FIRING RANGE ENVIRONMENTAL IMPACT - A CASE STUDY OF CAMP EDWARDS, MA

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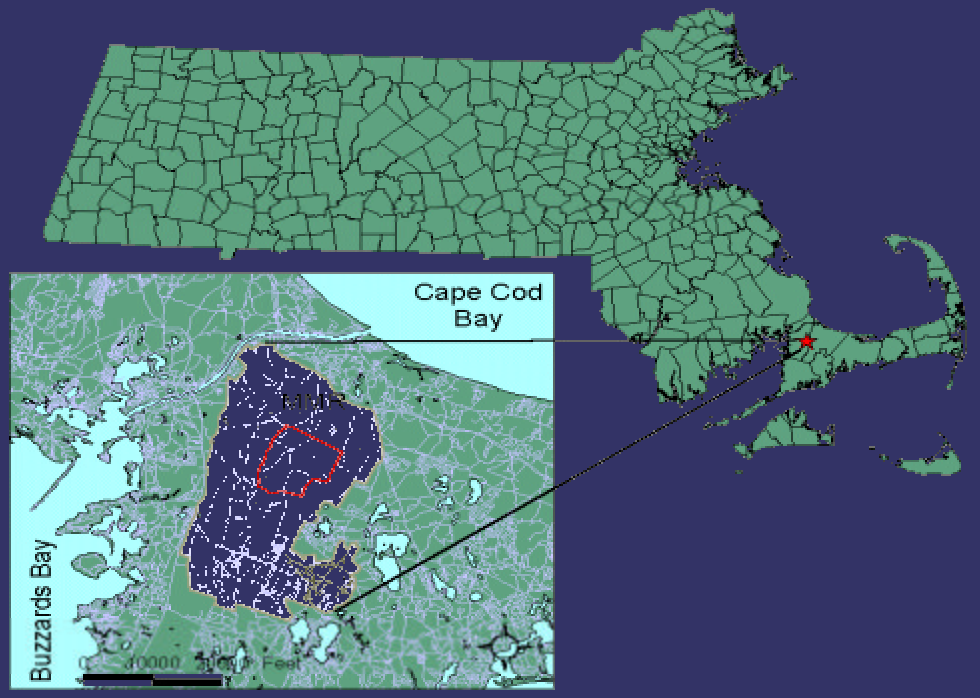
Presented at Geological Society of America National Meeting. November 1-10, 2001. Boston, MA, (IAGWSPO Contact Ben Gregson 508-968-58210).

Introduction

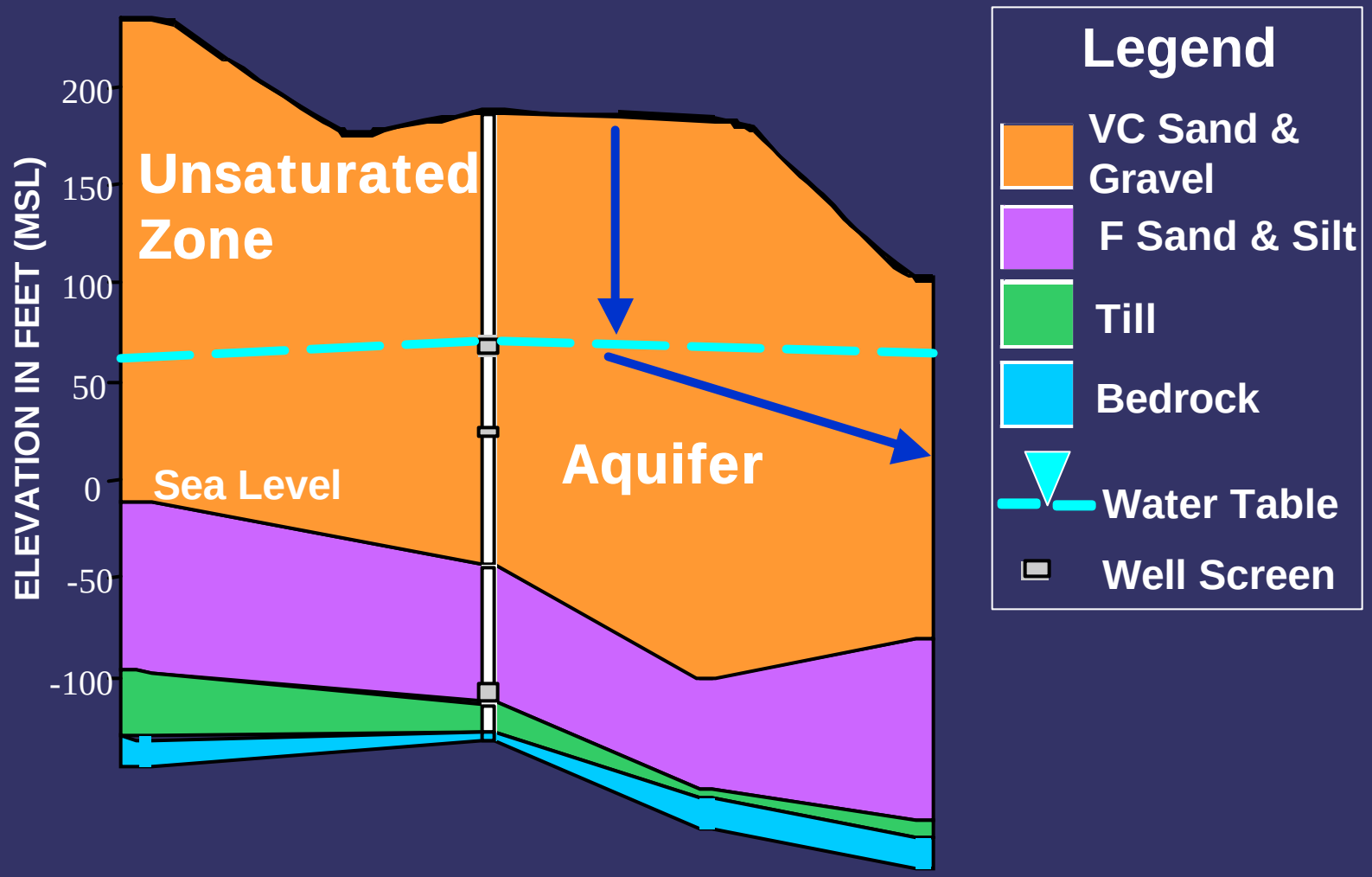
- Military training ranges under scrutiny
  - Potential impacts to ecology and environment
  - Complex issues and problems
- Major ranges receiving attention
  - Camp Edwards (MMR), MA - ARNG
  - Noman Island, MA
  - Vieques, Puerto Rico - U.S. Navy

Camp Edwards - Site History

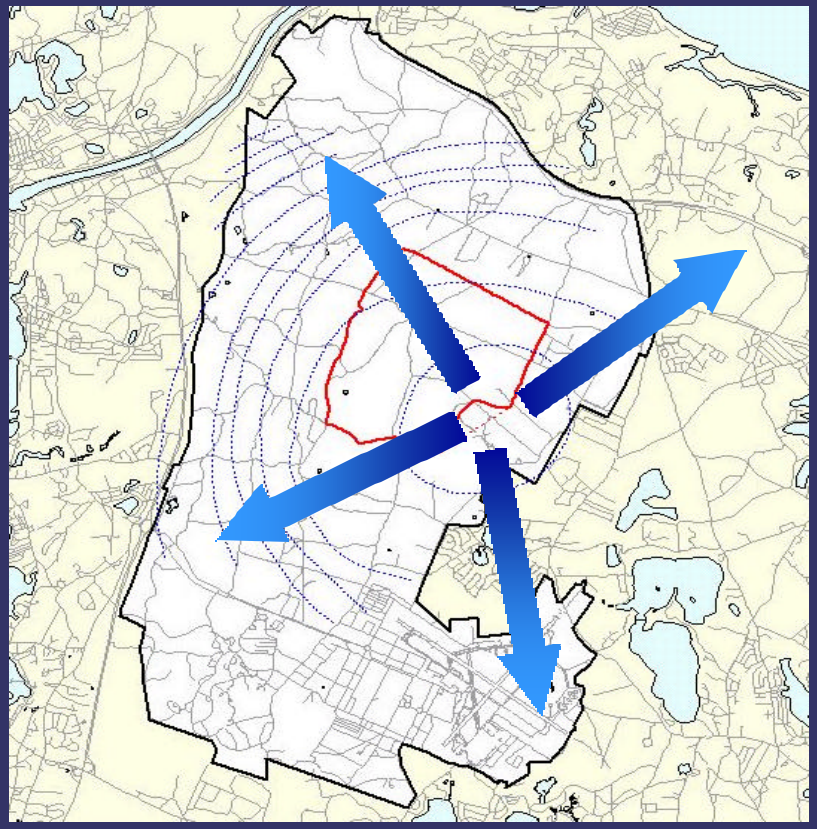
- Training and Impact Areas used since 1911
- Designed to house 30,000 troops during WWII
- USEPA banned training in 1997 through an administrative order



Site Lithology

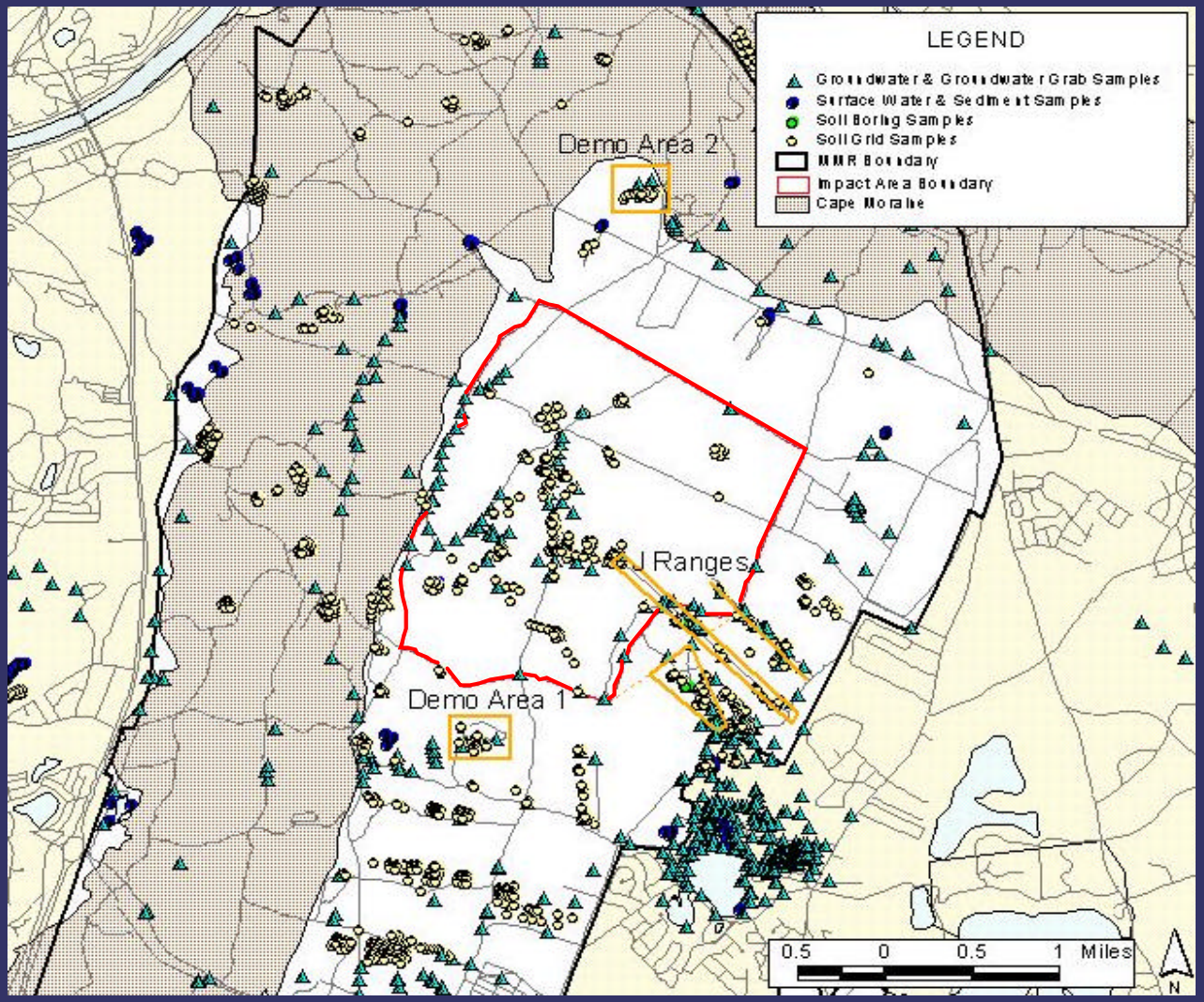


Hydrogeologic Model

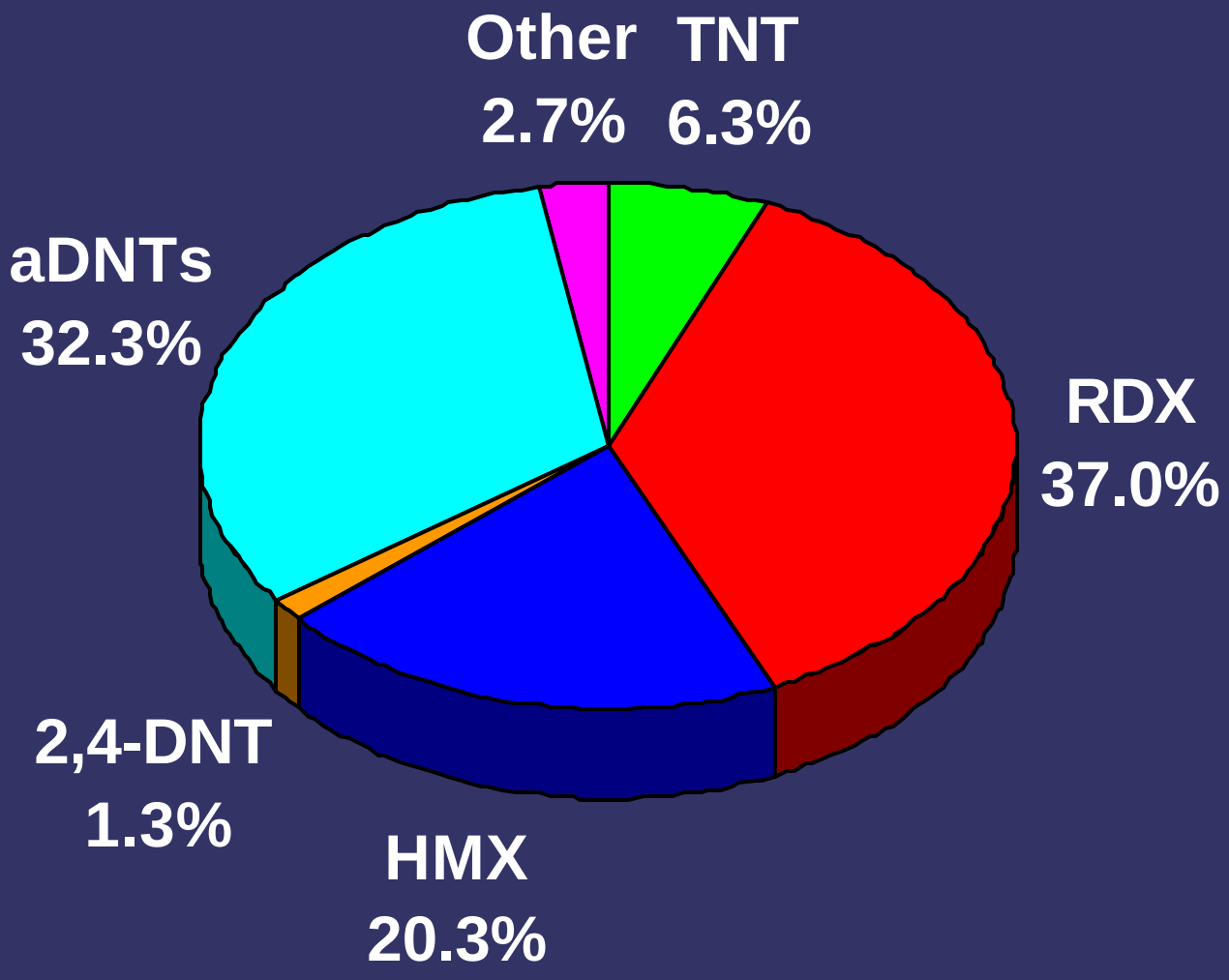


- Groundwater flow is radial with the mound to the southeast of the Impact Area in the J Range Area
- Groundwater flow is approximately one foot per day

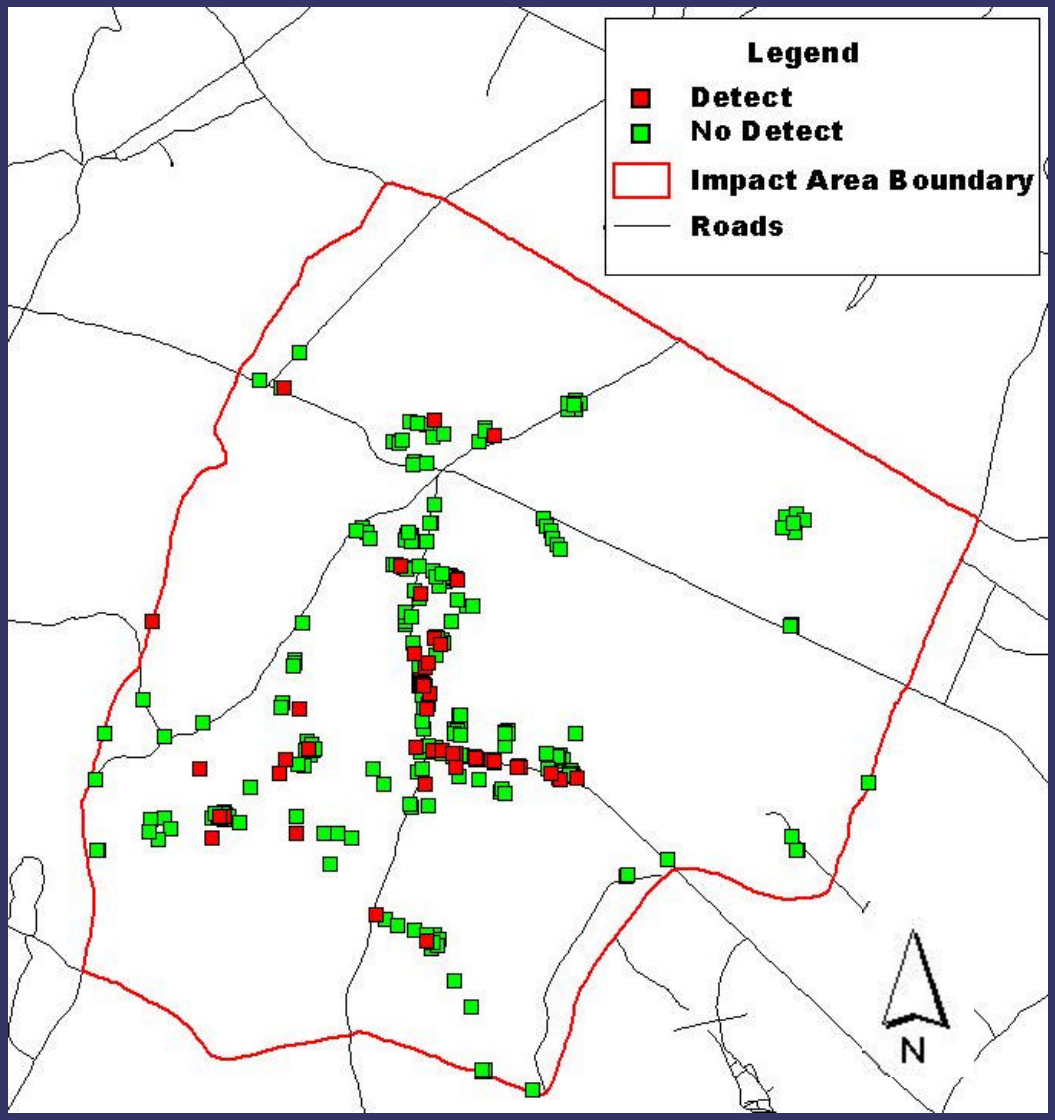
Specific Areas of Investigation



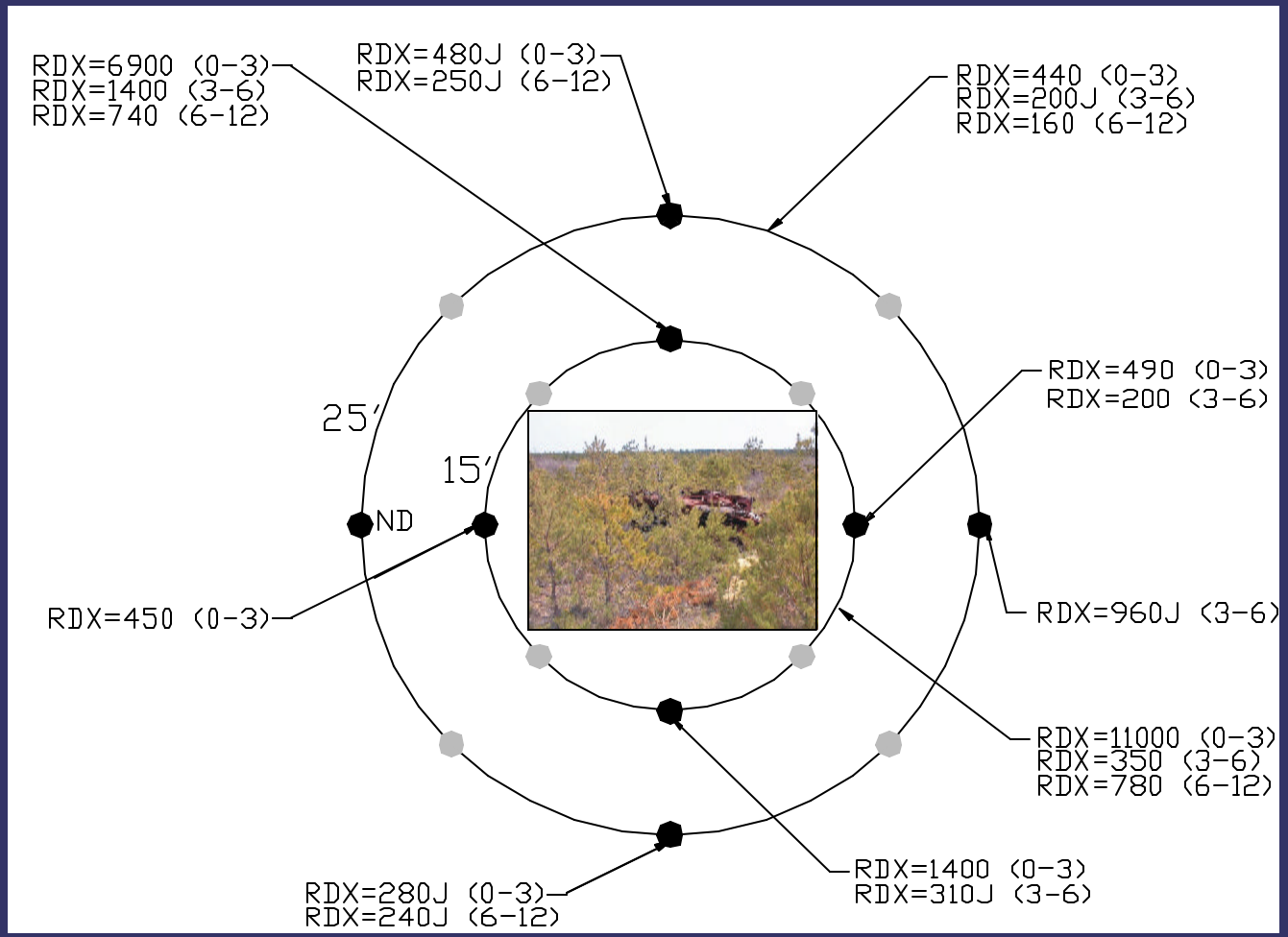
Surface Soil Findings (explosives)



Soil Results (explosives)



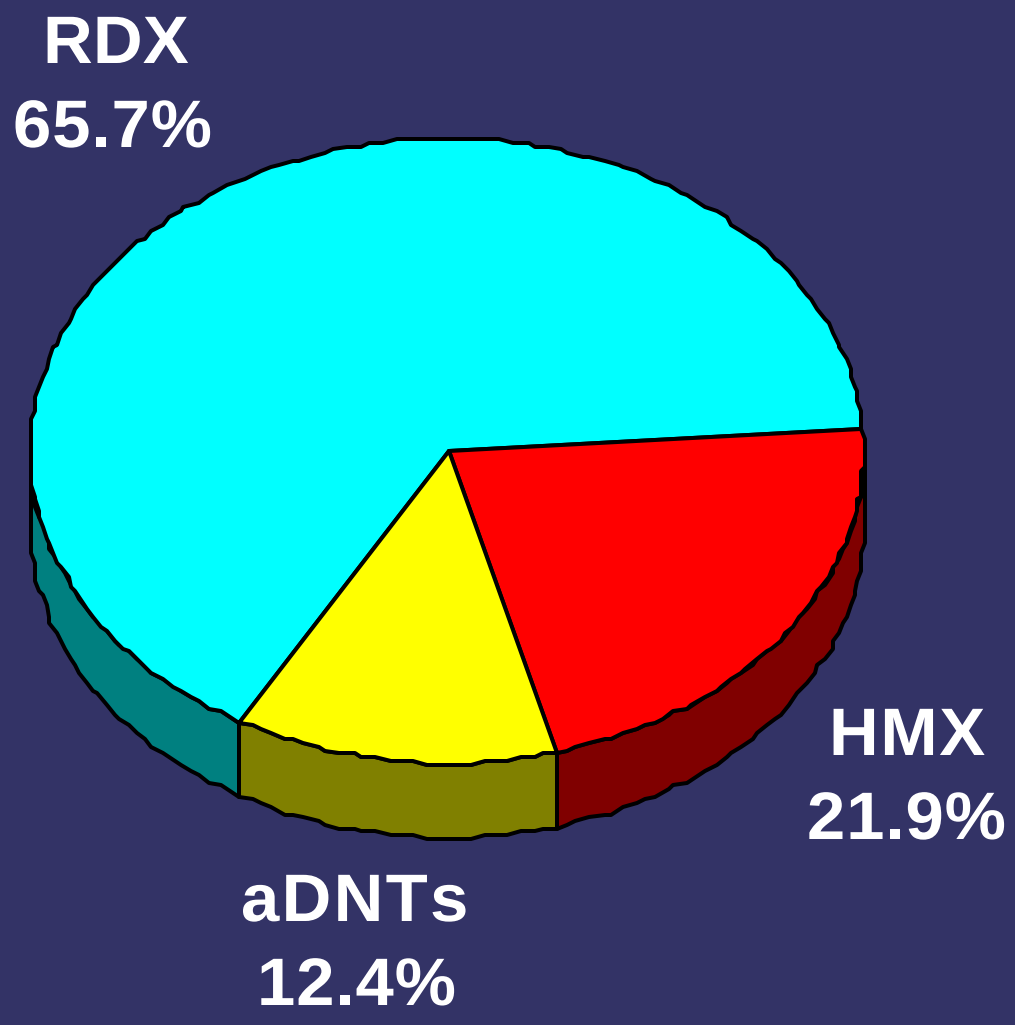
Soil Results at Artillery Target 42



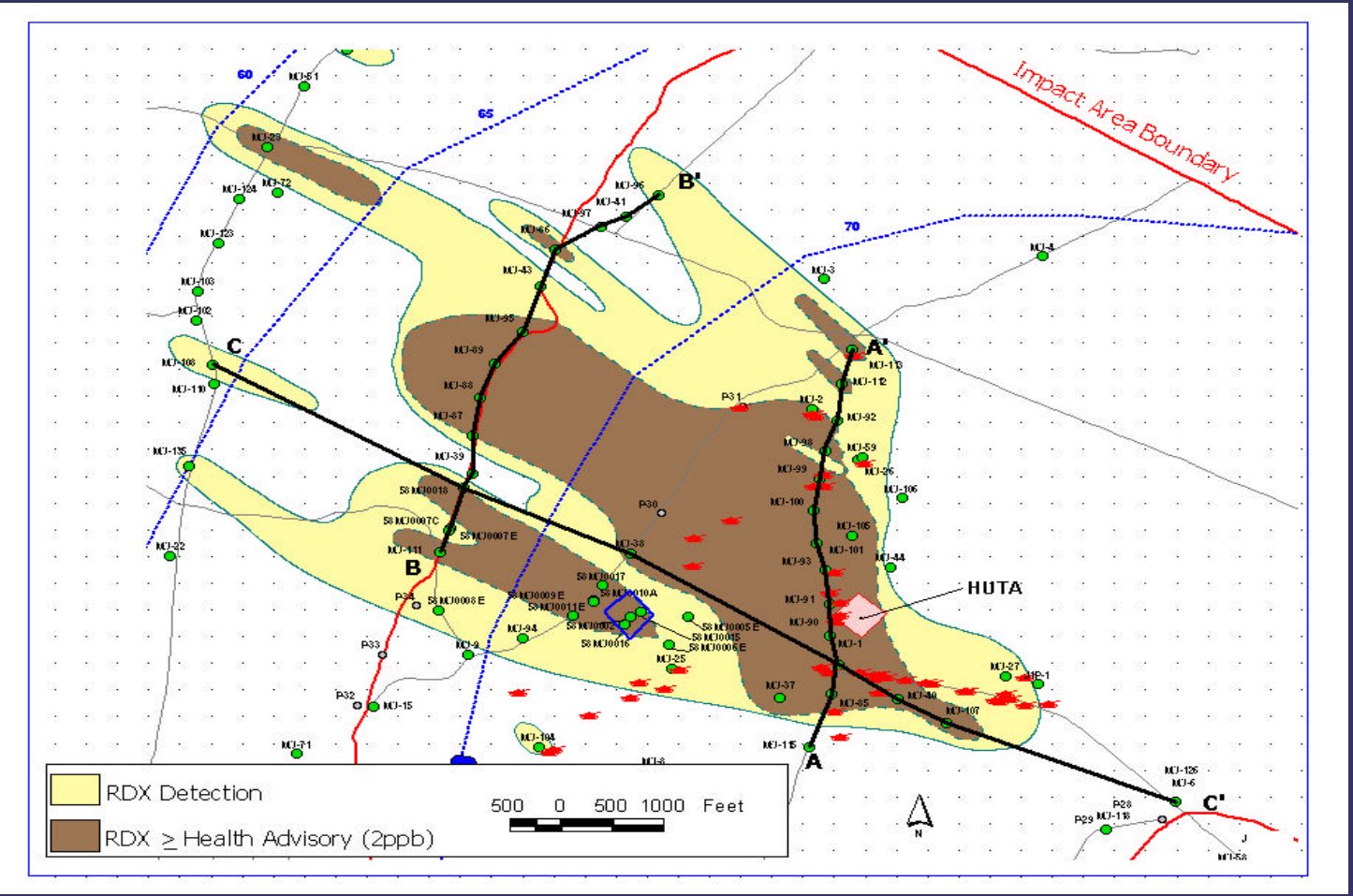
Other Soil Results

- Elevated metals evident (0 – 3 inches below ground surface)
  - Al, Fe, Mo
- PAHs present
- PCNs?

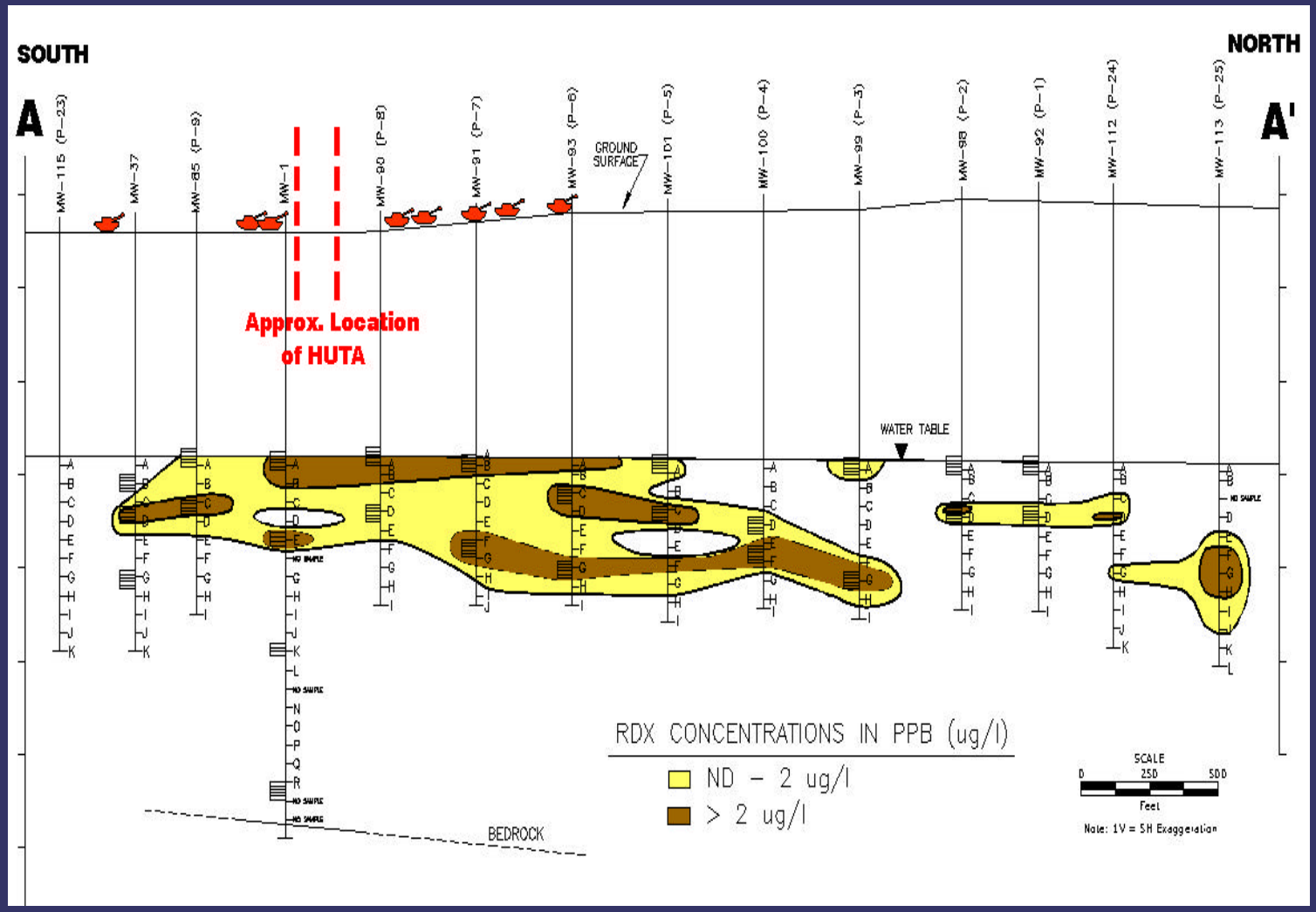
Groundwater Findings (explosives)



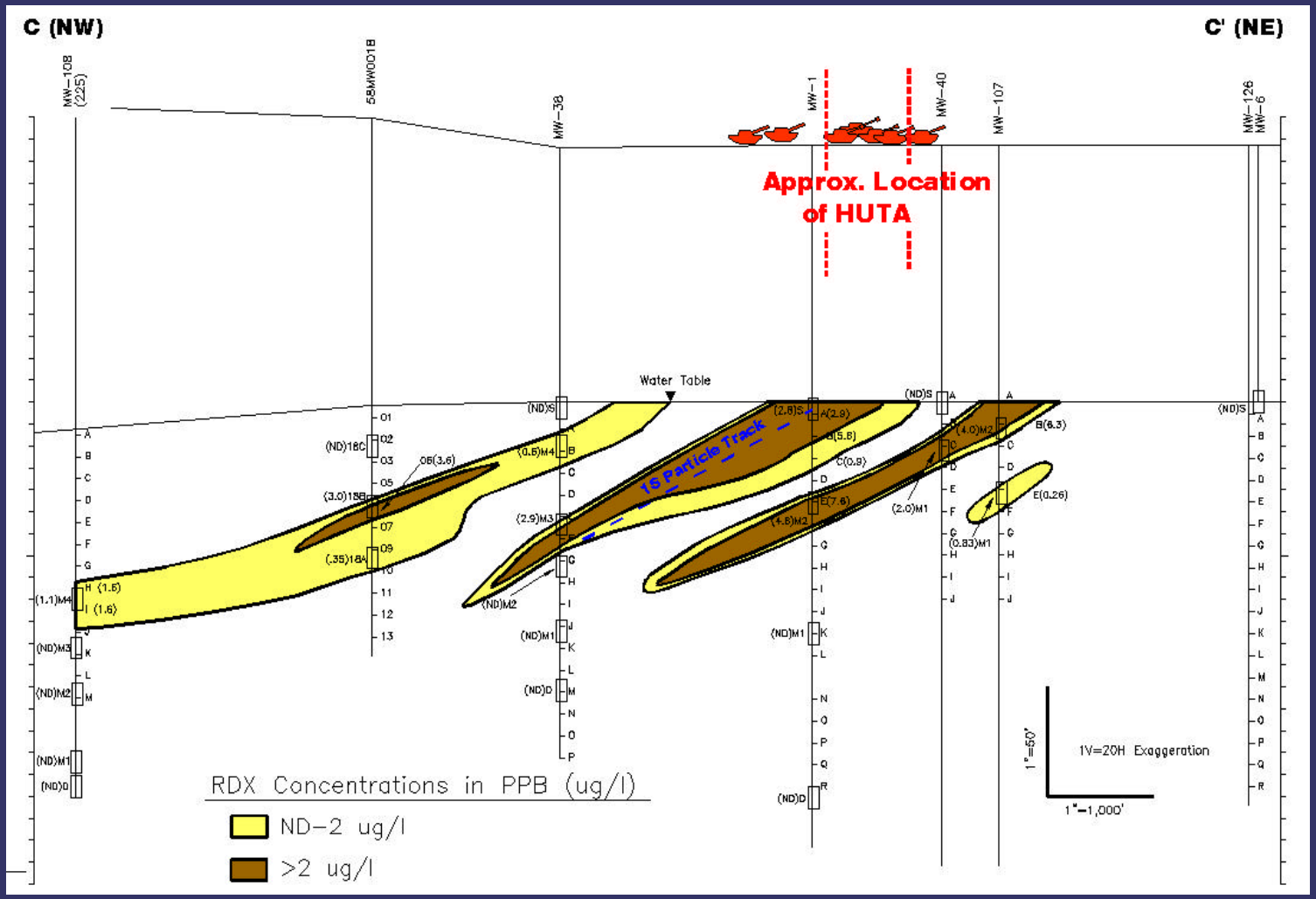
Plan View of RDX Detections in the Impact Area



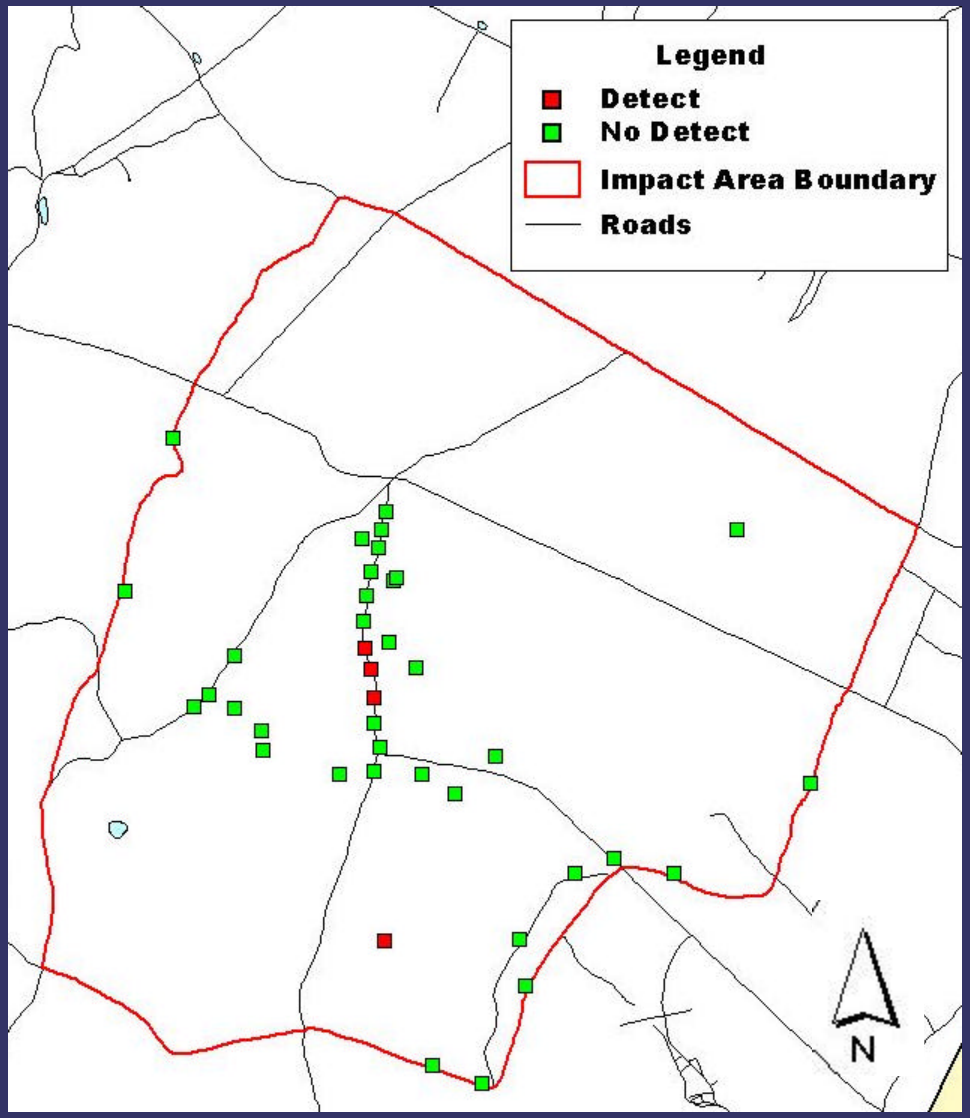
Inner Groundwater Transect within the Impact Area



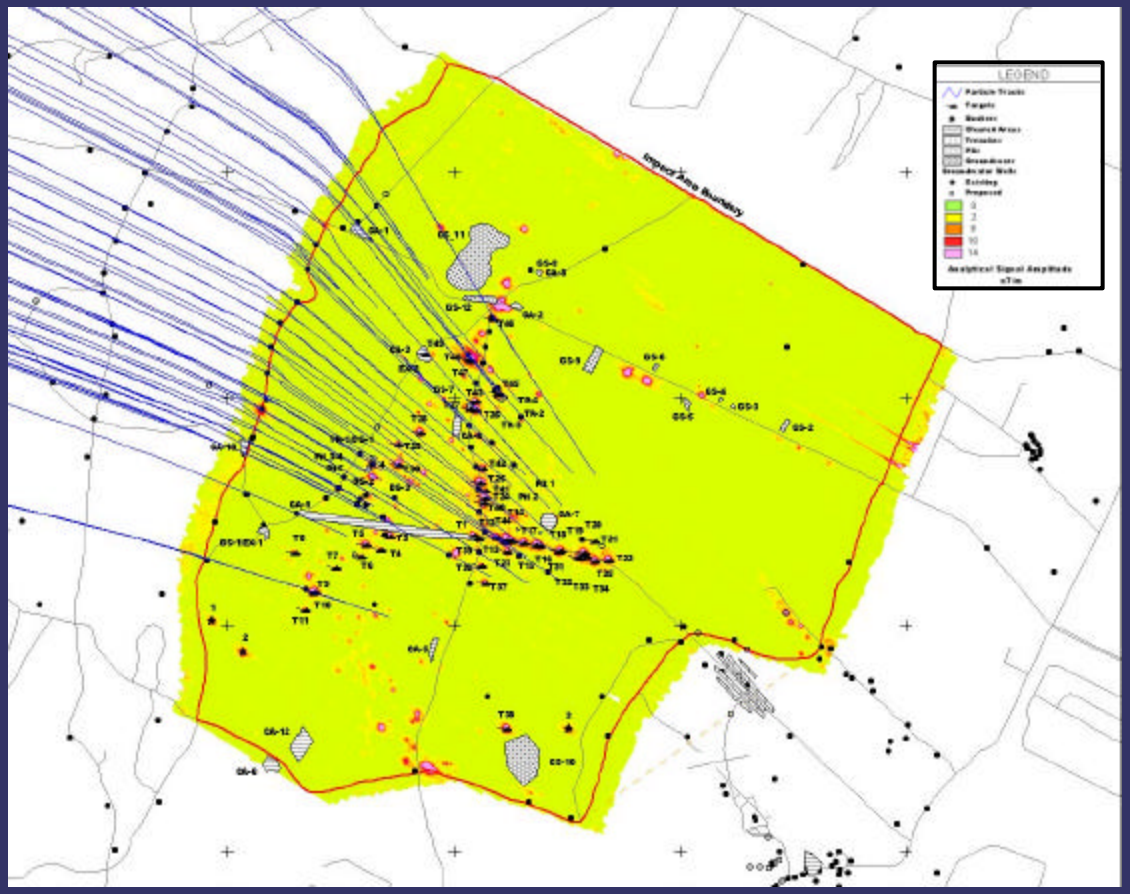
Longitudinal Cross-Section through the Impact Area



Location of Perchlorate In Groundwater at MMR



Potential Source Area



- High-order detonations
- Low-order detonations
- UXO
- EOD activities at the J Range
- Disposal/Burial sites
- Washout

Conclusions

- RDX and HMX present in surface soil adjacent to artillery and mortar targets
- RDX and HMX present in groundwater downgradient of primary target area (i.e. Tank Alley) within the Impact Area
- TNT which is a component of the munitions appears to be degraded before reaching groundwater

Conclusions (cont.)

- Training using HE artillery and mortar rounds (UXO, detonation, or both) appears to have resulted in an explosive impact to groundwater at MMR
- Some metals, PAHs, and pesticides/herbicides present in surface soil but no evidence of impacts to groundwater
- PCNs may be an issue for soil and perchlorate may be an issue for groundwater
- MMR findings are potentially applicable to other bombing ranges and battlefields