

Fort Detrick, Maryland

Off-Post Private Well Investigation and
Associated Activities



Restoration Advisory Board Meeting
6 February 2013

Imagine the result



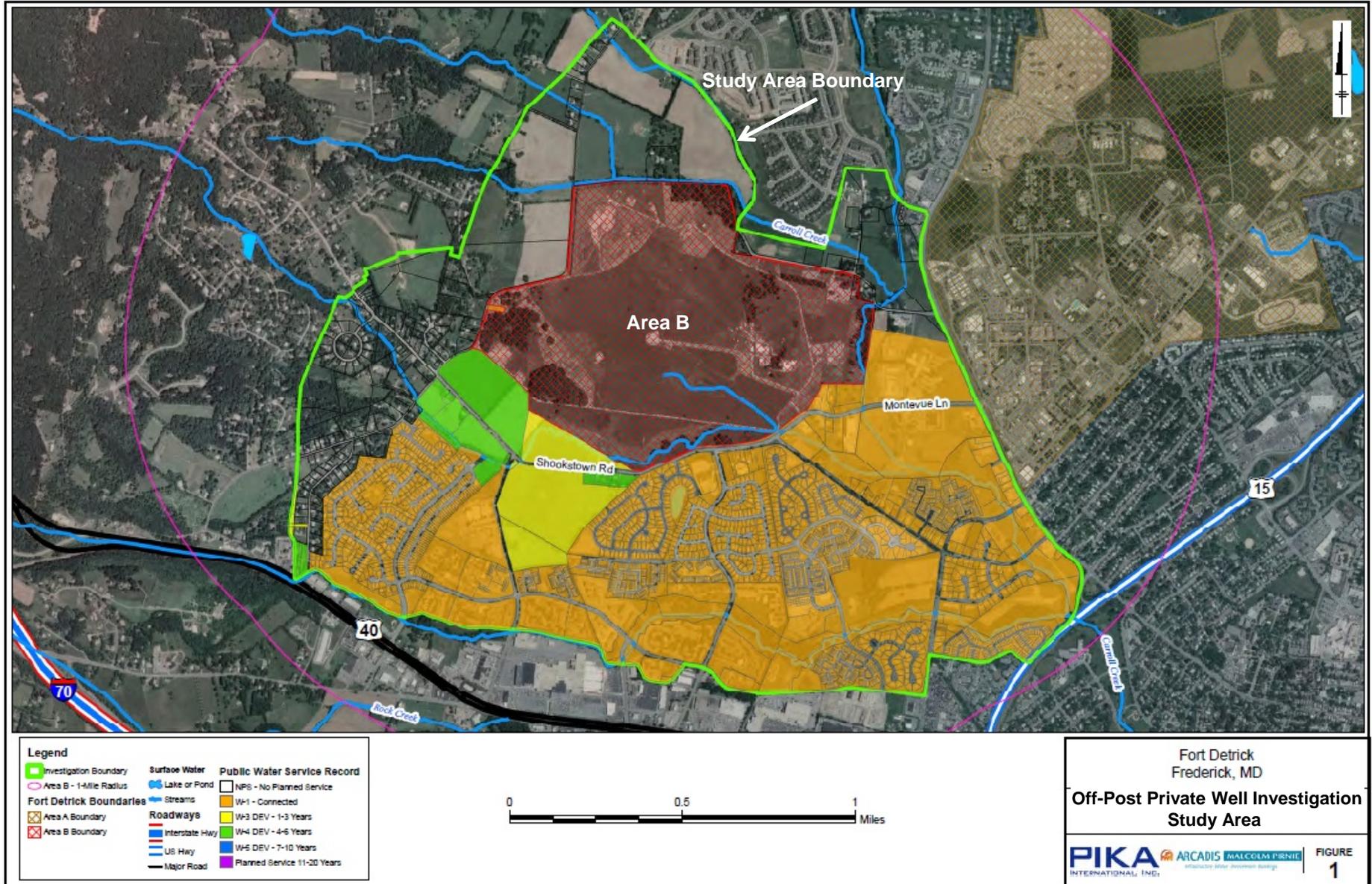
Off-Post Private Well Investigation Study Basis

- To document known and potentially unknown drinking-water wells in use surrounding Fort Detrick's Area B in a comprehensive report.
- To expand Fort Detrick's current drinking-water well sampling program and to compile all data into a comprehensive data set.
- To further verify that the volatile organic compounds emanating from Area B have not affected drinking-water wells in the surrounding community.

Off-Post Private Well Investigation Study Area

- Approximately 1,368 acres surrounding Area B.
- Approximately 2,522 Parcels Identified in the Study Area.
 - Approximately 149 parcels outside of public water service area.
 - Verified the drinking-water source for parcels in the City of Frederick through research.

Study Area



Fort Detrick
Frederick, MD

**Off-Post Private Well Investigation
Study Area**



FIGURE
1

Off-Post Private Well Investigation Summary of Project Activities

| | |
|---|---|
| ✓ Identify/verify drinking water wells through research | Sept-Oct 2012 |
| ✓ Public Outreach (Mailings, Newspaper Announcement) | Sept-Oct 2012 |
| ✓ Public Meeting | October 2012 |
| ✓ Private Well Survey | November 2012 |
| ✓ Certified Letters (Third Mailing) | January 2013 |
| ▶ Private Well Sampling | Nov-Dec 2012 (main effort) Jan-Feb 2013 (certified letter responses) |
| ▶ Reporting Results to Residents | Jan-April 2013 60 days after sampling event |

Grey = completed

Off-Post Private Well Investigation Timeline for Project Activities Completed

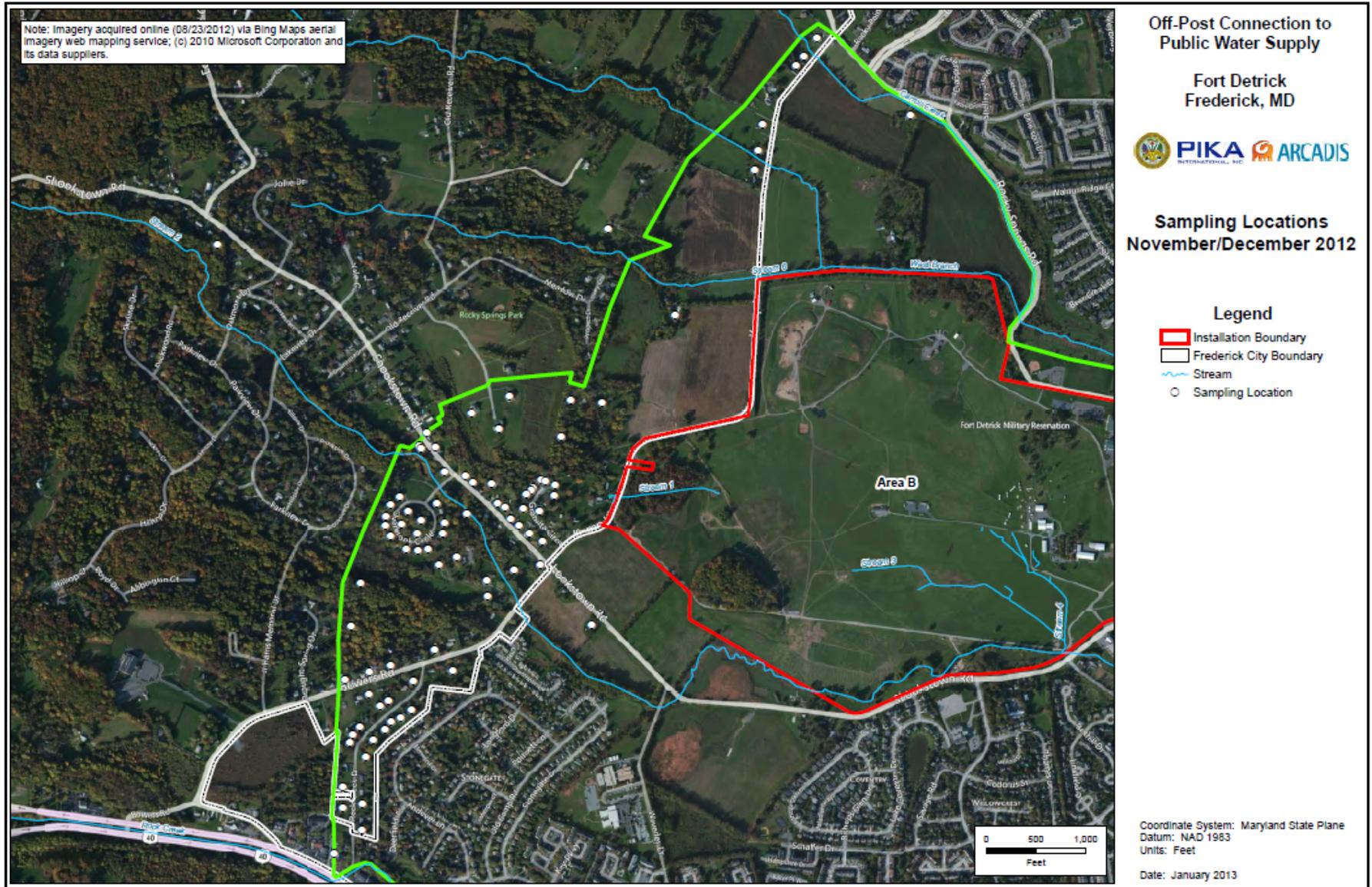
- Mailing:
 - 1st September 28th - project announcement
 - 2nd October 24th - three letter types sent to residents with and without public water
 - 3rd January 2nd - 32 certified letters sent to non-responsive homeowners
- Initial Public Information Session: October 16th
- Door-to-Door Survey:
 - November 5th-7th in areas not supplied by public water.
 - 135 residences visited, and
 - 85 residents agreed to participate.

Off-Post Private Well Investigation Timeline for Project Activities Completed (Continued)

➤ Private Well Sampling:

- November 26th through December 19th, January 29th
- 90 wells sampled (88 properties)
- Wells analyzed for Volatile Organic Compounds (VOCs)
- Additional properties have been added as a result of the certified letter responses.
 - 32 letters mailed January 2nd, 2013
 - 4 ROEs received as of February 5th, 2013
 - 3 wells sampled January 29th (one pending)

Off-Post Sampling Locations



Overview Off-Post Sampling Results

- No VOCs detected in 61 of 87 wells sampled through December 2012.
- All but one detection below the laboratory reporting limits (very low levels).
- Seven VOCs detected (25 wells 1 detection & 1 well with 2 detections)
- All concentrations well below federal drinking water standards.
- Based on concentrations detected no immediate public health concern indicated.
- Detections unlikely associated with Area B groundwater based on:
 - Current understanding of groundwater flow direction (eastward away from private wells sampled)
 - Distribution of detections across study area and in relation to Area B.
 - Properties are topographically “higher” than Area B and hydraulically upgradient/side gradient.

Off-Post Detections (Nov-Dec 2012)

| Chemical | Description/Use | Number of Detections | Range of Detections (ppb) | Drinking Water Standard (ppb) ^a |
|----------------------|---|----------------------|---------------------------|--|
| TCE | Solvent | 1 | 0.2 J | 5 |
| Chloroform | Drinking water disinfectant byproduct | 8 | 0.1J-0.3 J | 70 ^b |
| MTBE | Gasoline additive | 14 | 0.1J-0.4 J | 12 ^c |
| 1,2-Dichlorobenzene | Paint and insecticide additive | 1 | 0.9 | 600 |
| 2-Butanone | Car exhaust component, cleaning agent | 1 | 2.7 J | 4,900 |
| Benzene | Gasoline component | 1 | 0.3 J | 5 |
| Styrene | Car exhaust component, plastics component | 1 | 0.4 J | 100 |
| <i>No Detections</i> | 61 wells | | | |

ppb: parts per billion = µg/L J: estimated concentration, near/at laboratory detection limits below reporting limits

^a *Drinking Water Standard: US Environmental Protection Agency (USEPA) Maximum Contaminant Level*

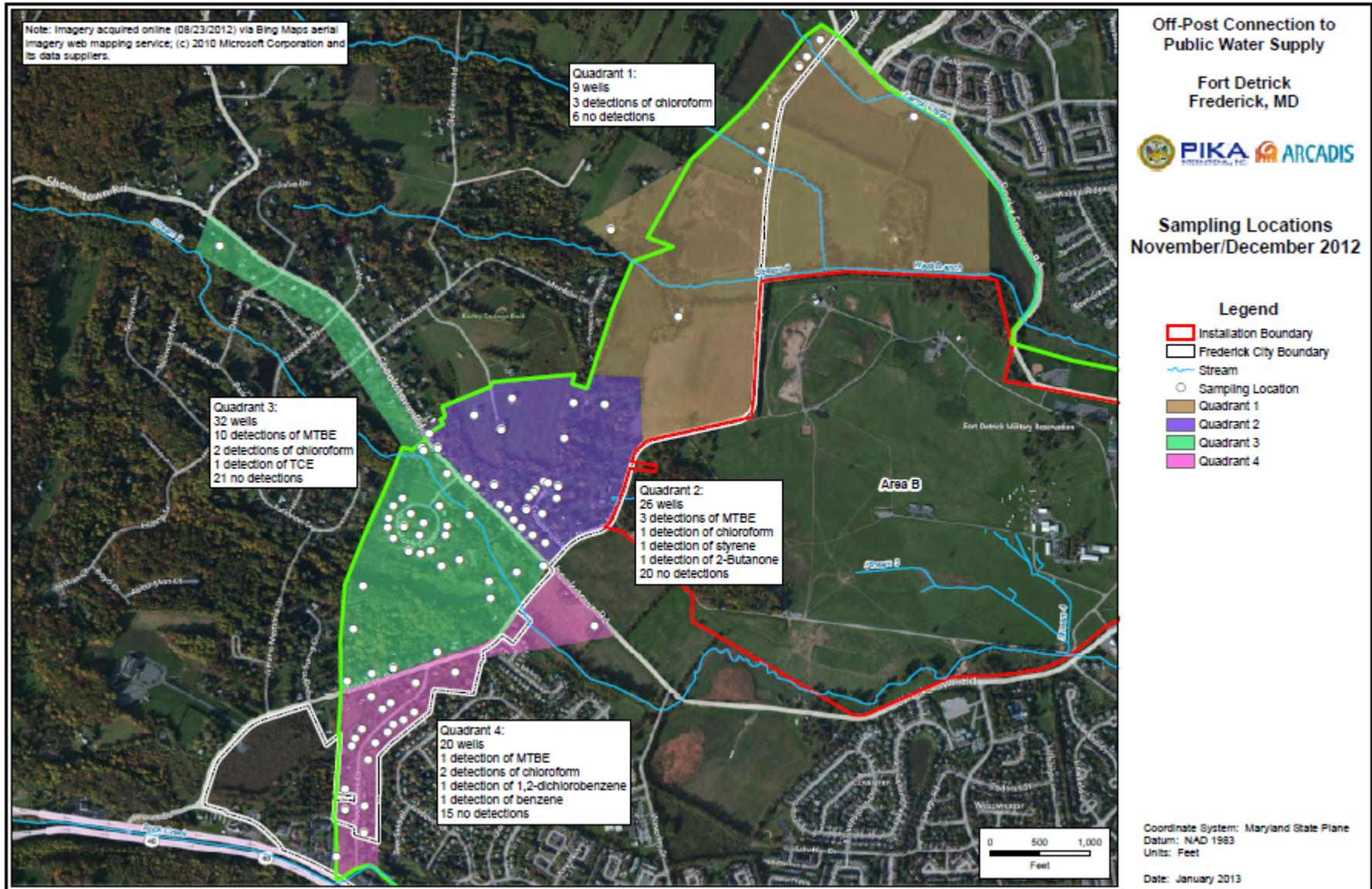
^b *Drinking Water Standard for Chloroform: Maximum Contaminant Level Goal (MCLG)*

^c *Drinking Water Standard for MTBE: USEPA Risk Based Limit (RBC)*

Notes: No Detections associated with Area B Groundwater.

Data on 3 wells sampled in January 2013 still preliminary – not reported in table.

Off-Post Detection Locations



Sampling Results

➤ MTBE:

- Detected in 14 wells - max of 0.4 J ppb below 12 ppb RBC.
- First detection on Area B in April 2012 max concentration of 0.2 J ppb,
- Detected in an upgradient private well at a max concentration of 1.4 ppb in 2002,
- Used since 1979 as an octane enhancer in gasoline,
- Highly unlikely detections are associated with Area B groundwater based on:
 - Current understanding of groundwater flow direction,
 - Properties are topographically “higher” than Area B and hydraulically upgradient / side gradient, and
 - No history of underground gasoline storage tanks on Area B.

Sampling Results (continued)

➤ TCE:

- One very low detection of 0.2 J ppb below MCL of 5.0 ppb
- Current and historical detects in Area B groundwater at levels exceeding MCL.
- Confirmation sample collected on January 29th (waiting on full data package and data validation report)
- Detection is unlikely associated with Area B groundwater based on:
 - Groundwater flow direction,
 - No detections in multiple wells between Area B and subject well,
 - Well located ~1/4 mile away, and
 - Property is topographically “higher” than Area B / hydraulically side gradient.

Sampling Results (continued)

➤ Chloroform:

- Detected in 8 wells - max of 0.3 J ppb below 70 ppb MCLG.
- Current and historical detections in Area B groundwater at levels exceeding MCLG.
- Drinking water disinfection byproduct commonly found in public water supplies and formed when chlorine reacts with organic matter.
- Given wide distribution (all quadrants) and low concentrations a single source is highly unlikely. Most probable sources include:
 - Property owners' well disinfection activities, and
 - Infiltration from residential septic drainfields (i.e., bleach from laundry wastewater) into groundwater.
- Detections unlikely associated with Area B groundwater based on:
 - Current understanding of groundwater flow direction, and
 - Properties are topographically "higher" than Area B and hydraulically upgradient / side gradient.

Sampling Results (continued)

➤ Benzene:

- One very low detection of 0.3 J ppb below 5 ppb MCL
- Current and historical detections in Area B groundwater at levels exceeding MCL.
- Most commonly found in gasoline.
- Highly unlikely detection is associated with Area B groundwater based on:
 - Groundwater flow direction,
 - No detections in multiple wells between Area B and subject well,
 - Well located near outer limit of study area ~1/2 mile away, and
 - Property is topographically “higher” than Area B / hydraulically side gradient.

Sampling Results (continued)

- 1,2-Dichlorobenzene:
 - One very low detection of 0.9 ppb below 600 ppb MCL
 - Three historical (max 1.3 J ppb in 2000) and two current (max 2.0 J ppb) detections in Area B groundwater well below MCL.
 - Production of many products including wood preservatives, paints, and insecticides (termites);
 - Highly unlikely detection is associated with Area B groundwater based on:
 - Groundwater flow direction,
 - No detections in multiple wells between Area B and subject well,
 - Well located near the outer limit of the study area ~1/2 mile away, and
 - Property is topographically “higher” than Area B / hydraulically side gradient.

Sampling Results (continued)

➤ 2-Butanone:

- One very low detection of 2.7 J ppb below 4,900 ppb MCL
- Three historical (max 3.83 J ppb in 2008) and one current (2.5 J ppb) detections in Area B groundwater well below MCL.
- Released to the air from car and truck exhausts.
- Used in paints/coatings, glues and as a cleaning agent.
- Common laboratory contaminant.
- Highly unlikely detection is associated with Area B groundwater based on:
 - Groundwater flow direction,
 - No detections between Area B and subject well, and
 - Property is topographically “higher” than Area B and hydraulically upgradient.

Sampling Results (continued)

➤ Styrene:

- One very low detection of 0.4 J ppb below 100 ppb MCL
- One historical at 0.7 J ppb (2008) well below MCL and no current detections in Area B groundwater.
- Styrene is used to make plastics, synthetic rubber, resins, and insulators.
- Cigarette smoke, automobile exhaust, and some foods also contain small amounts of styrene.
- Highly unlikely detection is associated with Area B groundwater based on:
 - Groundwater flow direction,
 - No detections between Area B and subject well, and
 - Property is topographically “higher” than Area B and hydraulically upgradient.

Summary Off-Post Sampling Results

- Detections unlikely associated with Area B groundwater based on:
 - Groundwater flow direction (eastward away from private wells sampled)
 - Distribution of detections across study area and in relation to Area B.
 - Private wells topographically “higher” than Area B and hydraulically upgradient
- No VOCs detected in 61 of 87 wells sampled.
- All very low-level detections well below federal drinking water standards.
- Based on concentrations detected no immediate public health concern indicated.

Summary Off-Post Sampling Results

- Additional planned Area B Groundwater RI studies will enhance understanding of groundwater flow direction.
- Future Off-Post activities:
 - Additional monitoring well installation/monitoring,
 - Dye trace study,
 - Reporting confirmation/additional sampling results with property owners/residents, and
 - Overall results reporting (report and public meeting).