U.S. Army Corps of Engineers, New York District and Engineering and Support Center, Huntsville, Alabama, Worldwide Environmental Restoration Services

PROPOSED PLAN FOR SITE FTMM-22

Fort Monmouth, Oceanport, Monmouth County, New Jersey **May 2018**

INTRODUCTION

The U.S. Army is presenting this **Proposed Plan*** for the public to review and comment regarding the **preferred alternative** proposed for Site FTMM-22 at Fort Monmouth (FTMM) in Tinton Falls, Monmouth County, New Jersey. The U.S. Army (Army) is the lead agency for FTMM in accordance with **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** and Executive Order 12580. New Jersey Department of Environmental Protection (NJDEP) is the state support agency under the **National Contingency Plan (NCP)** for FTMM. The Army, in consultation with NJDEP, shall make the final selection of the response action for FTMM-22.

A **Remedial investigation (RI)**, including a **human health risk assessment (HHRA)**, was performed at FTMM-22 in 2015 to identify risks to human health and the environment from exposure to soil, **groundwater**, and vapor intrusion of soil gas to indoor air. The HHRA identified trichloroethene (TCE) as a **constituent of concern (COC)** in groundwater. **A Feasibility Study (FS)** was then conducted since there was a potential unacceptable risk and hazard to human health associated with direct contact with volatile organic compounds (VOCs), specifically TCE, in groundwater.

This Proposed Plan describes the preferred alternative as source removal through direct excavation and off-site disposal of the remaining concrete lime pit structure. Any potential contaminated soils encountered beneath the structure will be removed and disposed off-site. **Land use controls (LUCs)** to control exposure to VOCs (i.e., TCE) in groundwater will be established in the form of a **Classification Exception Area (CEA)/Well Restriction Area (WRA)**. The CEA/WRA would remain in place until NJDEP **Ground Water Quality Standard (GWQS)** are achieved at the site. **Monitored Natural Attenuation (MNA)** would be used to document the natural degradation of VOCs over time. The government reserves the option to pilot test groundwater remedies at FTMM-22 if MNA proves to be ineffective over time.

Dates to Remember:
PLEASE MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:
31 May 2018 – 29 June 2018
The Army will accept written comments on the Proposed Plan during the public comment period. Written comments may be postmarked or emailed by 29 June 2018 and sent to:

BRAC Environmental Coordinator
OACSIM - U.S. Army Fort Monmouth
Attn: Mr. William Colvin
P.O. Box 148
Oceanport, NJ 08641
Email: william.r.colvin18.civ@mail.mil

PUBLIC MEETING:
14 June 2018
The Army will hold a public meeting to explain the Proposed Plan and the proposed remedial alternative. Oral and written comments will also be accepted at the meeting. The meeting will be held 7pm at West Long Branch Public Library, 95 Popular Ave, West Long Branch, New Jersey 07764.

The Proposed Plan can be found at http://www.pica.army.mil/ftmonmouth/ or the Fort Monmouth Environmental Restoration Public Information Repository (the Administrative Record) at the following location:

Monmouth County Library, Eastern Branch
1001 Route 35, Shrewsbury, NJ
Phone: (732) 683-8980
Hours: Mon-Thurs, 9am-9pm; Fri-Sat, 9am-5pm; and Sun, 1pm-5pm

* Words or phrases shown in **BOLD** are defined in the glossary at the end of this document.

PUBLIC INVOLVEMENT PROCESS

As the lead agency for implementing the environmental response program at FTMM, the Army has prepared this Proposed Plan in accordance with CERCLA Section 117(a) and Section 300.430(f)(2) of the NCP to continue its community awareness efforts and to encourage public

participation. After the public has the opportunity to review and comment on this Proposed Plan, the Army will hold a public meeting to summarize and respond to the comments received during the public comment period. Information on the times and places for public comment and the public meeting are shown in the box above.

Local community members and other interested parties are encouraged to review this Proposed Plan and submit comments. The Army will carefully consider all comments received from the public and provide responses which will be compiled into a **Responsiveness Summary**. The decision on which action is appropriate for FTMM-22 will be detailed in a **Record of Decision (ROD)**, which will include the Responsiveness Summary.

This Proposed Plan summarizes information that can be found in greater detail in the Final RI/FS Report for FTMM-22 (Parsons, 2017) and other documents contained in the **Administrative Record** file for FTMM and on the website listed in the box on Page 1. The Army encourages the public to review these documents to gain a more comprehensive understanding of the site and all associated activities.

SITE BACKGROUND

FTMM is located in the central-eastern portion of New Jersey in Monmouth County, approximately 45 miles south of New York City, New York, 70 miles northeast of Philadelphia, Pennsylvania, and 40 miles east of Trenton, New Jersey. The Atlantic Ocean is approximately 3 miles to the east. FTMM was comprised of three areas: the Main Post (MP), the Charles Wood Area (CWA), (Figure 1), and the Evans Area (EA) (not shown).

Figure 1 - Fort Monmouth Location

FTMM's MP and CWA were selected for closure by the Base Realignment and Closure (BRAC) Commission in 2005, and officially closed on 15 September 2011. (The EA was closed under BRAC in 1998 and has since been transferred from FTMM.)

FTMM-22 is located in the western part of the CWA within the courtyard of Building 2700 (Figure 2). The site encompasses a former lime pit that was used to pre-treat acidic liquid wastes produced in the laboratories and workshops in Building 2700 from 1952 to the late 1980s. The lime pit (10 feet wide x 20 feet long) was constructed in 1952 with a concrete bottom and concrete block and mortar walls that extended to approximately 12 feet bgs.

The United States Army Environmental Hygiene Agency (USAEHA, 1976) sampled the effluent from Building 2700 from 1974 to 1975 and identified contaminated wastewater discharges resulting from then-current processes.

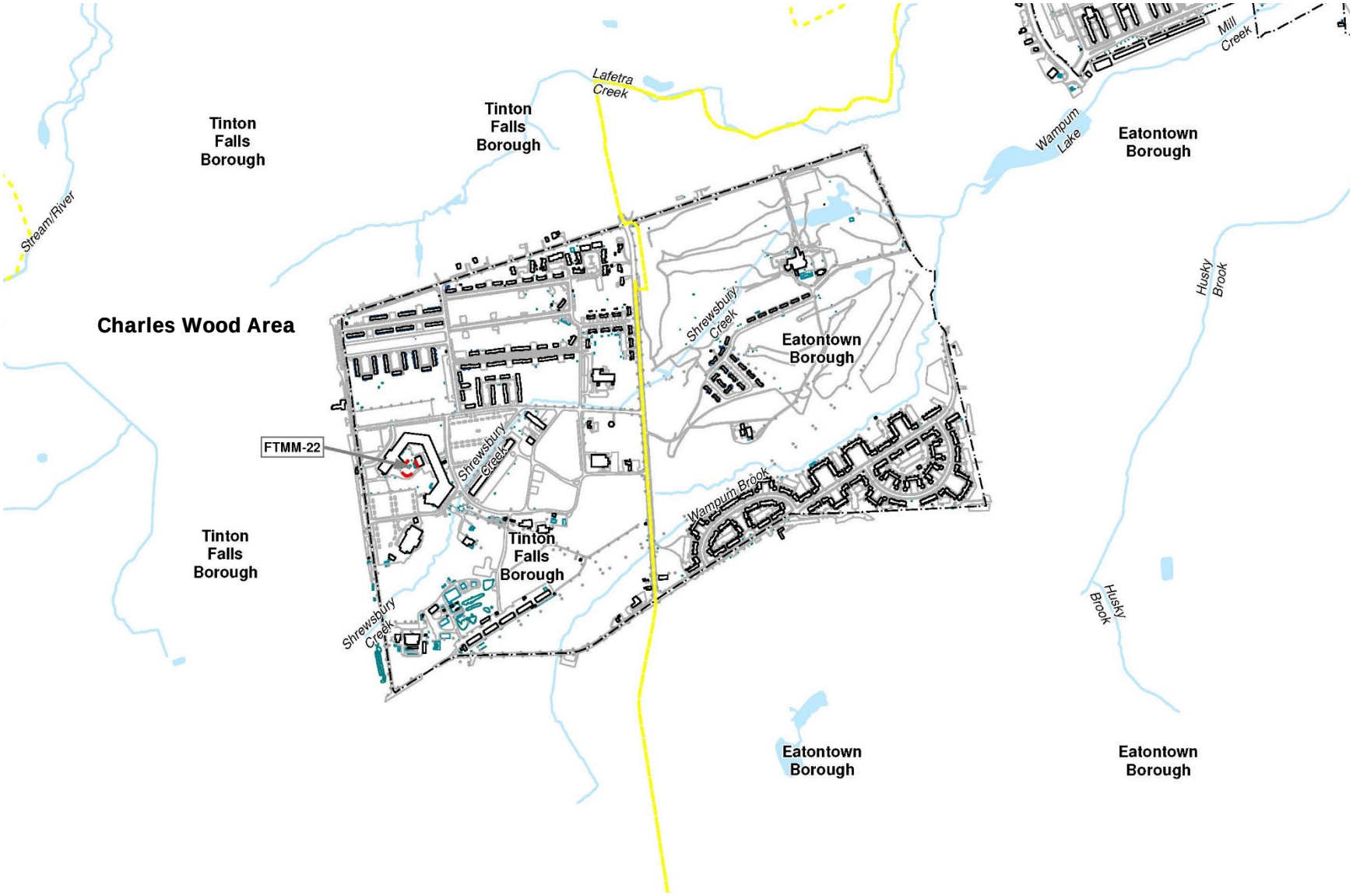
In October 1992, the pit was cleaned out, inspected, and the limestone chips replaced (Groundwater & Environmental Services, Inc. [GES], 2001). VOCs (including TCE), semivolatile organic compounds (SVOCs), and metals were detected in samples collected during the clean-out. As a result, numerous investigations were conducted at FTMM-22 over the past 25 years. The RI/FS report is a compliation of these investigations and an evaluation of the analytical data colllected.

SITE CHARACTERIZATION

Major vegetation zones at FTMM consist of landscaped areas, wetlands, **riparian** areas, and upland forests. Much of the CWA upland areas consist of extensive areas of regularly mowed lawns and landscaped areas. Detailed vegetation information can be found in the Baseline Ecological Evaluation (BEE) Report (Shaw, 2012).

FTMM is situated on Coastal Plain deposits which are unconsolidated material that has not been cemented or compacted. Soil encountered at FTMM-22 is comprised of brown, fine to coarse sand with fine gravel and root fragments and green/gray/black sandy silt and clay with varying amounts of sand and gravel.

Figure 2 – Location of FTMM-22



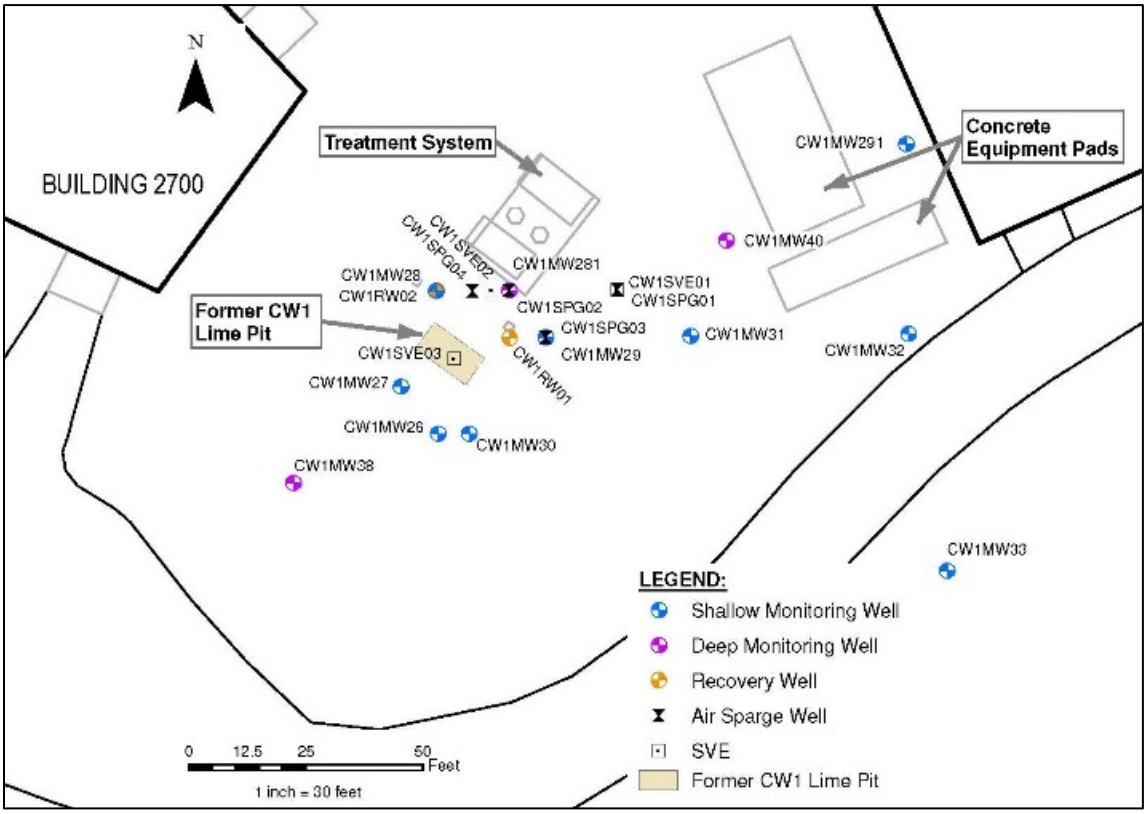


Figure 3 – FTMM-22 Site Layout

New Jersey GWQS classify groundwater for FTMM as Class II-A: **potable water** with secondary uses including agricultural and industrial (NJDEP, 2010). The depth to water in the FTMM-22 area is approximately 8 feet below ground surface (bgs). Groundwater flow in the shallow and deep water-bearing zones is typically toward the east to southeast towards Shrewsbury Creek (GES, 2001).

The proposed future land use at FTMM-22 including nearby Building 2700 is "Technical, Office, and Research and Design (R&D) Campus" (FMERA , 2017).

To determine the nature and extent of contamination at the site, chemical concentrations measured during the SI and RI were compared to Federal (USEPA) and State (NJDEP) residential, non-residential, and **Impact to Groundwater (IGW)** screening criteria as well as FTMM-specific background concentrations for metals. NJDEP comparison criteria included:

- Residential Direct Contact Soil Remediation Standards (RDCSRS), Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS), and IGW screening levels (SLs) for soils and sediments;
- GWQS for groundwater; and
- NJDEP nonresidential Soil Gas Screening Levels (SGSLs) for soil gas/vapor intrusion.

USEPA **Regional Screening Levels (RSLs**) for soil and groundwater were used for comparison purposes because the Army is required to complete a CERCLA-compliant RI (including HHRA). Therefore, RSLs were used to identify those chemicals that are COPCs. COPCs were then evaluated in a HHRA. The only COPCs evaluated in the HHRA for soil were benzo(a)pyrene and chromium. The COPCs in groundwater that were evaluated in the HHRA were cis-1,2-dichloroethene (1,2-DCE), 1,2,4-trichlorobenzene, TCE, vinyl chloride (VC), and hexavalent chromium.

The following subsections describe site characterization activities for soil, groundwater,

and soil gas/indoor air and a summary of the remedial measures conducted at FTMM-22. The HHRA results are presented following the site characterization data. The Final RI/FS Report was submitted to the NJDEP in June of 2017 and subsequently approved by NJDEP in October 2017.

Summary of Remedial Measures

In August 1997, the NJDEP approved a combination of **air sparging** and **soil vapor extraction (SVE)** for the treatment for groundwater at FTMM-22. The remedial system began operating in April 1998 and consisted of two air sparging wells (CW1SPG01 and CW1SPG02) and four SVE wells (CW1SVE01, CW1SVE02, CW1MW28, and CW1MW29).. Well locations are shown on Figure 3.

The CW-1 lime pit was decommissioned in December 2001, and the limestone chips were excavated and disposed off-site. In addition, a limited removal effort was conducted and part of the concrete lime pit sidewalls were removed and disposed off-site. The pit was subsequently backfilled with clean fill. The concrete bottom of the pit (located about 12 ft bgs) and about 3 feet of the adjacent surrounding sidewalls were left in place (Handex, 2004)

A groundwater pump and treat system was installed in April 2001 and consisted of two recovery wells (CW1RW01 and CW1RW02) located in the source area. System was operational in July 2002.

The air sparging/SVE and groundwater pump and treat systems were turned off on May 25, 2005 based on monthly groundwater data. NJDEP concurrence with the shutdown was documented in a November 2005 letter from the FTMM Directorate of Public Works (DPW) to NJDEP (FTMM DPW, 2005). The TCE concentrations in groundwater then rebounded and the system was restarted in October 2007. In April 2009, the air sparging portion of the system was shut down and remained off through at least the third quarter of 2009 (CALIBRE Systems, 2011). The air sparging/SVE system was operational during a portion of 2010, and was ultimately shut down when the influent concentration had decreased below detection levels and vapor-phase mass was not being recovered (GES, 2010). In December 2010 the groundwater pump and treat system was also shut down permanently with NJDEP concurrence (November, 2010) to evaluate alternative remediation technologies.

Soil

One soil sample was collected from each of four monitor well boreholes in December 1994 as part of the SI (Weston, 1995), and analyzed for **VOCs**, **SVOCs,** pesticides, **polychlorinated biphenyls (PCBs),** and metals. The samples were collected between 7 and 9 inches bgs.

A total of 6 subsurface soil samples were collected and analyzed for VOCs in 1996 as part of a supplemental SI (Weston, 1996). Samples were collected from two depth intervals during the installation of wells CW1MW281 (18.8-19.4 and 38.0-39.2 ft bgs), CW1MW282 (6-8 and 38-40 ft bgs), and CW1MW291 (6-7.3 and 32-32.4 ft bgs).

From July to December 1999, 63 soil borings were advanced and a total of 63 soil samples were collected for laboratory analysis of VOCs. Samples were collected continuously from the ground surface to just below the groundwater table, 9 feet bgs.

Three soil borings were advanced around the former CW-1 Lime Pit during the January 2014 RI sampling event, with two soil samples collected and analyzed at each location. Soil samples were analyzed for VOCs. Analytical results showed no exceedances of NJDEP or USEPA direct contact or impact to groundwater/ groundwater protection comparison criteria.

Based on comparison to USEPA Residential RSLs and (in the case of metals) maximum background concentrations presented in Weston (1995), the only COPCs identified in soil that were evaluated in the HHRA included benzo(a)pyrene and chromium. Neither benzo(a)pyrene nor chromium were identifed as COCs for soil at FTMM-22.

Groundwater

Between 1994 and 2000, 21 groundwater monitoring wells were installed at FTMM-22 to investigate and monitor contaminants in groundwater.

Quarterly groundwater sampling was performed at the site from April 1997 to August 2011 using a network of up to 19 monitoring wells. An additional sampling event was performed in August 2013 to reestablish baseline conditions after the FTMM closed in 2011. Groundwater

samples were also collected from January 2014 through June 2015 as part of regular quarterly monitoring. Quarterly groundwater monitoring was temporarily suspended as of the first quarter of 2016 and will resume following submittal of the CEA/WRA.

Groundwater monitoring data for January 2010 through June 2015 were evaluated as being representative of more recent aquifer conditions. Detected analyte concentrations were compared to Federal and State screening criteria for potable water, as well as FTMM-specific background concentrations for metals to identify COPCs. COPCs in groundwater evaluated in the HHRA included the VOCs *cis*-1,2-DCE, 1,2,4-trichlorobenzene, TCE, and VC and the metal hexavalent chromium.

Injections of **RegenOx**, a chemical oxidant, were performed in the vicinity of recovery well CW1RW01 where elevated concentrations of VOCs were detected in the groundwater. A Permit By Rule for the injections was submitted to the NJDEP by the Army. Three injection events were performed from December 2010 through September 2011 (FTMM, 2010).

Soil Gas/Indoor Air

In 2007, near-slab soil gas samples and indoor air samples were collected adjacent to and within Building 2700, respectively. A subsequent sampling event in 2012 included collection of sub-slab soil gas samples and indoor air samples beneath and within Building 2700, respectively. Comparison of sampling results to current NJDEP screening levels for soil gas and indoor air did not reveal exceedances that indicate a current vapor intrusion threat to Building 2700 related to FTMM-22. The NJDEP approved the Final Vapor Intrustion SI Report for the MP and CWA in their July 22, 2013 letter (NJDEP, 2013).

SCOPE AND ROLE OF RESPONSE ACTION

The **Remedial Action Objective** (RAO) is to protect public health by preventing exposure (inhalation, dermal contact, and ingestion) to groundwater containing VOCs. This will be accomplished by source removal through excavation and off-site disposal of the remaining concrete lime pit and potentially contaminated soils beneath it, controling access to groundwater where unacceptable risk or hazard is possible, and monitoring groundwater to document the natural degradation of VOCs.

SUMMARY OF SITE RISKS

A HHRA evaluation of the potential **carcinogenic** and **noncarcinogenic** risk from exposure to contaminants in soil and groundwater was conducted as part of the RI at FTMM-22.

The HHRA evaluated exposure of residential users and utility workers to soil through dermal contact, incidental ingestion, and inhalation of particulates, and exposure to groundwater as a potable water source through dermal contact, ingestion as drinking water (residential receptors only) or incidental ingestion, and inhalation of volatiles migrating from groundwater to indoor air.

The proposed future use of FTMM-22 is "Technical, Office, and R&D Campus." The conceptual site model (CSM) and the HHRA included in the RI report were reviewed for applicability for the proposed future land use. It was determined that the unlimited use/unrestricted exposure (UU/UE) scenario, which considers long-term exposure of children and adults to potentially contaminated environmental media, would adequately evaluate exposure of indoor workers associated with future development at FTMM-22.

etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated. The USEPA has established standard RME exposure scenarios for residents and commercial/industrial receptors that are used to calculate the RSLs.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

Risk Evaluation: The final step provides a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. Concentrations of COPCs at the site are compared to the concentrations that are protective of the standard RME scenarios established by the USEPA to quantify the risk or hazard that may be expected. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a threshold (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site and are referred to as COCs in the final remedial decision or Decision Document.

WHAT IS RISK AND HOW IS IT CALCULATED?

Human Health Risk Assessment:
A baseline HHRA is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the COPCs at the site in various media (i.e., soil, groundwater, surface water, and sediment) are identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants in water, soil,

Risks to Residential Users Exposed to Surface and Subsurface Soil, Outdoor Air, and Groundwater.

The HHRA used a conservative approach that assumed exposure to the maximum detected concentrations of analytes in soil, and it was determined that risks to human health and the environment from soil are within acceptable ranges for the current and future intended land use (i.e., Technical, Office, and R&D Campus). No unacceptable potential noncarcinogenic or carcinogenic effects to residential users and indoor workers are expected from exposure to soil at FTMM-22.

The HHRA determined there are carcinogenic risks and noncarcinogenic hazards for receptors associated with the unrestricted use of groundwater at at FTMM-22, and may require consideration of remedial actions to prevent health effects. There are also carcinogenic risks associated with vapor intrusion of volatile COCs from groundwater to indoor air, should a building be constructed on site. The risks are driven primarily by the presence of TCE in groundwater and reduction of the concentrations in groundwater to the NJDEP GWQS would mitigate the risk to acceptable levels.

Onsite groundwater is not currently used as a potable drinking water source so the risk/hazard

estimates described in the HHRA may be overestimated. The estimated risks/hazards associated with potable groundwater would apply only if a well was installed as a source for potable water at FTMM-22. Further, there are no plans to use the groundwater as potable water source since a municipal water source is provided. There is potential unacceptable risk to indoor workers associated with vapor intrusion of volatile COCs from groundwater to indoor air should a building be constructed on the site.

Risks to Utility Workers Exposed to Surface Soil and Groundwater for Non-Drinking Water Purposes. No unacceptable potential noncarcinogenic or carcinogenic effects to utility workers are expected from exposure to soil or groundwater through dermal contact or incidental ingestion.

In summary, the HHRAs concluded that there were potential risks to residential and indoor worker receptors exposed to groundwater, either directly (i.e., domestic use of groundwater) or through volatilization into buildings (i.e., vapor intrusion). As a result, a FS was performed to address the potential risks from exposure to contaminants in groundwater.

Soil does not pose an unacceptable risk to human health and the environment at FTMM-22. It is the Army's current judgement that the Preferred Alternative identified in this Proposed Plan is necessary to protect public health and welfare or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

This Proposed Plan recommends actions to address groundwater contamination at FTMM-22 that poses a risk to human health and the environment. The RAO is to protect public health by preventing exposure (inhalation, dermal contact, and ingestion) to groundwater containing VOCs, specifically TCE at concentrations in excess of the NJDEP GWQS of 1 micrograms per liter (µg/L).

SUMMARY OF REMEDIAL ALTERNATIVES

The proposed remedial alternatives for FTMM-22 were evaluated against USEPA's evaluation criteria as outlined in Table 1. USEPA's modifying criteria of state and community acceptance will be considered once comments are received on the preferred remedial alternative.

A range of general response actions were identified, evaluated, and screened to develop a list of possible remedial alternatives for FTMM-22. These general response actions were: (1) no action, (2) LUCs and MNA, and (3) source removal via direct excavation and backfill combined with LUCs and MNA. Various technology options for these general remedial alternatives were evaluated, and these evaluations are described in detail in Section 9 of the RI/FS Report.

The "no action" alternative (Alternative 1) was used as a baseline against which to compare the other alternatives. Under Alternative 1, no remedial action or monitoring would be conducted and contamination would remain in place. The estimated cost for Alternative 1 is $30,000, for

Table 1 – Evaluation Criteria for Remedial Alternatives

Threshold Criteria	**Overall Protectiveness of Human Health and the Environment** determines whether an alternative adequately protects human health and the environment from unacceptable risks.
	Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets Federal and State environmental regulations and requirements that pertain to the site.
Primary Balancing Criteria	**Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time.
	Reduction of Toxicity, Mobility, and Volume (TMV) of Contaminants through Treatment evaluates use of treatment to reduce harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
	Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
	Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the availability of goods and services.
	Cost includes estimated capital and annual operations and maintenance costs for a specific time period.
Modifying Criteria	**State/Support Agency Acceptance** considers whether the State agrees with the Army's analyses and recommendations, as described in the RI/FS and Proposed Plan.
	Community Acceptance considers whether the local community agrees with the Army's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

costs associated with planning, project execution, and reporting for groundwater well abandonment. Alternative 1 would not achieve the RAO as it is not protective of human health; does not meet ARARs described in Table 2; provides little short- or long-term effectiveness and permanence; achieves no reduction in TMV through active treatment; and has a minimal cost.

Alternative 2 consists of implementing LUCs to control exposure of VOCs (i.e., TCE) in groundwater in the form of a groundwater CEA/WRA. MNA would be used to document the natural degradation of VOCs over time by conducting groundwater sampling to document reduction in concentrations through MNA processes until NJDEP GWQS are met. Reporting would be conducted to document the continuing effectiveness of the remedy. The estimated total present value of Alternative 2 is $742,000 based the initial capital costs for the preparation of a long-term monitoring (LTM) plan; operations and maintenance (O&M) costs for labor, maintenance, materials, shipping, analysis, waste disposal, report preparation; biennial sampling and five-year reviews for 30 years (Parsons, 2017). Alternative 2 would achieve the RAO.

Alternative 3 implements the LUCs and MNA previously discussed for Alternative 2 with Lime Pit excavation and soil source removal. This alternatively addresses source removal through direct excavation, backfill, and off-site disposal of the remaining concrete lime pit vault structure (bottom and remaining partial sidewalls) and any potential contaminated soils encountered beneath it.

Alternative 3 is $700,000 based on the initial capital costs for the preparation of a LTM plan; O&M costs for labor, maintenance, materials, shipping, analysis, waste disposal, report preparation; biennial sampling and five-year reviews for 20 years (Parsons, 2017). Alternative 3 would provide a higher degree of long-term effectiveness and permanence, reduction of TMV by reaching cleanup levels sooner, and a decreased remediation time since the source would have been removed. Alternative 3 is the least expensive alternative. Alternatives 2 and 3 would provide adequate protection of human health and the environment and comply with ARARs. Alternative 2 provides short-term effectiveness and ease of implementation, but it does not provide active treatment of the groundwater contamination. This alternative would provide the monitoring necessary to track plume movement, as well as the necessary restrictions to limit exposure to the site contaminants.

Table 2 – Applicable or Relevant and Appropriate Requirements at FTMM-22

Chemical-Specific	**New Jersey Administrative Code (N.J.A.C.) 7:9C-2(c):** New Jersey has promulgated Groundwater Quality Standards (GWQS) to aid in the restoration or enhancement of groundwater quality in the State. NJ GWQS are considered to be relevant and appropriate because of the nature of the substances, the characteristics of the site, the circumstances of the release to groundwater, and the selected remedial action. *The GWQS for TCE at FTMM-22 is 1 microgram per liter (µg/L).*
Action-Specific	**RCRA, 40 CFR 262.11 (Hazardous Waste Identification), 264.175 (Container Management):** Remedial actions must appropriately identify and manage investigation derive wastes and remedial wastes (that are hazardous wastes) stored onsite, including waste characterization samples to classify waste as hazardous or non-hazardous. Potentially applicable for characterizing waste generated during the remedial action. *Excavation material generated during source removal at FTMM-22 will be managed in accordance with these requirements and disposed at approved disposal facility.*
	RCRA, 40 CFR 268 (Subpart D): Excavation/Placement of Waste in Land Disposal Unit. Movement of excavated materials to new location and placement in or on land will trigger land disposal restrictions for the excavated waste at disposal facility. Materials containing RCRA hazardous wastes subject to land disposal restrictions are placed in an approved disposal facility. *Excavation material generated during source removal at FTMM-22 will be managed in accordance with these requirements and disposed at approved disposal facility.*

SUMMARY OF PREFERRED ALTERNATIVE

The criteria used to evaluate the remedial alternatives individually and against each other to select a preferred alternative for FTMM-22 is provided in Table 3.

The preferred alternative at FTMM-22 is Alternative 3, Source Removal via Direct Excavation and Backfill combined with Alternative 2 implementing LUCs to control exposure to COCs in groundwater where unacceptable risk or hazard is possible; and MNA to document the natural degradation of VOCs in groundwater.

Alternative 3, which includes Alternative 2, provides the highest degree of long-term effectiveness and permanence and reduction of TMV of the three evaluated altenatives by reaching cleanup levels sooner and a decreased remediation time because the source would

have been removed. It provides adequate protection of human health and environment and short-term effectiveness and ease of implementation. This alternative would provide the monitoring necessary to track plume movement, as well as the necessary restrictions to limit exposure to the site contaminants. Alternatives 2/3 is also the least expensive alternative and complies with ARARs (Table 2). NJDEP has concurred with the selection of the preferred alternative of 3 for FTMM -22 as documented in their October 31, 2017 letter to the Army.

LUCs will be used to prevent uncontrolled exposure of potential receptors to contaminated media. A groundwater use restriction will be established in the form of a CEA/WRA in accordance with NJDEP's Technical Requirements for Site Remediation (TRSR) (N.J.A.C. 7:26E) and Administrative Requirements for the Remediation of Contaminated Sites (N.J.A.C. 7:26C). The CEA/WRA will remain in place until NJDEP GWQS are achieved. Sampling will be conducted every other year with two sampling rounds during the final year.

The Army will prepare a **LUC Implementation Plan (LUCIP)** to document the ICs and identify procedural responsibilities including groundwater monitoring and MNA reporting, and long-term stewardship responsibilities. Activity use restrictions (such as the installation of a sub-slab vapor removal system) will be required to prevent vapors from entering structures for any future building constructed at the site as long as groundwater contaminant concentrations exceed the NJDEP GWQS. When the property is transferred to private ownership out of federal control, the LUCs will be recorded against the property, and the new owner would be responsible for complying with the LUCs. Although the Army may later transfer its procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Army would retain ultimate responsibility for remedy integrity until groundwater contaminant concentrations are in compliance with NJDEP GWQS.

Source removal will be conducted to excavate the remnants of the concrete vault and any impacted soil beneath it. A remedial action work plan (RAWP) will be prepared and approved prior to beginning the excavation. All contaminated soil and materials will be disposed off-site, and the excavated area will be backfilled with clean fill and restored to original vegetation.

In conjunction with the remedial actions described above for the preferred alternative, the Army may pilot test an in-situ treatment technology, such as chemical oxidation or bioremediation, on a pilot test basis as recommended by NJDEP in their October 31, 2017 RI/FS Report acceptance letter (NJDEP, 2017). The pilot test will be described in detail in the RAWP.

A final report will be prepared and submitted to NJDEP for review and concurrence.

COMMUNITY PARTICIPATION

Public participation is an important component of remedy selection. The Army is soliciting input from the community on the preferred alternative identified for FTMM-22. The comment period includes a public meeting at which the Army will present this Proposed Plan. Both oral and written comments will be accepted at this meeting. The Army and the NJDEP encourage the public to gain a more comprehensive understanding of the sites and the remedial activities that have been conducted at FTMM-22. The dates for the public comment period; the date, location, and time of the public meeting; and the locations of the Administrative Record files are provided on the front page of this Proposed Plan.

Comments made at the meeting will be transcribed. A copy of the transcript will be included in the ROD and will be added to the FTMM Administrative Record file and information repositories.

Table 3 – Comparison of Remedial Alternatives to Threshold and Balancing Criteria

Criteria		Alternative		
		1 – No Action	2 – LUCs and MNA	3 - Source Removal via Direct Excavation and Backfill with Alternative 2
Threshold Criteria	Overall Protection of Human Health and the Environment	**No** No treatment and no control of exposure pathways.	**Yes** Restricts future use of impacted groundwater and effectively eliminates the exposure pathway.	**Yes** Restricts future use of impacted groundwater and effectively eliminates the exposure pathway.
	Compliance with ARARs	**No** Does not restrict groundwater usage nor monitors groundwater migration.	**Yes** Groundwater use restricted through CEA until GWQS is achieved through natural attenuation processes. Includes sampling and monitoring to verify that contamination is not migrating offsite and complies state groundwater monitoring requirements.	**Yes** Groundwater use restricted through CEA until GWQS is achieved through natural attenuation processes. Includes sampling and monitoring to verify that contamination is not migrating offsite and complies state groundwater monitoring requirements.
Balancing Criteria	Long-Term Effectiveness and Permanence	**Low** No actions or controls to reduce the existing contaminant levels or risks to human health and the environment.	**Moderate** Risks to human health and the environment mitigated through LUCs; LTM reduces the potential for exposure by periodically assessing the extent of contamination and the degree of plume reduction. RAO assumed to be achieved in 30 years.	**High** Excavation of source materials provides permanent solution for protecting human receptors and results in an adequate and reliable reduction of exposure pathways. Removal and offsite disposal of source materials results in minimal residual COC mass left behind after excavation and this mass would be further addressed by MNA and LTM for 20 years.
	Reduction of Toxicity, Mobility, or Volume by Treatment	**Low** No active treatment and does not monitor for any reduction of TMV through of the contaminated groundwater.	**Low to Moderate** Does not include active treatment of contaminated groundwater. However, remediation via natural attenuation expected to reduce groundwater contaminant levels to RAOs over time.	**High** Source mass reduction since source materials would be removed and disposed off-site and LUC and MNA would be in place.
	Short-Term Effectiveness	**Low** No remedial actions would be implemented.	**High** Short implementation timeframe since this alternative is limited to groundwater sampling and monitoring.	**Moderate to High** Slightly longer implementation timeframe than Alternative 2 in order to mobilize heavy equipment and implement additional field health and safety measures.
	Implementability	**Not Rated** No action would be taken/implemented.	**High** LUCs limiting groundwater access/use is an administrative process that is readily implementable. A monitoring network already exist at the site. New wells can be installed quickly.	**High** Excavation and disposal of contaminated concrete and soil at an off-site disposal facility are readily implementable. A monitoring network already exist at the site. New wells can be installed quickly; equipment and services are readily available.
	Cost	**$30,000** Includes planning, project execution, and reporting for groundwater well abandonment.	**$742,000** Includes preparation of LTM plan (sampling and analysis plan, quality assurance project plan, health and safety plan, etc). O&M costs include labor, maintenance, material, shipping, analysis, waste disposal, data validation, and report preparation.	**$700,000** Includes preparation of RAWP, equipment, materials, and labor to perform site preparation, construction of the stockpile area; excavation, backfilling with clean soil; confirmation sampling and laboratory analysis; waste characterization; transportation and disposal of excavated material; surveying; and site restoration and the preparation of a completion report. Includes Alternative 2 O&M costs for 20 years.
Optional Evaluation Criteria	Remedial Timeframe	**0**	**30 years**	**20 years**

REFERENCES

AECOM. 2013. Final Vapor Intrusion Site Investigation Report Main Post and Charles Wood Area, OACSIM – U.S. Army Fort Monmouth, Oceanport, New Jersey. Prepared for the U.S. Army Corps of Engineers, Baltimore District. January.

CALIBRE Systems. 2011. Building 2700, Charles Wood Area (CW-1) Remedial Action Progress Report (1st Quarter 2009 through 3rd Quarter 2010). November.

FMERA. 2017. Future Use Of FTMM-22 Property email correspondence. December 2017.

Groundwater & Environmental Services, Inc. (GES). 2001. Expanded Soil and Groundwater Investigation Report Site CW-1, DSERTS Site #FTMM-22 Wastewater Treatment Lime Pit #1 Building 2700, Charles Wood Area, Fort Monmouth, New Jersey. Prepared for the Fort Monmouth Directorate of Public Works. March 12.

NJDEP. 2010. Groundwater Quality Standards. New Jersey Administrative Code Title 7 Chapter 9C. July 22.

NJDEP. 2010. Letter from Mr. Larry Quinn, Bureau of Investigation, to Mr. Joseph Fallon, CHMM, Directorate of Public Works, Approval of Discharge to Ground Water (DGW) Permit-by-Rule. November 19.

NJDEP. 2013. Letter from Ms. Linda Range, Bureau of Case Management, to Ms. Wanda Green, BRAC Environmental Coordinator at Fort Monmouth, Final Vapor Intrusion Site Investigation Report. July 22.

NJDEP. 2017. Letter from Mr. A.J. Joshi, Bureau of Northern Field Operations, to Mr. William Colvin, BRAC Environmental Coordinator at Fort Monmouth, Remedial Investigation/Feasibility Study (RI/FS) – FTMM 22. October 31.

Parsons. 2017. Final Remedial Investigation/Feasibility Study Report for Site FTMM-22, Fort Monmouth, Oceanport, Monmouth County, New Jersey. Prepared for the U.S. Army Engineering and Support Center, Huntsville, Alabama. June.

Shaw. 2012. Final Baseline Ecological Evaluation, Fort Monmouth Main Post & Charles Wood Area. Monmouth County, New Jersey. May.

U.S. Army Environmental Hygiene Agency (USAEHA), 1976. Water Quality Engineering Special Study No. 24-016-75-76, Sanitary and Industrial Wastewater, Fort Monmouth, New Jersey. September 23-October 9, 1974; April 15-17, 1975; June 10-12, 1975.

Weston. 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

GLOSSARY OF TERMS

Administrative Record – A file that contains all information used by the lead agency to make its decision on the selection of a response action under CERCLA. A copy of this file is to be available for public review at or near the site, usually at the information repository.

Air Sparging – The injection of air or oxygen through a contaminated aquifer or media to remove VOCs and SVOCs by volatilization. Injected air traverses horizontally and vertically in channels through the soil column, creating an underground stripper.

Applicable or Relevant and Appropriate Requirement (ARAR) - Federal, State, and local regulations and standards determined to be legally applicable or relevant and appropriate to remedial actions at a CERCLA site.

Carcinogenic – Able to produce malignant tumor growth.

Classification Exception Area (CEA) – A NJDEP designation established whenever groundwater standards in a particular area are not met. It ensures the use of the groundwater in that area is restricted until standards are achieved.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, otherwise known as Superfund) – A federal law that addresses the funding for and remediation of abandoned or uncontrolled hazardous waste sites. This law also establishes criteria for the creation of key documents such as the Remedial Investigation, Feasibility Study, Proposed Plan, and Decision Document.

Constituent of Concern (COC) – COCs are defined as the COPCs (see below) that are present at sufficient concentrations to pose a risk to human health or the environment.

Constituent of Potential Concern (COPC) – A chemical that is identified as a potential threat to human health or the environment and is evaluated further in the baseline risk assessment.

Decision Document – A report documenting the final action, approved by the regulatory agencies, that is required at CERCLA sites.

Engineering Control (EC) – Methods used to restrict site access to provide human protection at a contaminated site, such as containment, fences, and informational devices such as warning signs. Land use controls consists of both institutional controls and engineering controls.

Feasibility Study (FS) – A study performed to identify, develop, and perform a detailed analysis of potential remedial alternatives that meet remedial action objectives to provide adequate information to support decision-makers in selection of the most appropriate remedial alternative.

Groundwater – Water found beneath the earth's surface that fills pores between materials such as sand, soil, or gravel. In aquifers, groundwater occurs in sufficient quantities that it may be used for drinking water, irrigation, and other purposes.

Ground Water Quality Standards (GWQS) – NJDEP GWQS, N.J.A.C 7:9C, establish the designated uses of the State's groundwater and specify the water quality (criteria) necessary to attain those designated uses. The ground water quality criteria are numerical values assigned to each constituent (pollutant) discharged to groundwater of the State. The GWQS also contain technical and general policies to ensure that the designated uses can be adequately protected. Groundwater is classified according to its hydrogeologic characteristics and designated uses.

Human Health Risk Assessment (HHRA) – An evaluation of the potential threat to human health due to environmental COPCs.

Impact to Groundwater (IGW) – A NJDEP soil cleanup standard that is applied in soil above the groundwater table that is designed to be protective of groundwater quality.

Land Use Control (LUC) – Physical, legal, or administrative mechanisms that restrict the use of, or limit access to, real property to manage risks to human health and the environment. Physical mechanisms include physical barriers to limit access to real property, such as fences or signs, providing potable water, as well as a variety of engineered remedies to contain or reduce contamination. Legal mechanisms include zoning, permits, and deed restrictions on property; for example, allowing only commercial or industrial use of a property where contaminants have not been remediated to residential levels.

Land Use Control Implementation Plan (LUCIP) – Documents the LUCs required during and after implementation of the preferred alternative.

Monitored Natural Attenuation – A remedial approach that involves monitoring of contaminant concentration and natural attenuation parameters that provide an indication of the effectiveness of natural attenuation and progress being made to achieve remedy goals. In general, MNA does not include remediation methods that require human intervention beyond monitoring. However, LUCs, such as use restrictions, may be needed in conjunction with MNA to ensure protection of human health and the environment.

National Contingency Plan (NCP) – National Oil and Hazardous Substances Pollution Contingency Plan, "National Contingency Plan" (40 CFR 300). Provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

New Jersey Administrative Code (N.J.A.C.) – The collection of all rules and regulations made by the executive branch agencies of the State of New Jersey.

Noncarcinogenic – Not able to produce malignant tumor growth.

Polychlorinated Biphenyls (PCB) – A group of persistent chemicals used in transformers and capacitors for insulating purposes and in gas pipeline systems as a lubricant.

Potable Water – Water of a quality suitable for drinking

Pre-Design Investigation (PDI) - A pre-design investigation would be conducted prior to excavation to further delineate and better determine the lateral and vertical extent of impacted soil requiring excavation.

Preferred Alternative(s) – The alternative(s) that, when compared to other potential alternatives, was/were determined to best meet the CERCLA evaluation criteria and is proposed for implementation at the site.

Primary and Secondary Drinking Water Standards – Primary Drinking Water Standards limit the allowable concentrations of contaminants which may affect consumer health. Secondary Drinking Water Standards were developed to address the aesthetic qualities of drinking water (e.g., color, taste, odor).

Proposed Plan – A plan that identifies the preferred remedial alternative(s) for a site, and is made available to the public for comment.

Regional Screening Level (RSL) – USEPA Screening levels are risk-based concentrations derived from standardized equations combining information assumptions with EPA toxicity data. RSLs are considered by the EPA to be protective for humans over a lifetime.

Remedial Action Objective (RAO) – Cleanup objective that specify the level or area of cleanup ore attainment.

Remedial Investigation (RI) – Exploratory inspection conducted at a site to define the nature and extent of contamination present, and to assess potential related hazards and risks

Responsiveness Summary -. A component of the Record of Decision that summarizes information about the comments and views of the public and support agency regarding both the remedial alternatives and general concerns about the site submitted during the public comment period. It also documents in the record how public comments were integrated into the decision-making process.

Riparian – Riparian areas are ecosystems adjacent to a river or waterway that, in an undisturbed state, provide habitat for wildlife and help improve water quality. Riparian areas are usually transitional zones between wetland and upland areas and are generally comprised of grasses, shrubs, trees, or a mix of vegetation types that exist within a variety of landscapes (e.g., natural, agricultural, forested, suburban, and urban).

Semivolatile Organic Compounds (SVOC) – An organic compound which has a boiling point higher than water and which may vaporize when exposed to temperatures above room temperature. SVOCs include phenols and PAH.

Soil Vapor Extraction – A vacuum is applied to the soil to induce the controlled flow of air and remove VOCs and some SVOCs from the soil.

Volatile Organic Compound (VOC) – Organic chemical compound whose composition makes it possible for it to evaporate under normal indoor atmospheric conditions of temperature and pressure.

ACRONYMS AND ABBREVIATIONS

ACRONYM	DEFINITION
µg/L	micrograms per liter
BEE	Baseline Ecological Evaluation
bgs	below ground surface
BRAC	Base Realignment and Closure
CEA/WRA	Classification Exception Area/Well Restriction Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	constituent of concern
COPC	constituent of potential concern
CWA	Charles Wood Area
DCE	dichloroethene
EA	Evans Area
FS	Feasibility Study
FTMM	Fort Monmouth
FMERA	Fort Monmouth Economic Redevelopment Authority
GWQS	Ground Water Quality Standard(s)
HHRA	human health risk assessment
HI	Hazard Index
IGW	Impact to Groundwater
LTM	long-term monitoring
LUCs	land use controls
LUCIP	Land Use Controls Implementation Plan
MNA	monitored natural attenuation
MP	Main Post
NCP	National Contingency Plan
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NRDCSRS	Non-Residential Direct Contact Soil Remediation Standard
O&M	operations and maintenance
PCB	polychlorinated biphenyl
RAO	remedial action objective
RDCSRS	Residential Direct Contact Soil Remediation Standard
R&D	Research and Design
RI	remedial investigation
ROD	Record of Decision
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
SI	site investigation
SL	screening level
SGSls	Soil Gas Screening Levels
SVE	soil vapor extraction
SVOCs	Semi-volatile organic compounds
TCE	trichloroethene

ACRONYM	DEFINITION
TRSR	Technical Requirements for Site Remediation
Army	U.S. Army
CEHNC	U.S. Army Engineering and Support Center, Huntsville
USAEHA	U.S. Army Environmental Hygiene Agency
USEPA	U.S. Environmental Protection Agency
UU/UE	Unlimited Use/Unlimited Exposure
VC	Vinyl chloride
VOCs	volatile organic compounds

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the Proposed Plan for the Sites FTMM-22 is important to the Army. Comments provided by the public are valuable in helping the Army select a remedy for FTMM-22.

You may use the space below to write your comments. Comments must be postmarked by 29 June 2018. Mailed comments should be sent to Mr. William Colvin at the address listed on Page 1. If you have any questions about the comment period, please contact. Mr. Colvin at (732) 380-7064. Those with electronic communications capabilities may submit their comments to the Army by 29 June 2018 via Internet at the following e-mail address: william.r.colvin18.civ@mail.mil

Name: _____

Address: _____

City: _____

State and Zip: _____

Comments: