place Stamp Here

Name _____

Address _____

City _____ State _____ Zip _____

Rusty Kestle, Remedial Project Manager
Superfund & Emergency Management Division
U.S. EPA, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303

Figure 1: Site Location

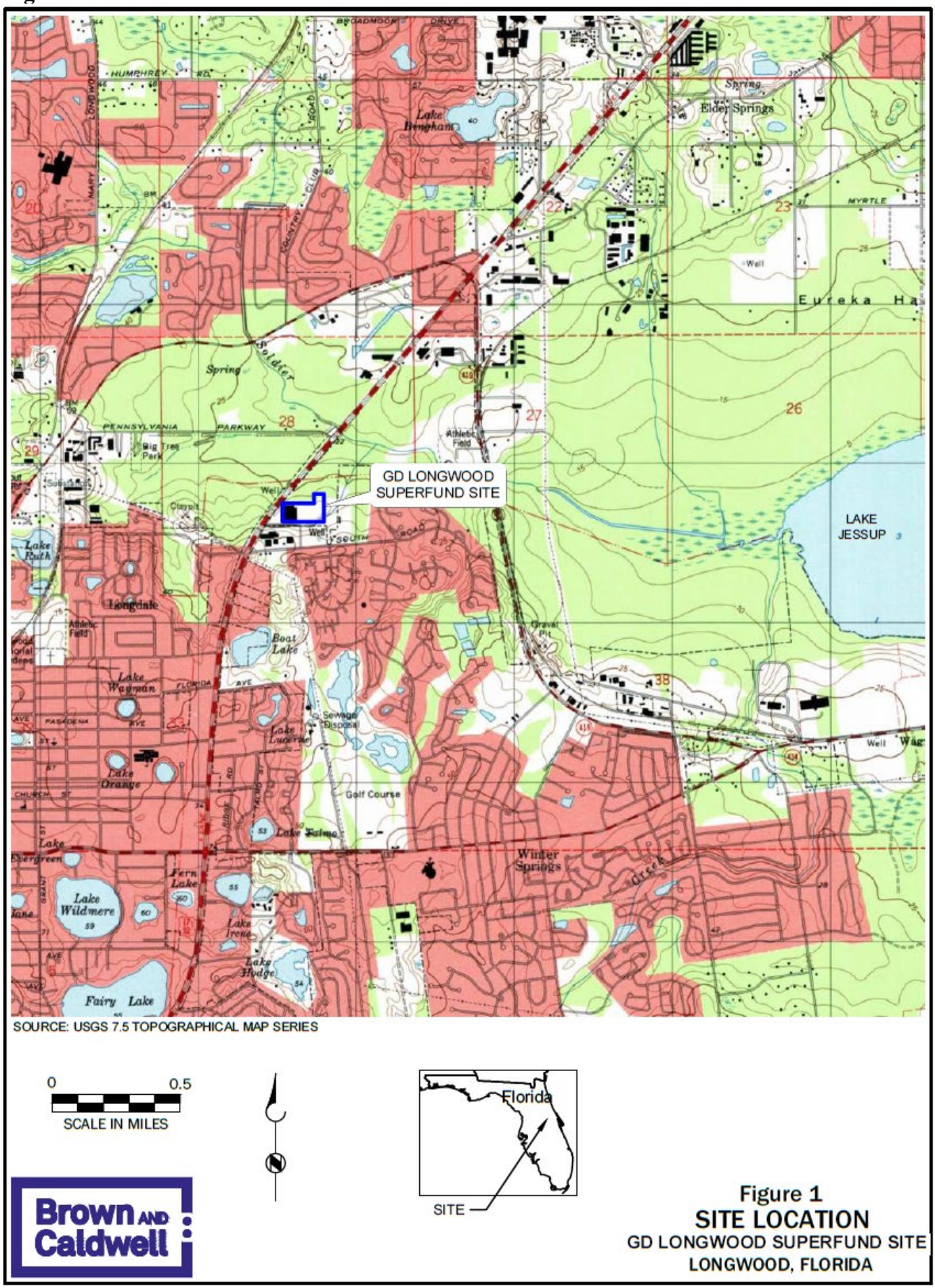


Figure 2: Site Vicinity

Figure 3: Site Plan

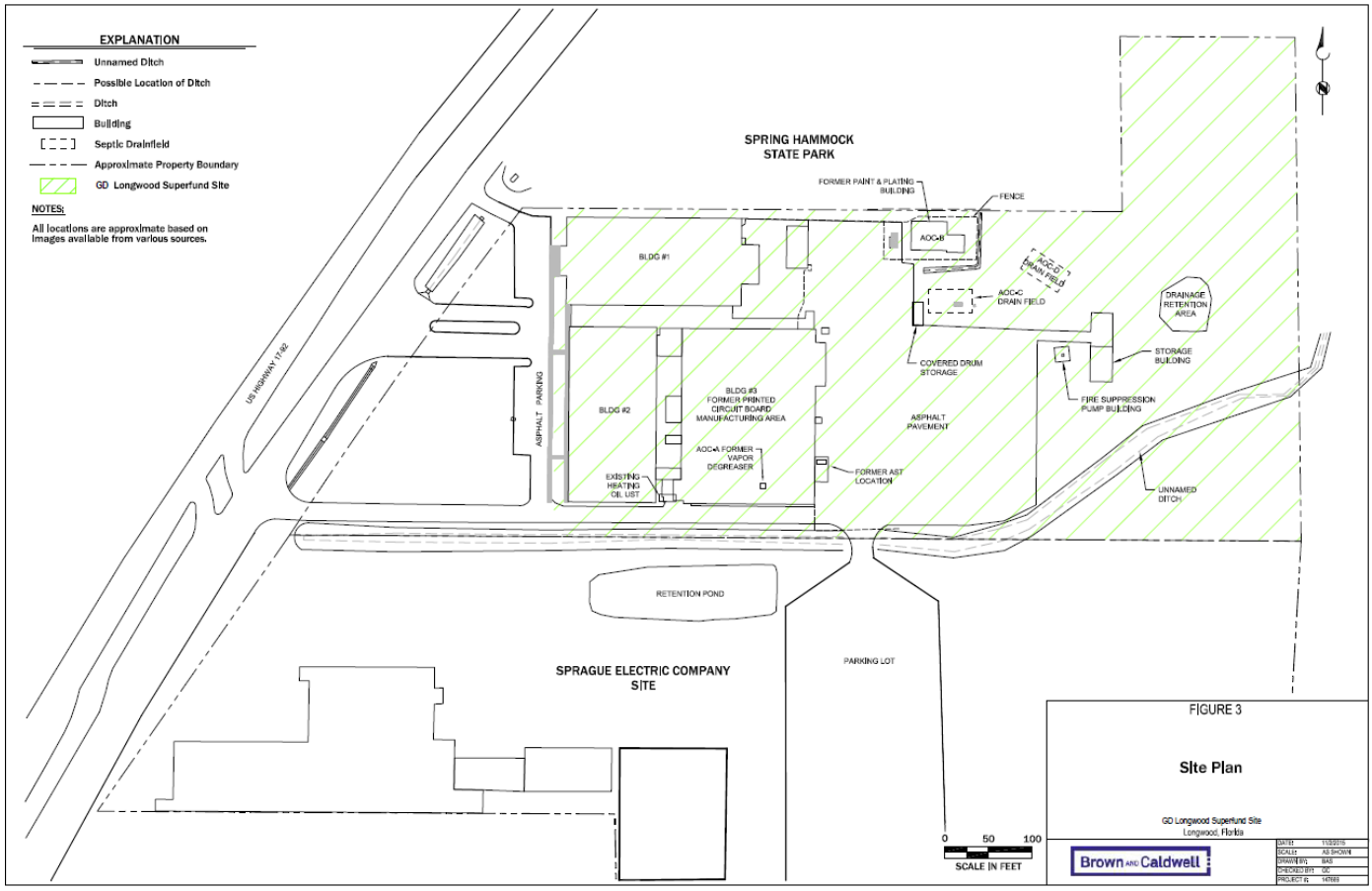


Figure 4: Concentrations of Primary VOCs and 1,4-Dioxane in Upper Surficial Aquifer (July 2021)

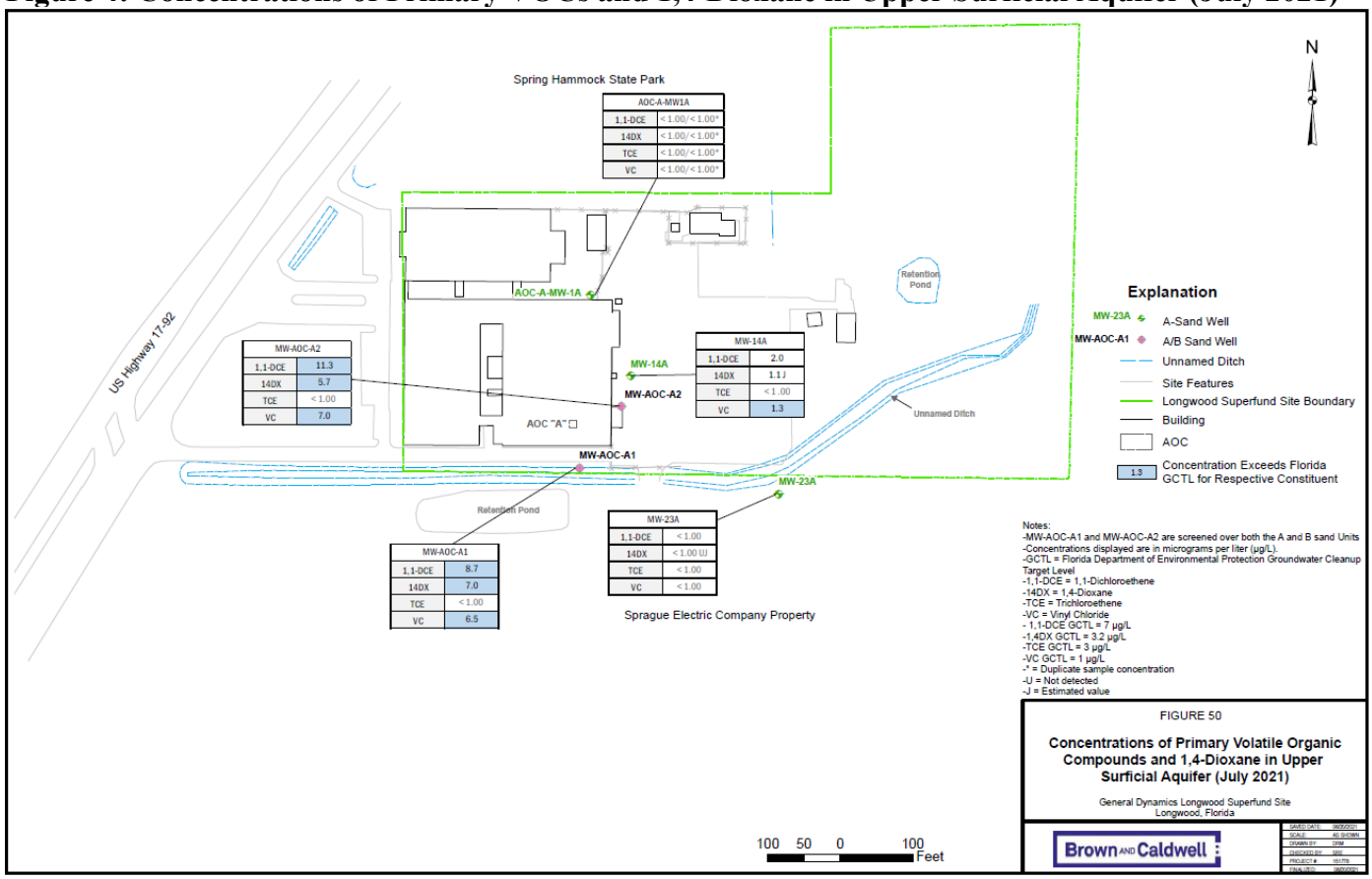


Figure 5: Concentrations of Primary VOCs and 1,4-Dioxane in Lower Surficial Aquifer (July 2021)