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Main Plant Area Groundwater Proposed Plan

Public Meeting

April 2023

Overview

- Background
- Cleanup strategy and timeline
- Scope of the Proposed Plan
- Evaluating the alternatives
- DOE's preferred alternative for the Main Plant Area
- How the Main Plant Area remedial action fits into the sitewide ETTP groundwater approach
- Public input process
- Comments

Background

- This Proposed Plan presents the U.S. Department of Energy's (DOE's) preferred alternative for interim remedial actions for groundwater in the Main Plant Area at the East Tennessee Technology Park (ETTP).
- The purposes of this Proposed Plan are to solicit public comments, describe the alternatives analyzed, identify the preferred alternative, and explain the rationale for the preferred alternative.
- The scope covered by the Proposed Plan includes six areas of groundwater contamination (i.e., groundwater plumes) within the Main Plant Area located below the water table in the unconsolidated weathered soil/rock and bedrock zones.
- The preferred alternative is active remediation using enhanced in situ bioremediation and continuation of land-use controls that are in place at ETTP.

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Cleanup Strategy and Timeline

1992

Tri-party Federal Facility Agreement signed

DOE, U.S. EPA, State of Tennessee

1990s

Early actions

Off-site contamination

High-risk/high-priority releases to the environment

2000s

Watershed Interim Records of Decision signed

Addresses numerous contaminant sources and building demolition projects

2000s – 2024

East Tennessee Technology Park building demolitions and soil remedial actions complete

2023

Focus shifting to groundwater at East Tennessee Technology Park

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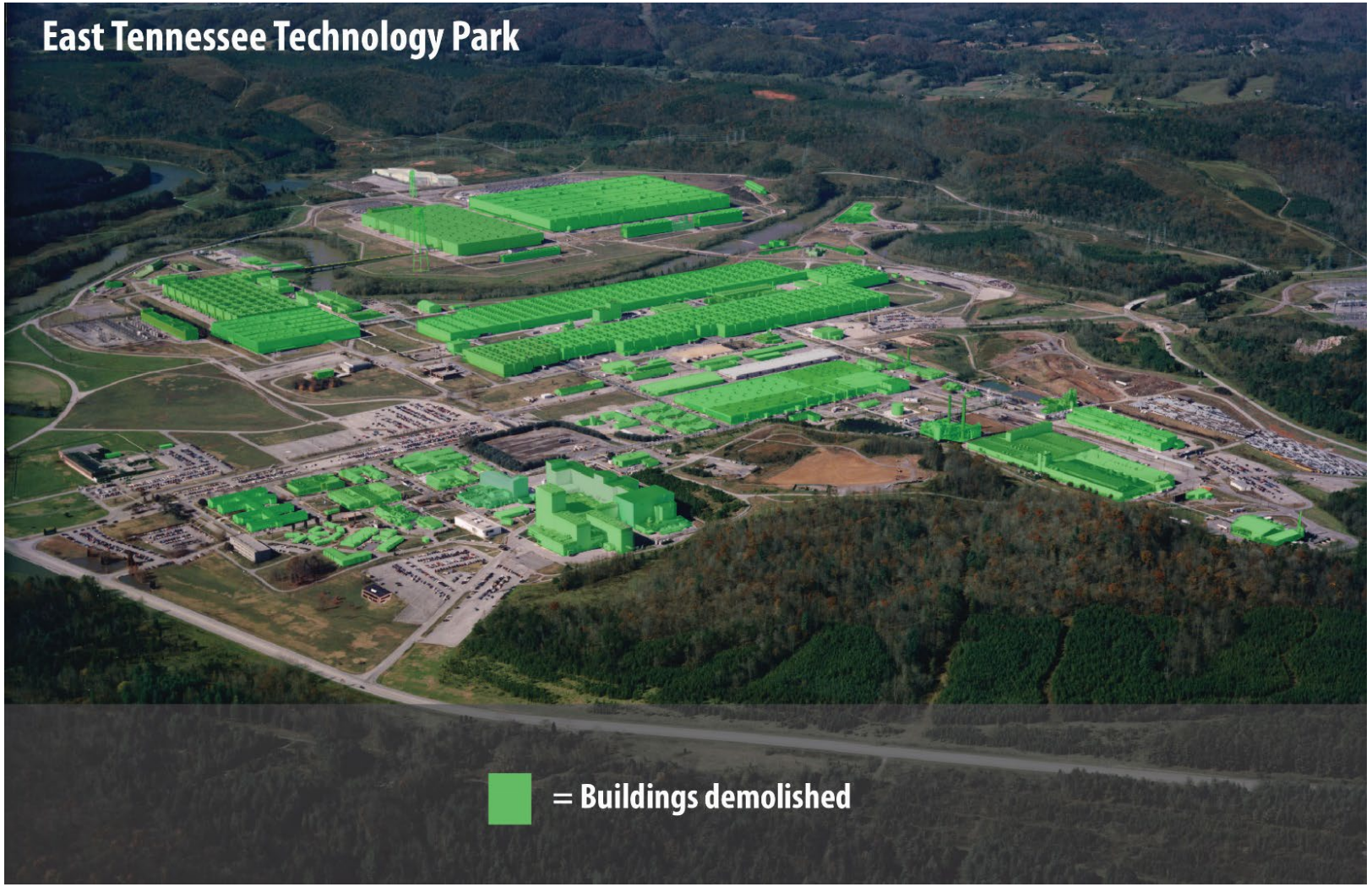
DOE's Cleanup at the East Tennessee Technology Park

- DOE completed removal of all contaminated and unneeded buildings in 2020, paving the way for completion of the soil cleanup work
- DOE is scheduled to complete soil cleanup in 2024



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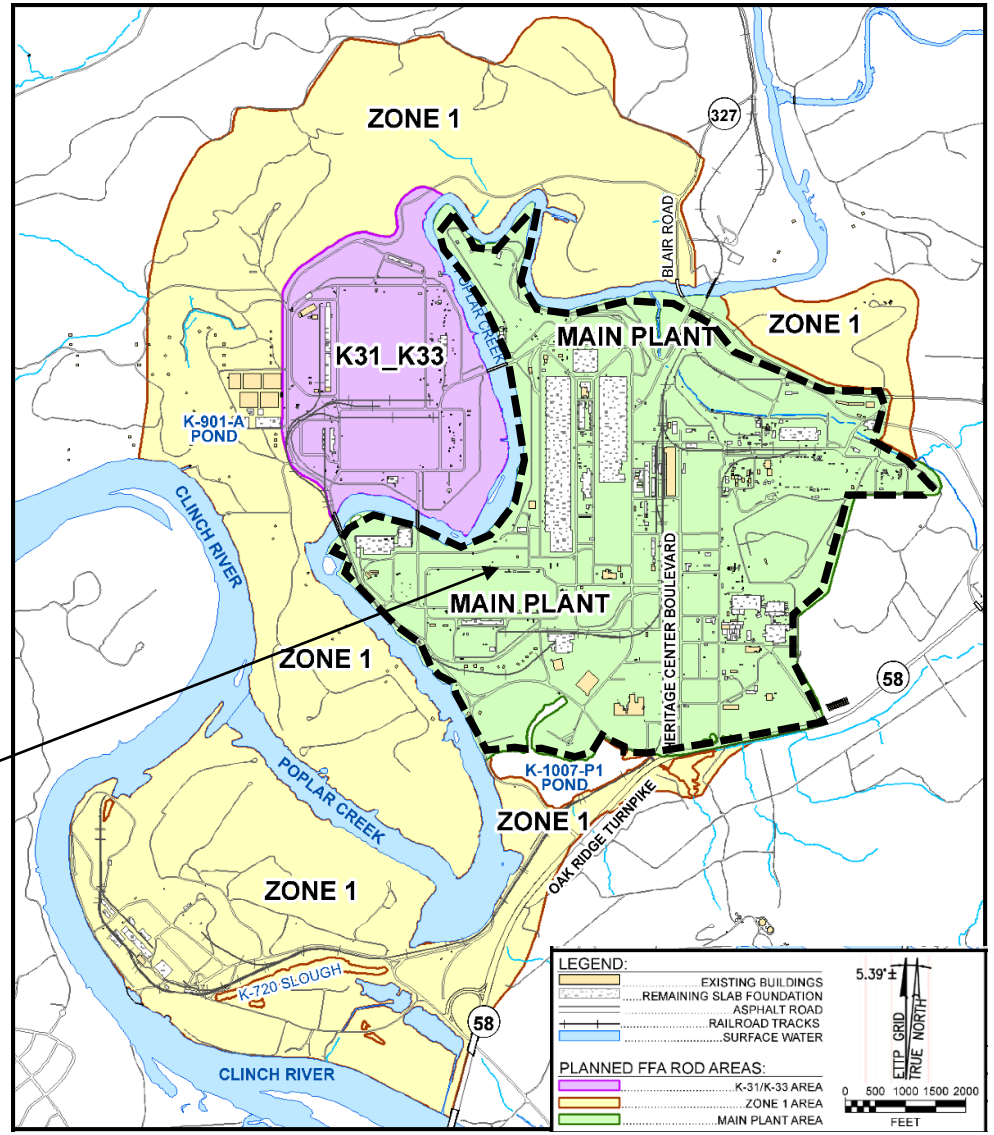
Three ETTP Groundwater Record of Decision geographical areas

- Main Plant
- K-31/K-33
- Zone 1

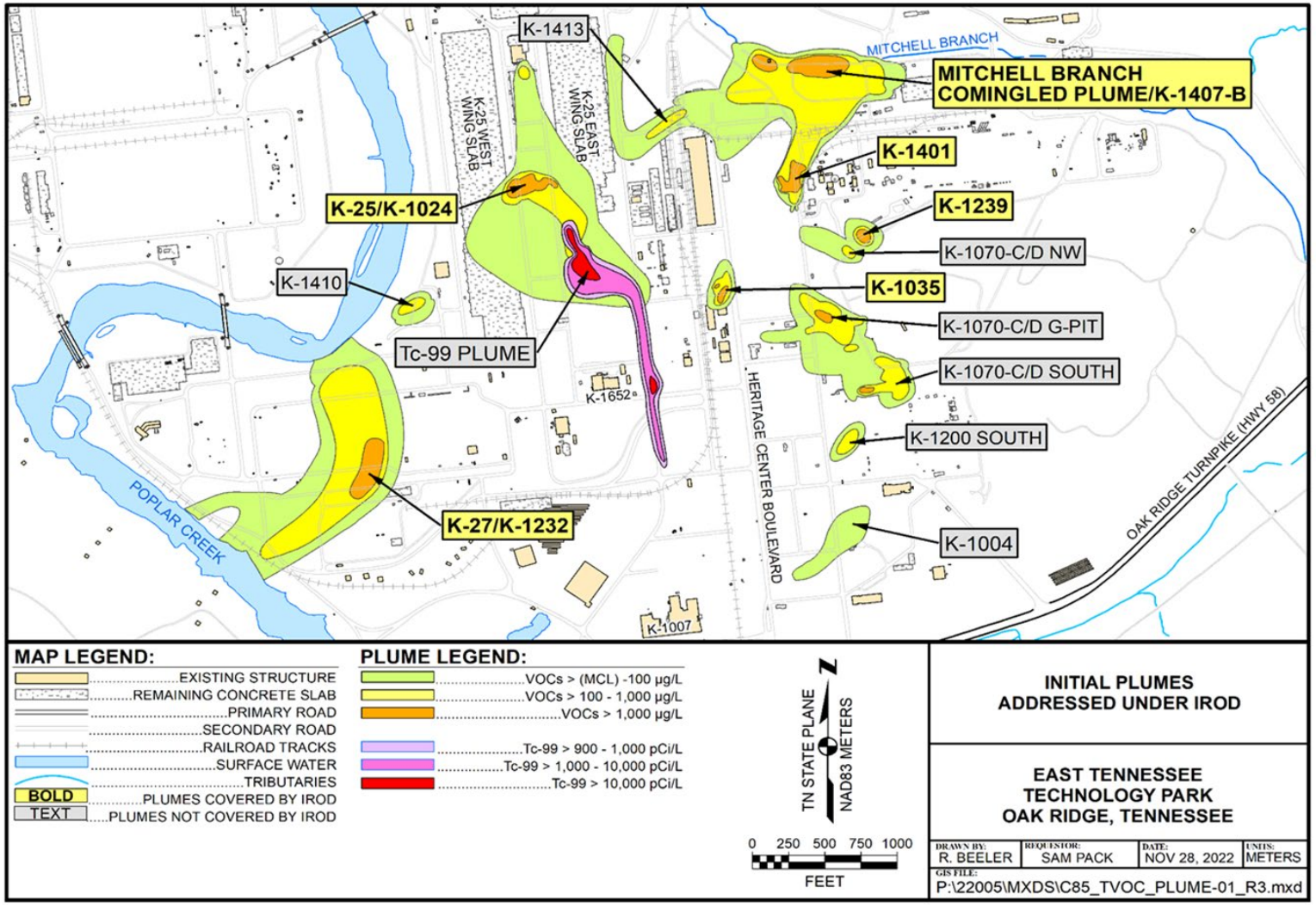
The Main Plant Area (in green) is covered by this Proposed Plan.

Other portions of ETTP, including Zone 1 and K-31/K-33, are covered by other CERCLA projects.



Scope of the Proposed Plan

- The six areas of groundwater contamination within the Main Plant Area are located below the water table in the unconsolidated weathered soil/rock and bedrock zones
- The areas are named after former facilities that were located in the area of the contamination



DOE evaluated 4 alternatives for the Main Plant Area

Alternative 0 – No action

Alternative 1 – In situ thermal treatment (ISTT)

Alternative 2 – Enhanced in situ bioremediation (EISB) treatment

Alternative 3 – In situ soil mixing (ISSM), along with EISB for deeper zones

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Description of the 4 Alternatives

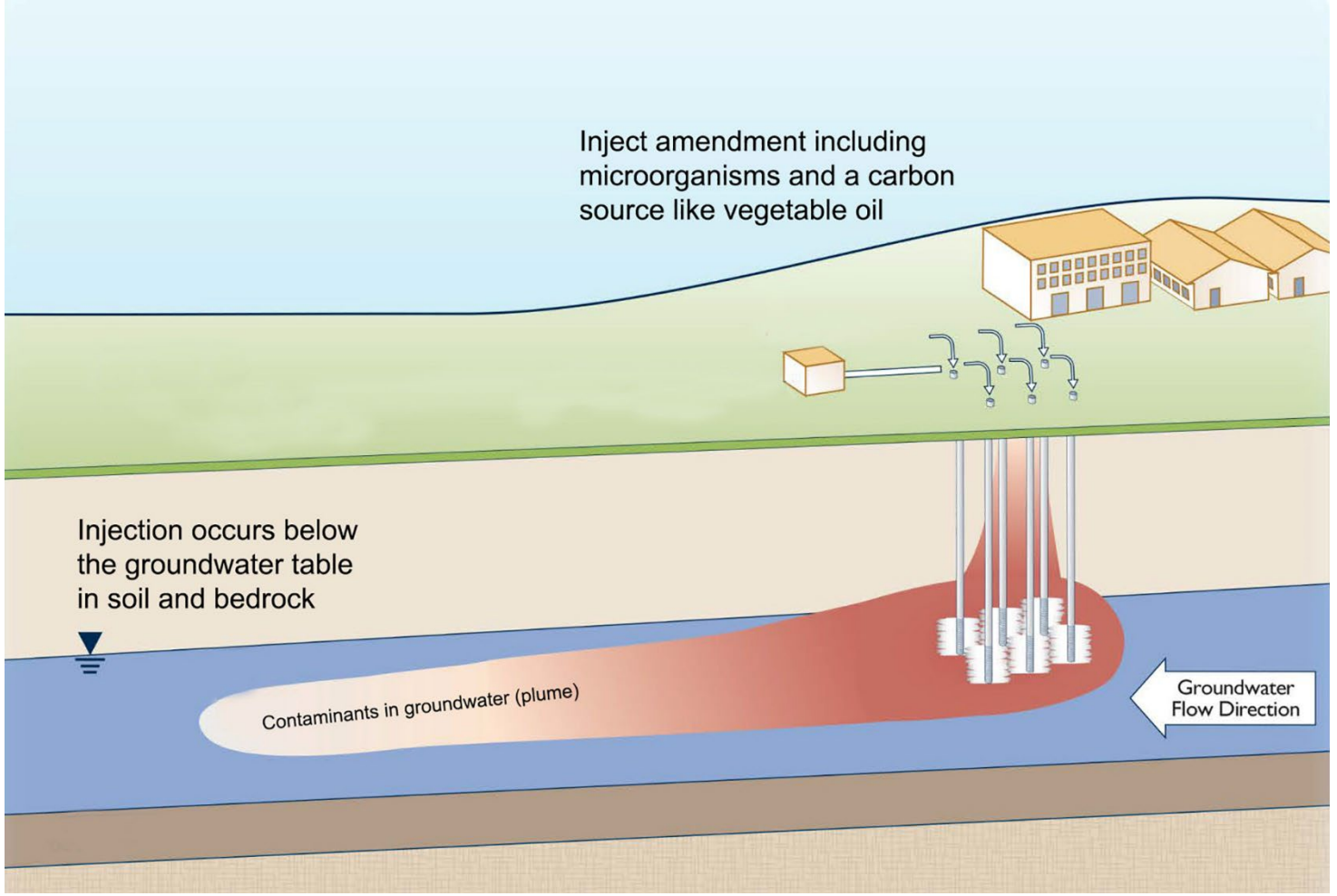
Alternative	Description	Cost/Timeframe
Alternative 0 – No action	No actions	**Cost**: $0 **Timeframe:** not applicable
Alternative 1 – In situ thermal treatment and land use controls	This alternative involves installing heating elements to increase the subsurface temperature, resulting in volatilization of contaminants, with a vacuum extraction system that captures the resulting vapors. The vapors are treated before being discharged to the atmosphere. Process water produced as a result of treatment will be treated onsite and discharged to a permitted NPDES outfall.	**Capital cost:** $123.3 million **Total present-worth cost:** $133.5 million **Timeframe:** 5 years
Alternative 2 – Enhanced in situ bioremediation and land use controls	This alternative involves stimulating existing subsurface bacteria to promote dechlorization and ultimate destruction of the contaminants. It involves installing injection wells in the unconsolidated zone and bedrock. A carbon substrate, along with other supporting treatment reagents, are injected into the wells so they can be distributed in the subsurface. Multiple injections will be completed to recharge the system with treatment reagents.	**Capital cost:** $16.9 million **Total present-worth cost**: $32.7 million **Timeframe:** 5 years
Alternative 3 – In situ soil mixing, along with enhanced in situ bioremediation for deeper zones, and land use controls	This alternative involves using a soil mixing technology to deliver ZVI and bentonite to the unconsolidated zone. The reagents will treat contaminants and minimize contamination migration from the treatment zone. The soil mixing technology will be completed under a tent with air control to prevent the release of contaminants to the atmosphere. This alternative also uses EISB treatment in the bedrock.	**Capital cost:** $154.1 million **Total present-worth cost:** $167.2 million **Timeframe:** 5 years

DOE performed a detailed analysis of the 4 alternatives using the CERCLA decision criteria

- Threshold criteria:
  - Overall protection of human health and the environment
  - Compliance with Applicable or Relevant and Appropriate Requirements
- Balancing criteria:
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume through treatment
  - Short-term effectiveness
  - Ability to implement
  - Cost
- Modifying criteria:
  - State acceptance
  - Community acceptance

DOE's Preferred Alternative for the Main Plant Area Groundwater Interim Record of Decision

- The selected remedy is active treatment using enhanced in situ bioremediation (EISB) at six groundwater plumes
- The selected remedy includes continuation of land use controls that are in place at ETTP, specifically deed restrictions preventing groundwater use



The Preferred Alternative meets the statutory requirements of CERCLA

The proposed remedy for this MPA IROD is protective of human health and the environment

The interim remedy is cost effective

The interim remedy satisfies the statutory preference for permanent solutions through treatment

As an interim remedy, the CERCLA law allows DOE to invoke a waiver to the Safe Drinking Water Act

As part of this interim remedy, DOE plans to reduce source area contaminant concentrations to <1000 ppb

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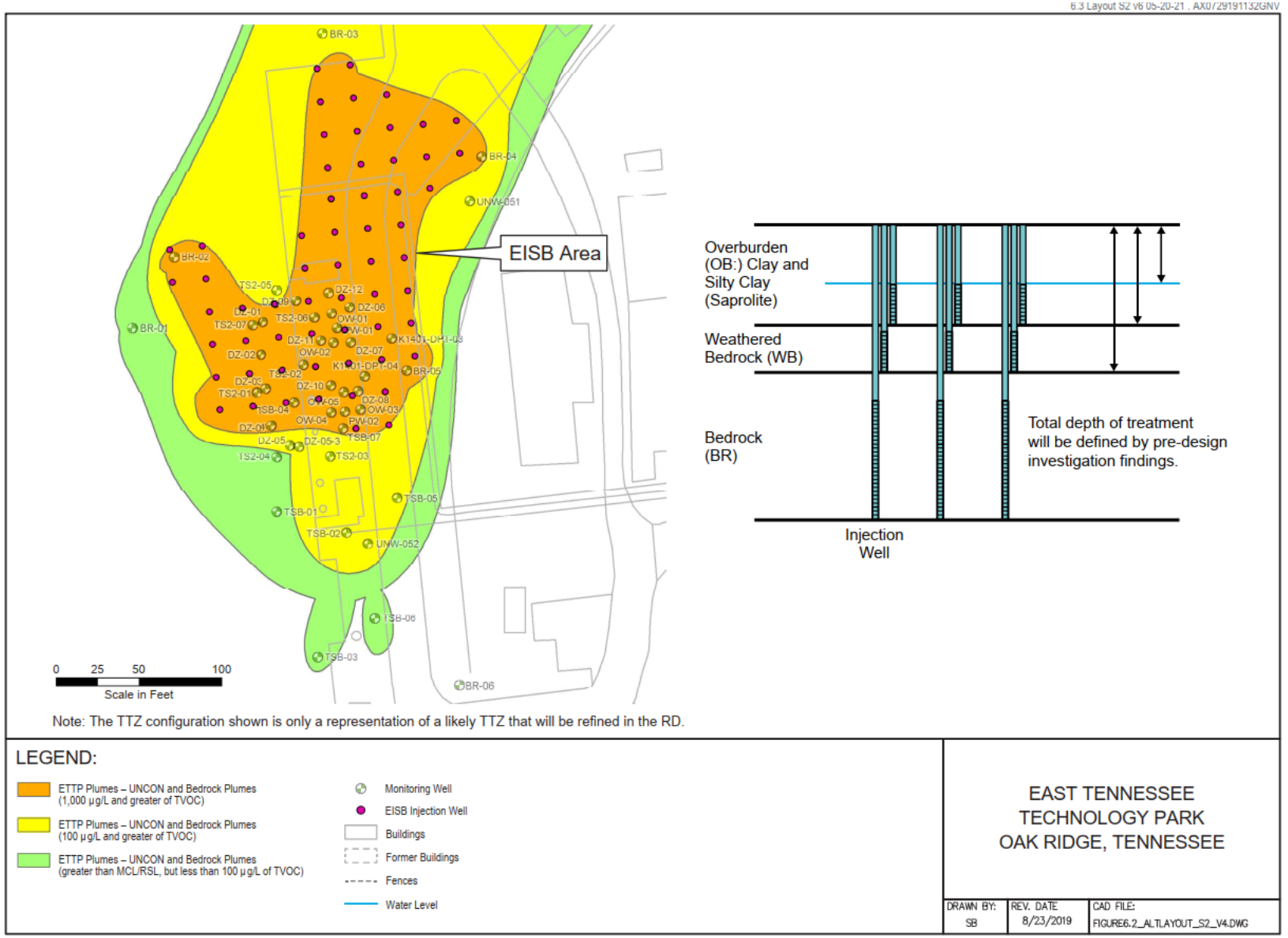
Interim Remedial Action Objectives for the Main Plant Area

- In the ETTP Main Plant Area, Chlorinated Volatile Organic Compounds (CVOC) present the greatest human health risks in groundwater
- The groundwater plume areas addressed in this Interim Record of Decision are the areas where the greatest solvent contaminant mass has been observed
- The interim remedial action objective is to substantially reduce CVOC contaminant mass in these areas
- The target performance metric is to reduce contaminant concentrations below 1000 µg/L for individual CVOCs

Components of the Remedy

- Bioremediation is a proven technology that encourages microorganisms to destroy or detoxify organic contaminants in the environment
- Requires injecting a carbon substrate, such as vegetable oil, into a network of injection wells to feed and enhance the natural microbial population
- The exact substrate, number of injections, and injection rates will be determined in the project design phase

Conceptual Design for Enhanced In Situ Bioremediation Injection Wells



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Public comment period

April 5 through May 19, 2023

DOE will accept written comments on the Proposed Plan at any time during the public comment period. Formal comments should be written and submitted to:

Mr. Roger Petrie
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P.O. Box 2001
Oak Ridge, TN 37831

or

OakRidgeEM@orem.doe.gov.

Scan to view Proposed Plan

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Proposed Plans for Future Decision Areas