

Raytheon

Public Involvement Meeting

Draft Phase II and Phase III

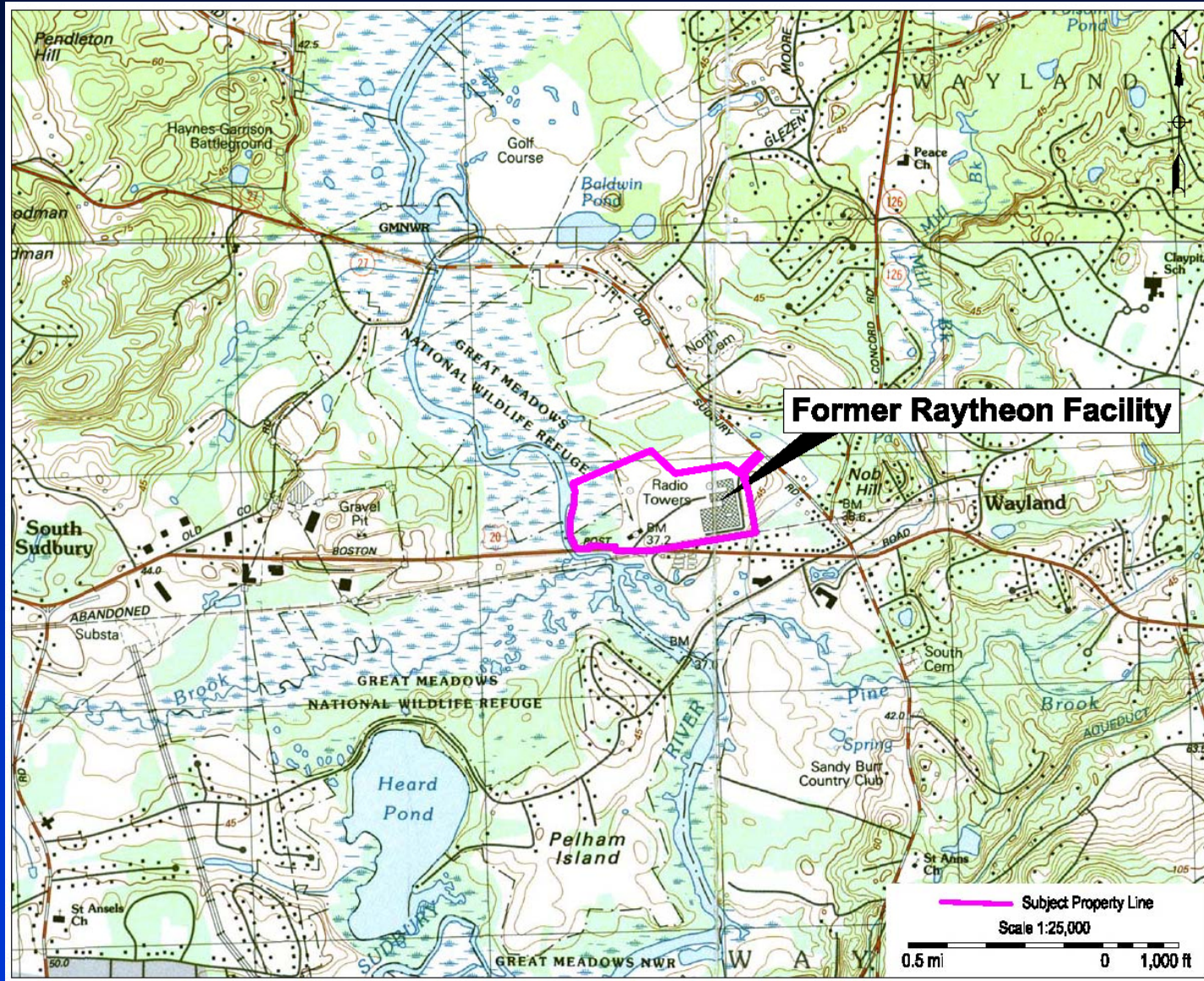
October 19, 2005

Former Raytheon Facility
Wayland, Massachusetts

Presented by:
Edwin P. Madera
Raytheon Company

Purpose of Meeting

- **Draft Phase II – Comprehensive Site Assessment (CSA)**
 - For Release Tracking Number (RTN) 3-22408 and Tier IB Permit Number W0405278 (Northern Area of the Site)
 - Results of additional assessment activities
 - Membrane Interface Probe (MIP)
 - Groundwater Results
 - Wetland Monitoring Wells
- **Draft Phase III – Remedial Action Plan (RAP)**
 - For Release Tracking Number (RTN) 3-22408 and Tier IB Permit Number W0405278 (Northern Area of the Site)
 - Identifies remedial alternatives which are reasonably likely to achieve a level of “No Significant Risk”
 - Excavation and Disposal
 - Monitored Natural Attenuation (MNA)
 - Bioremediation
 - In Situ Chemical Oxidation
- **Question and Answer Period**



Locus Map

Raytheon

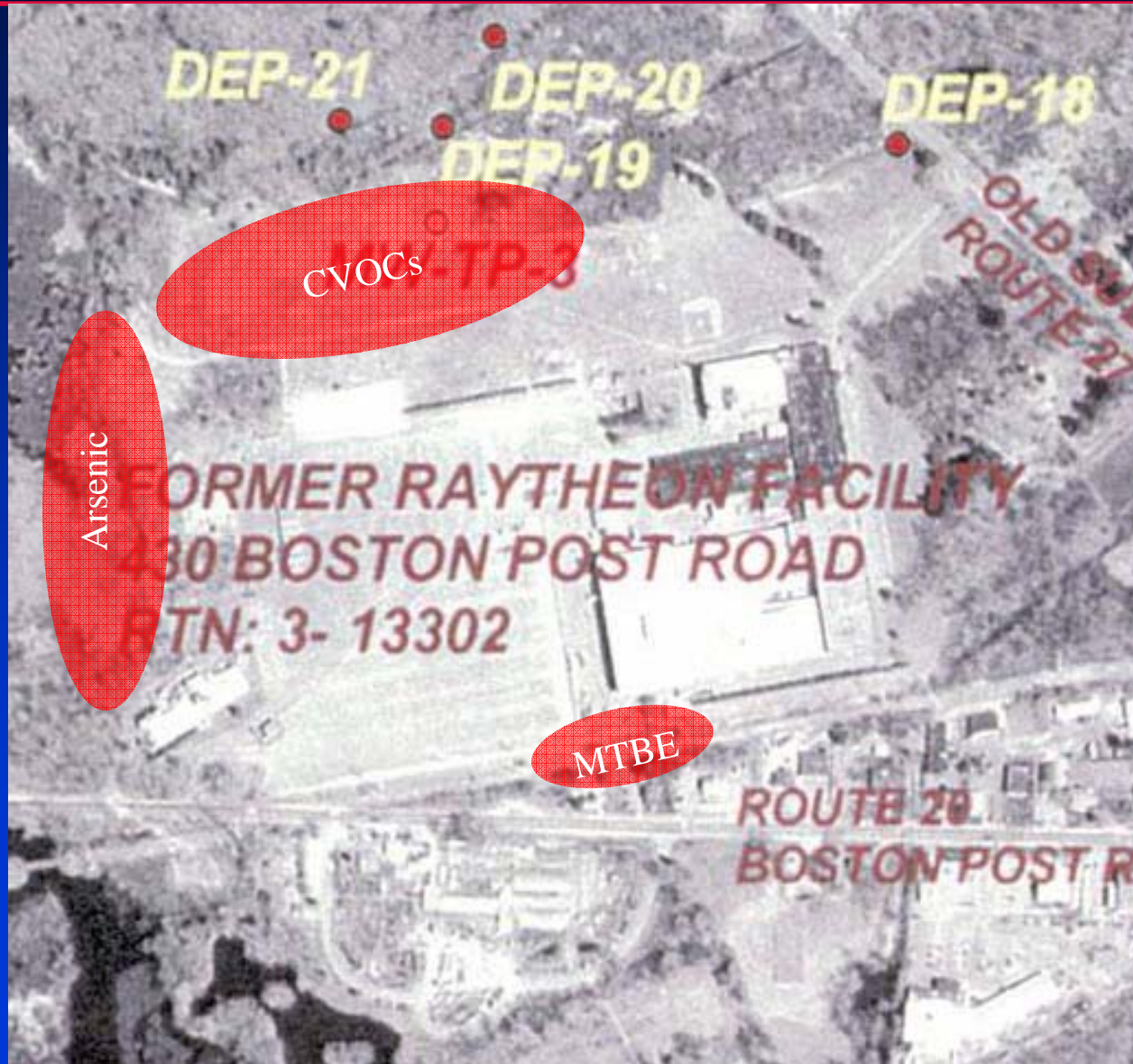


Draft Phase II –
Comprehensive Site
Assessment (CSA)

Draft Phase II – CSA

- Purpose of a Phase II – Comprehensive Site Assessment
 - Collect data to support conclusions and opinions regarding:
 - 1) The source, nature, and extent of oil and/or hazardous materials (OHM)
 - 2) The potential risk of harm to health, safety, public welfare, and the environment
 - 3) The need to conduct remedial actions at the Site.

Phase II Investigation Area



Compounds of concern encountered:

- Chlorinated Volatile Organic Compounds (CVOCs)
- Toluene
- Arsenic
- Methyl Tertiary Butyl Ether

Phase II - Investigation Techniques

Northern Area Focus

Membrane Interface Probe (MIP)

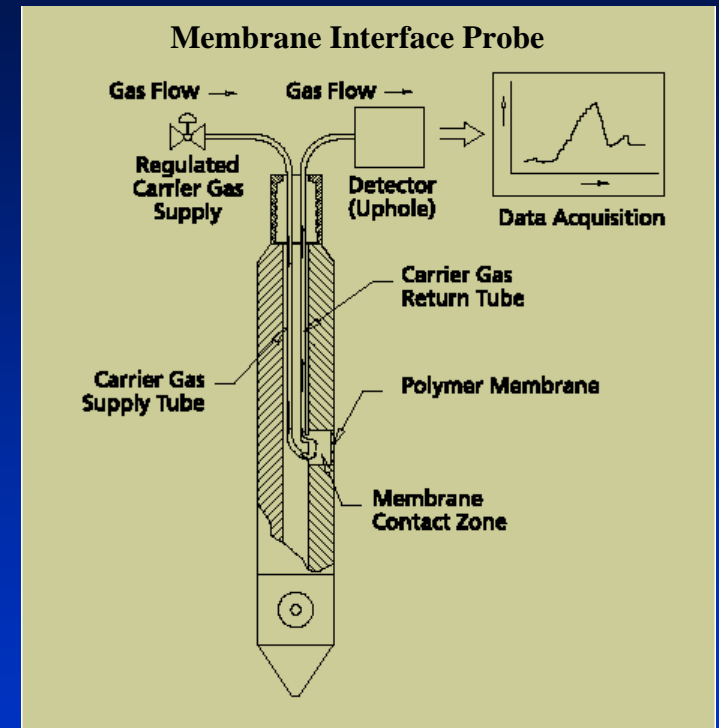
- 43 boring locations

Waterloo Profiler

- 13 boring locations
- 55 groundwater samples analyzed for select CVOCs

Soil Borings/Monitoring Wells

- 3 borings advanced
- 3 single monitoring wells installed at each location



Phase II - Investigation (cont.)

Baldwin Pond Investigation

Waterloo Profiler

- 15 boring locations
- 123 groundwater samples analyzed for VOCs

Wetland Monitoring Wells

Soil Borings

- 3 borings advanced to bedrock
- 11 monitoring wells installed (one triplet and two quadruplets)

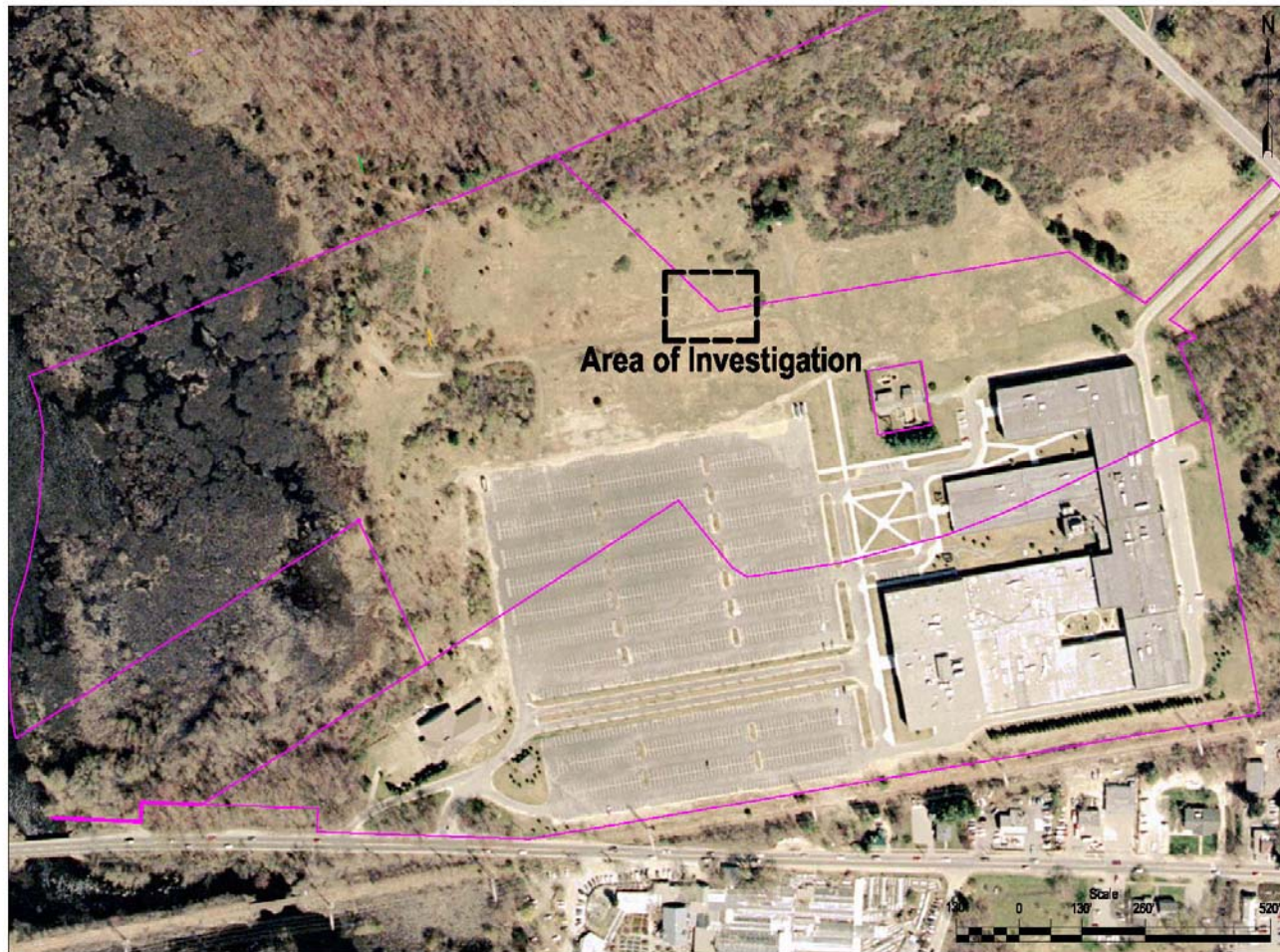
Groundwater Gauging and Sampling

- April and September/October Events

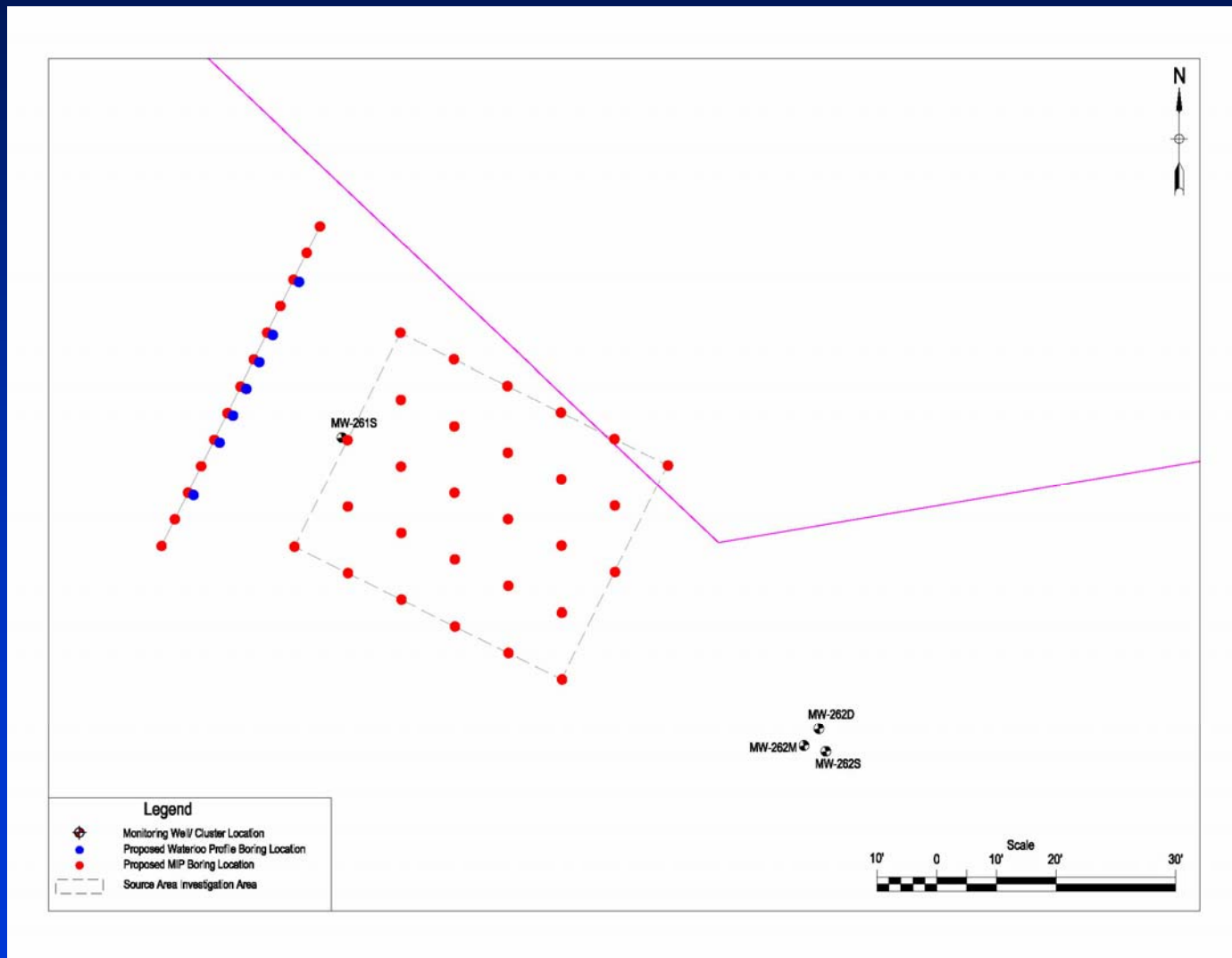
Northern Area Assessment



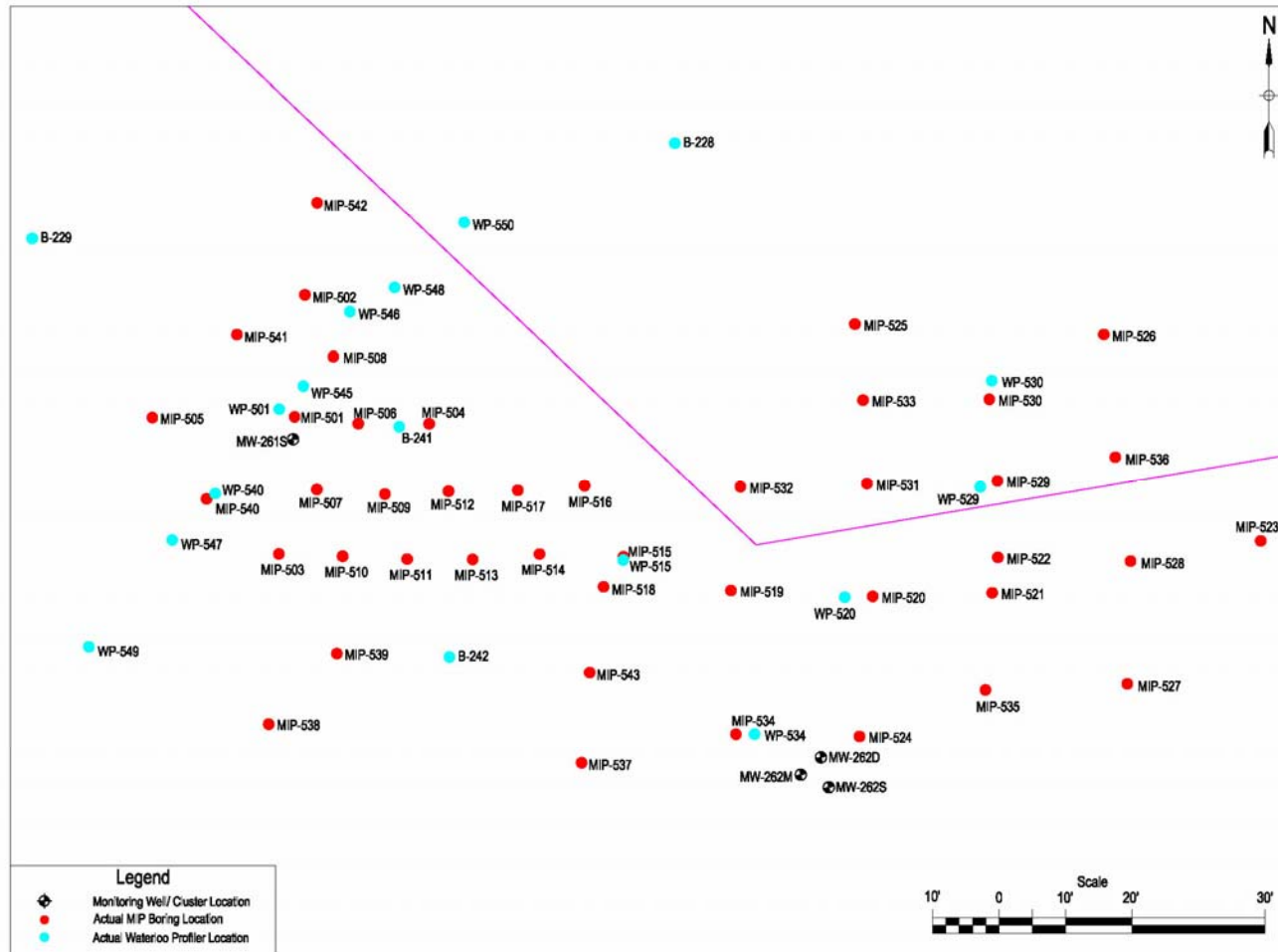
Source Area Investigation



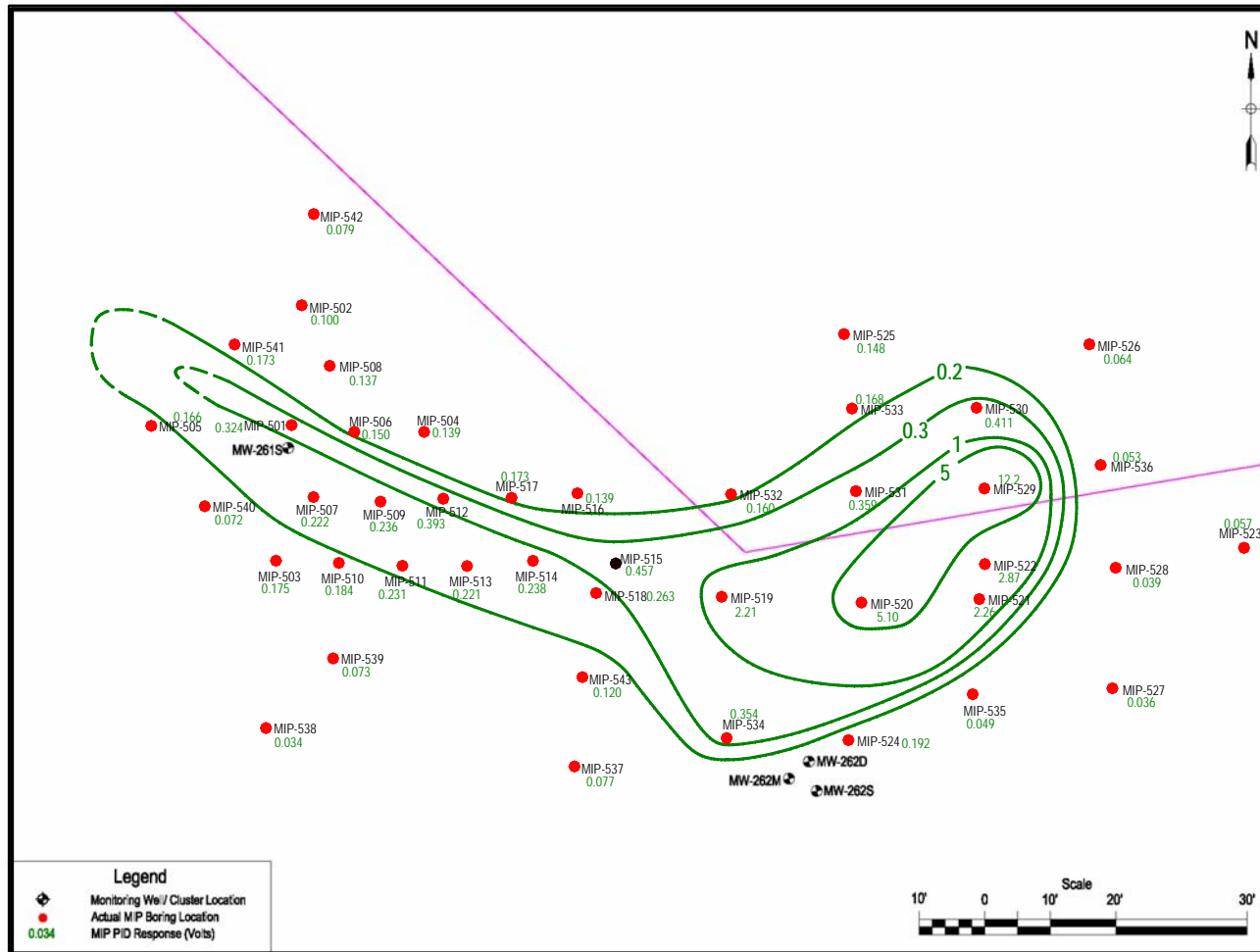
Proposed MIP/ Waterloo Locations



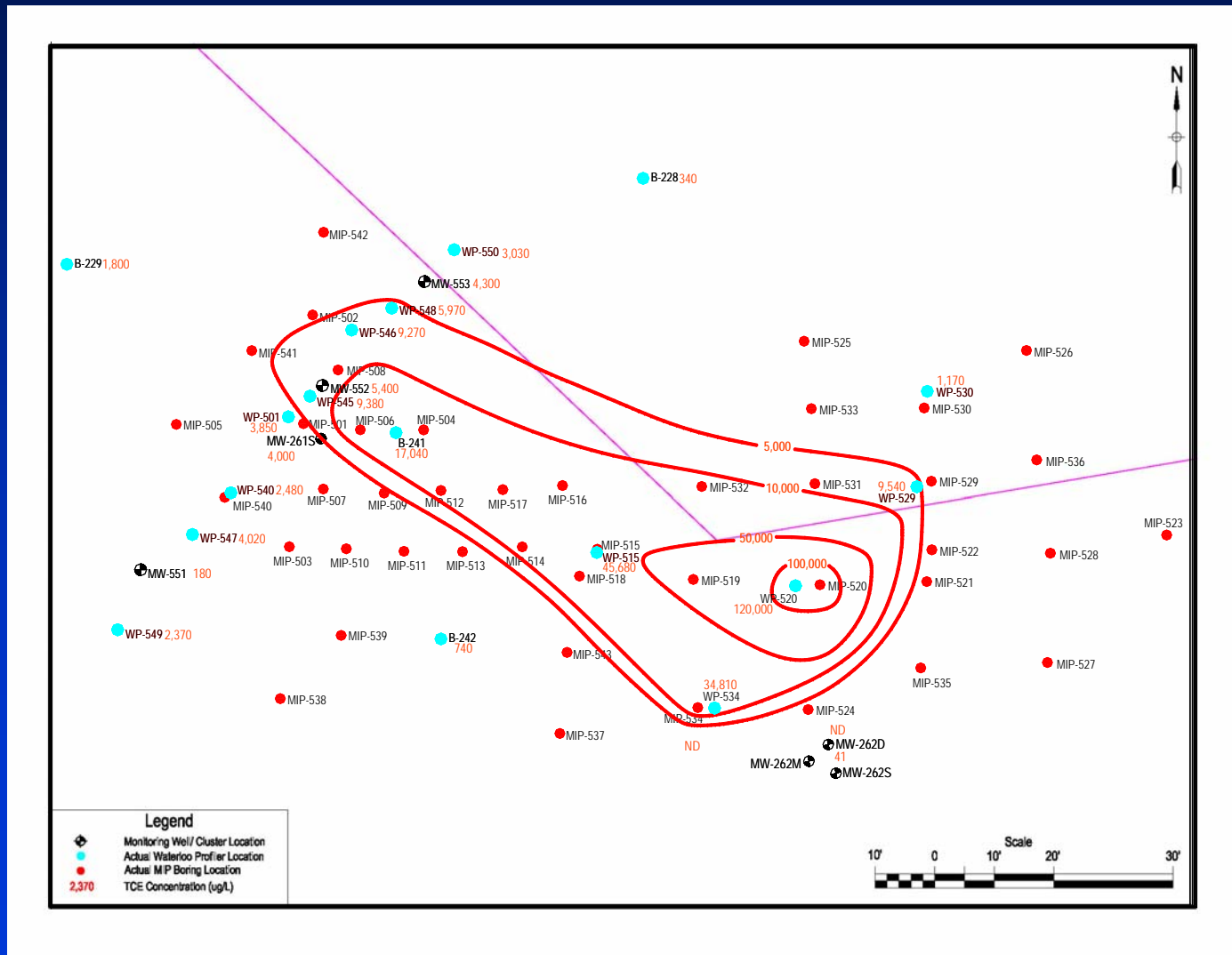
Actual MIP/ Waterloo Locations



MIP Source Area Investigation



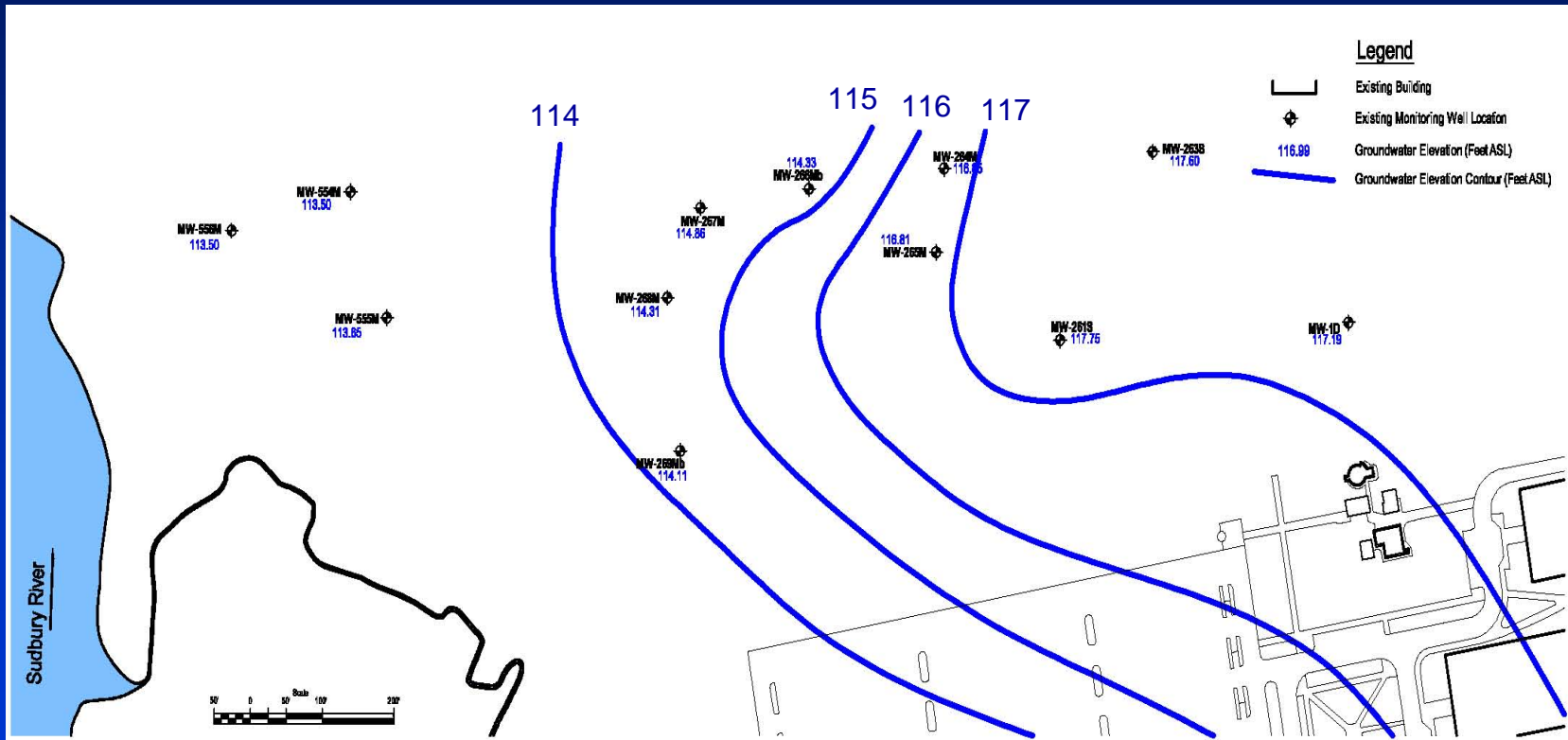
Source Area TCE Concentration in Groundwater



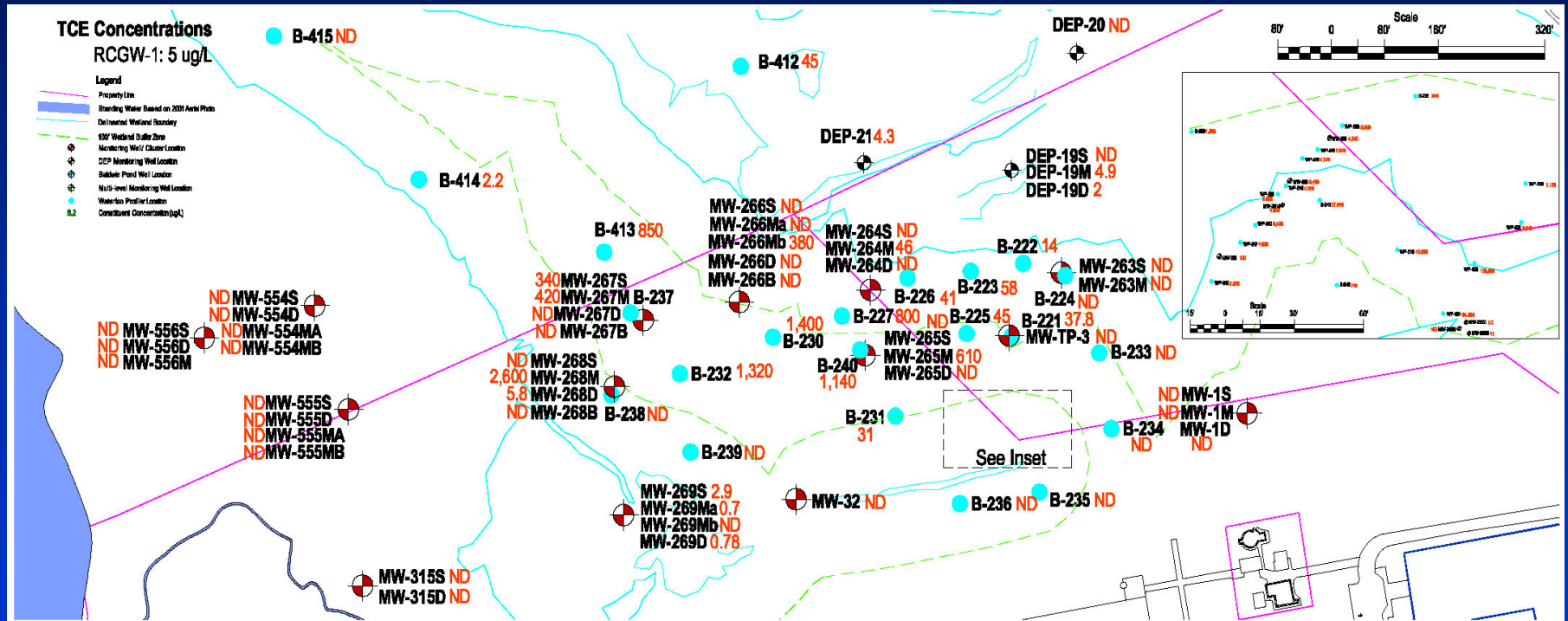
MIP/Waterloo Field Investigation



Groundwater Contour Map



TCE Concentration Contour Map



Phase II – Wetlands Drilling



Phase II Compounds of Concern

- **CVOCs – tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2 dichloroethene (cDCE), and vinyl chloride (VC)**
 - Focus of Phase II investigation activities
- **MTBE**
 - The presence of MTBE in groundwater is attributed to a release from local gas station
 - Supporting evidence provided in the Phase II Report
- **Arsenic**
 - The presence of arsenic in groundwater is naturally occurring
 - Supporting evidence provided in the Phase II Report
- **Toluene**
 - New Reportable Condition, identified with Waterloo Profiler during the Northern Area “source area” investigation
 - Reported to Massachusetts Department of Environmental Protection (DEP)

Phase II - Conclusions

- CVOCs

- Focused investigation in Northern Area have defined and delineated the nature and extent

- MTBE

- Release of MTBE from potential upgradient property, may file Downgradient Property Status

- Arsenic

- Naturally occurring arsenic has impacted groundwater quality in Western Area and is attributable to background conditions

- Site groundwater poses a condition of “significant risk” under potential future conditions. (i.e., PCE, TCE, cDCE, 1,1-DCE, VC, MTBE and toluene)

- A Phase III is necessary

Draft Phase III – Remedial Action Plan (RAP)

Draft Phase III – Remedial Action Plan

- **Purpose**

- Evaluate remedial technologies against performance standards established by the DEP
- Select the preferred remedial technologies for abatement of impacts in source area saturated soils and in groundwater

* Arsenic has been attributed to background conditions and not carried into Phase III

*MTBE may be addressed with potential Downgradient Property Status

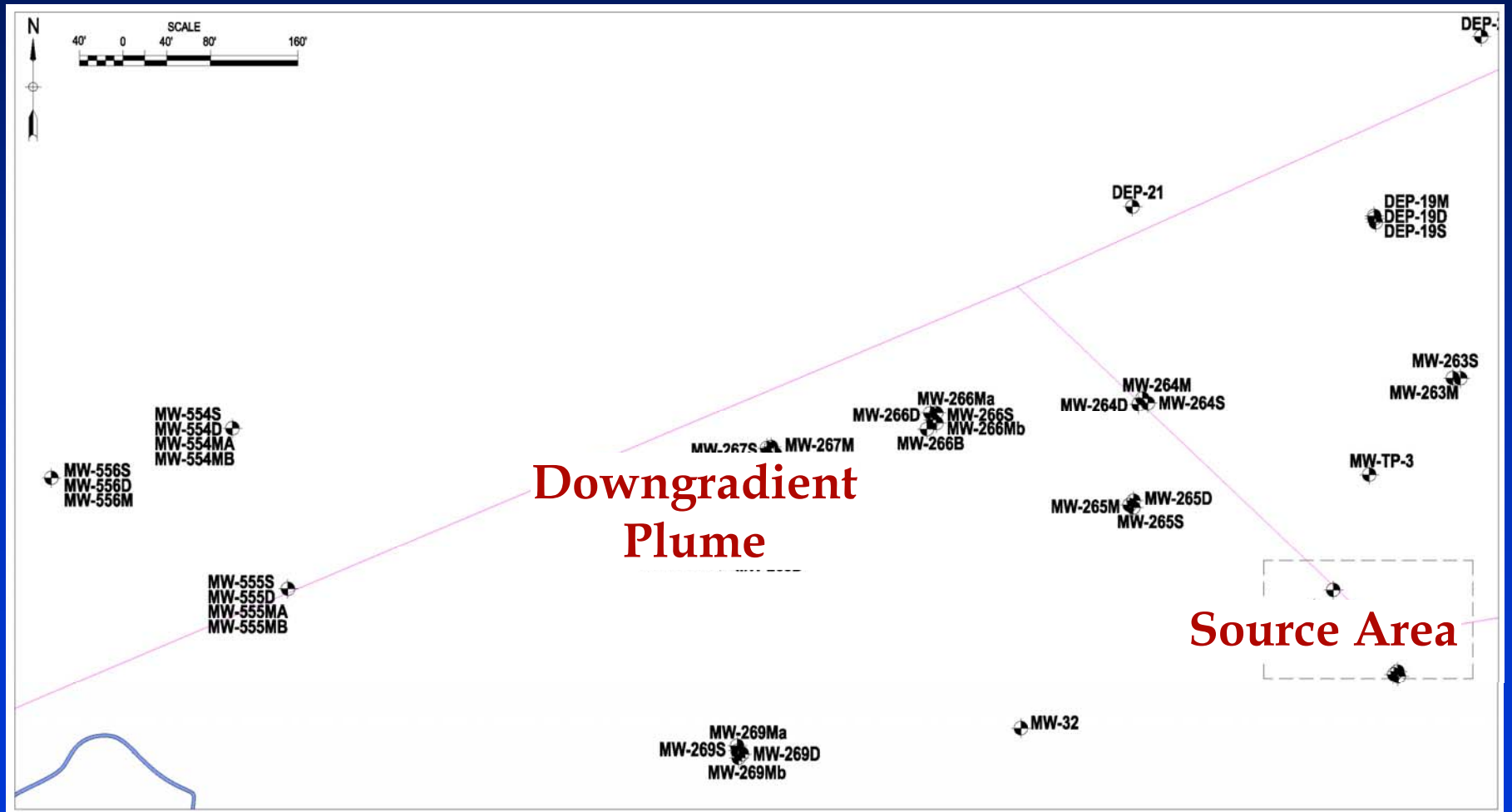
Source Area Alternatives Comparison

Alternative Approach	Estimated Costs	Overall Effectiveness Rank
#1 - No Action/Institutional	\$300,000	6
#2 - Excavation	\$1,400,000	1
#3 - Bioremediation	\$1,600,000	5
#4 - ISCO	\$1,200,000	4
#5 - Thermal Treatment	\$2,100,000	2
#6 - Injectable ZVI	\$1,400,000	3

Groundwater Alternatives Comparison

Alternative Approach	Estimated Costs	Overall Effectiveness Rank
#1 - Monitor Natural Attenuation	\$600,000	2
#2 - Pump and Treat	\$3,100,000	3
#3 - Bioremediation	\$900,000	1

Treatment Areas



Conclusion of Phase III

- **Phase III Recommendations**
 - Excavation of source area
 - Enhanced Bioremediation
 - Monitor groundwater quality
- **Details will be included in Phase IV Remedy Implementation Plan**

PIP Schedule

- **Draft Phase II and Phase III have been submitted for public comment on October 19, 2005**
 - Public comments on Draft Phase II – CSA and Draft Phase II RAP due on November 18, 2005 to:
Edwin P. Madera
Raytheon Company
Mail Stop 1880
528 Boston Post Road
Sudbury, MA 01776
- **A summary of the comments received and a response to those comments will be prepared**
- **Documents will be made available at the information repositories (Public Library and Board of Health) and web site**
- **Notice of Availability of the documents have been sent to the PIP mailing list**

Q & A