BOS Meeting 3/23/15

Beede Waste Oil Superfund Site

Superfund Process and Update of
Remedial Actions for
Thermal - Phase 1
Steam Enhanced Soil Treatment

Agenda

- Introductions
- Site Setting and History
- Cleanup Remedy
- Public Water Supply and Intersection Improvements
- Groundwater Treatment System update
- Soils cleanup: Thermal Overview, update and schedule
- Questions?

Introductions

US EPA – Lead Agency

- Cheryl Sprague, Project Manager
- Rodney Elliot, Community Relations

NHDES – State Oversight

- Ken Richards, Project Manager
- Sanborn Head Associates: Chip Crocetti

Beede Site Group

- Mike Skinner, Project Coordinator
- Woodard & Curran: Supervising Contractor
  - Peter Nangeroni, Project Manager
- Cedarview: Construction Manager
  - Scott Freeman

Site Setting and History

- Currently a 40-acre site located in a residential neighborhood
- 1926 – Parcel 1-Robert Beede started operation as a waste oil recycling facility.
- 1950s – Parcel 1 –large underground and numerous above ground tanks are placed on site to store waste oils. Parcel 2 - Sand and gravel operations began.

Site Setting and History

- 1960s through the 1980's - 1-acre unlined lagoon is used on-site, additional tanks added to store used, recycled, waste oils and virgin oil.

- 1980 through 1995 – NHDES conducted investigations and enforcement actions.

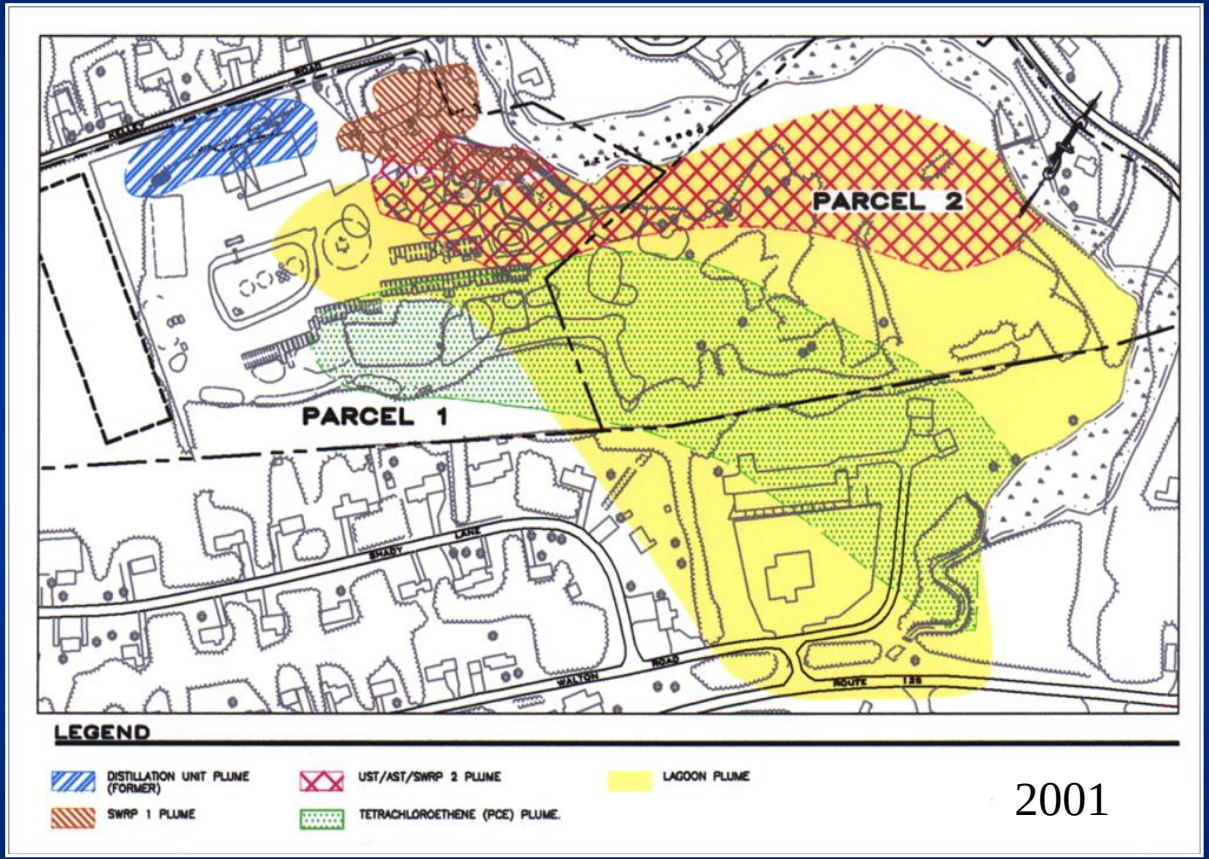
- December 1996 – Listed on Superfund NPL.

1996-1997 Removal Actions

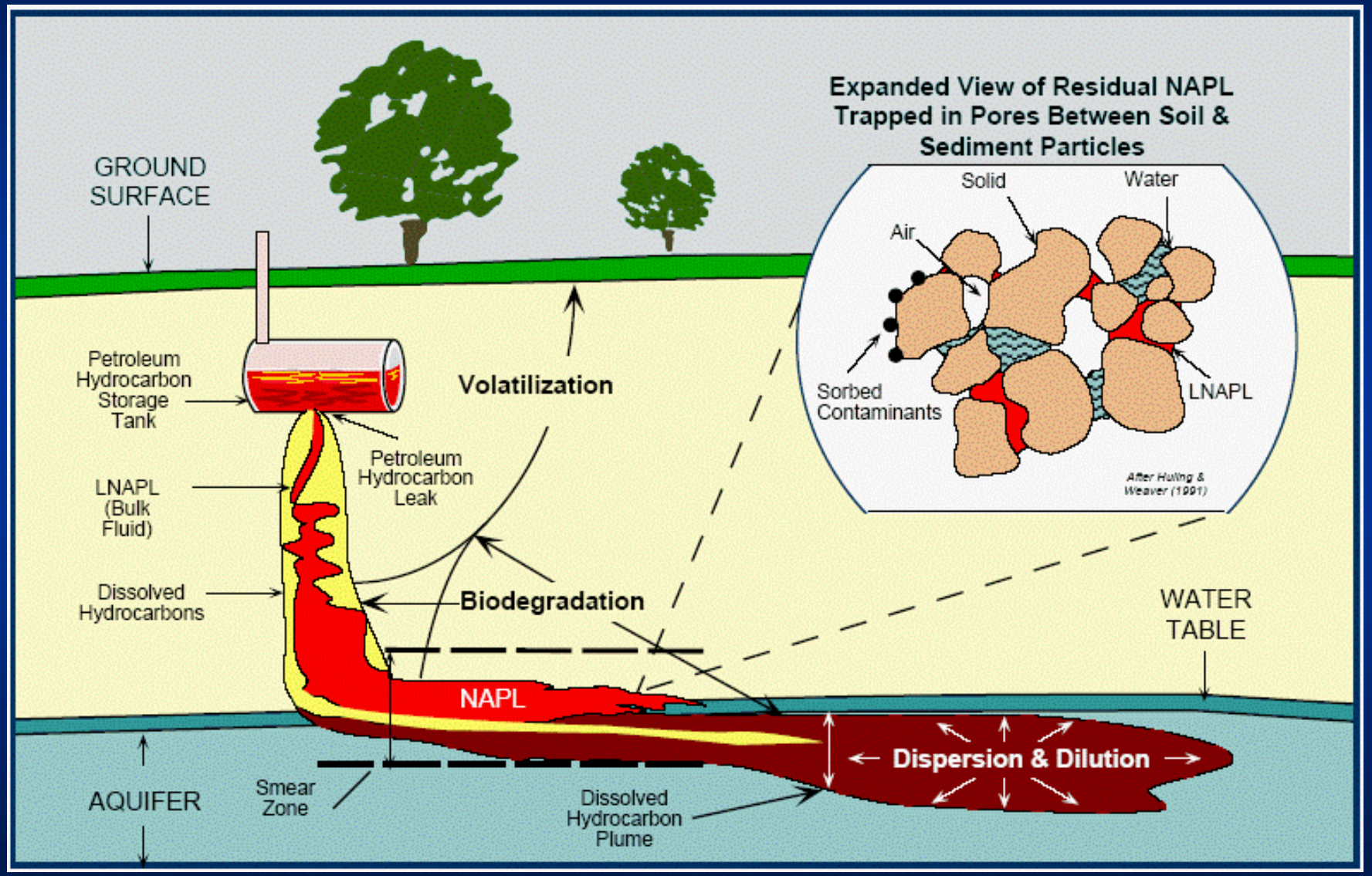
- **Purpose was to mitigate immediate threats and stabilize site conditions.**
- **Performed by USEPA and NHDES from July 1996 to November 1997.**
  - **Removed 1.1 million gallons of waste oil, sludge and water from 100 Above Ground Storage Tanks "ASTs" ;**
  - **Removed 800 drums.**
  - **Installed booms/sorbent pads to limit oil seeping into Kelley Brook.**

1996-2001 Remedial Investigations

- Site was contaminated primarily with waste oils that seeped into the ground from a variety of sources, including the former unlined lagoon, USTs, ASTs, and numerous drums.
- Chlorinated and petroleum-related compounds (VOCs) migrated off-site and contaminated residential wells.
- Approximately 3 acres of Light non-Aqueous Phase Liquid “LNAPL”.



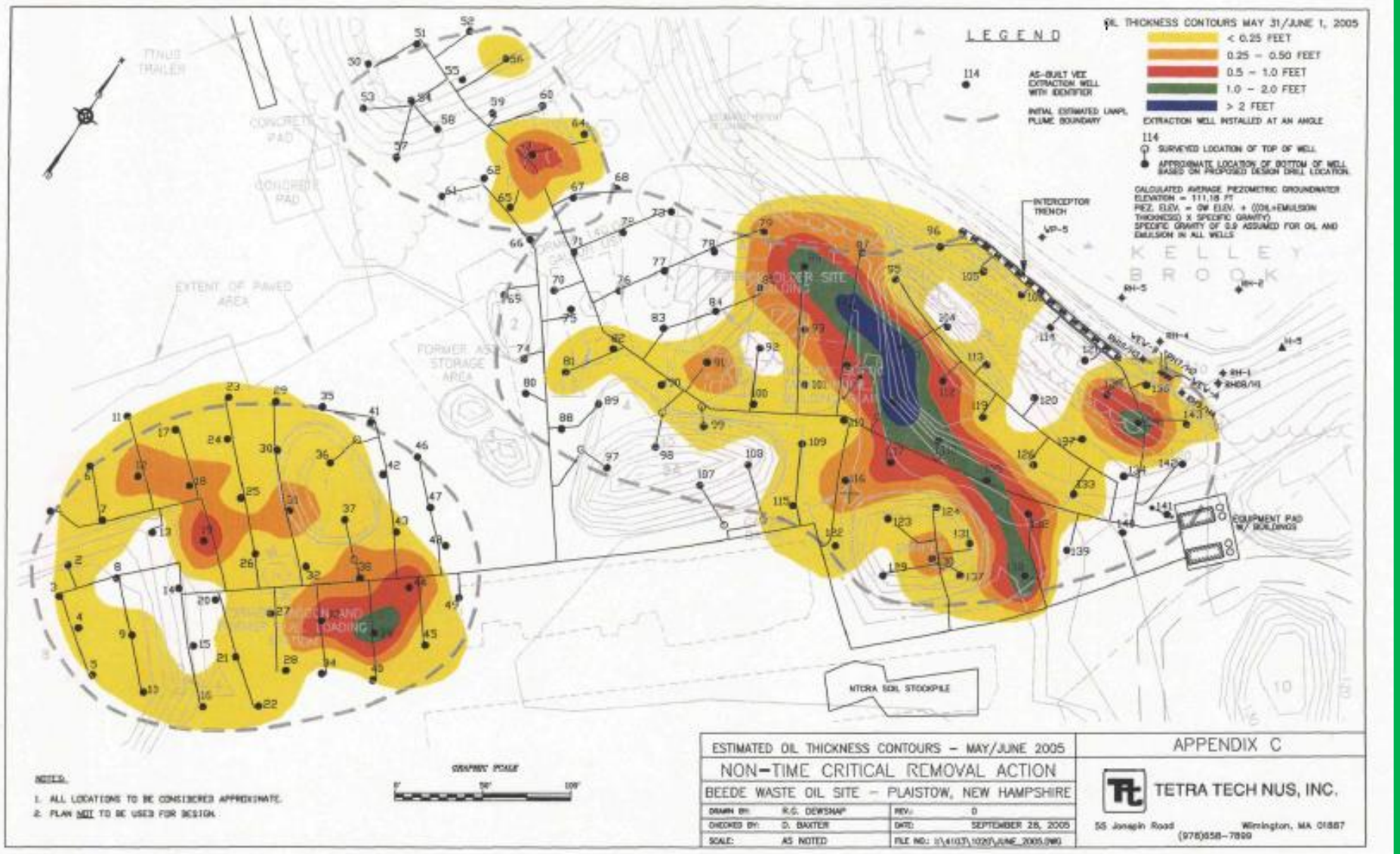
Migration of Oils into Subsurface



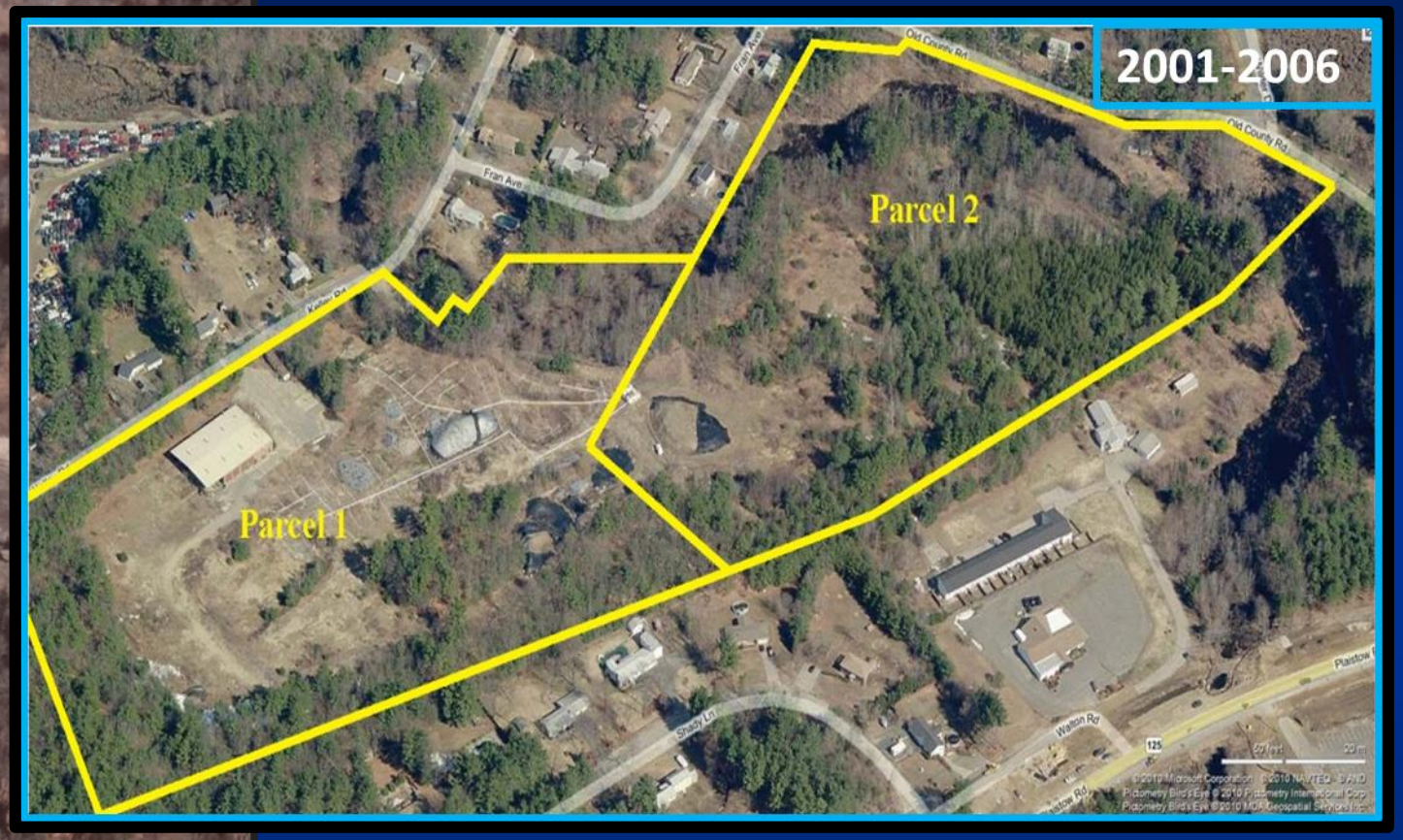
2001-2005 Vacuum-Enhanced LNAPL Extraction System

Removed over 90,000 gallons of Waste Oil (LNAPL)

Parcel 1 Areas with Residual Oils in Deep Soils



1996


2001-2006
Parcel 1
Parcel 2

2004 EPA Cleanup Remedy

- Cleanup is intended to result in the site meeting residential reuse standards for shallow surface soil (less than 10 ft bgs) and the return of groundwater to drinking water standards.
- Cleanup to proceed sequentially
- **Groundwater:**

Management of Migration "MOM" -130 gpm groundwater extraction and treatment system with on-site discharge of treated water.

Includes Long-term monitoring of groundwater and surface water.

- 2012 – Waterline

2004 EPA Cleanup Remedy

Soils: Cleanup to be implemented in 3 Phases

Thermal treatment of Residual Materials using steam enhanced vacuum extraction

Phase 1 (April 2015): within deeper soils of the former lagoon area

Phase 2: (2017): within deeper soils of the former tank storage area

- Combination of Phase 1 and Phase 2 will address 70,000 yd^3 of contaminated soil (greater than 10 ft bgs), removing contaminants which could continue to leach into the groundwater

2004 EPA Cleanup Remedy

Soils: Cleanup to be implemented in 3 Phases

Excavation and Off-site Disposal of Contaminated Shallow Soils

Phase 3 (2017-2018): Excavation and off-site disposal of approximately 77,000 yd^3 of the contaminated shallow soils (top 10 feet) within Parcel 1, including all remaining soil piles, landfill materials and contaminated sediments; followed by backfill with clean fill and grading.

Early Work

- Prior to starting any major site remedial work, 2 projects were completed to eliminate exposure to contaminated drinking water and provide safe site access
  - A new public water supply was installed and provided to all neighbors who had wells that were contaminated and had treatment systems
  - A new intersection and access were constructed so trucks and other construction vehicles did not have to go on neighborhood roads.

ROD - Groundwater Treatment System

Objectives

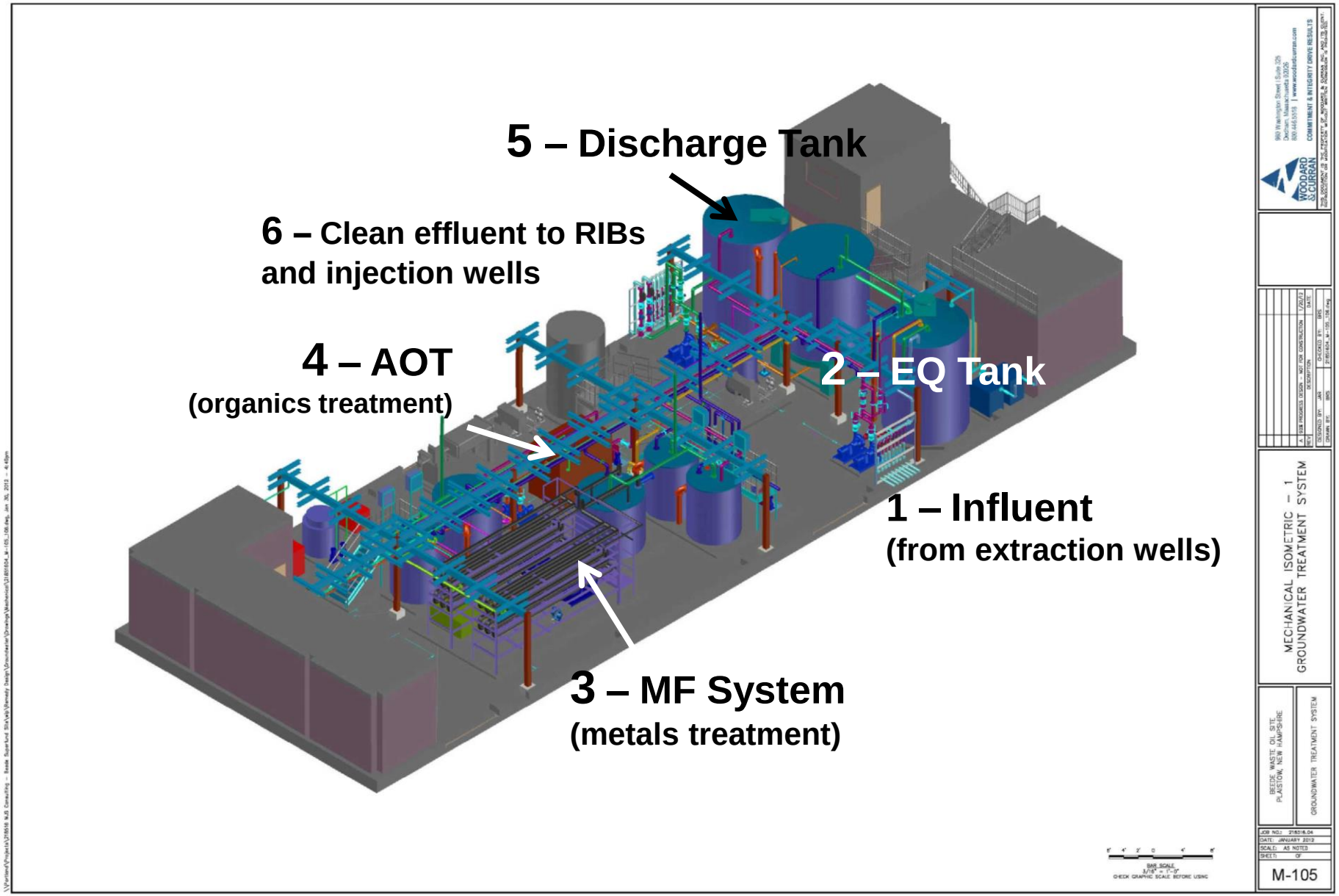
- Reduce Plume Migration
- Prevent New Exposure to Plume (down gradient drinking water wells)*
- Improve Groundwater Quality

Details

- Seven extraction wells
  - Average of 130 gpm / Maximum of 160 gpm
- Microfiltration treatment of metals (iron, manganese and arsenic)
- Advanced oxidation of VOCs, 1,4-dioxane
- Discharge of Groundwater to Rapid Infiltration Basins (RIB) and Injection wells
- Remote monitoring and controls
- Geothermal heating of treatment building

** All contaminated drinking wells have been replaced with a public water supply*

Treatment Building Layout



Groundwater System Status

- Summer/ Fall 2012 –new access route and intersection constructed
- Winter 2012 – Water treatment building constructed
- 2013 – Treatment system installation
- December 2, 2013 – System start-up
- **Treated approximately 69.3 million gallons (through the end of Feb 2015)**
- **Meeting discharge standards**
- **Extensive ongoing monitoring programs**

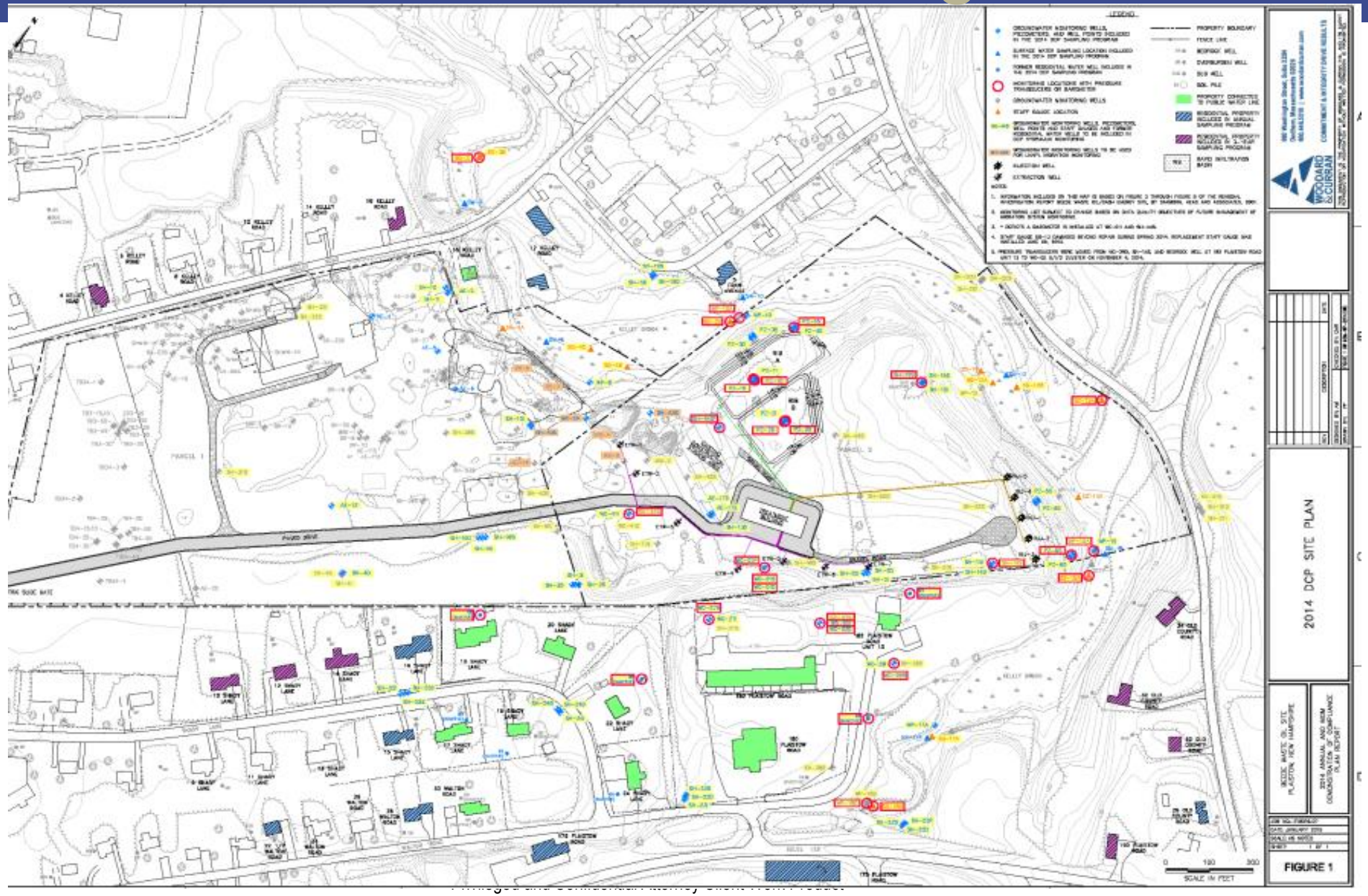
Hydraulic Monitoring

Groundwater MOM
DCP Hydraulic Monitoring Programs

	Locations	Transducers (15-min)
Hydraulic Capture of VOC Plume	116	15
Residential Well Hydraulic Monitoring	24	7
LNAPL Migration Monitoring	8	None
Slope Stability Monitoring	24	None
Kelley Brook Hydraulic Monitoring	25	8

***Locations shown on next slide*

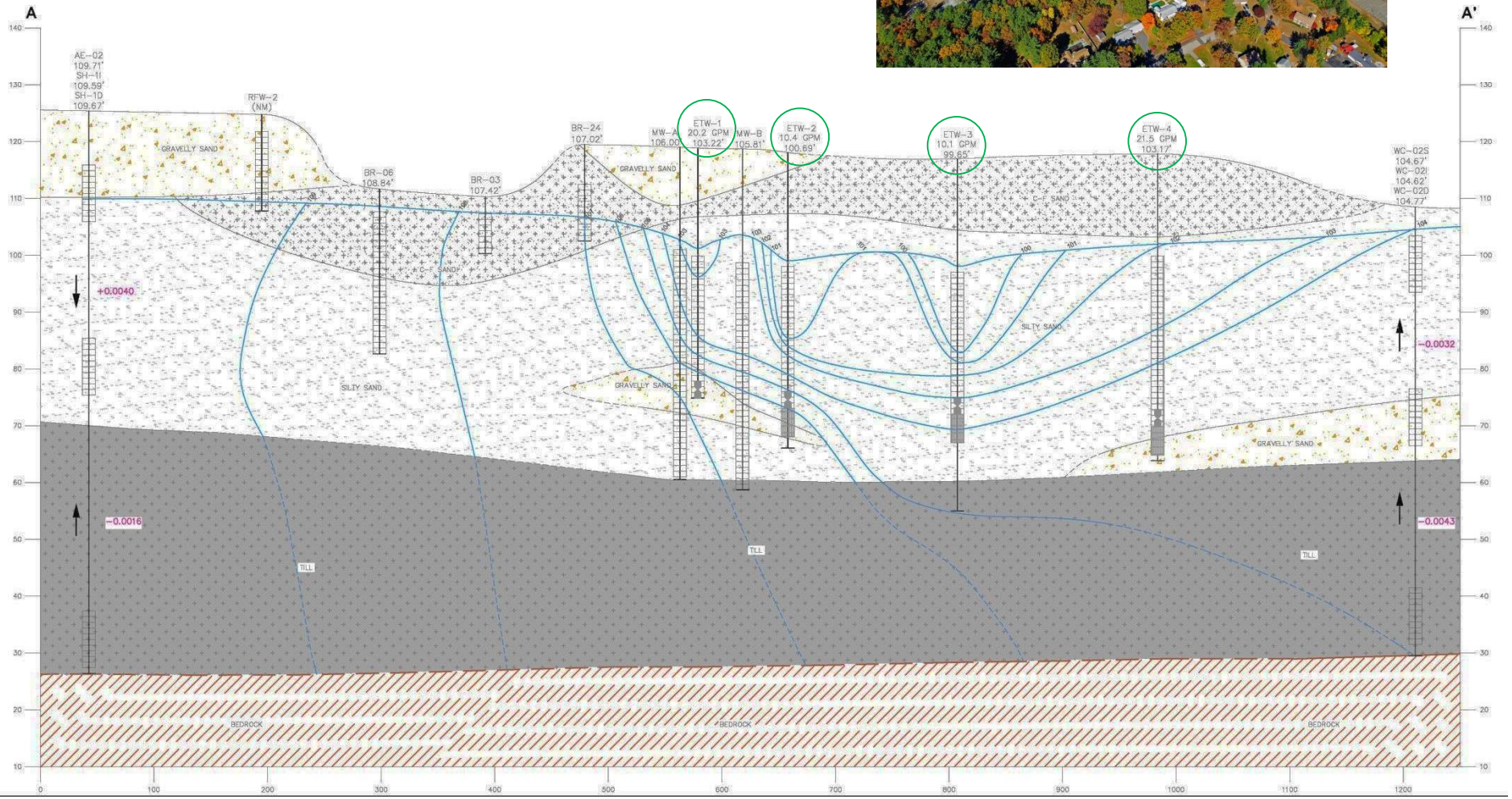
2014 DCP Monitoring



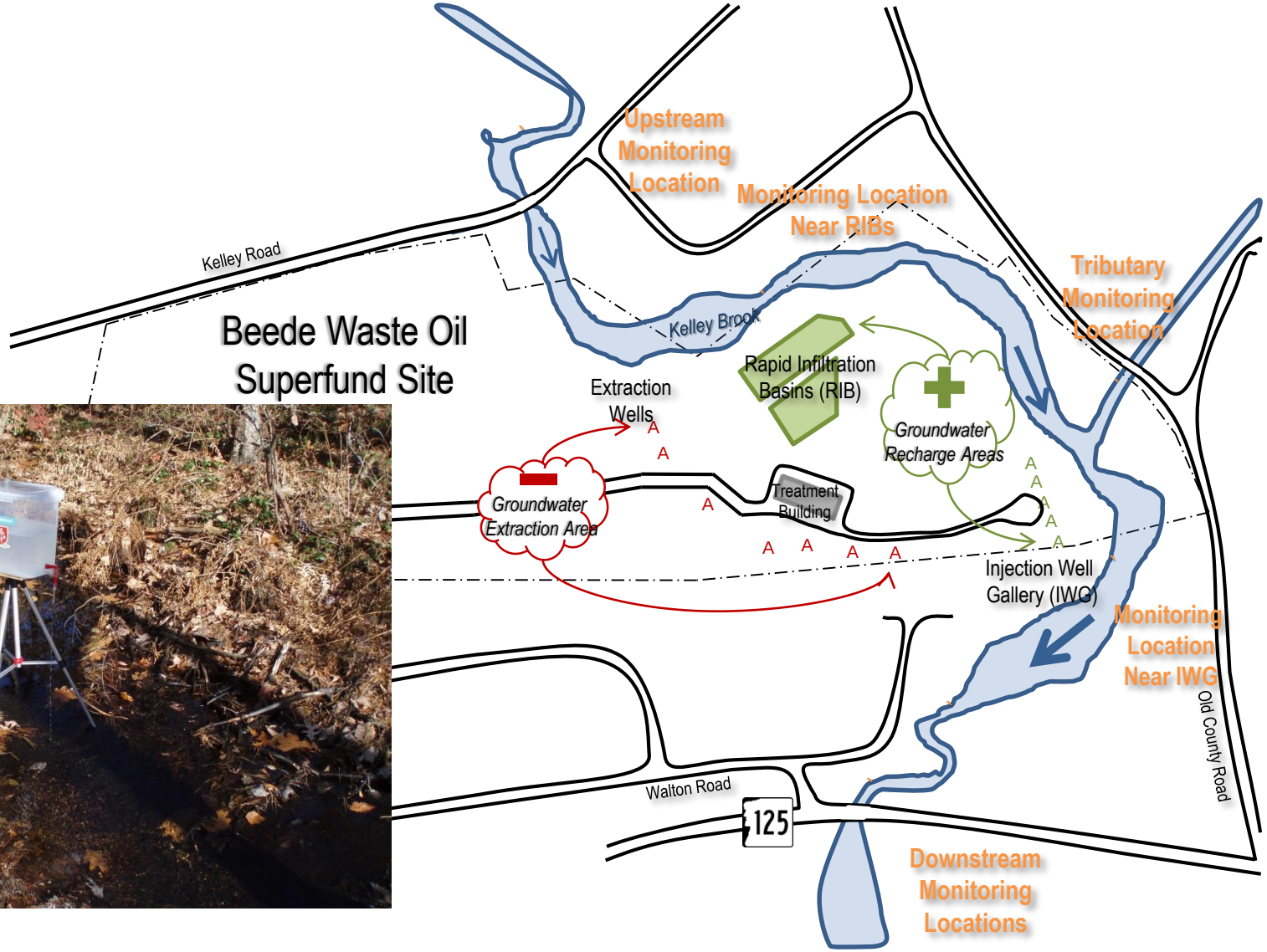
Privileged and Confidential: Attorney Client Work Product

Hydraulics

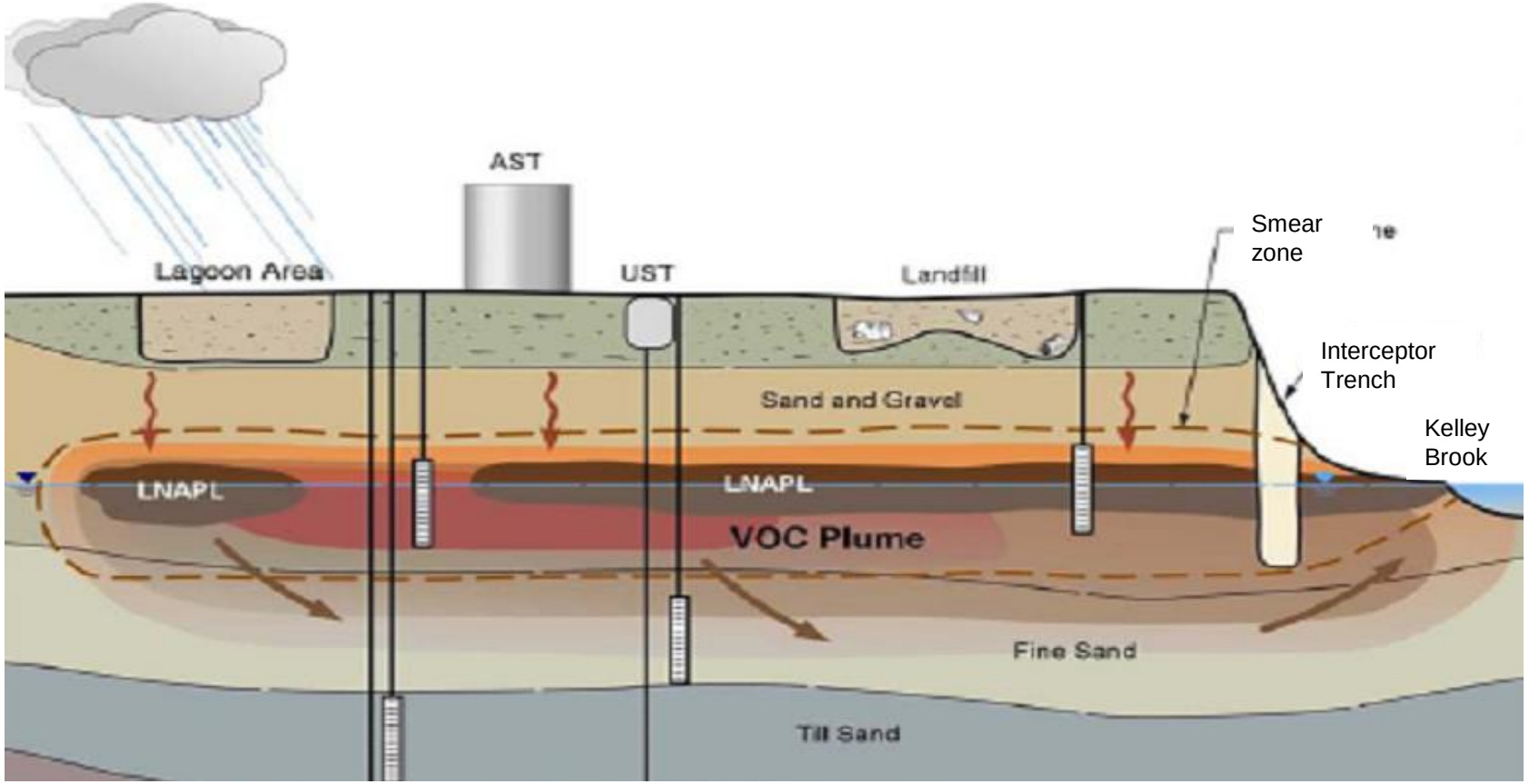
Hydraulic Capture of the VOC Plume



Hydraulics – Kelley Brook Monitoring



Conceptual Site Model – Cross Section



SEE In-situ Thermal Remediation

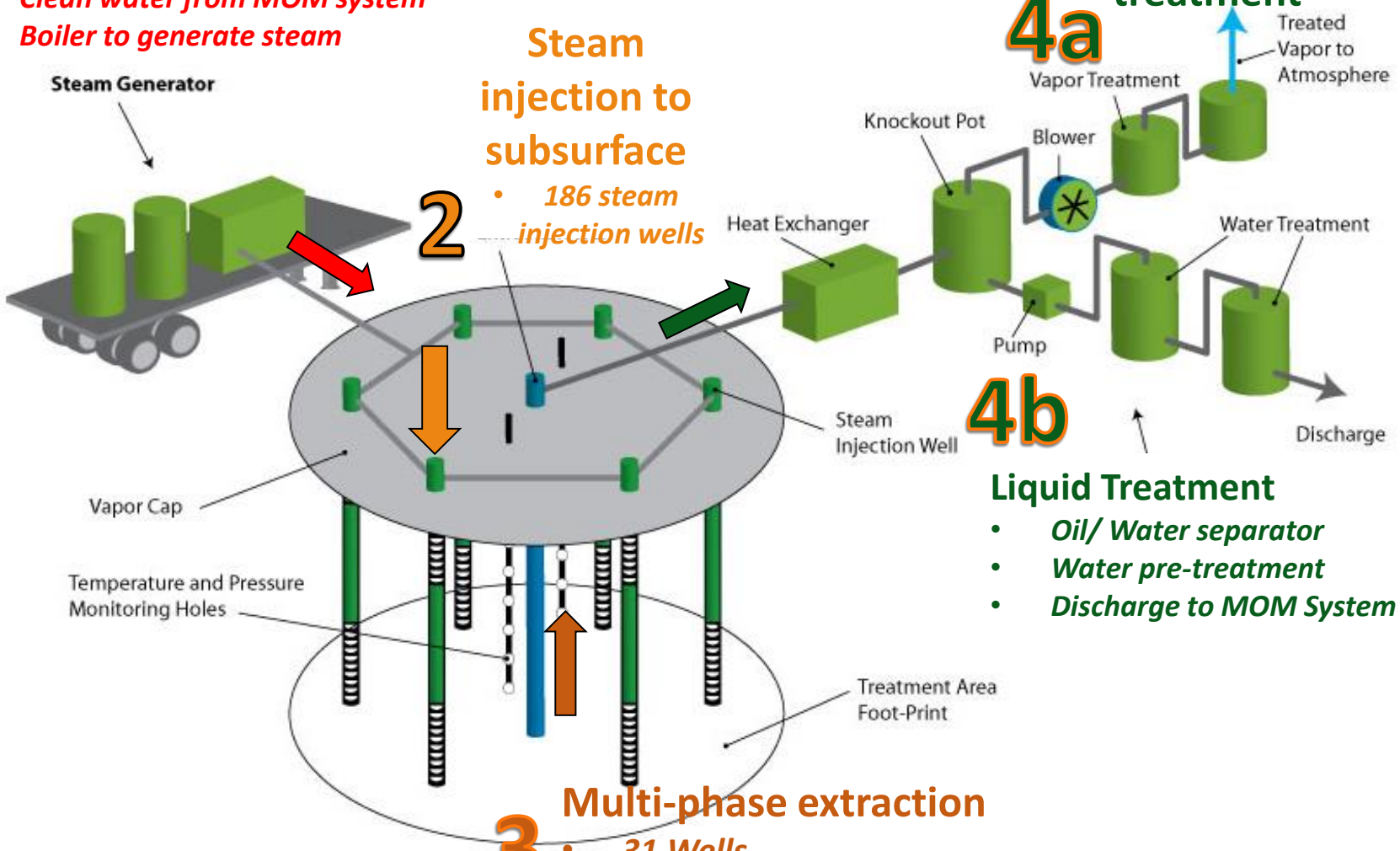
1 Steam generation

- *Clean water from MOM system*
- *Boiler to generate steam*

Steam injection to subsurface

- *186 steam injection wells*

Vapor phase treatment



Liquid Treatment

- *Oil/ Water separator*
- *Water pre-treatment*
- *Discharge to MOM System*

3 Multi-phase extraction

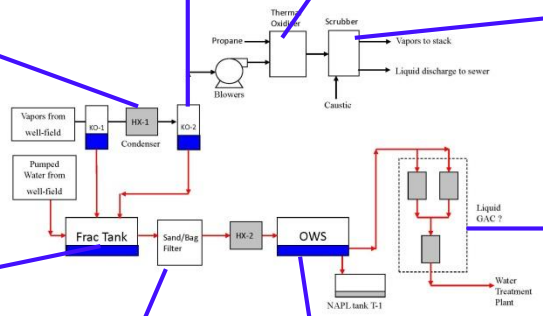
- *31 Wells*
- *LNAPL, water and vapor*

Treatment Equipment

thermal oxidizer

scrubber
& stack

heat
exchanger



Frac Tank

bag filter

oil/water
separator

Discharge to MOM System

TERRATHERM
Think Thermal

Process Equipment for Beede similar to that shown here

Beede Waste Oil Superfund Site

March 2015

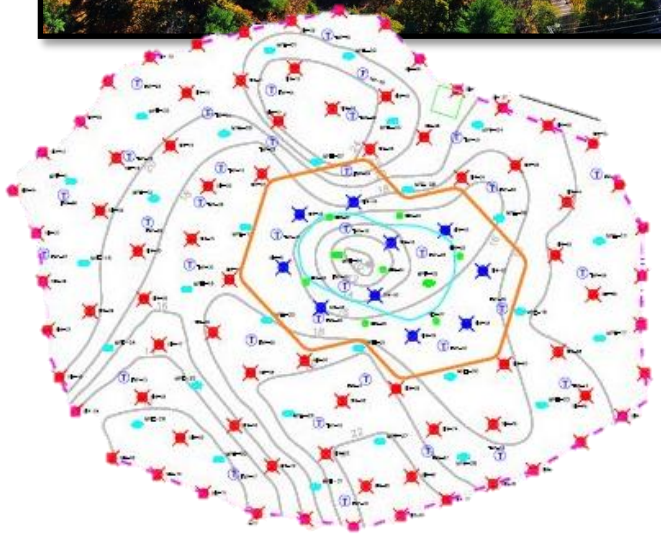
Thermal Status

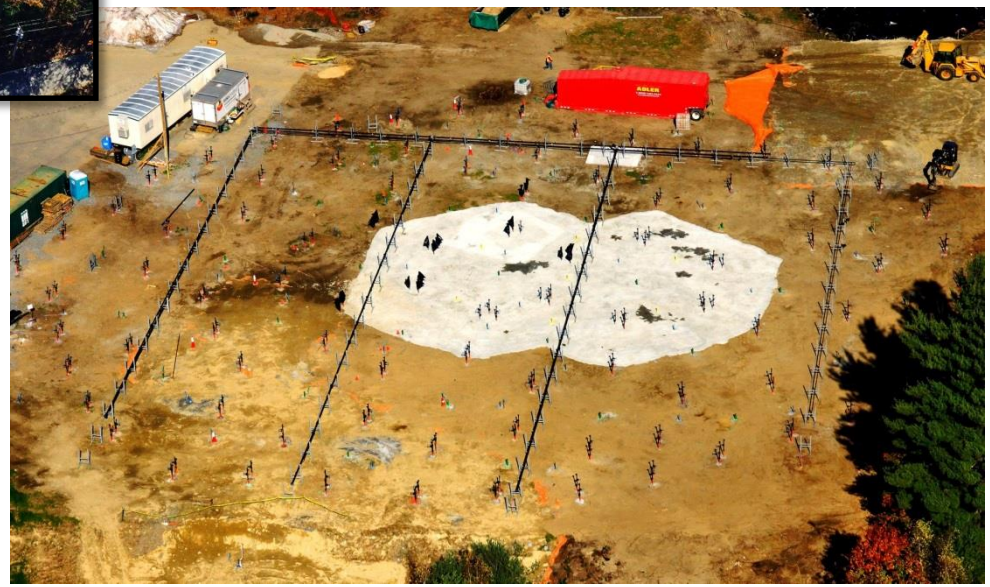
- Work Completed:
  - Phase 1 Well field installed
  - New gas line and electric lines installed
  - Equipment pad poured
- Equipment installation – started mid-February 2015
- Operations start-up Spring 2015
- estimated operation of 150 days)

Phase 1 Thermal Layout

Wellfield Layout

- Steam wells configured in hexagonal array
- MPE wells located in center
- Temperature monitored throughout





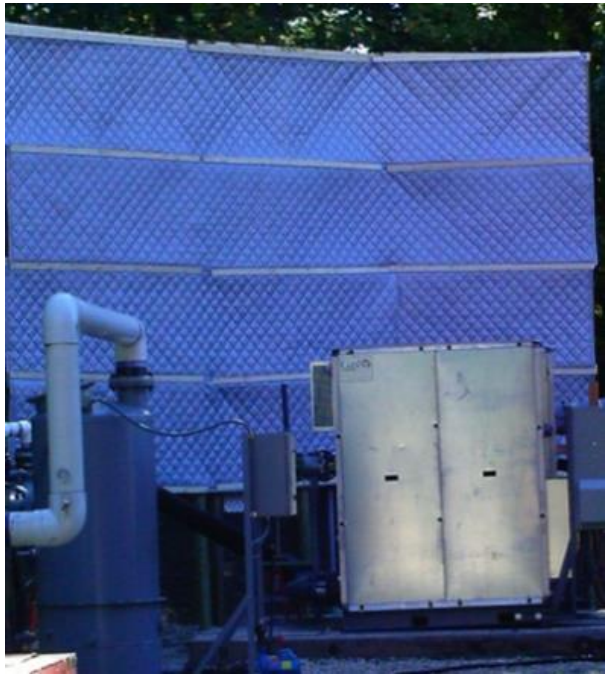
What you'll see & hear

- Minimal vehicular traffic (daily TerraTherm operators, occasional deliveries) through 221 Main Street entrance
- Slats in (old) Kelley Road entrance installed – limits visual impact of treatment equipment for neighborhood

What you'll see & hear

- Steam plume from stack
- Noise barrier (to be installed)

Sound Curtains



How we know it’s working:

- Operations Monitoring
  - Temperature monitoring – 41 locations, 7 to 8 individual temperature probes/ sensors at select depths at each location, over 300 across the treatment area
  - Vapor and liquid remedy performance monitoring – pre and post treatment
- Remedy Performance Monitoring – vapor, groundwater, soil throughout operations
- Compliance Monitoring – soil sampling

Safety

- General Safety Precautions
  - Site fenced and locked
  - Only authorized personnel allowed in Phase 1 area during operations
  - 24 hour security and motion detector cameras
  - Operators – proper training and personal protective equipment (PPE)
  - Police patrol on site at night
  - Ambient air monitoring around work zone/ site perimeter

Safety Continued

Figure 4.3 Steam Injection Well Equipped with Pressure Regulator and Metering

- Equipment Precautions
  - Pressure release valves on steam unit
  - Redundant back-up systems are provided, including an emergency generator that turns on automatically in the event of a loss of grid power, so that the off-gas treatment equipment can operate continuously
  - Immediate remote alarm notification to operators
  - Heated pipes are insulated

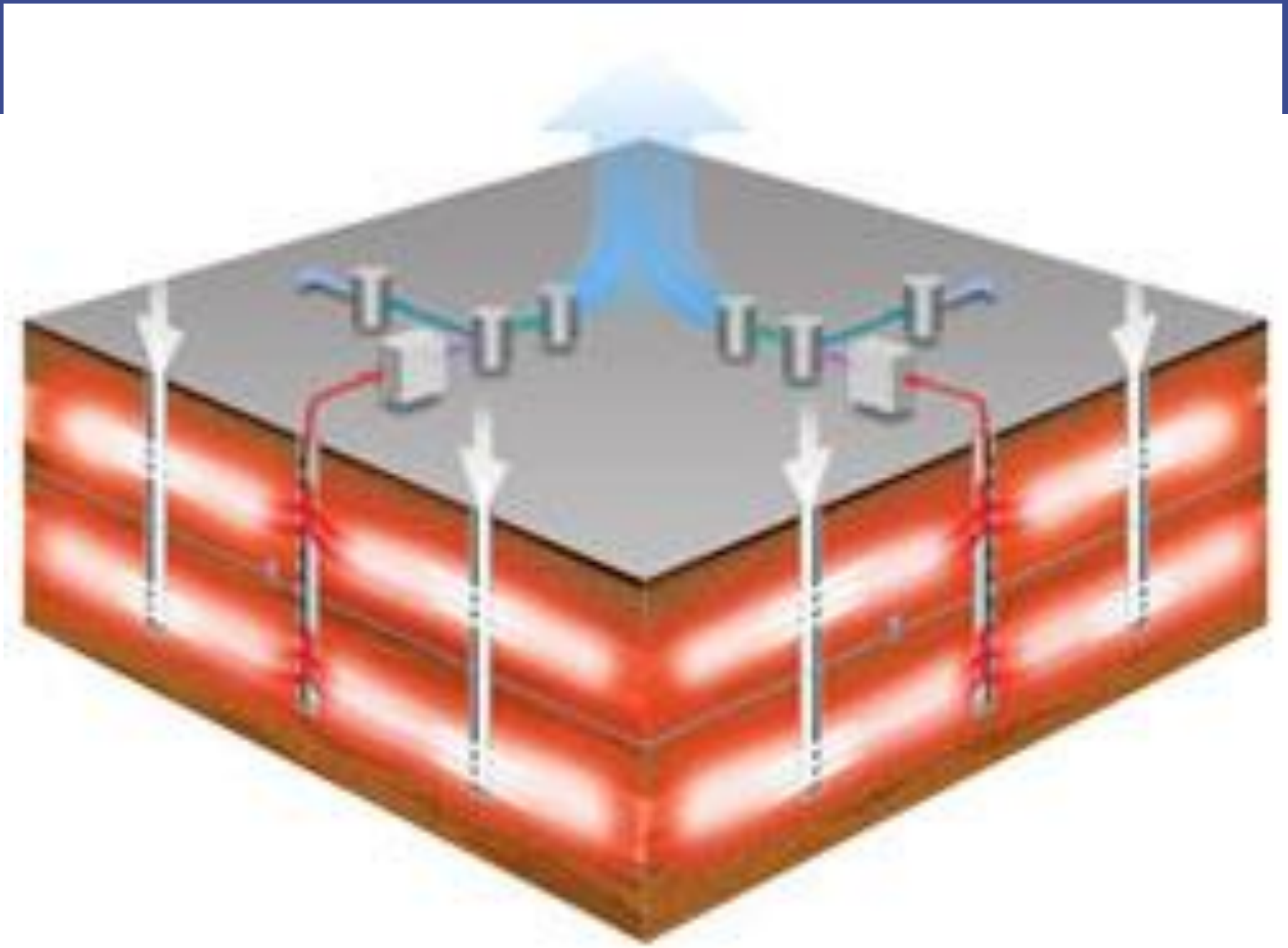
Questions?

- www.epa.gov/ne/superfund/sites/beede and on NHDES's One Stop Web Site at: http://des.nh.gov/onestop//.
- or please visit the Beede Groups progress updates and on-going field work at:
- http://www.facebook.com/pages/Beede-Clean-Up/447695315275824

Back up information

Site Plan

N
KELLEY ROAD
FRAN AVENUE
OLD COUNTY ROAD
MAIN STREET
SITE BUILDING
THERMAL PHASE I LAGOON AREA
LANDFILL AREA
RIB A
RIB B
KELLEY BROOK
GROUNDWATER TREATMENT PLANT
ETW-1
ETW-2
ETW-3
ETW-4
ETW-5
ETW-6
ETW-7
INJ-1
INJ-2
INJ-3
INJ-4
INJ-5
SHADY LANE
WALTON ROAD
NH ROUTE 125
0 100 200 400
Feet



Steam Enhanced Extraction (SEE)

Thermal Status

- Work Completed:
  - Phase 1 Well field installed
  - New gas line and electric lines installed
  - Equipment pad poured
- Equipment installation – started mid-February 2015
- Operations start-up Spring 2015
- estimated operation of 150 days – into fall of 2015

- **Field Work Scheduled for Upcoming Period**
  - **Soils – Phase 1 Thermal *(current schedule; subject to change)***
    - Continue installation of wellfield components
    - Collection of samples from onsite carbon vessels for waste characterization (March 16)
    - Delivery of liquid treatment train (March 17)
    - Gravel placement for base for rental tanks/ equipment outside of the treatment pad
    - Set electrical skid, duct heater, and scrubber pumps (March 20)
    - Crane operations for rental tanks (March 23)
    - Carbon vessel delivery (March 23 tentatively)
    - Delivery of rental boiler (March 30)
    - Noise barrier wall (end of March)
    - Delivery of rental generator (April 1)
    - Installation of fiber optic cables on electrical poles between MOM system and thermal equipment pad (TBD)
  - **MOM system – Groundwater treatment**
    - Extraction well/line flushing (Weston) – TBD pending weather
  - Installation of piping connections inside the treatment plant for the effluent from and influent to the thermal treatment system.
  - Support controls integration for the thermal system (late March/early April)
  - Sludge pickup in mid to late March.