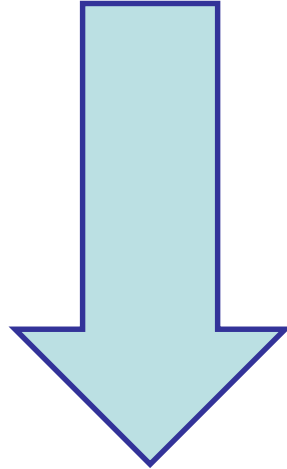


# **Broad Run Farms Civic Association Meeting Review of Remedial Investigation Hidden Lane Landfill**

**Mark Widdowson, Ph.D., P.E.**

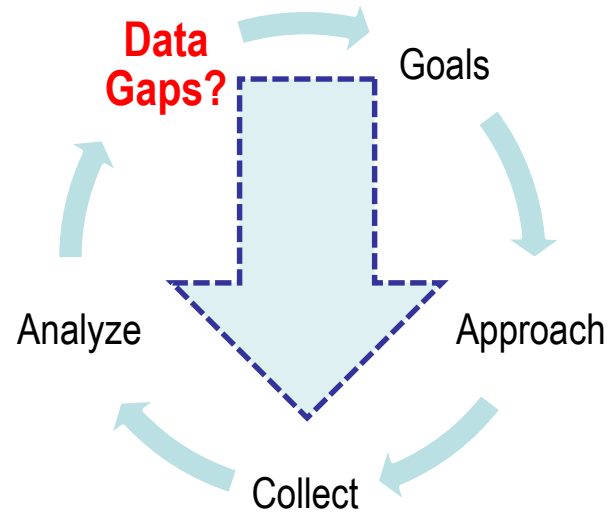
**June 21, 2016**

**Remedial Investigation (RI)**  
***(Diagnosis and Risk Assessment)***



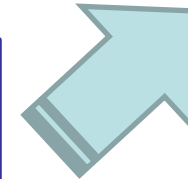
**Feasibility Study (FS)**  
***(Treatment)***

# Remedial Investigation (RI) (*Diagnosis and Risk Assessment*)



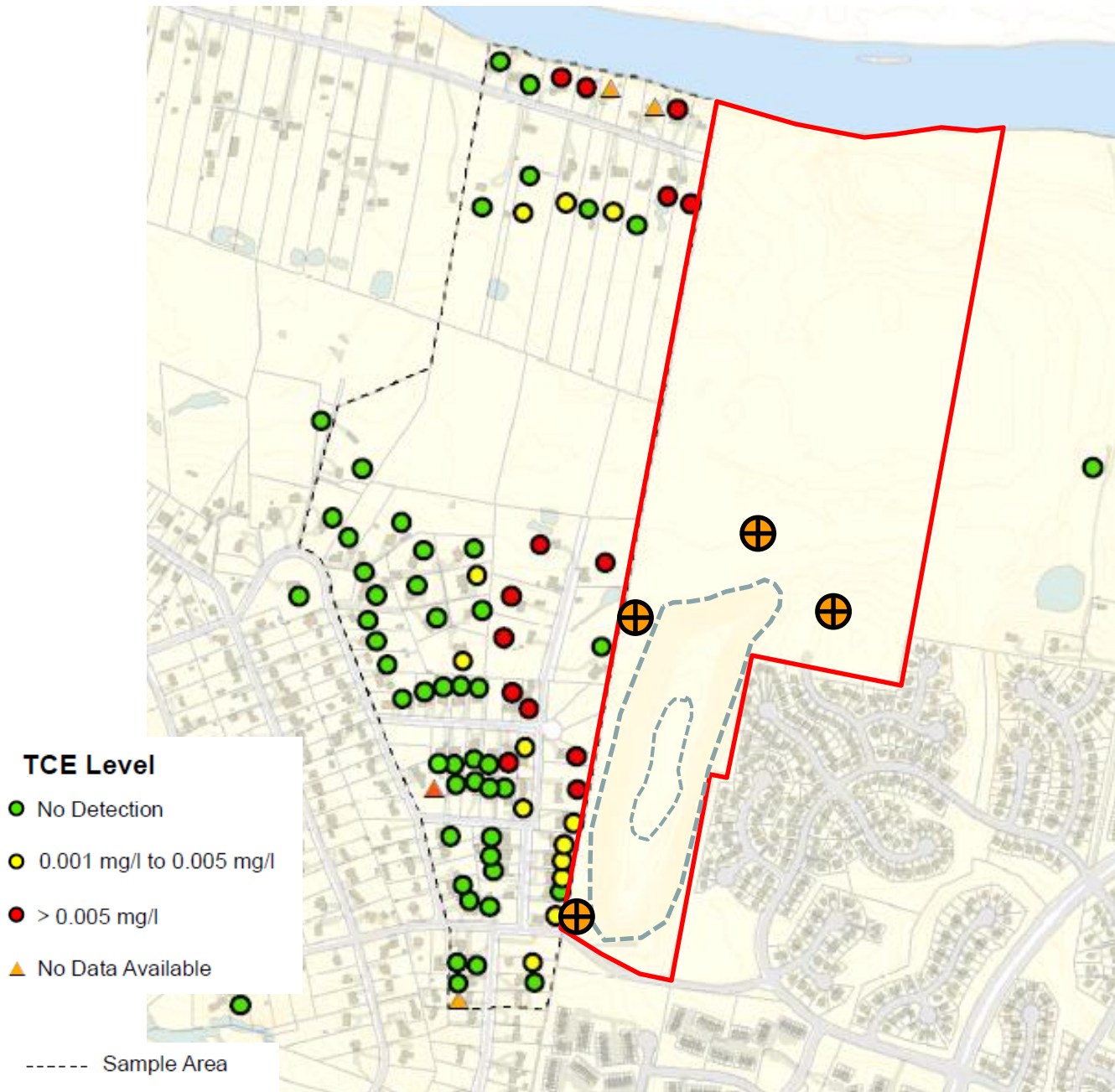
**Risk Abatement?**

**Feasibility Study (FS)**  
(*Treatment*)



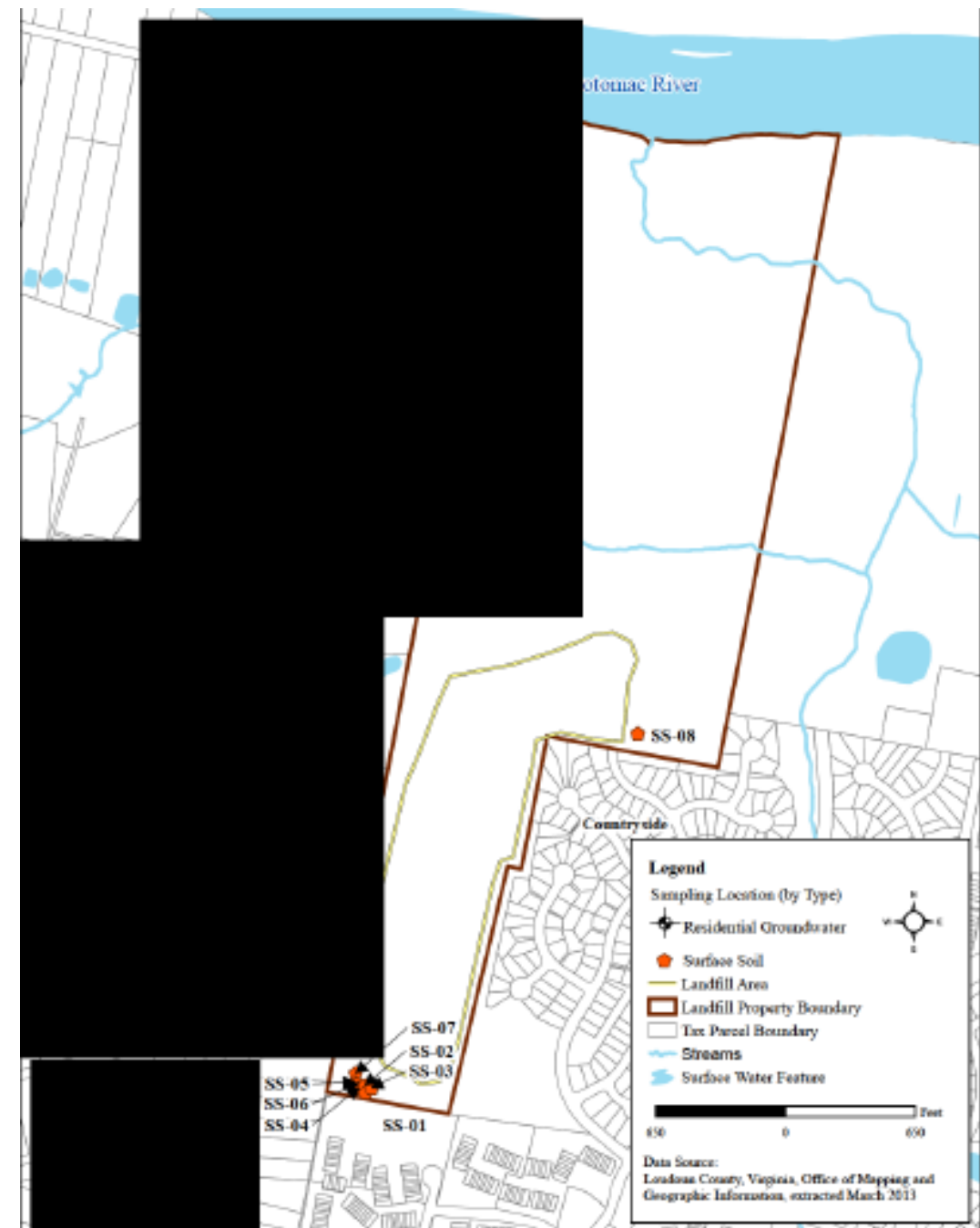
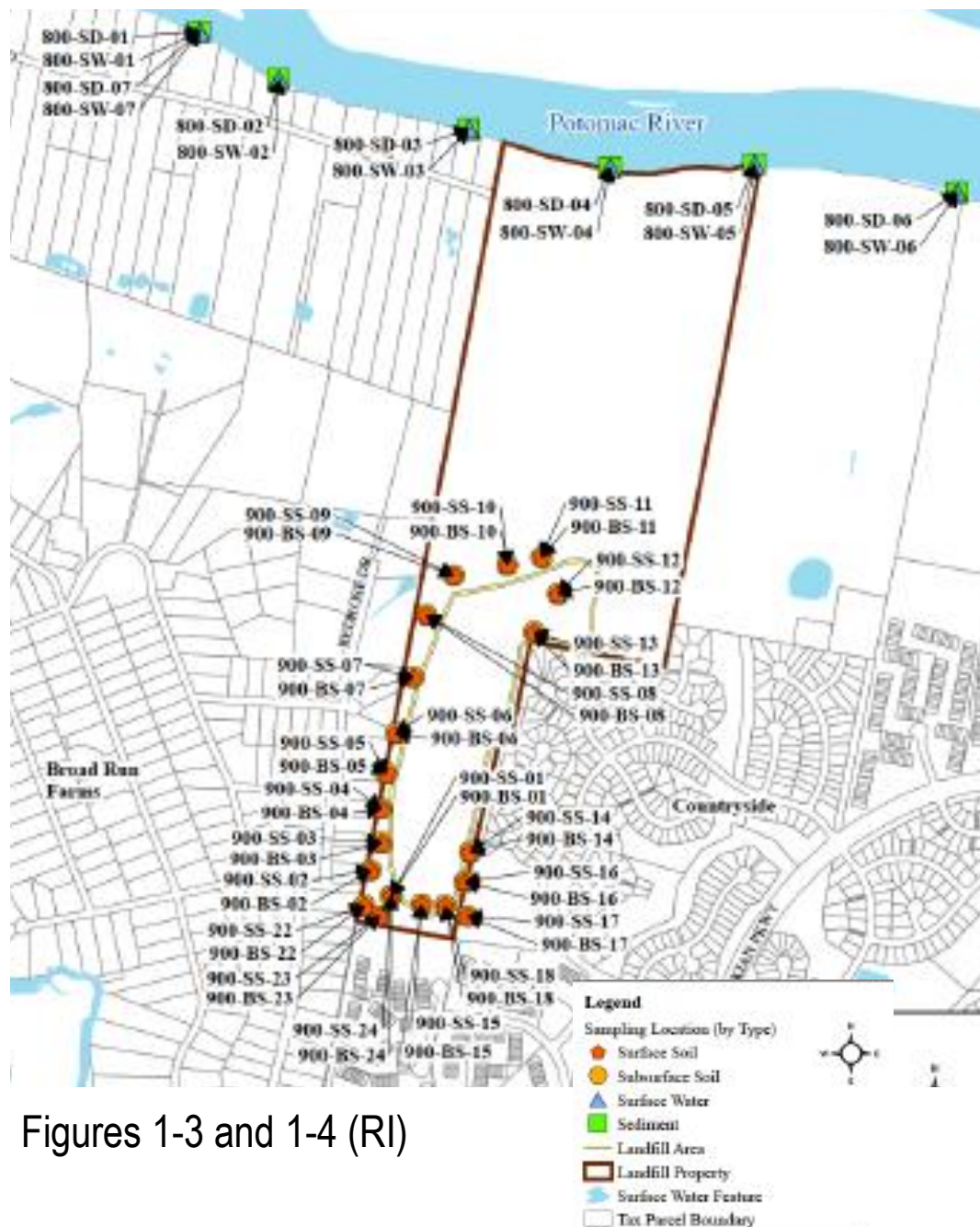
# Key Objectives – RI

1. What are the chemicals of potential concern (COPC)?
  - Groundwater
  - Sediment and Surface Water
2. What is the extent of landfill gas?
3. Evaluate fate and transport of contaminants
4. Assess risk
  - Human Health Risk Assessment (HHRA)
  - Ecological Risk Assessment (ERA)
5. Provide sufficient data for FS



## What was known pre-RI?

- ▶ TCE in groundwater above MCLs
- ▶ Methane in soil gas
- ▶ Metals above RSLs
  - Groundwater
  - Soil



Figures 1-3 and 1-4 (RI)



# TCE Contamination – Groundwater

## ► Phase 1

- 9 wells – 150 ft depth
- 2 screens per well (S/D)

## ► Phase 2

- 9 borehole wells – 300 ft depth
- Sampled at multiple depths

## ► Phase 3

- Extended 3 borehole wells to 500 ft

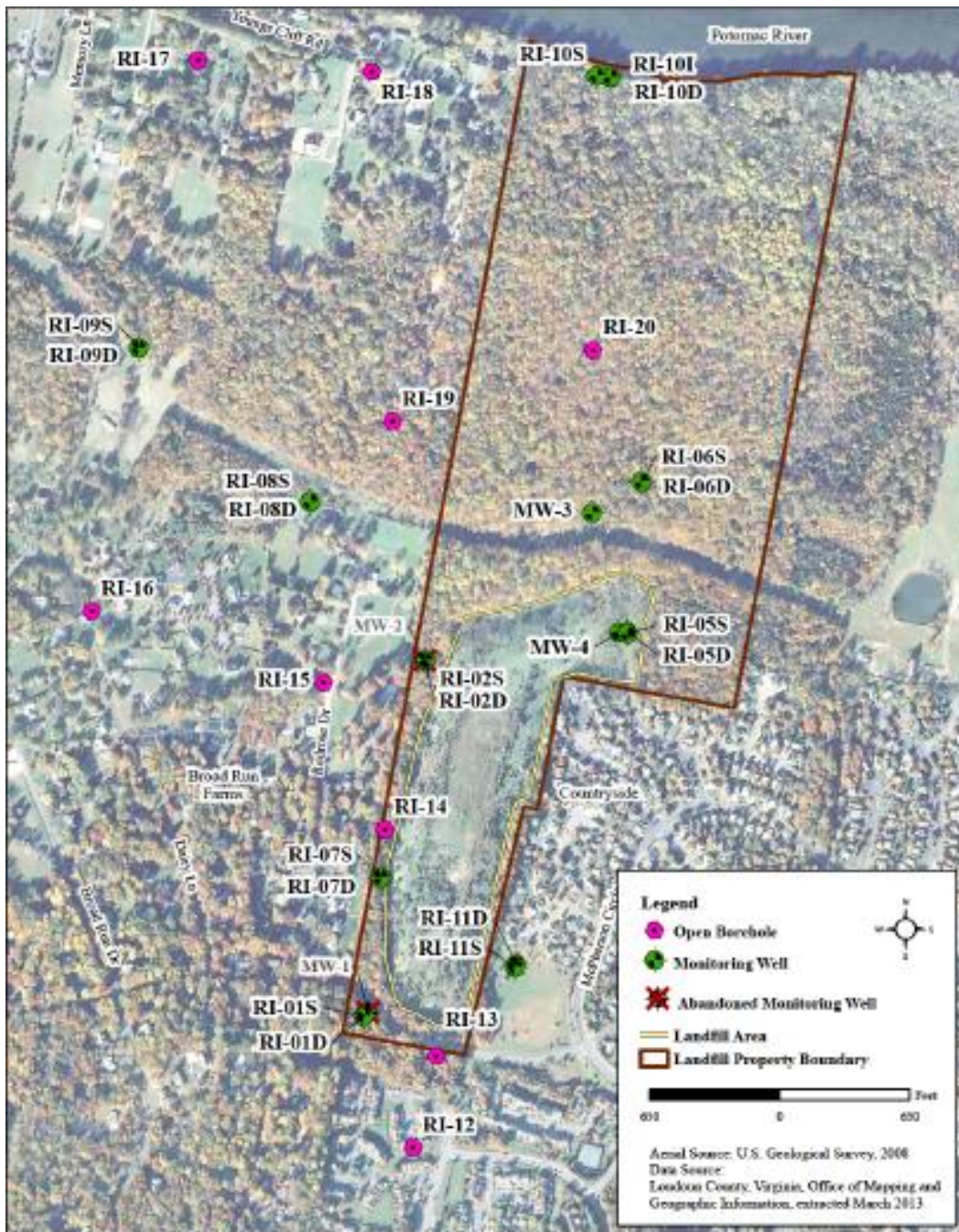
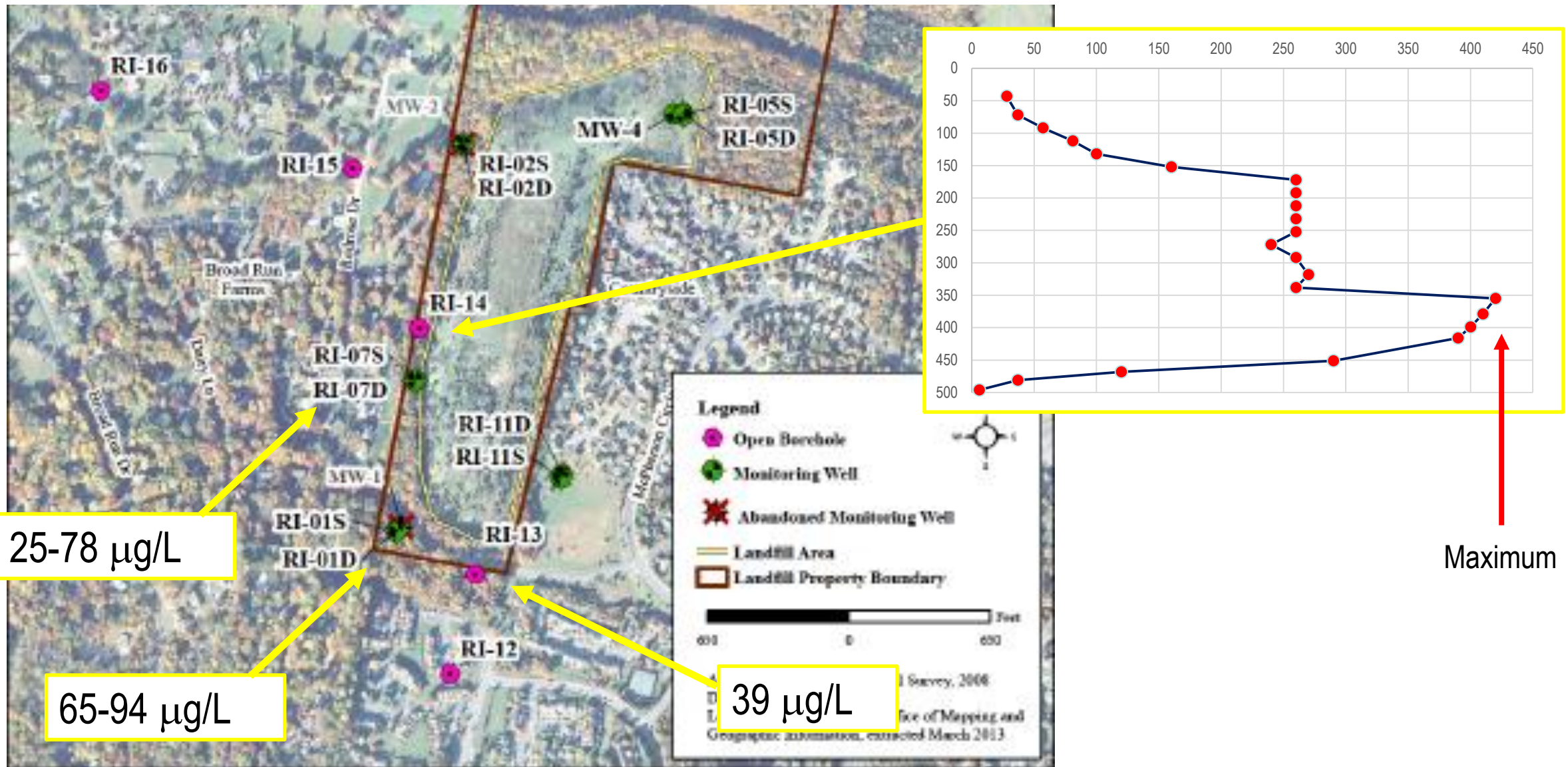


Figure 2-2 (RI)



# TCE Contamination – Groundwater





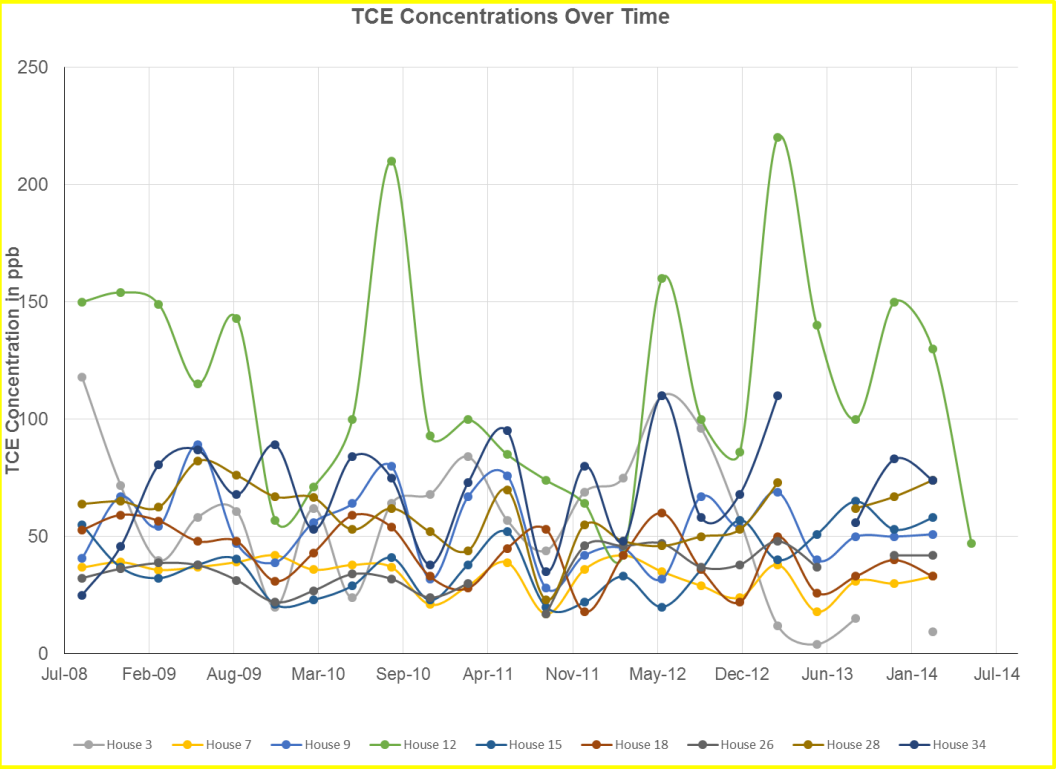
# Remaining Data Gaps – TCE

- ▶ Nature and extent of the TCE source beneath the landfill
  - RI speculates that “DNAPL is no longer present, and only a sorbed source of TCE remains within or adjacent to specific bedrock fractures”
  - Persistent TCE source = Continued TCE plume in subdivision
- ▶ TCE plume leaving HLLF into Broad Run Farms is not spatially resolved
- ▶ Geochemistry of groundwater was not assessed
  - Biodegradation of TCE, cisDCE and VC (and other VOC solvents)
  - Release of metals
- ▶ “Migration of TCE is controlled by flow in fractured bedrock”
  - Hydrogeologic characterization of the fractured-rock aquifer is incomplete

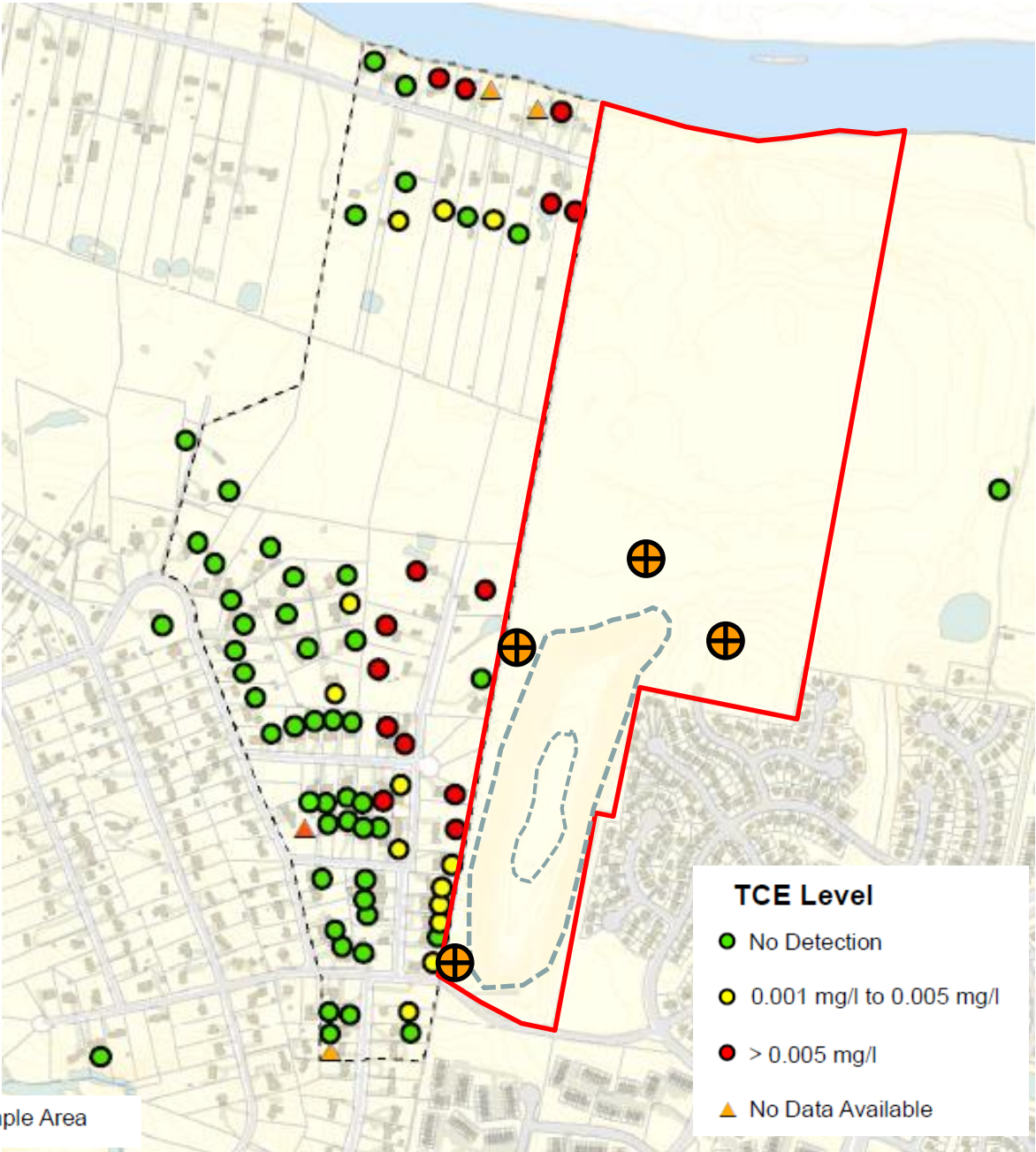
# Concern – Landfill Integrity

- ▶ Integrity of Landfill Cap is Questionable
  - RI refers to a 2-foot clay cover, which is inconsistent with original permit and recent memo by contractor
- ▶ Drainage from HLLF was not evaluated
  - TCE was measured in one surface water sample
  - Metals
- ▶ Recommendations
  - Add a clay layer (upgrade cap) to meet current waste regulatory statute (9VAC20-81-160.D.2.e)
  - Engineering controls for runoff

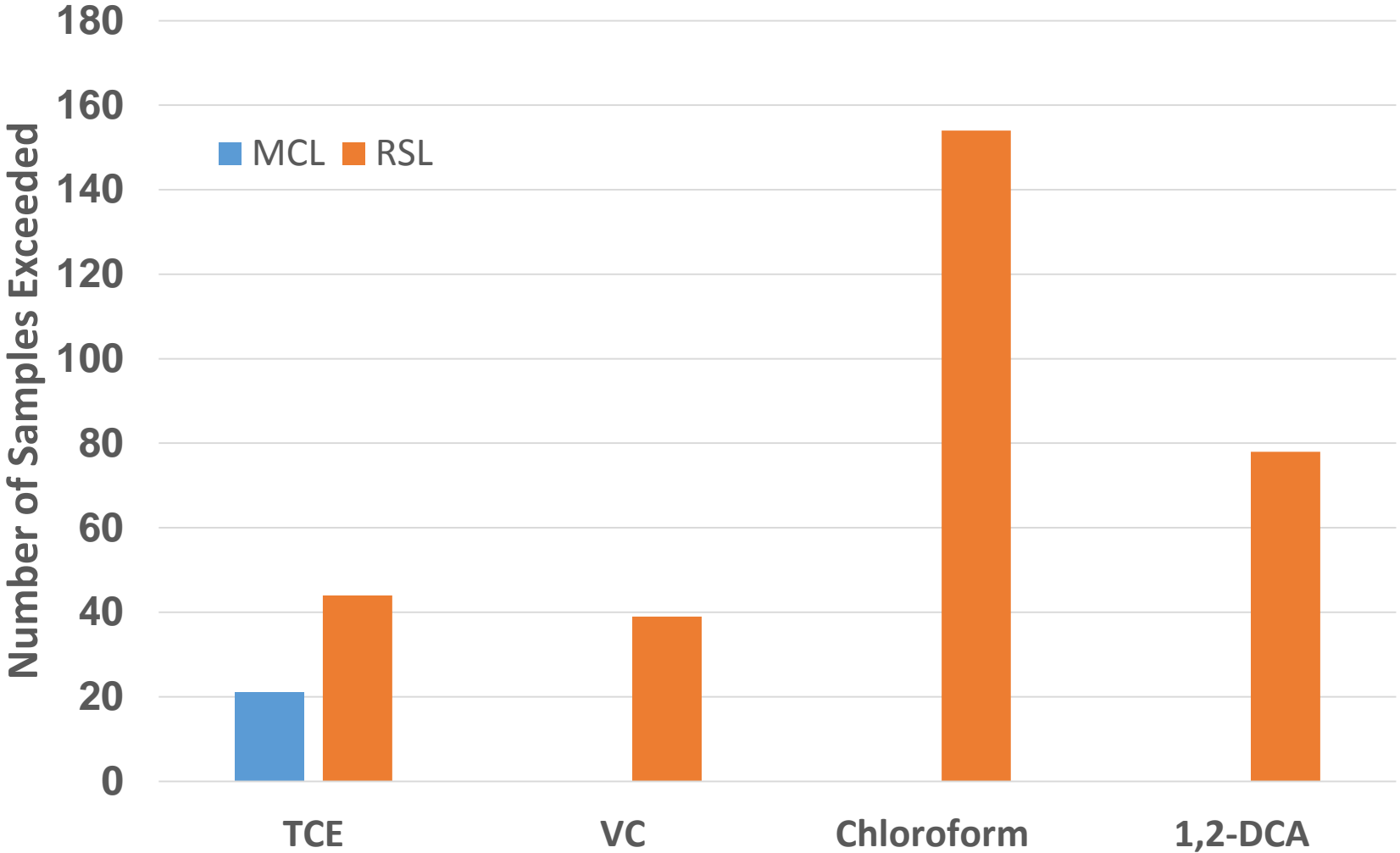
# Untreated Groundwater – Residential Wells (TCE)



----- Sample Area



# Treated Tap Water (2008-2014)





# Concern – POETS

EPA should address the following

- ▶ TCE and other COPC in Treated Tap Water
  - Failures in the treatment systems to eliminate TCE below MCL
  - Responsiveness of contractor to TCE > MCL – Maintenance, Communication
  - Other VOCs and Metals above RSLs
- ▶ Metals – Direct the contractor to immediately begin consistent monitoring of wells and tap water for metals
- ▶ Redaction – Release the ID system for residential sampling locations

# Additional Concerns

## ▶ Vapor Intrusion

- TCE expose to residents (VI pathway) should remain a concern
- EPA should release VI Work Plan, reports and data

## ▶ Treatability Study

- FS – Additional data collection strongly recommended before completing FS
- EPA should release Work Plan for Treatability Study, interim reports and data

## ▶ Metals in Groundwater and Soil

- Establish background levels, particularly in groundwater
- Reconsider exposure to metals in the human health risk assessment