



# Fort George G. Meade

## Closed Sanitary Landfill (CSL) FGGM - 17

### Restoration Advisory Board Meeting September 18, 2014





# Presentation Agenda

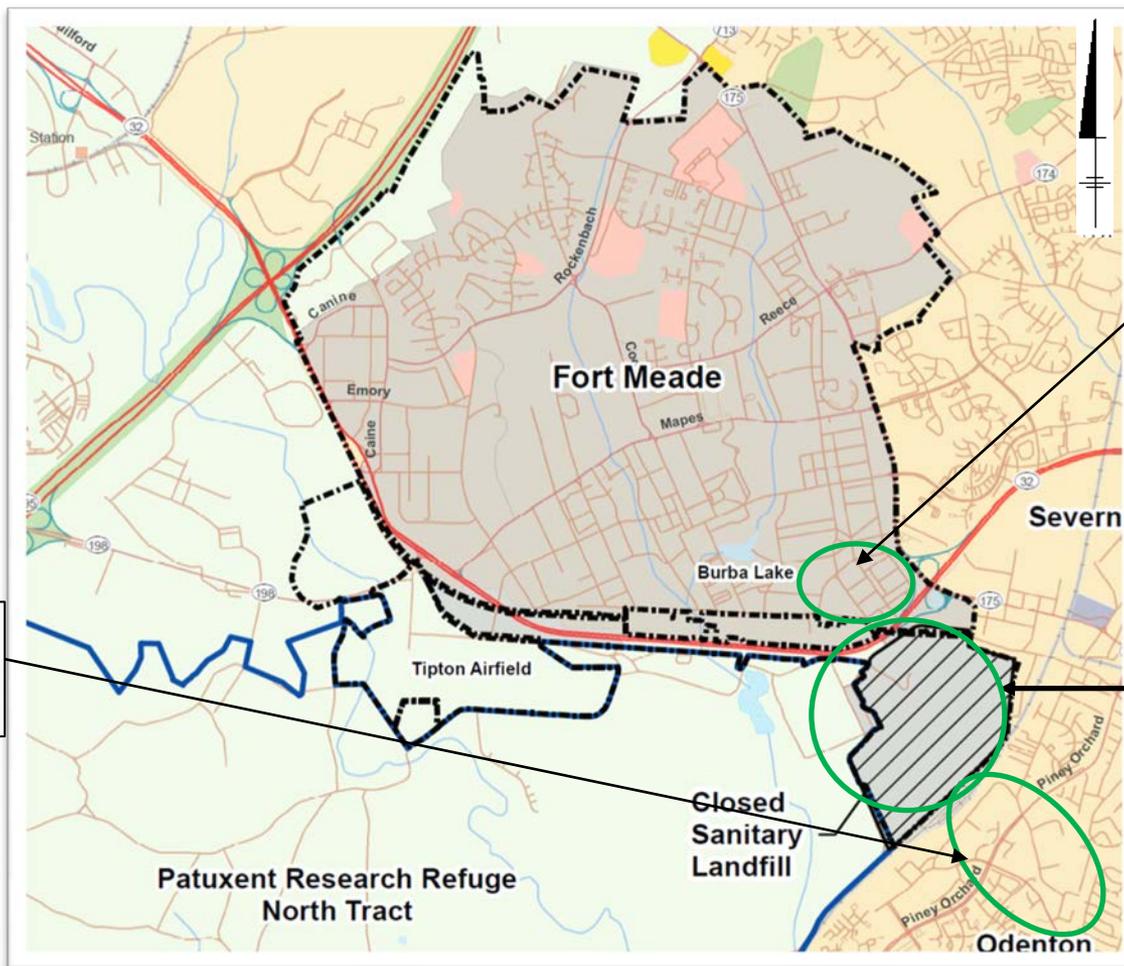


- Site Information
  - Location
  - History
- Field Investigations
  - Summary of Findings
- Risk Assessment Results
- Feasibility Study Summary
- Draft Proposed Plan Recommendation
- Schedule





# CSL Site Location



*Off-Site Lower Patapsco Aquifer GW Issues*

Operable Unit-4

Closed Sanitary Landfill





# Site Use and History



- Used as the Installation landfill from 1958 to 1996 and received “mixed residential, commercial, and non-hazardous industrial waste”
- All cells closed under the Maryland Department of the Environment solid waste requirements through the Resource Conservation and Recovery Act program
  - Cell 1 capped and closed between 1995 to 1997
  - Cell 2 capped and closed between 1997 to 1998
  - Cell 3 received less waste and no cap was required—Cell 3 not part of this contract. Additional work to be conducted in 2015





# Closed Sanitary Landfill



Route 32



Installation Boundary

Piney Orchard Pkwy





# Regulatory Status



- Under the Maryland Department of the Environment solid waste permit requirements semi-annual groundwater (GW) and surface water (SW) sampling has been conducted in the Upper Patapsco Aquifer since 1994 and in the Lower Patapsco Aquifer since 2000
- This sampling continues as part of the Maryland Department of the Environment Solid Waste Post Closure Care requirements (since 1996) as well as methane venting and monitoring
- Methane concentrations are minimal (insufficient to maintain a flare at the recovery system)





# Remedial Investigation Activities



- Remedial Investigation fieldwork between 2001 and 2005 under the Comprehensive Environmental Response, Compensation, and Liability Act
  - Groundwater samples collected on and off site to evaluate the impact of the waste materials and other historical site activities
  - Surface water and sediment samples collected to assess the impacts of runoff from the landfill areas
  - Surface soil samples collected to assess potential direct contact exposures





# Soil Data



- Surface and subsurface soil samples collected from across the site indicated:
  - Minimal impacts (other than capped sanitary waste)
  - Polychlorinated biphenyls were detected above screening criteria at 1 location
  - Arsenic was the only other analyte detected above the industrial screening criteria up to a concentration of 8.6 mg/kg. While this is slightly above background arsenic is a common naturally occurring element in this area





# Surface Water and Sediment Data



- Surface Water and Sediment data collected across the site did not have concentrations above screening criteria.





# Groundwater Data

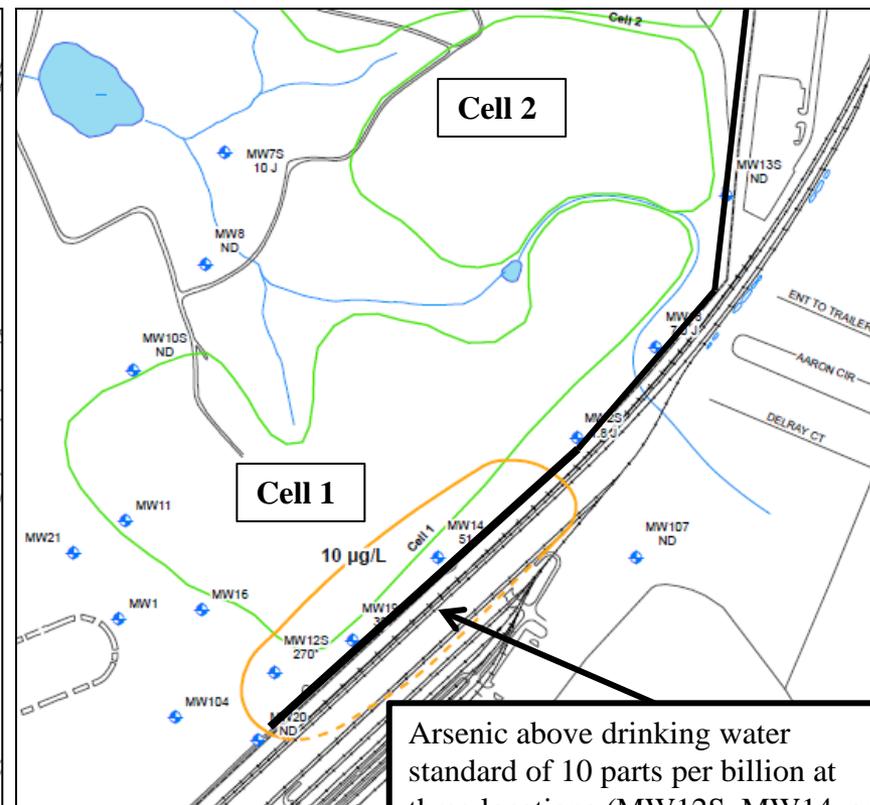
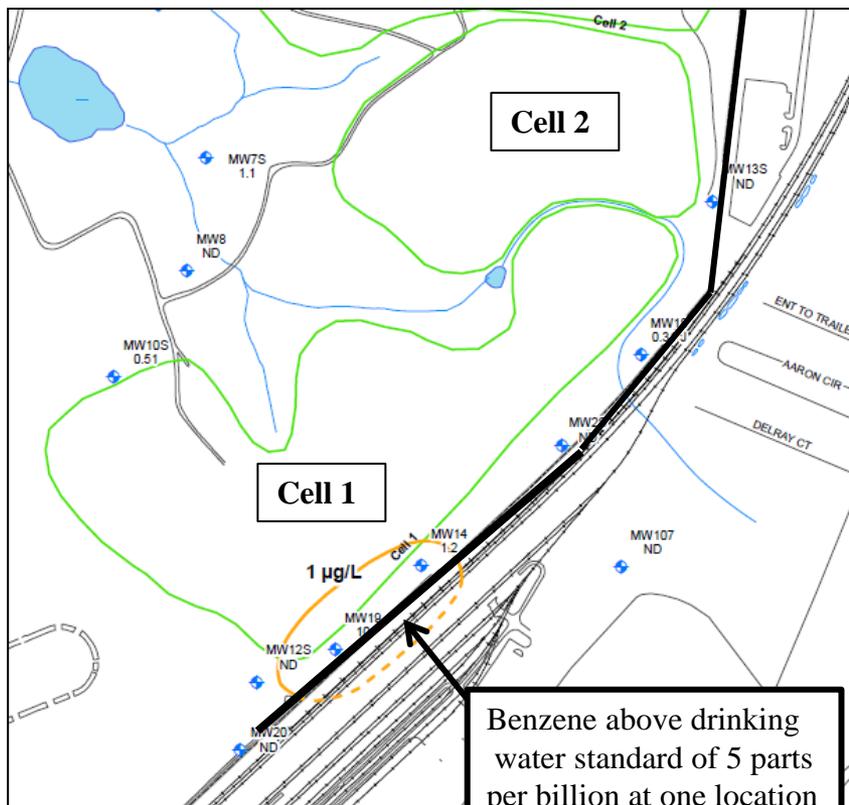


- Remedial Investigation fieldwork included monitoring well installation and sampling on and off-post
- Long term monitoring of groundwater has been occurring semi-annually since 1994.
- This extensive data set indicates that in general only arsenic, benzene, and nitrate are consistently detected above associated drinking water standards
- Sporadic detections of other metals have occurred and are assessed as part of the risk assessment process





# Benzene and Arsenic Detections in Groundwater



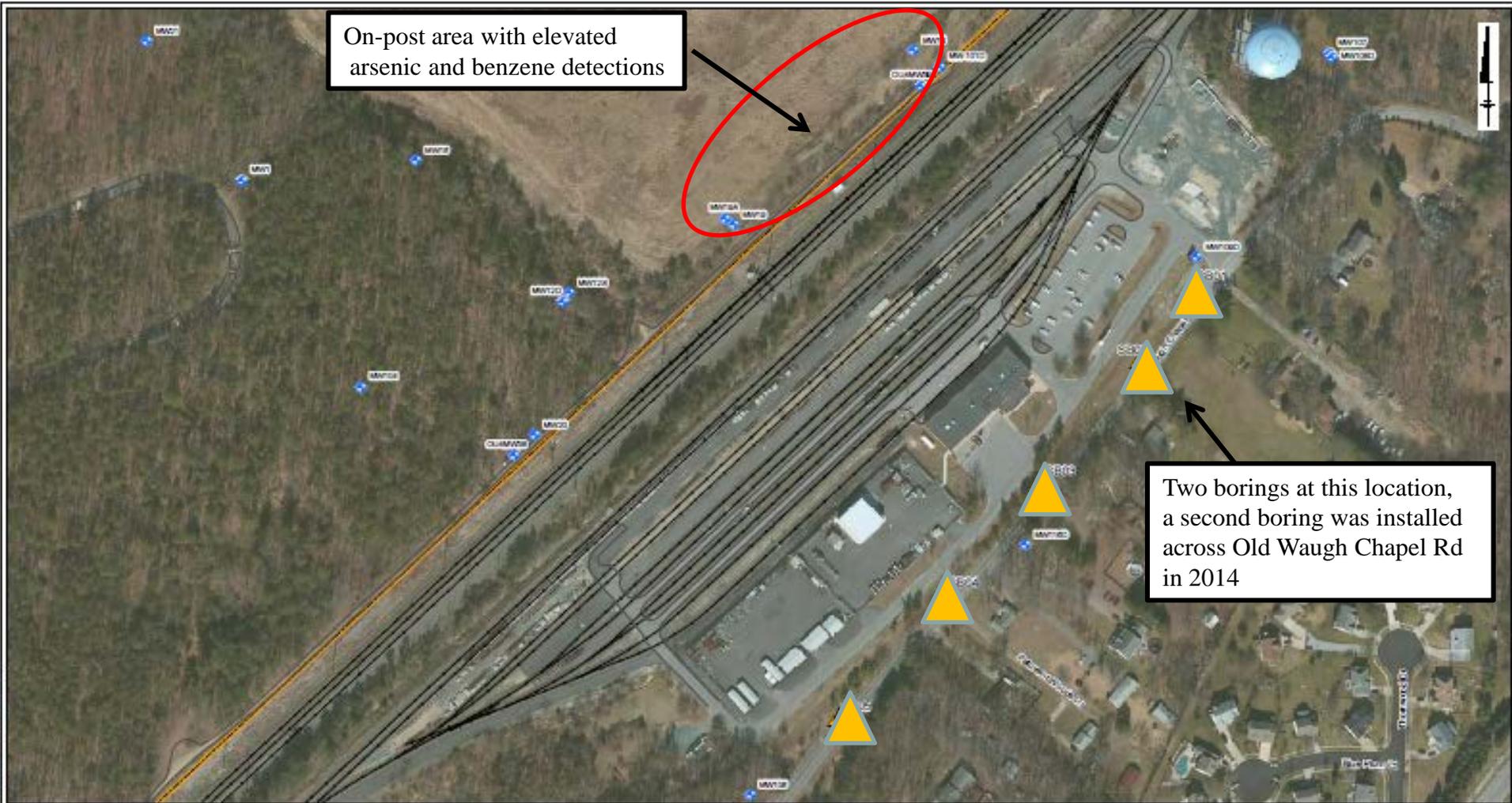


# Off-Post Investigations



- In response to requests from the Maryland Department of the Environment additional work was conducted in 2013 and 2014 to assess if benzene and arsenic extended off-post
- One additional monitoring well was installed on-post
- 6 geoprobe borings were advanced off-post in the Anne Arundel County Right-of-Way
- Groundwater samples were collected for benzene and arsenic



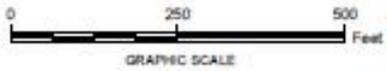


On-post area with elevated arsenic and benzene detections

Two borings at this location, a second boring was installed across Old Waugh Chapel Rd in 2014

LEGEND:

- SOIL BORING
- MONITORING WELL
- CURB
- RAILROAD
- INSTALLATION BOUNDARY



NOTES:

IMAGERY ACCESSED THROUGH BING MAPS AERIAL VIA ARCGIS ONLINE LAYER PACKAGES BY ESRI (12/1/2010) (C) 2010 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS ACCESSED ON 4/19/2013 THROUGH ARCGIS 10

CLOSED SANITARY LANDFILL FORT GEORGE G. MEADE, MARYLAND	
CSL BENZENE DELINEATION SOIL BORING LOCATIONS	
	FIGURE 2

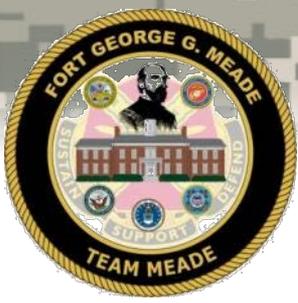


# Results of Additional Groundwater Investigation



- Benzene was not detected off-post above its drinking water standard (detected at a maximum concentration of 1.8 ppb)
- Arsenic was detected above the drinking water standard in three samples from two off-post locations (SB05 and SB-06) (up to 44 parts per billion)

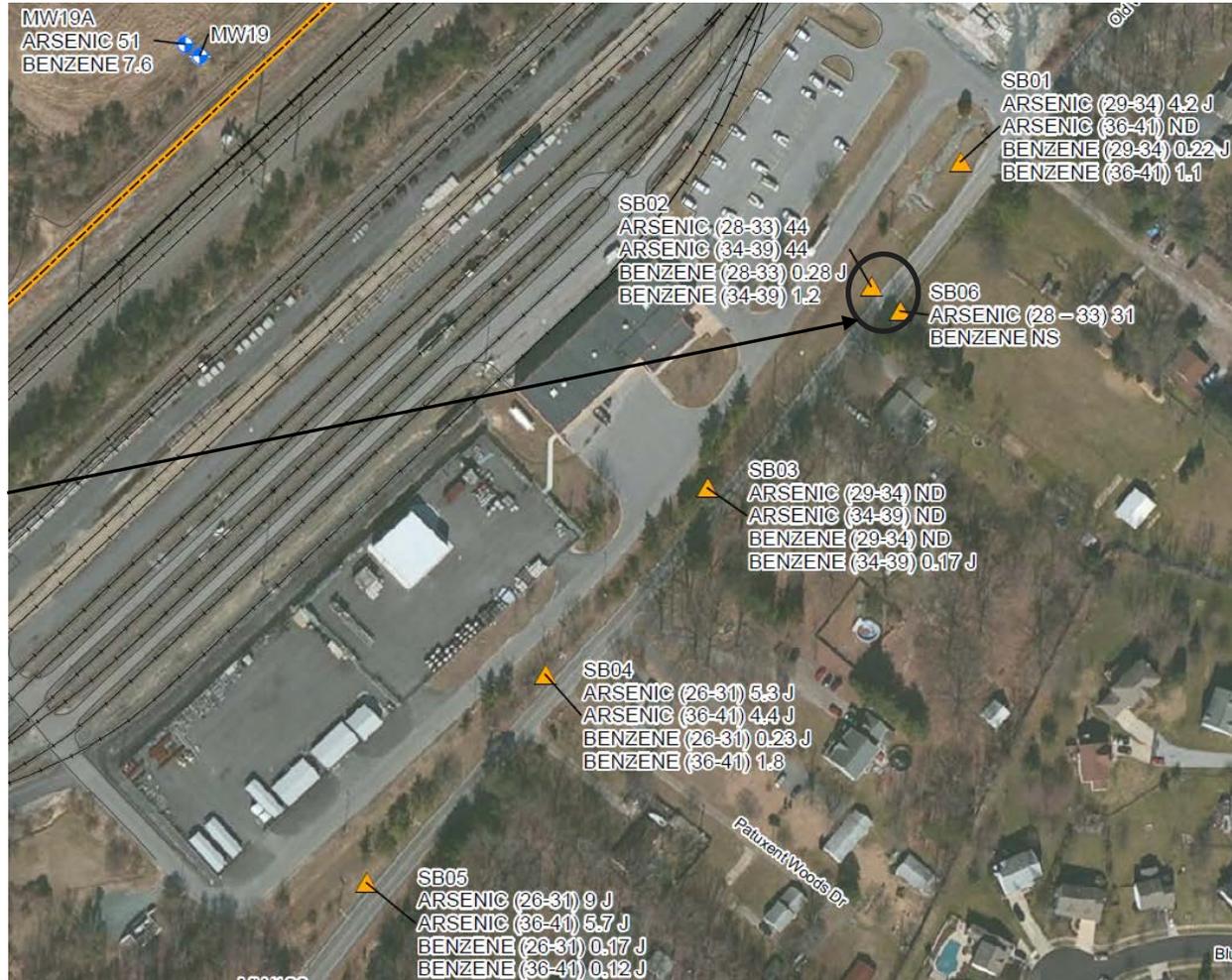




# Investigation Results



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Benzene was not detected above its drinking water standard of 5 parts per billion off-post

Arsenic was detected above its drinking water standard of 10 parts per billion in 3 samples from 2 off-post borings





# Summary of Groundwater Conditions



- Benzene and arsenic are present above drinking water standards at the property line in a localized portion of the southwest corner of the Closed Sanitary Landfill
- Arsenic concentrations above standards are present off-site
- Sporadic and scattered detections of metals driving risk have been documented by the long term semi-annual monitoring
- Groundwater is the only medium driving unacceptable risks





# Feasibility Study



- Feasibility Study evaluated options to address low-level scattered metals exceedances and the benzene/arsenic issues at the property boundary
- Land-use controls (prohibiting groundwater use) included in all options
  - On-post implemented through the Army Master Land-use Plan
  - In discussions with the County for mechanisms to control future groundwater use off-post (no current receptors)
- Specific remedies also evaluated to stop further migration of benzene and arsenic off-post





# Feasibility Study Alternatives



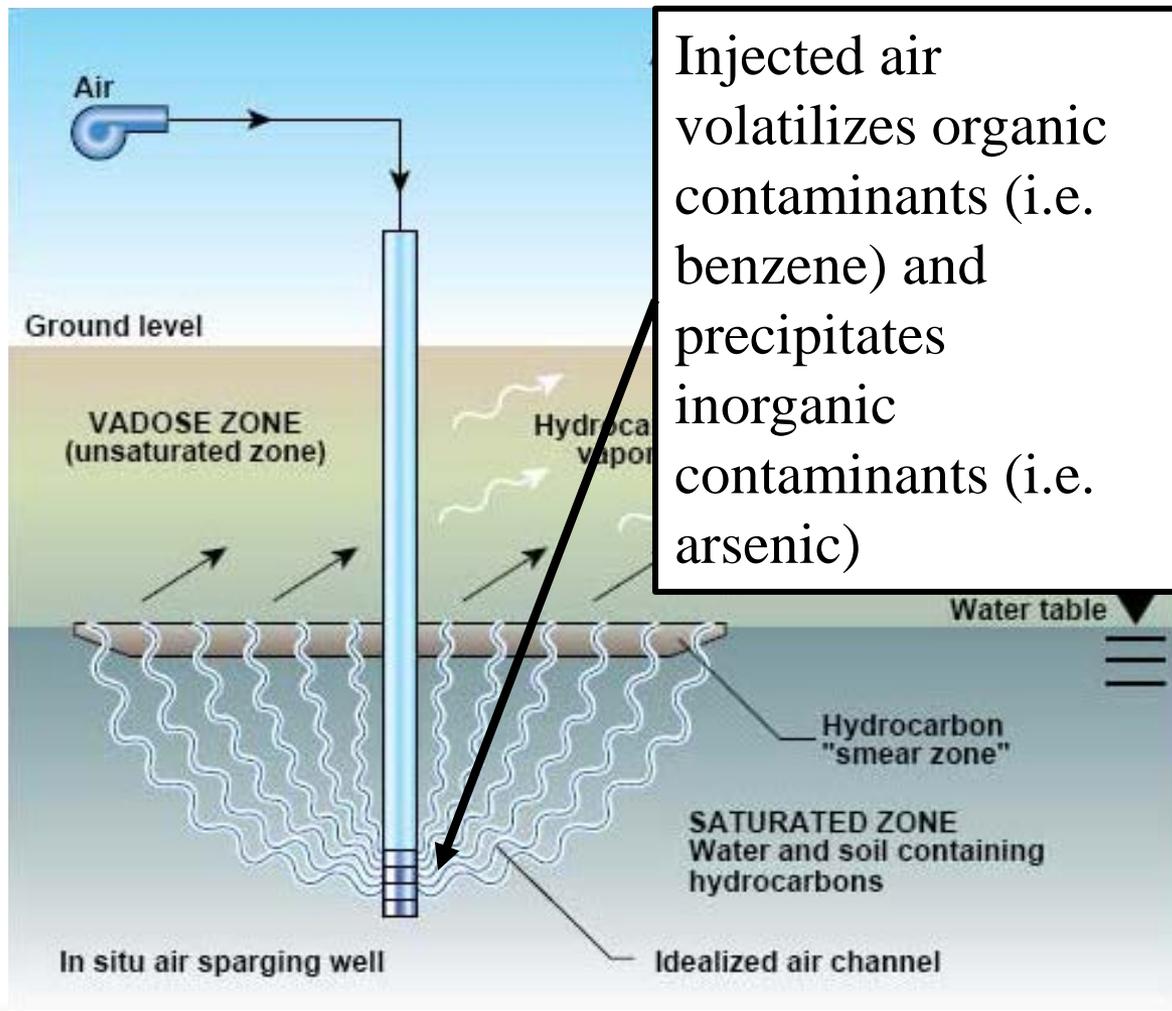
- **Alternative GW-1 - No Action**
- **Alternative GW-2 – Monitored Natural Attenuation (MNA)/Land Use Controls**
  - Monitor benzene and arsenic along the property line to assess rates of natural decline
  - Approximate capital costs = \$9,900
  - Approximate present worth operation and aintenance costs = \$28,600
- ***Alternative GW-3 – Aquifer Air Sparging /Land Use Controls***
  - 1,000 ft sparge curtain placed along the property line
  - Approximate capital costs = \$436,300
  - Approximate present worth operation and maintenance costs = \$1,242,300
- **Alternative GW-4 – Permeable Reactive Barrier/Land Use Controls**
  - 1,000 ft PRB to a depth of 40 ft
  - Approximate capital costs = \$3,539,400
  - Approximate present worth operation and maintenance costs = \$404,300



# Air Sparging Diagram

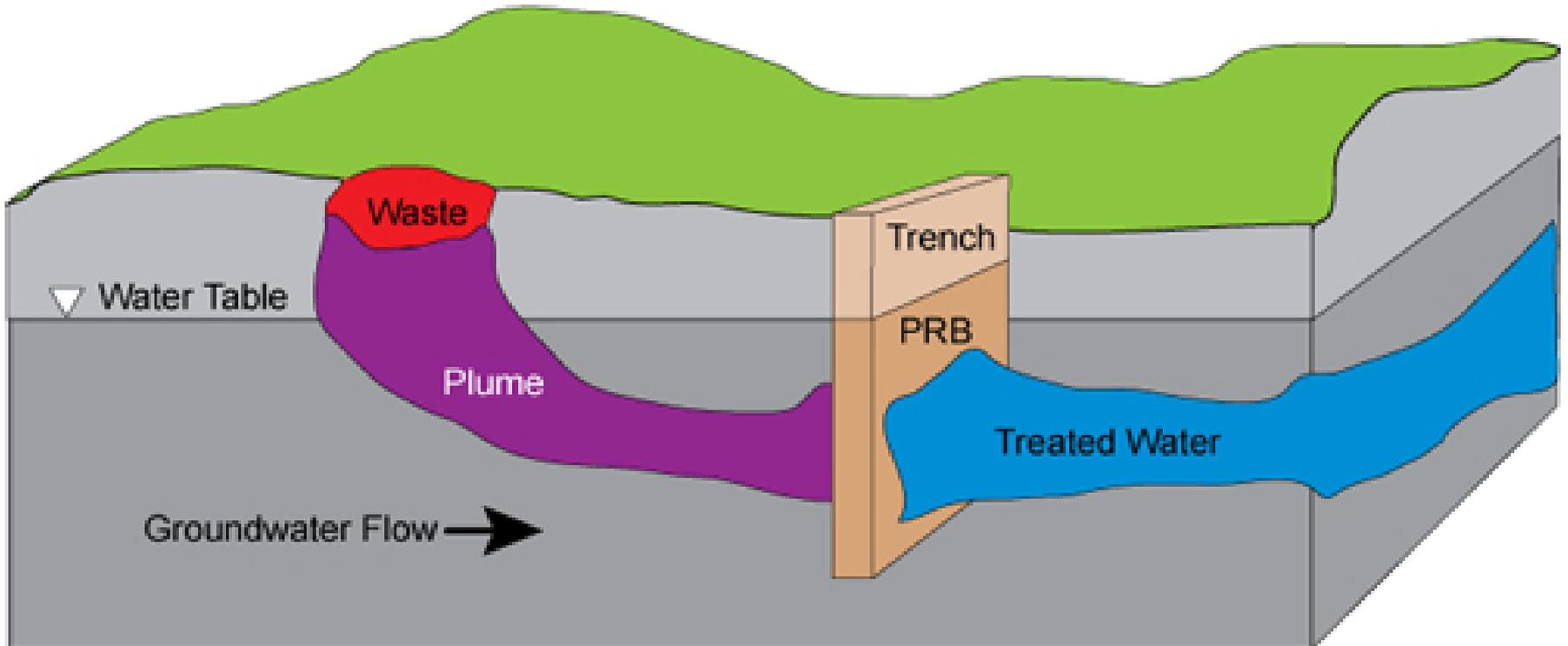


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# Permeable Reactive Barrier Diagram





# Preferred Alternative



- GW-3 – Aquifer Air Sparging/Land Use Controls is the likely recommended remedial alternative in the Proposed Plan
  - Is protective of human health and the environment by eliminating potential exposure
  - Incorporates active remediation to reduce toxicity, mobility and volume of contaminants at the southeast property boundary
  - Equally effective as Alternative 4 yet significantly more cost effective
- Landfill post-closure monitoring would also continue





# Air Sparge Conceptual Layout



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# Schedule



- Feasibility Study under Army review (will be submitted to stakeholders this month)
- Proposed Plan under Army review and anticipated to be available to the public in the late fall with the public meeting requesting comments scheduled at the same time
- The Record of Decision and remedy itself scheduled for 2015-2016





# Questions/Comments?





# Glossary



## **Comprehensive Environmental Response, Compensation, and Liability Act**

**(CERCLA):** This federal law was passed in 1980 and is commonly referred to as the Superfund Program. It provides for liability, compensation, cleanup, and emergency response in connection with the cleanup of inactive hazardous waste disposal sites that endanger public health and safety or the environment.

**Remedial Investigation (RI):** An investigation under CERCLA that involves sampling environmental media such as air, soil, and water to determine the nature and extent of contamination and human health and environmental risks that result from the contamination

**Feasibility Study (FS):** This CERCLA document reviews the risks to humans and the environment at a site, and evaluates multiple remedial technologies for use at the site. Finally, it identifies the most feasible Response Actions.

**Long Term Monitoring (LTM)** – LTM is conducted to monitor the performance of the remedy over time. LTM includes groundwater sampling and reporting.





# Glossary (Cont'd)



**Preferred Remedy**– The MEC remediation approach that appears to best meet acceptance criteria; the remedial option proposed for implementation in the ROD.

**Record of Decision (ROD):** This legal document is signed by the Army and the USEPA and will be reviewed by the MDE for concurrence. It provides the cleanup action or remedy selected for a site, the basis for selecting that remedy, public comments, responses to comments, and the estimated cost of the remedy.

**Operation and Maintenance (O&M):** Annual post-construction cost necessary to ensure the continued effectiveness of a Response Action

**Land Use Controls (LUCs)** – LUC are physical, legal, or administrative mechanisms that restrict use of or limit access to, real property, to manage risks to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and/or physical barriers to limit access to real property, such as fences or signs.





# CSL Hydrogeologic Setting

