

**Draft Final**

**Proposed Plan  
FTG-07, Burial Site No. 1  
Fort Gillem  
Forest Park, Georgia**

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## List of Acronyms

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µg/L	micrograms per liter
APTIM	Aptim Federal Services, LLC
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BHHRA	baseline human health risk assessment
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	chemical of concern
COPEC	chemical of potential ecological concern
DCE	dichloroethene
EPA	U.S. Environmental Protection Agency
FORSCOM	U.S. Army Forces Command
Foster Wheeler	Foster Wheeler Environmental Corporation
FS	feasibility study
GA EPD	Georgia Department of Natural Resources, Environmental Protection Division
HGL	HydroGeoLogic, Inc.
HI	hazard index
HSRA	Hazardous Site Response Act
IC	institutional control
IRA	interim remedial action
IT	IT Corporation
KMnO <sub>4</sub>	potassium permanganate
mg/kg	milligrams per kilogram
MCL	maximum contaminant level
MNA	monitored natural attenuation
MOU	Major Operable Unit
MU	Manageable Unit
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NLA	North Landfill Area
North Wind	North Wind Services, LLC
O&M	operation and maintenance
OU	Operable Unit
PCB	polychlorinated biphenyl
PP	Proposed Plan

## **List of Acronyms** *(Continued)*

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RAO	remedial action objective
RI	remedial investigation
ROD	Record of Decision
RRS	Risk Reduction Standard
Shaw	Shaw Environmental, Inc.
SLERA	screening-level ecological risk assessment
SVOC	semivolatile organic compound
TAL	target analyte list
TCE	trichloroethene
TCL	target compound list
TCRA	Time-Critical Removal Action
UAO	Unilateral Administrative Order
URA	Urban Redevelopment Agency
USACE	U.S. Army Corps of Engineers
USATHAMA	U. S. Army Toxic and Hazardous Materials Agency
UU/UE	unlimited use and unrestricted exposure
VI	vapor intrusion
VOC	volatile organic compound

## **1.0 Introduction**

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The U.S. Army invites the public to review and comment on this Proposed Plan (PP), which documents the Army's Preferred Remedial Alternative that addressed environmental contamination associated with historical activities at the former Burial Site No. 1 portion of the Southeast Burial Sites (SEBS), FTG-07, at Fort Gillem, Forest Park, Georgia. The PP also summarizes environmental investigations and human health and ecological risk assessments completed to date at FTG-07.

The Army issues this PP as the lead agency under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) of 42 U.S. Code § 9601 et. seq. for cleanup at FTG-07. The Army is authorized to be the lead agency under Executive Order 12580, as amended. The response is in compliance with the Defense Environmental Restoration Program (10 U.S.C. §2701 et. seq.). The Georgia Department of Natural Resources, Environmental Protection Division (GA EPD) is the support agency and concurs with the preferred alternative. This PP was prepared in accordance with the public participation requirements of the CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) § 300.430(f)(2).

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

Environmental investigations at the SEBS began in the late 1970s and data collected for the FTG-07 study area prior to 2000 were generally collected as part of investigations completed for the entire SEBS. The most recent remedial investigation (RI) began in 2015 to delineate the extent of groundwater contamination and address remaining data gaps. In September 2014, the U.S. Environmental Protection Agency (EPA) issued a Resource Conservation and Recovery Act (RCRA) §7003 Unilateral Administrative Order (UAO) to the Army to investigate the potential for vapor intrusion (VI) from groundwater contamination underlying the property surrounding Fort Gillem. The Order required the Army to conduct a survey of all water wells and springs, sampling of any water wells and springs identified by the survey, completion of a VI study, mitigation of contamination discovered by these efforts, and public outreach. The Army conducted a VI study in 2014 and 2015 in the mostly residential, off-post buildings around Fort Gillem, including the residential off-post area southwest of FTG-07. The VI study evaluated 308 structures (104 associated with the SEBS and 204 associated with the North Landfill Area, also

referred to as FTG-01). The VI study concluded that there were no complete VI pathways for any of the 308 structures evaluated for the study and that no further action is planned (Geosyntec Consultants, 2016). Based on the summary and conclusions of the recent VI work, an aggressive schedule for remediation of groundwater was implemented to decrease the potential for further VI concerns. The schedule included continuation of the RI activities to identify potential on-post groundwater source areas that required treatment/removal to reduce on-post and off-post groundwater contamination.

Based on preliminary review of new and existing data, interim remedial actions were initiated in 2018 to address unacceptable risk from groundwater concurrently with preparation of the RI report. The groundwater interim actions were completed from January to May 2018 while the RI was being completed. As such, the results of the groundwater remedial action were not incorporated into the RI report or the feasibility study (FS) and the subsequent PP. A PP for FTG-07 was initially prepared based on the existing RI/FS reports (Aptim Federal Services, LLC [APTIM], 2020a;2020b). The PP was issued for public review (APTIM, 2020c). A public comment period was held from 22 July to 21 August 2020. No comments were received. A public meeting was not held since no comments were received from the public during the public comment period, nor was sufficient interest expressed from the public.

A subsequent RI/FS Addendum was issued that summarized the findings and conclusions of the RI conducted from 2015 to 2018, described the groundwater interim remedial action implemented from January to May 2018 to address on-post and off-post groundwater volatile organic compound (VOC) contamination associated with FTG-07, and described the remedial action alternatives that were evaluated for the FS Addendum (APTIM, 2022). The alternatives evaluation presented in the addendum included the completed remedial action as a component of the final remedy for FTG-07, where appropriate.

This revised PP, based on the RI/FS Addendum and findings of the interim remedial action, presents the preferred alternative for FTG-07 groundwater. After the public comment period, all the comments received will be evaluated. The comments will be summarized along with responses in the “Responsiveness Summary” section of the Record of Decision (ROD). The Army, in consultation with GA EPD, will present the Preferred Remedial Alternative and incorporate it into a ROD as the permanent site remedy.

Fort Gillem is in the Atlanta metropolitan area, approximately 10 miles southeast of downtown Atlanta and approximately 3 miles east of Atlanta's Hartsfield-Jackson International Airport. Fort Gillem originally occupied 1,452 acres, and the Army operated the installation under various names from 1941 to 2011. Construction started in 1940 and was mostly completed by December

1942. Fort Gillem initially operated as two installations, the Atlanta Quartermaster Depot and the Atlanta Ordnance Depot. The Army consolidated the installations on April 1, 1948 and renamed them Atlanta General Depot. In 1962, the installation name was changed to the Atlanta Army Depot.

On June 28, 1974, the Atlanta Army Depot was renamed Fort Gillem and Fort McPherson assumed administrative control. The installation was active through numerous military efforts from World War II through Operation Desert Shield/Desert Storm. The installation shared responsibility for providing the Army's needs, such as weapons and equipment, research and development, procurement, production, storage, distribution, inventory management, maintenance, and disposal of surplus and waste materials during peacetime and wartime. As a sub-post of Fort McPherson, Fort Gillem also supported the U.S. Army Forces Command (FORSCOM) readiness missions and was home for many FORSCOM and Fort McPherson activities, including the Army and Air Force Exchange Service and the Federal Emergency Management Agency.

On November 9, 2005, the U.S. Congress approved the Base Realignment and Closure (BRAC) Commission's recommendation to close Fort Gillem, and stand-down began in 2007. Closure of Fort Gillem was completed on September 15, 2011; Army operations ceased, and the base was vacated.

The Army retained 260 acres of the western portion of Fort Gillem that comprises the Fort Gillem Enclave. The remaining acreage, or "excess property," totaled approximately 1,170 acres. The Forest Park Urban Redevelopment Agency (URA) purchased the excess property in 2014. To date, approximately 936 acres have been released to the URA and are currently being developed. The remainder of the acreage purchased by URA, including FTG-07, will be released upon completion of environmental restoration activities. Based on current development at Fort Gillem and planned development, the anticipated future land use at FTG-07 is commercial/industrial (non-residential).

## **2.0 Site Background**

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FTG-07 is in the southern portion of the former Fort Gillem (Figure 1). Surrounding land use to the north and west of the installation boundary is residential. Previously known as Burial Site No. 1, the 69.57-acre site is primarily a mixture of wooded and open land that generally slopes to the south (Figure 2). The open areas were formerly used for recreation, including a garden plot, a baseball field, tennis courts, and Stephens Lake.



The topography across Fort Gillem is gently rolling, with surface elevations ranging from 855 to 971 feet above mean sea level (Figure 3). A northeast-southwest-trending ridge bisects the installation and acts as a groundwater and surface water divide. FTG-07 is located south of the northeast-southwest-trending ridge bisecting the installation; therefore, surface topography as well as surface drainage slopes gently to the south.

The locations of the burial sites within the SEBS were identified based on available disposal records from approximately 1960 through 1975 and through interviews with Fort Gillem personnel familiar with historical operations and disposal activities. No records exist for disposal activities before 1960. The U. S. Army Toxic & Hazardous Materials Agency (USATHAMA) conducted an installation assessment in 1979 and 1980 and the presumed locations of the SEBS (as well as other sites across Fort Gillem) were first presented in the assessment report (USATHAMA, 1980). The types of materials reportedly buried in the SEBS included petroleum, oil, and lubricants; rubber products (i.e., tires and gaskets); pharmaceutical wastes of unspecified origin; and food products.

FTG-07 was reportedly used for disposal of rubber products and unspecified non-biological pharmaceutical wastes in the early 1970s. It is speculated that isolated surface disposal of other wastes may have occurred as well. Anecdotal information suggests that the FTG-07 area may have also been used for infantry training. The ESI conducted by Foster Wheeler in 1995 at FTG-07 included trenching which uncovered relatively inert material, including metal pipe, medical training equipment (intravenous tubes, needles, and flow regulators), and miscellaneous construction debris (Foster Wheeler, 1996).

## **2.1 Previous Investigations**

Environmental studies and investigations at the SEBS began in the late 1970s. The previous investigative activities conducted at FTG-07 included geophysical and soil vapor surveys, trenching, soil sampling from borings and trenches, installation and sampling of temporary and permanent monitoring wells, and surface water and sediment sampling from on-post surface water features and off-post surface water features south of FTG-07. Previous studies and investigations conducted at FTG-07 include the following:

- **Expanded Site Inspection (Foster Wheeler, 1995).** The purpose of the ESI was to determine the chemical contaminants present at each of the five burial areas within the SEBS (FTG-02, FTG-07, FTG-08, FTG-09, and FTG-10), the hydrogeological characteristics of the area, and the potential contaminant migration pathways. Included in the investigation were geophysical and soil vapor surveys, soil sampling in soil borings and trenches, and permanent and temporary monitoring well installations. Surface water, sediment, soil, and groundwater samples were collected for laboratory analyses.

The geophysical survey conducted at FTG-07 identified several geophysical anomaly areas that were suggestive of isolated, near-surface disposal practices. The passive soil vapor survey identified a series of soil vapor anomalies which formed a long linear pattern; the elongated pattern was aligned with several of the geophysical anomalies and appeared to coincide with a topographic low. Soil borings and trenches were completed at the locations of the anomalous features identified by the geophysical survey and/or passive soil vapor survey. Six trenches were completed within FTG-07. Waste materials were encountered in two of the six trenches, consisting of only a 3-foot metal pipe from one trench and medical training equipment (intravenous tubes, needles, and flow regulators) and miscellaneous construction debris (wood and wire fragments) from another trench. Miscellaneous construction debris were also observed on the ground surface during clearing for one soil boring. No other evidence of debris or buried waste was found at FTG-07.

Soil, groundwater, surface water, and sediment samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and metals. Select samples were also analyzed for herbicides and cyanide. Soil and sediment data were compared to GA EPD Hazardous Site Response Act (HSRA) Type 3 Risk Reduction Standards (RRSs). Groundwater data were compared to the values contained in Appendix III, Table 3 of the HSRA rules. Surface water data were compared to the criteria contained in Chapter 391-3-6-.03, *Water Use Classification and Water Quality Standards*.

- ***FTG-07/10 Remedial Investigation and Baseline Risk Assessment (IT and HGL and Shaw)***. The data set evaluated for the FTG-07/10 RI conducted by IT and HGL and Shaw incorporated soil, groundwater, surface water, and sediment data collected from 1999 to 2007 as well as the data collected by Foster Wheeler in 1995. Analytical parameters included VOCs, SVOCs, pesticides/polychlorinated biphenyls (PCB), and metals. Select samples were also analyzed for herbicides and cyanide. Soil and sediment data were compared to the 2004 EPA Region 9 residential preliminary remediation goals (PRG) (the nomenclature for the PRGs was subsequently revised to regional screening levels [RSL]). Groundwater data were compared to the 2004 EPA Region 9 tap water PRGs and the 2006 maximum contaminant levels (MCL). Surface water data were compared to ambient water quality criteria for human health-consumption of water and organisms. Metals and pesticide data were also compared to Fort Gillem-specific background values.
- ***Environmental Condition of Property (ECP) (Shaw, 2006)***. The ECP evaluated the area to the north of the FTG-07 groundwater plume, and no apparent source was identified. Buildings 309, 310, and 312 are located just to the north of FTG-07.
- ***FTG-07/10 Revised Remedial Investigation (North Wind)*** North Wind collected soil, groundwater, surface water, and sediment samples from 2012 to 2013 to address GA EPD comments regarding the previous RI report prepared by HGL and Shaw in 2008. Analytical parameters included VOCs, SVOCs, pesticides/PCBs, and the target analyte list (TAL) metals hexavalent chromium and calculated trivalent chromium. Soil and sediment data were compared to residential soil RSLs.

Groundwater data were compared to MCLs or to tap water RSLs if an MCL is not established. Surface water data were compared to Georgia Instream Water Quality Standards or National Ambient Water Quality Standards. Metals and pesticide data were also compared to Fort Gillem-specific background values.

- **Vapor Intrusion (VI) Study (Geosyntec Consultants).** In September 2014, the EPA issued a Resource Conservation and Recovery Act §7003 Unilateral Administrative Order (UAO) to the Army to investigate the potential for VI from groundwater contamination underlying the property surrounding Fort Gillem. The Order required the Army to conduct a survey of all water wells and springs, sampling of any water wells and springs identified by the survey, completion of a VI study, mitigation of contamination discovered by these efforts, and public outreach. The Army conducted a VI study in 2014 and 2015 in the mostly residential, off-post buildings around Fort Gillem, including the residential off-post area north of FTG-01. The VI study evaluated 308 structures (104 associated with the Southeast Burial Sites and 204 associated with the NLA). The VI study concluded that there were no complete VI pathways for any of the 308 structures evaluated for the study and that no further action is planned (Geosyntec Consultants, 2016).
- **RI (Aptim Federal Services, LLC [APTIM]).** APTIM conducted an RI from 2015 to 2018 to complete the delineation of the nature and extent of contamination at FTG-07. The RI included the collection of soil, groundwater, surface water, and sediment samples. The analytical parameters included target compound list (TCL) VOCs, TCL SVOCs, TCL pesticides/PCBs, and TAL metals. The soil and sediment data were compared to industrial and residential regional screening levels. Groundwater data were compared to tap water regional screening levels. Surface water data were compared to Georgia Instream Water Quality Standards or National Ambient Water Quality Standards. Metals and pesticide data from soil were also compared to Fort Gillem-specific background values. The FTG-07 RI was interrupted to respond to the 2014 RCRA §7003 UAO involving off-post exposure to VI. The CERCLA RI activities were resumed in 2015. Although the UAO work concluded there were no VI risks associated with VOCs migrating off post, the resumed RI activities identified the need for interim remedial action to address groundwater contamination at FTG-07.
- **RI/FS Addendum (HGL-Aptim Applied Science and Technology).** As noted above, the FTG-07 RI began in 2015. Based on preliminary review of new and existing data, interim remedial action (further discussed in Section 2.2 below) was initiated in 2018 to address unacceptable risk from groundwater concurrently with preparation of the RI report. As such, the results of the groundwater remedial action were not incorporated into the RI report or the FS. However, the remedial action was consistent with alternatives proposed in the FS. Therefore, the RI/FS Addendum summarized the findings and conclusions of the RI conducted from 2015 to 2018, described the remedial action implemented to address on-post groundwater VOC contamination associated with FTG-07, and described the remedial action alternatives that were evaluated for the FS. The alternative evaluations presented in the addendum included the completed interim remedial action as a component of the final remedy for FTG-07, where appropriate (APTIM, 2022).

## **2.2 Remedial Actions Completed to Date**

Prior to 2018, no remedial actions were conducted within the FTG-07 site boundary. Soil excavations were conducted north of FTG-07 in the vicinity of former Buildings 310 and 312 to address pesticide, metals, and petroleum hydrocarbon contamination.

**2018-2021 Groundwater Interim Actions.** The FTG-07 RI was interrupted in order to respond to the 2014 RCRA §7003 UAO involving off-post exposure to VI. The CERCLA RI activities were resumed in 2015. Although the UAO work concluded there were no VI risks associated with VOCs migrating off post, the resumed RI activities identified the need for additional interim remedial action to address groundwater contamination at FTG-07. An interim action was implemented in 2018 while the RI was being completed. The interim action consisted of Enhanced Bioremediation. The remedial activities should have been implemented under a TCRA, in accordance with 40 CFR 300.415(b), however they were implemented under a continuation of the RCRA UAO response. APTIM implemented the interim action to address off-post and on-post VOC groundwater contamination associated with FTG-07. Enhanced bioremediation included a combination of a carbon source in the form of emulsified vegetable oil, microbial nutrients, and a bioaugmentation culture, which were injected into the aquifer by direct-push technology. On-post enhanced bioremediation activities consisted of the injection of 1,494,963 gallons of amendment solution to create eight biobarriers. Post-injection performance monitoring was conducted from 2018 to 2021 to evaluate the effectiveness of the groundwater remedial actions. Figures 4 and 5 illustrate the overburden and partially weathered rock groundwater plume footprints for pre-and post-interim action, respectively.

## **3.0 Site Characteristics**

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Surface soil, subsurface soil, groundwater, surface water and sediment samples have been collected at FTG-07 during various investigation from 1995 to 2018. The summary below is based upon the most recent samples collected from 2015 to 2018.

**Soil.** The RI soil sampling did not identify areas of soil contamination that required further investigation or remedial action, which was consistent with the findings of previous investigations (APTIM, 2020a).

**Groundwater.** The groundwater sampling results indicate that the primary contaminants present in FTG-07 groundwater were 1,1,2,2-tetrachlorethane (TeCA) and its abiotic daughter product trichloroethene (TCE). Other VOCs present in FTG-07 groundwater above screening criteria included 1,1,2-trichlorethane, tetrachloroethene, cis-1,2-dichloroethene (DCE), chloroform, trans-1,2-DCE, and vinyl chloride (VC). Contamination occurs in the overburden,

partially weathered rock, and bedrock zones. The largest plume footprints are in the overburden/partially weathered bedrock (APTIM, 2020a).

Prior to implementation of the interim remedial actions, concentrations of TeCA and TCE in the FTG-07 groundwater plume remained relatively stable or showed some evidence of a decreasing trend over time. This suggested that the plume was stable and likely the result of an old release or releases. The comparatively low VOC concentrations in 2018 baseline groundwater samples (maximum TCE concentration of 190 µg/L and maximum TeCA concentration of 170 µg/L), the lack of evidence of increasing trends in the majority of the monitoring wells at FTG-07, and the absence of VOCs in soil indicate that there is not a current source to groundwater.

Enhanced bioremediation was implemented as an interim measure for on-post groundwater treatment of VOC contamination in 2018. On-post groundwater enhanced bioremediation activities at FTG-07 included injecting emulsified vegetable oil, a dechlorinating microbial culture, and microbial nutrients into groundwater in a series of on-post biobarriers.

The enhanced bioremediation treatment was effective, as shown by the occurrence of active bioremediation via enhanced reductive dichlorination (Figure 4 and Figure 5). The overall FTG-07 plume area was reduced by approximately 25 percent between 2018 pre-injection baseline concentrations and 2021 post-injection conditions based on the 5 µg/L contour. Reductions were also observed in the areal extent of the TCE plume greater than 50 µg/L (78 percent) and 100 µg/L (100 percent) While enhanced bioremediation has significantly reduced contaminant concentrations in on-post groundwater, the concentrations remain above risk reduction standards and unlimited use and unrestricted exposure (UU/UE) conditions have not been met.

**Surface Water.** Surface water has been impacted by TeCA and TCE where contaminated groundwater discharges to the surface water drainage features. TeCA and TCE have been detected in historical and recent surface water samples at concentrations above screening criteria. The TeCA and TCE concentrations decrease downstream and downgradient of the groundwater plume boundaries. Sporadic detections of SVOCs, pesticides, and metals have exceeded screening criteria (APTIM, 2020a).

**Sediment.** The current sediment data indicate that there have been minimal impacts to sediment. VOCs, SVOCs, pesticides, polychlorinated biphenyls, and metals were only sporadically detected in historical sediment samples at concentrations above screening criteria. Screening criteria exceedances in recent sediment samples consisted of one detection of the pesticide dieldrin and one to two detections each of the metals aluminum, arsenic, iron, and vanadium (APTIM, 2020a).

## **4.0 Scope and Role of Response Actions**

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This PP is for Installation Restoration Program site FTG-07 at the former Fort Gillem and includes both the on-post and off-post areas of the plume. Soil, groundwater, surface water, and sediment samples were collected during investigations conducted at FTG-07 from 1995 to 2018 to define the extent of contamination. Based on VOC concentrations detected in on-post and off-post groundwater above screening criteria, remedial actions were warranted.

## **5.0 Summary of Site Risks**

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A risk assessment was conducted for FTG-07 in 2019 that included a BHHRA and a SLERA.

The 2019 BHHRA (40 CFR 300.430[d][4]) evaluated exposure to a commercial worker; construction worker; hypothetical on-post residential receptor; adult sportsman and adult, child, and youth recreationist as plausible receptors for FTG-07. Although on-post residential use is not a plausible scenario, the BHHRA also evaluated exposure to the hypothetical on-post residential receptor for information purposes. Media to which the commercial worker and construction worker and hypothetical on-post residential receptor were hypothetically exposed included surface soil, shallow subsurface soil, deeper subsurface soil, and groundwater hypothetically developed as a potable source. A youth recreationist was assumed to be exposed to surface water present both on and off post and to fish caught from surface water at FTG-07. An adult sportsman was also evaluated for exposure to contaminants in surface water through consumption of fish.

Risk-based screening did not identify chemicals of potential concern for soil; therefore, it was not necessary to carry soil through the quantitative BHHRA. The concentrations of several chemicals of concern (COC) in groundwater exceeded the EPA's unacceptable risk level and the HI.

The cancer risk for exposure to groundwater for the on-post industrial receptor exceeded the EPA risk management range. The cancer risk for exposure to groundwater for the off-post residential receptor was within the EPA risk management range. The Hazard Index (HI) estimate from the exposure to groundwater for the on-post industrial receptor exceeded the threshold level. The HI estimate from the exposure to groundwater for the off-post residential was below the threshold level. In addition, several VOCs exceeded EPA standards. However, the off-post receptor pathway is incomplete because all residents within or near the plume are on municipal water.

Cancer risk for the youth recreationist was within the EPA risk management range and below the threshold level. For the adult sportsman scenario, cancer risk exceeded the EPA risk management range and the HI estimate exceeded the threshold level. However, the sampling locations where the surface water COCs were detected were in an on-post ephemeral surface water drainage feature that does not contain fish, which makes the fish ingestion exposure scenario implausible. In addition, access to those on-post locations for hypothetical wading and fishing will be restricted by the future industrial use scenario at Fort Gillem. Based on the absence of fish and access restrictions to the ephemeral surface water drainage feature, remedial actions for surface water were not warranted.

The SLERA (40 CFR §300.430[d][1]) concluded that the results of the community-level assessments and food chain assessment for FTG-07 indicated that the initial food chain chemicals of potential ecological concern (COPEC) and direct contact COPECs were determined to be of low concern and unlikely to impact ecological receptors. No further action was recommended for COPECs in surface soil, sediment, and surface water.

The SLERA (40 CFR 300.430[d][1]) concluded that there may be potential risks to aquatic receptors from direct contact exposure to dieldrin in sediment and lead in surface water under current conditions. Several other chemicals were determined to be of low concern and unlikely to adversely impact ecological receptors. The fact that some chemicals were classified as having potential risks did not suggest that adverse ecological effects were occurring due to exposure to them, that they were contaminants originating from FTG-07, or that further evaluation for ecological purposes alone was necessary. Future land use of the site as a commercial/industrial complex would reduce the usable habitat at the site and subsequently reduce exposure to any remaining contaminants and greatly eliminate concern for adverse effects to ecological populations.

## **6.0 Remedial Action Objectives**

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Remedial action objectives (RAO) are medium-specific goals for protecting human health and the environment. RAOs provide the basis for the identification, detailed analysis, and selection of remedial alternatives.

The RAOs developed for the protection of human health and the environment specified the following:

- Environmental media to be addressed
- Relevant exposure routes and receptors

- Chemical concentration limits specific to COCs and environmental media, referred to as remedial goals, if any.

As previously noted, no chemicals of potential concern were identified for soil and thus, soil concentrations do not pose an unacceptable risk above the selected remediation goals for future land use. Therefore, the only environmental medium that needs to be addressed at FTG-07 is groundwater. The relevant exposure routes were ingestion, inhalation, and dermal contact with contaminated groundwater. Relevant receptors included residential, commercial/industrial, and construction receptors. Based on these three criteria, the RAOs for groundwater at FTG-07 included the following:

For human health protection:

- Prevent ingestion, inhalation, and dermal contact with groundwater containing COCs above remedial goals (Type 1 residential RRS values for off-post residential receptors and Type 3 nonresidential RRS values for on-post commercial/industrial receptors).

For environmental protection:

- Control migration of the plume in the aquifer.

The groundwater COCs for residential off-post receptors and their respective Type 1 RRS values were as follows:

- 1,1,2,2-Tetrachloroethane– 0.8 micrograms per liter ( $\mu\text{g/L}$ )
- cis-1,2-Dichlorethene– 70  $\mu\text{g/L}$
- Trichloroethene – 5  $\mu\text{g/L}$
- Vinyl chloride – 2  $\mu\text{g/L}$ .

The groundwater COCs for commercial/industrial on-post receptors and their respective Type 3 RRS values were as follows:

- 1,1,2,2-Tetrachloroethane– 3.3  $\mu\text{g/L}$
- cis-1,2-Dichlorethene– 70  $\mu\text{g/L}$
- Trichloroethene – 5  $\mu\text{g/L}$
- Vinyl chloride – 2  $\mu\text{g/L}$ .

## **7.0 Evaluation of Remedial Alternatives**

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The FTG-07 RI/FS Addendum (APTIM, 2022) evaluated remedial action alternatives for groundwater contamination at the site. Implementation of remedial alternatives was necessary to



address VOCs in groundwater, primarily TeCA and TCE, to protect human health and the environment.

The RI/FS Addendum identified potential remedial action technologies for groundwater followed by a screening of the alternatives for detailed analysis. The detailed analysis included the No Action alternative and two active remedial action alternatives.

The No Action general response action was evaluated as required by the NCP (40 CFR 300.430[e][6]). This alternative provided a comparative baseline against which other alternatives can be evaluated. Under this alternative, no remedial action will be conducted. The contaminants are left in place without implementing any containment, removal, treatment, or other mitigating actions. For the No Action alternative, reductions in groundwater contaminant concentrations will not be expected other than those resulting from natural processes. The No Action alternative does not provide for access control actions taken to reduce the potential for contaminant exposure.

The alternatives retained and evaluated in the detailed analysis included:

- Alternative 1: No Action – Required by the NCP to be carried forward as a baseline for detailed comparison.
- Alternative 2: Monitored Natural Attenuation (MNA) and Institutional Controls (IC) – MNA consists of implementation of a monitoring program to track natural attenuation processes and their effectiveness in achieving RAOs for a site. Natural attenuation is defined as a variety of physical, chemical, and biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume or concentration of contaminants in groundwater.

ICs applicable to on-post groundwater use include municipal water supply, deed covenants restricting groundwater use if the Army-controlled property is transferred, and groundwater monitoring to achieve protection of human health and the environment and compliance with all legal requirements. ICs will remain in place until UU/UE conditions are met.

On-post groundwater receptors have been provided with municipal water to eliminate potential exposure to contaminated groundwater. Use of groundwater is prohibited on Army-controlled property overlying groundwater with concentrations exceeding federal maximum contaminant levels (MCL) through deed covenants at the time of property transfer until RAOs are met. On-post groundwater monitoring will be conducted until RAOs are met. As such, groundwater use restrictions will be described in a post-ROD Remedial Design/Remedial Action Land-Use Control Implementation Plan and will be finalized prior to transferring property. The Army is responsible for implementing, maintaining, monitoring, and enforcing the ICs, unless the Army transfers these responsibilities to another party by contract, property

transfer agreement, deed or other legal means. However, the Army shall retain ultimate responsibility for remedy implementation and protectiveness.

ICs applicable to off-post groundwater downgradient of FTG-07 include verification of the municipal water supply, public education outreach, periodic well surveys, and groundwater monitoring until groundwater concentrations meet federal MCLs. ICs will remain in place until UU/UE conditions are met.

Off-post groundwater receptors have been provided with municipal water to eliminate potential exposure to contaminated groundwater. Public education outreach conducted by the Army has included fact sheets, newspaper advertisements, public meetings, and social media. In addition, the Army has conducted off-post well surveys to assure that there are no off-post withdrawals or use of potentially contaminated groundwater. Thus, the off-post exposure pathway is already mitigated, and the Army will include assessment of this pathway through 5-Year Reviews, community notifications, and periodic consultation with the County Health Department. The Army will continue to conduct off-post groundwater monitoring until RAOs are met.

- Alternative 3: Enhanced Bioremediation with MNA and ICs – A process that accelerates the natural biodegradation process of contaminants by providing amendments, including nutrients, carbon that provides metabolic and hydrogen sources, and contaminant degrading microorganisms that may otherwise be limiting factors in the conversion of organic contaminants to innocuous end products. Amendments are injected into groundwater, often as a series of permeable biobarriers oriented perpendicular to groundwater flow direction. Typical carbon sources injected into the aquifer are commercially available hydrogen release compounds, molasses, sodium lactate, and emulsified vegetable oil. The Enhanced Bioremediation injections occurred during the interim remedial actions under the RCRA UAO continuation response. This alternative does not consider additional injections.

Sufficient data have been collected to determine that FTG-07 aquifer conditions are favorable for MNA, based upon the presence of TeCA and TCE daughter products (cis-1,2-DCE and vinyl chloride) that indicate natural degradation is occurring. However, the most recent concentrations of TeCA (120 µg/L) and TCE (100 µg/L) detected in on-post groundwater suggest that it is highly unlikely that groundwater cleanup objectives (reduction of VOC concentrations to meet Type 1 RRS [off-site] and Type 3 RRS [on-site]) could be achieved in a reasonable time frame by MNA as a stand-alone remedial alternative.

ICs applicable to on-post groundwater use include municipal water supply, deed covenants restricting groundwater use when the Army-controlled property is transferred, and groundwater monitoring to achieve protection of human health and the environment and compliance with all legal requirements. ICs will remain in place until UU/UE conditions are met.

On-post groundwater receptors have been provided with municipal water to eliminate potential exposure to contaminated groundwater. Use of groundwater is prohibited on

Army-controlled property overlying groundwater with concentrations exceeding federal MCLs through deed covenants at the time of property transfer until RAOs are met. On-post groundwater monitoring will be conducted until RAOs are met. As such, restrictions prohibiting on-post residential use and groundwater use will be described in a post-ROD Remedial Design/Remedial Action Land-Use Control Implementation Plan and finalized prior to transferring property. The Army is responsible for implementing, maintaining, monitoring, and enforcing the ICs, unless the Army transfers these responsibilities to another party by contract, property transfer agreement, deed, or other legal means. However, the Army shall retain ultimate responsibility for remedy implementation and protectiveness.

ICs applicable to off-post groundwater downgradient of FTG-07 included municipal water supply, public education outreach, periodic well surveys, and groundwater monitoring until groundwater concentrations meet federal MCLs. ICs will remain in place until UU/UE conditions are met.

Off-post groundwater receptors have been provided with municipal water to eliminate potential exposure to contaminated groundwater. Public education outreach conducted by the Army has included fact sheets, newspaper advertisements, public meetings, and social media. In addition, the Army has conducted off-post well surveys to assure that there are no off-post withdrawals or use of potentially contaminated groundwater. Thus, the off-post exposure pathway is already mitigated, and the Army will include assessment of this pathway through 5-Year Reviews, community notifications, and periodic consultation with the County Health Department. The Army continues to conduct off-post groundwater monitoring until RAOs are met.

The detailed analysis of each of the retained remedial action alternatives was conducted in accordance with *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA, 1988) and the NCP (40 CFR 300.430[e][9]). The detailed analysis phase includes the evaluation of remedial action alternatives against nine criteria. The evaluation criteria are divided into three categories: threshold criteria, primary balancing criteria, and modifying criteria. Threshold criteria (overall protection of human health and compliance with applicable or relevant and appropriate requirements [ARAR]) must be met for an alternative to be viable for selection in the ROD. Primary balancing criteria (long-term effectiveness and permanence; short-term effectiveness; reduction of toxicity, mobility, or volume through treatment; implementability; and cost, including capital, operation and maintenance [O&M], and present value costs) forms the basis for comparing alternatives to site-specific conditions. Modifying criteria (state acceptance and community acceptance) will be addressed in the ROD after this PP is completed by incorporating state support agency (GA EPD) review comments and community feedback from the 30-day public comment period.

Enhanced Bioremediation will be the recommended remedial alternative for FTG-07 groundwater. Table 1 presents the evaluated alternatives, estimated costs, and a summary of the evaluation.

In conformance with the NCP (40 CFR 300.430[e][9][iii][A]-[I]), seven evaluation criteria were used during the detailed analysis:

### **1. Overall Protection of Human Health and the Environment**

- Enhanced bioremediation reduced current and future risk posed to human health and the environments through elimination and reduction of contaminated groundwater. In addition, it continues to mitigate the potential for further downgradient migration of contaminated groundwater by reducing contaminant volumes and concentrations. Performance monitoring will be implemented to track the progress of the enhanced bioremediation.

### **2. Compliance with ARARs**

- Relevant ARARs will be met under this remedial alternative, as the contaminated groundwater in target treatment areas will be treated and monitored in the short term. Remediation of contaminated groundwater by this alternative would mitigate the potential migration of the plume.

### **3. Long-Term Effectiveness and Permanence**

- Enhanced bioremediation is reliable and effective in protecting human health and the environment in the long term because the biologically mediated treatment is permanent. A significant mass of VOCs in groundwater is already remediated and the natural attenuation processes will follow.

### **4. Short-Term Effectiveness**

- The enhanced bioremediation injections have already occurred, therefore there are no limitations for short-term effectiveness. No significant short-term environmental impacts or potential disruption of ecosystems were observed.

### **5. Reduction in Toxicity, Mobility, and Volume Through Treatment**

- Enhanced bioremediation has reduced the toxicity, mobility, and volume of contaminated groundwater because biologically mediated treatment of VOCs is permanent, resulting in their destruction.

### **6. Implementability**

- The injection portion of enhanced bioremediation has already been implemented. The remainder of this alternative is the MNA and easily implemented.

## 7. Cost, Including Capital, O&M, and Present Value Costs

- The estimated cost of enhanced bioremediation is \$2,303,000, which is approximately 18 percent less than the cost of MNA. It is estimated that implementation of enhanced bioremediation will reach RAOs in approximately 15 years, whereas MNA is estimated to require 30 years or more to achieve RAOs.

The comparative analysis in the FS Addendum (APTIM, 2022) used the results of the detailed analysis to select the best overall remedial action alternative for groundwater at FTG-07. The selection of the best alternatives depended on effectiveness, time frame to achieve RAOs, and cost.

## 8.0 Preferred Alternative

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The Army's Preferred Remedial Alternative for the FTG-07 site is Enhanced Bioremediation with MNA and ICs, to restrict residential use and groundwater use.

The enhanced bioremediation alternative consists of the injection of amendments, including emulsified vegetable oil, a dechlorinating microbial culture, buffer, and microbial nutrients into the aquifer to enhance the biodegradation of VOCs in groundwater. The amendments were injected by direct-push technology to create a series of biobarriers perpendicular to the direction of groundwater flow. The injections took place during the initial RI period and are complete.

The performance monitoring component of the alternative evaluates the effectiveness of the remedy after implementation of amendment injection. The MNA component of the alternative will provide five years of data to track post-treatment natural attenuation of VOCs in groundwater. ICs will remain in place until RAOs are achieved and UU/UE conditions are met. ICs for on-post Army-controlled property include municipal water supply, restricting groundwater use through deed covenants and groundwater monitoring. ICs for off-post receptors include municipal water supply, public education outreach, periodic well surveys to document there are no unauthorized groundwater withdrawals and groundwater monitoring. Based on an evaluation of FTG-07 groundwater data and field-demonstrated biodegradation rates, it is expected that RAOs will be reached in approximately 15 years.

Based on information currently available, the lead agency believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The Army 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. Because chemicals in on-post and off-post groundwater remain at the site above concentrations that allow for UU/UE, a CERCLA § 121(c) review will be conducted every five years until the site contamination reaches concentrations that are safe for UU/UE. The Preferred Remedial Alternative can change in response to public comments or new information.

## **9.0 Support Agency Comments**

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The GA EPD has reviewed the results of the historical studies, the RIs, and the FS reports for FTG-07. GA EPD has consulted with the Army concerning the Preferred Remedial Alternative selected for FTG-07. It is anticipated that GA EPD will concur with the Preferred Remedial Alternative for FTG-07.

## **10.0 Community Participation**

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Public participation is an important part of selecting the final remedy. The public is encouraged to submit written comments to the Army within the 30-day public comment period. The Army will review all written comments prior to finalizing the remedy selection in the ROD for FTG-07. All public comments and associated responses will be included in the Responsiveness Summary Section of the ROD.

### **10.1 Information Repositories**

This PP for FTG-07 is part of the Fort Gillem administrative record and available for review on the USACE Savannah's Web site link that will be provided in the *Atlanta Journal-Constitution* prior to the public comment period.

### **10.2 Public Meeting**

The Army will schedule a public meeting, should the public express interest. The public will be notified of the date, time, and location through a notice in the *Atlanta Journal-Constitution*.

### **10.3 Public Comment Period**

The public comment period for the FTG-07 PP will run from February 7, 2023 to March 8, 2023.

Please submit all written comments to Mr. Tom Lineer via e-mail at [thomas.a.lineer.civ@army.mil](mailto:thomas.a.lineer.civ@army.mil).

Comments received at the public meeting (if scheduled) and during the comment period will be considered in the selection of the final remedy. These comments will be addressed in the responsiveness summary section of the ROD for FTG-07. If the GA EPD concurs with Preferred

Remedial Alternative selected in the FTG-07 PP, the FTG-07 ROD will document the permanent site remedy for FTG-07 groundwater.

#### Contact for More Information

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(404) 657-8604  
Kim.Hembree@dnr.ga.gov

## **11.0 References**

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Aptim Federal Services, LLC (APTIM), 2022, *Final Remedial Investigation and Feasibility Study Addendum, FTG-07, Burial Site No. 1, Fort Gillem, Forest Park, Georgia*, September.

Aptim Federal Services, LLC (APTIM), 2020a, *Final Remedial Investigation Report, FTG-07, Burial Site No. 1, Fort Gillem, Forest Park, Georgia*, May.

Aptim Federal Services, LLC (APTIM), 2020b, *Final Feasibility Study Report, FTG-07, Burial Site No. 1, Fort Gillem, Forest Park, Georgia*, June.

Aptim Federal Services, LLC (APTIM), 2020c, *Final Proposed Plan, FTG-07, Burial Site No. 1, Fort Gillem, Forest Park, Georgia*, August.

Foster Wheeler Environmental Corporation (Foster Wheeler), 1996, *Expanded Site Inspection of the Southeast Burial Sites*.

Geosyntec Consultants, 2016, *Volume I Vapor Intrusion Investigation for the Southeast Burial Site (SEBS), United States Army Corps of Engineers, Savannah District (USACE), Fort Gillem, Forest Park, Georgia*, March

U. S. Army Toxic and Hazardous Materials Agency (USATHAMA), 1980, *Installation Assessment of Fort Gillem, Report No. 167*, March.

U.S. Environmental Protection Agency (EPA), 1988, *Guidance for Conduction Remedial Investigations and Feasibility Studies Under CERCLA*, Interim Final, Office of Solid Waste and Emergency Response, Washington, D.C., EPA/540/G-89/004, OSWER Directive 9355.01, October.

# TABLE



Table 1

Rationale for Recommended Remedial Action Alternatives  
 FTG-07 Proposed Plan  
 Fort Gillem, Forest Park, Georgia

	Evaluated Alternatives	Total Capital and Present Worth Costs	Evaluation Summary
Groundwater	No Action	\$0	Will not be protective of human health and the environment.
	Monitored Natural Attenuation and Institutional Controls	Capital Cost: \$452,700 Present Worth of Annual O&M: \$2,342,500 Total: \$2,795,000	Monitored natural attenuation as a stand-alone remedy is unlikely to achieve RAOs in a reasonable time frame. Institutional controls will remain in place until groundwater contaminant concentrations are below RAOs and UU/UE conditions are met. Estimated time frame to achieve RAOs and UU/UE is 30 years or more.
	<b>Enhanced Bioremediation with Monitored Natural Attenuation and Institutional Controls</b>	Capital Cost: \$1,607,000 Present Worth of Annual O&M: \$695,800 Total: \$2,303,000	Destruction of VOCs in off-post groundwater by enhanced bioremediation will reduce contaminant concentrations to be protective of human health and the environment. The alternative also includes Monitored Natural Attenuation and Institutional Controls until groundwater contaminant concentrations are below RAOs and UU/UE conditions are met. Estimated time frame to achieve RAOs and UU/UE is 15 years, based on an evaluation of FTG-07 groundwater data and field-demonstrated biodegradation rates.

**Bolding indicates the recommended remedial action alternative.**

O&M - Operation and maintenance.

RAO - Remedial action objective.

UU/UE - Unlimited use and unrestricted exposure.

VOC - Volatile organic compound.

## FIGURES

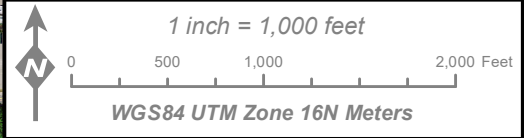
2018 Aerial Photograph



**Legend**

- ~ Stream
- FTG-07
- Other Environmental Sites
- Economic Development Parcels
- Gillem Enclave
- Fort Gillem Boundary

**Figure 1**  
**FTG-07**  
**Site Location Map**  
 Fort Gillem  
 Forest Park, Georgia



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Source: Esri, Maxar, Earthstar, GeoEye, IGN, GeoEye, and the USGS

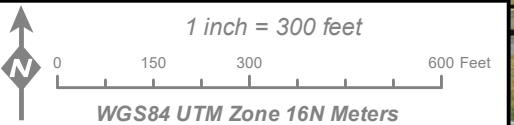
2018 Aerial Photo



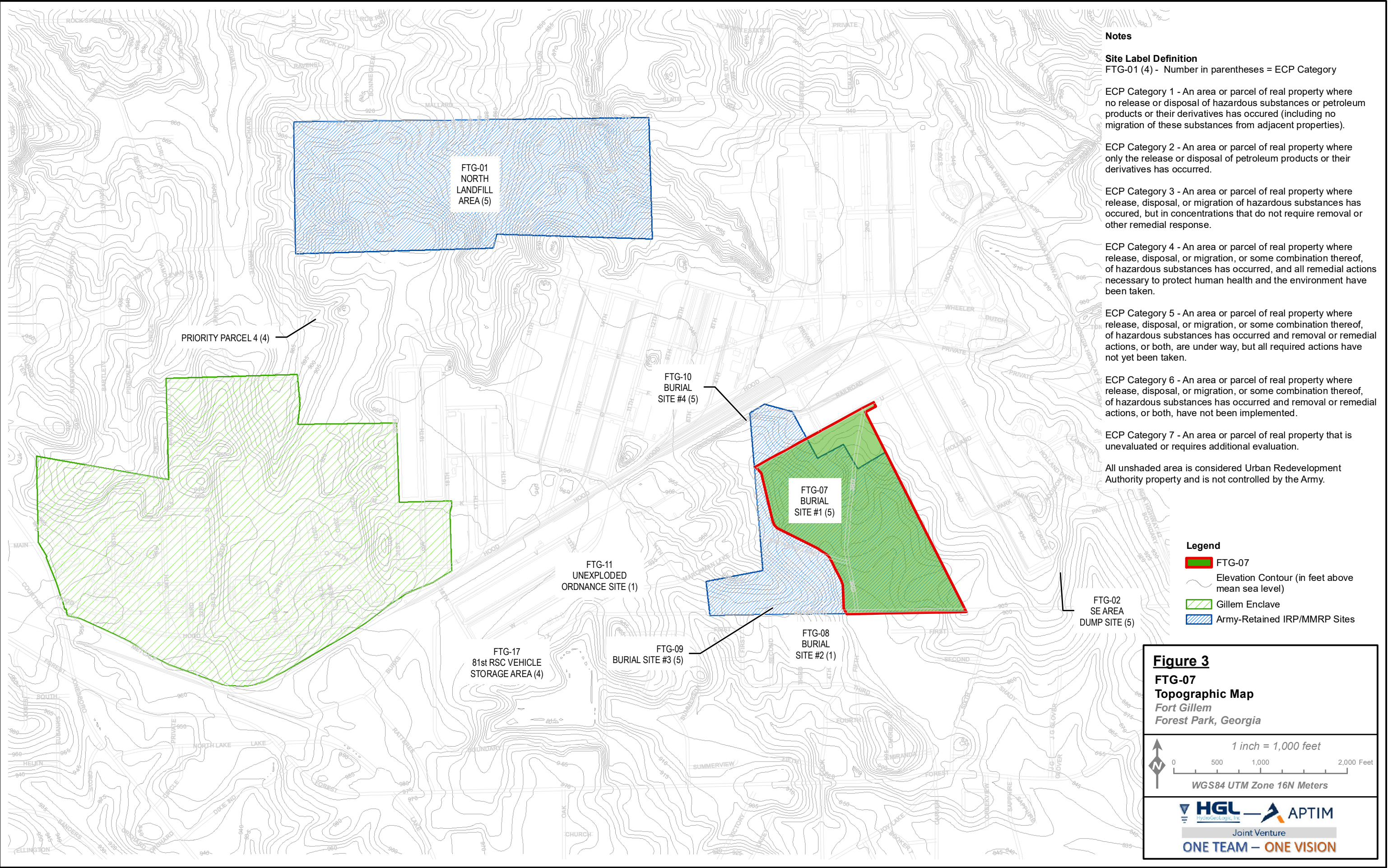
**Figure 2**

**FTG-07  
Site Map**

*Fort Gillem  
Forest Park, Georgia*



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 Joint Venture  
**ONE TEAM — ONE VISION**



**Notes**

**Site Label Definition**

FTG-01 (4) - Number in parentheses = ECP Category

ECP Category 1 - An area or parcel of real property where no release or disposal of hazardous substances or petroleum products or their derivatives has occurred (including no migration of these substances from adjacent properties).

ECP Category 2 - An area or parcel of real property where only the release or disposal of petroleum products or their derivatives has occurred.

ECP Category 3 - An area or parcel of real property where release, disposal, or migration of hazardous substances has occurred, but in concentrations that do not require removal or other remedial response.

ECP Category 4 - An area or parcel of real property where release, disposal, or migration, or some combination thereof, of hazardous substances has occurred, and all remedial actions necessary to protect human health and the environment have been taken.





ECP Category 5 - An area or parcel of real property where release, disposal, or migration, or some combination thereof, of hazardous substances has occurred and removal or remedial actions, or both, are under way, but all required actions have not yet been taken.

ECP Category 6 - An area or parcel of real property where release, disposal, or migration, or some combination thereof, of hazardous substances has occurred and removal or remedial actions, or both, have not been implemented.

ECP Category 7 - An area or parcel of real property that is unevaluated or requires additional evaluation.

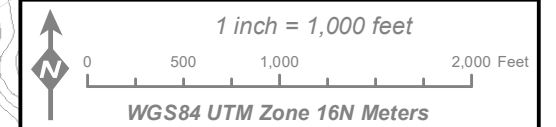
All unshaded area is considered Urban Redevelopment Authority property and is not controlled by the Army.

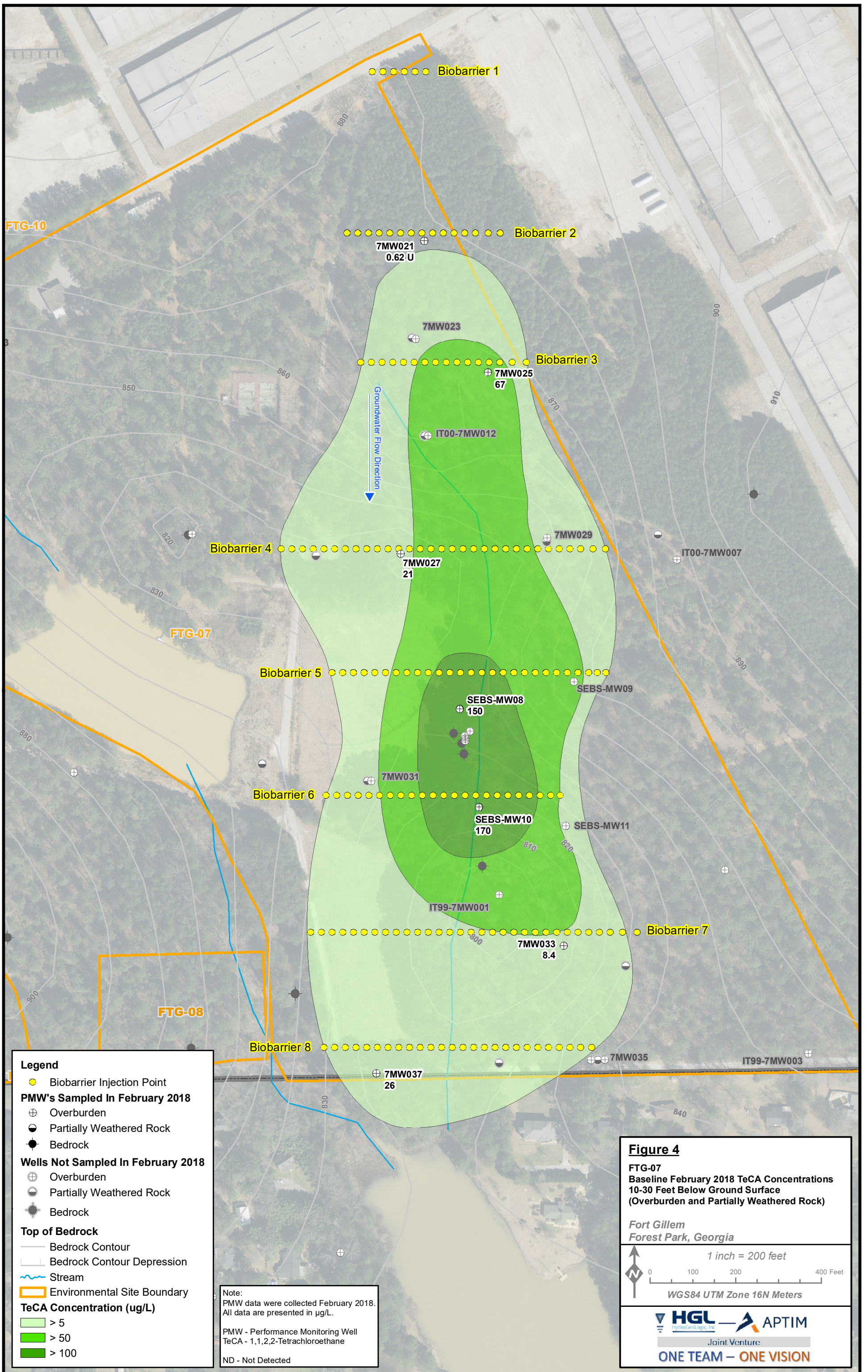
**Legend**

-  FTG-07
-  Elevation Contour (in feet above mean sea level)
-  Gillem Enclave
-  Army-Retained IRP/MMRP Sites

**Figure 3**

**FTG-07  
Topographic Map  
Fort Gillem  
Forest Park, Georgia**





**Legend**

- Biobarrier Injection Point
- PMW's Sampled In February 2018**
- ⊕ Overburden
- ⊖ Partially Weathered Rock
- Bedrock
- Wells Not Sampled In February 2018**
- ⊕ Overburden
- ⊖ Partially Weathered Rock
- Bedrock
- Top of Bedrock**
- Bedrock Contour
- Bedrock Contour Depression
- ~ Stream
- Environmental Site Boundary
- TeCA Concentration (ug/L)**
- Light Green > 5
- Medium Green > 50
- Dark Green > 100

Note:  
 PMW data were collected February 2018.  
 All data are presented in µg/L.

PMW - Performance Monitoring Well  
 TeCA - 1,1,2,2-Tetrachloroethane

ND - Not Detected

**Figure 4**

FTG-07  
 Baseline February 2018 TeCA Concentrations  
 10-30 Feet Below Ground Surface  
 (Overburden and Partially Weathered Rock)

Fort Gillem  
 Forest Park, Georgia

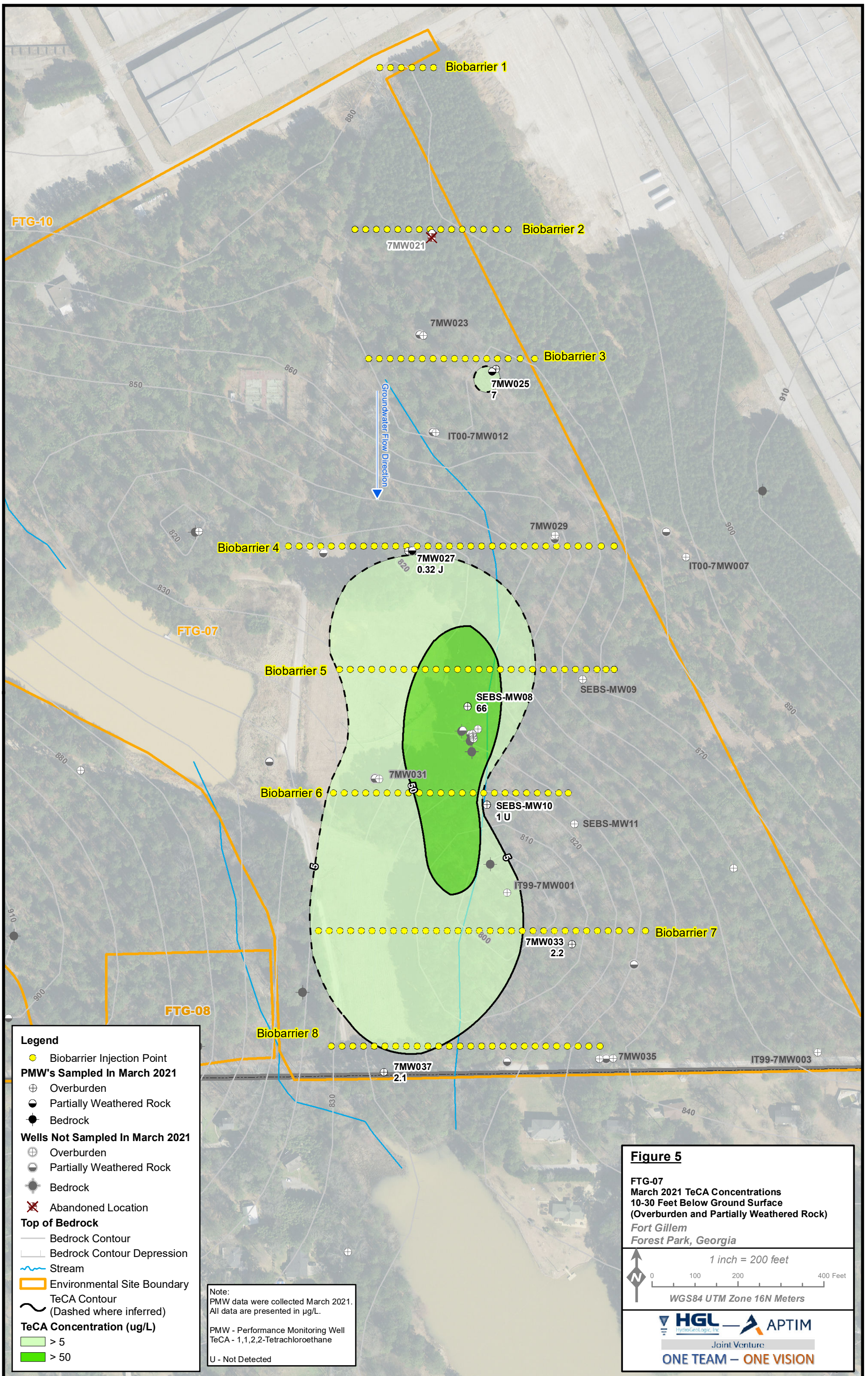
1 inch = 200 feet

0 100 200 400 Feet

WGS84 UTM Zone 16N Meters

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**Legend**

- Biobarrier Injection Point
- PMW's Sampled In March 2021**
- ⊕ Overburden
- Partially Weathered Rock
- Bedrock
- Wells Not Sampled In March 2021**
- ⊕ Overburden
- Partially Weathered Rock
- Bedrock
- ✘ Abandoned Location
- Top of Bedrock**
- Bedrock Contour
- Bedrock Contour Depression
- ~ Stream
- ▭ Environmental Site Boundary
- ~ TeCA Contour (Dashed where inferred)
- TeCA Concentration (ug/L)**
- Light Green > 5
- Dark Green > 50

Note:  
 PMW data were collected March 2021.  
 All data are presented in µg/L.

PMW - Performance Monitoring Well  
 TeCA - 1,1,2,2-Tetrachloroethane  
 U - Not Detected

**Figure 5**

FTG-07  
 March 2021 TeCA Concentrations  
 10-30 Feet Below Ground Surface  
 (Overburden and Partially Weathered Rock)  
 Fort Gillem  
 Forest Park, Georgia

1 inch = 200 feet

0 100 200 400 Feet

WGS84 UTM Zone 16N Meters

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