Industri-Plex Superfund Site: Understanding and Considering Fate & Transport Mechanisms towards Remedy Selection

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Problem

- Large Site with over 130 years of chemical and glue manufacturing.
- River system cuts through the site, plus a second superfund site, and extends six miles downstream before discharging into a Lake.
- Unclear Fate & Transport of arsenic in groundwater and surface water at the site and downstream.
- Establish Cost Effective Remedy under the Superfund Program (RI, FS and ROD).
  - Remedy to be implemented by either EPA or PRPs

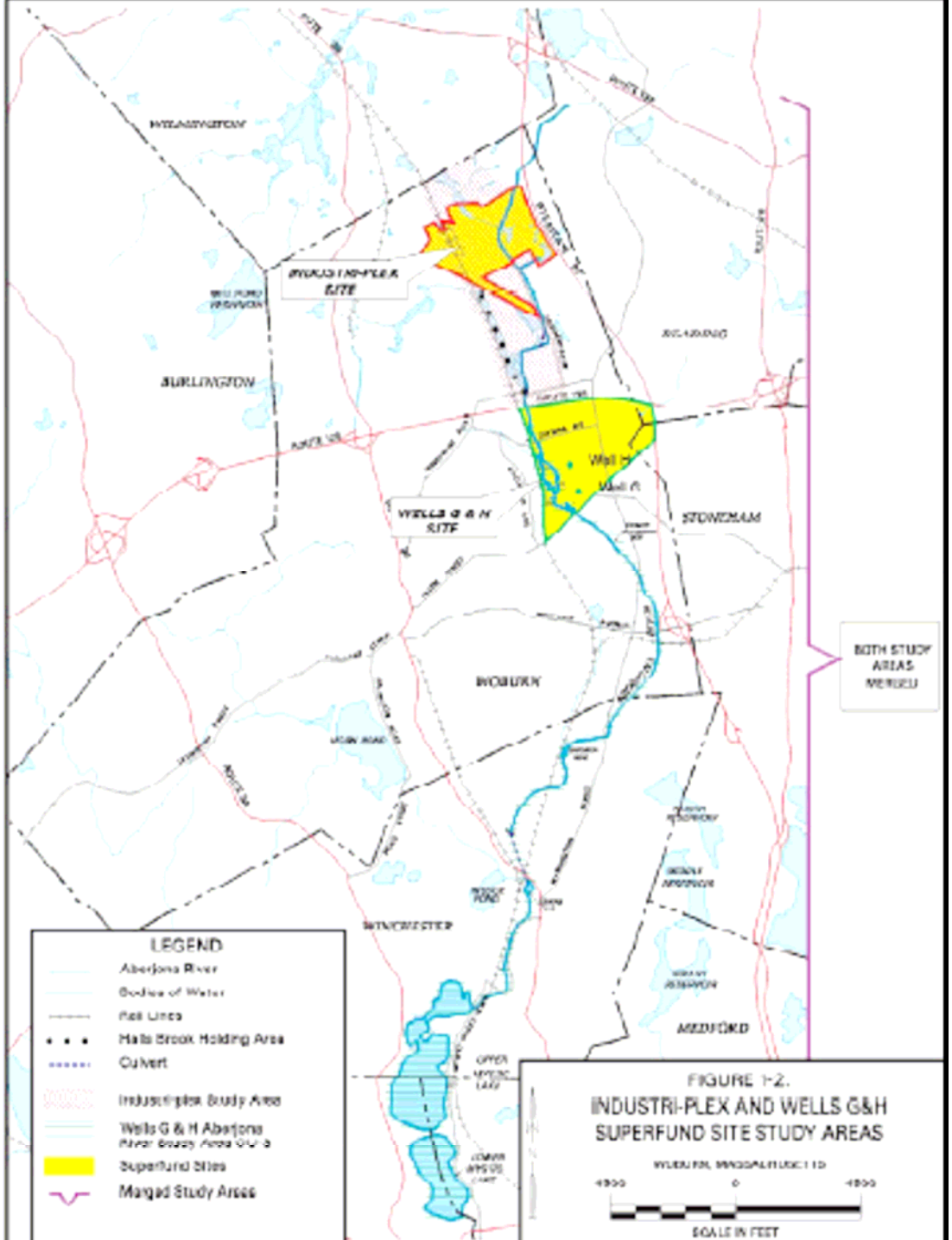


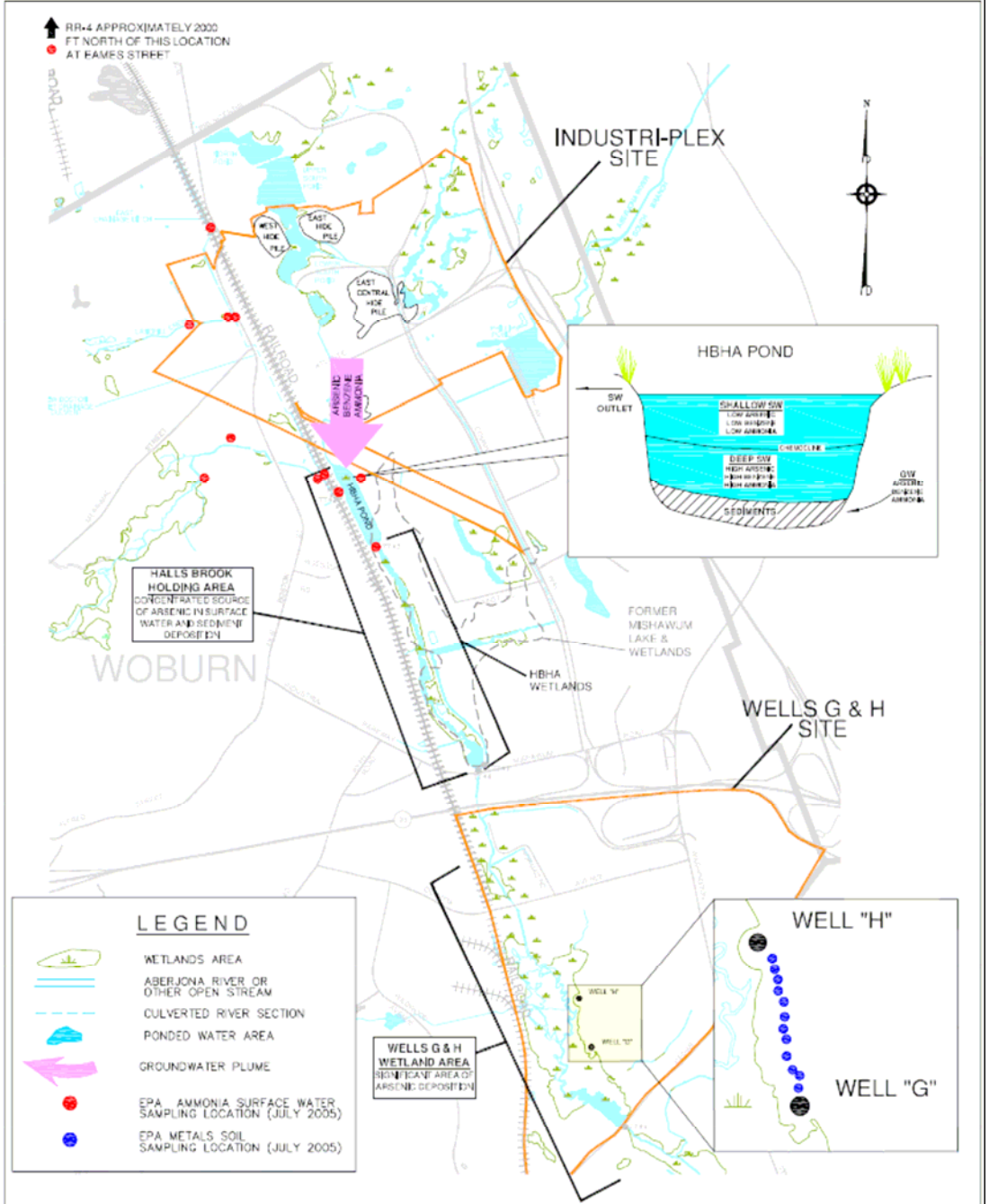
FIGURE 1-2.
INDUSTRI-PLEX AND WELLS G&H SUPERFUND SITE STUDY AREAS

SCALE IN FEET

Solution

- Determine mechanisms controlling arsenic migration via Natural Attenuation Study (NAS).
- EPA ORD implements NAS with site specific field investigations to determine mechanisms controlling arsenic transport and support cost effective approach to arsenic problem.

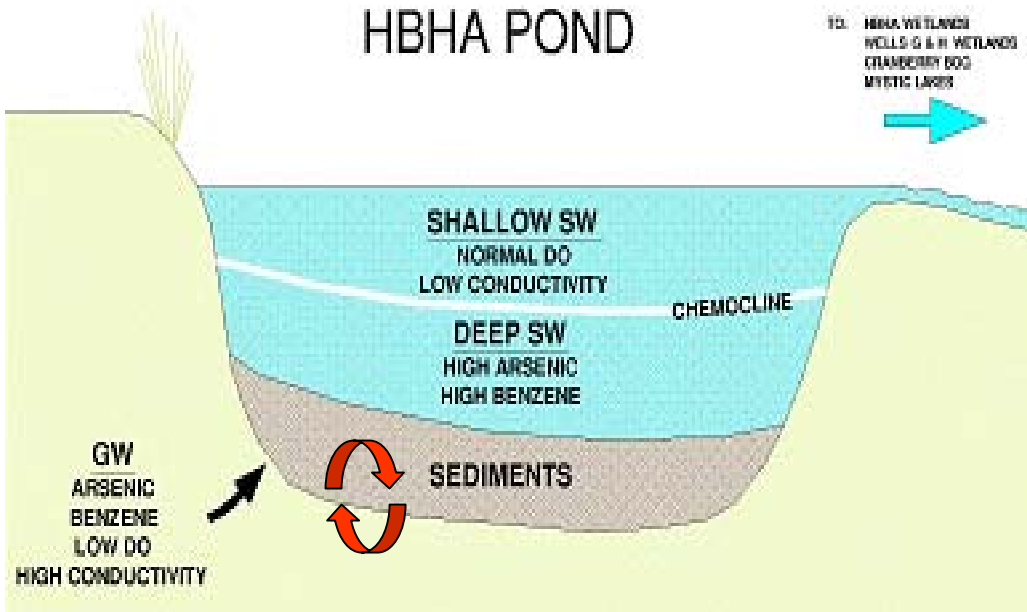
  → NAS Report is prepared and incorporated into the RI.
- PRPs implement additional groundwater and surface water studies at the Site.
- EPA Region 1 implements comprehensive surface water investigation along entire river system.
- EPA coordinates with EPA ORD regarding RI, FS and Record of Decision (ROD).



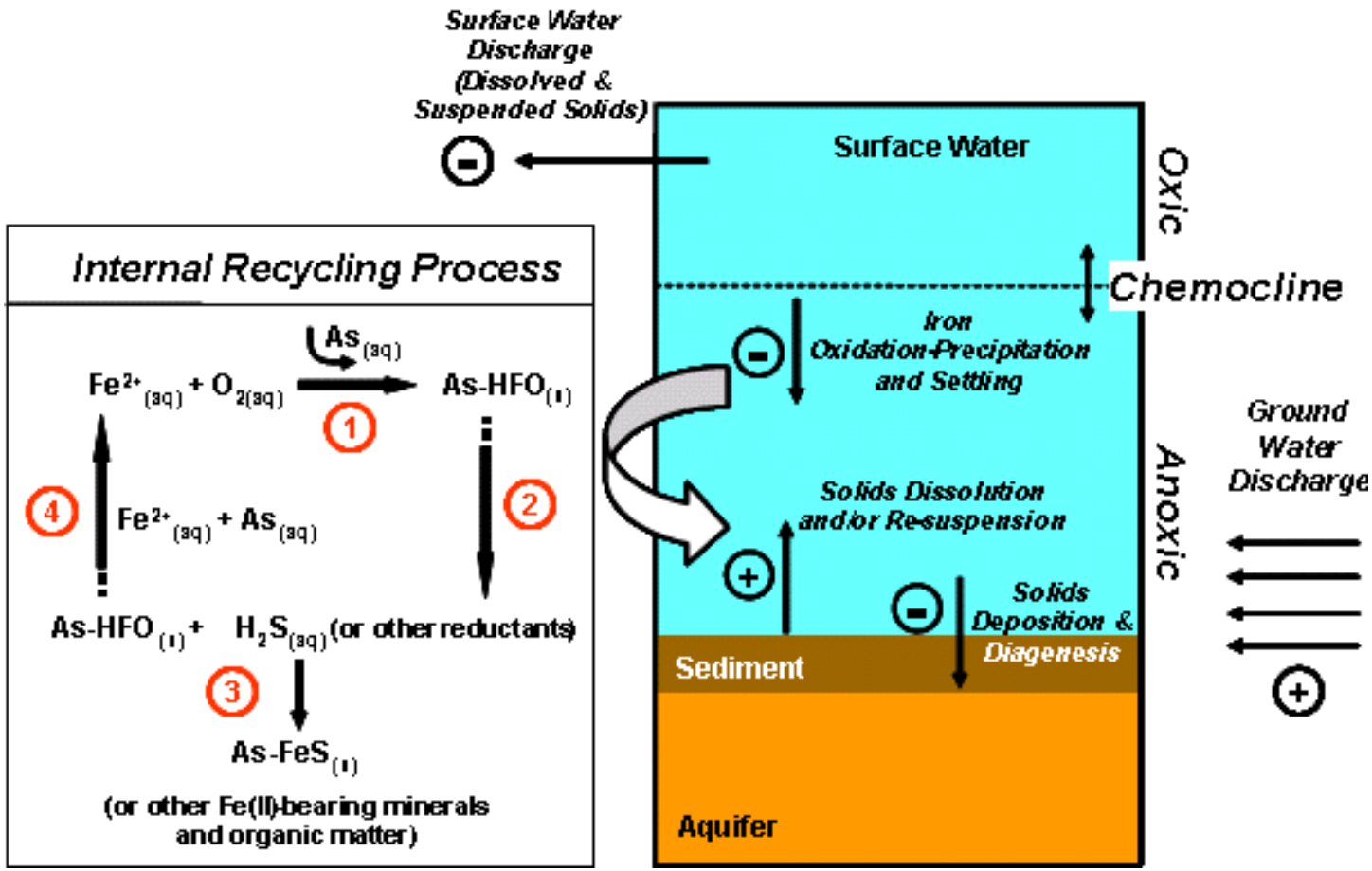
FACT SHEET – FIGURE 1
PARTIAL KEY CONTAMINANT MIGRATION PATHWAYS WITH AMMONIA AND JULY 2005 SAMPLING LOCATIONS

Fate and Transport of Key Contaminants

- **GW Plumes (Arsenic, Benzene, Ammonia, Low DO, High conductivity) discharge into downstream HBHA Pond.**
- **Upgradient shallow surface water (normal DO, low conductivity) discharges into the HBHA Pond**
- **Different water densities create "Chemocline" in HBHA Pond**
- **During SW baseflow conditions, the chemocline sequesters most arsenic below the chemocline and in sediments.**
- **During significant storm flows, the chemocline becomes unstable and increasing arsenic migration downstream.**



Schematic of Primary Geochemical Processes Controlling Arsenic Partitioning within HBHA Pond



RESULTS/CONCLUSIONS

- HBHA Pond intercepts contaminant plume and effectively sequesters arsenic during baseflow conditions

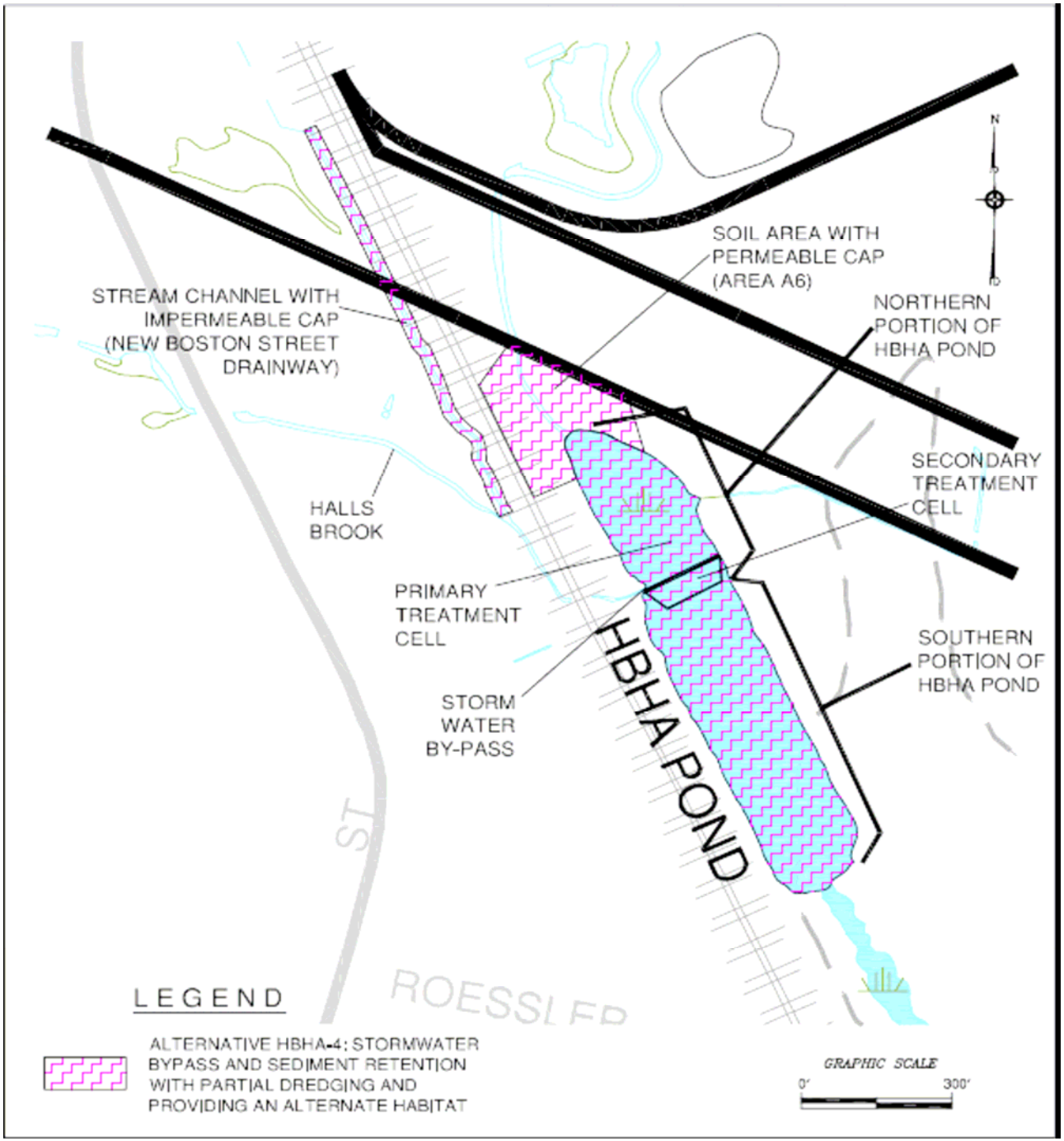
- FS includes cost effective alternatives of utilizing and enhancing the sequestering and natural treatment processes at the HBHA Pond

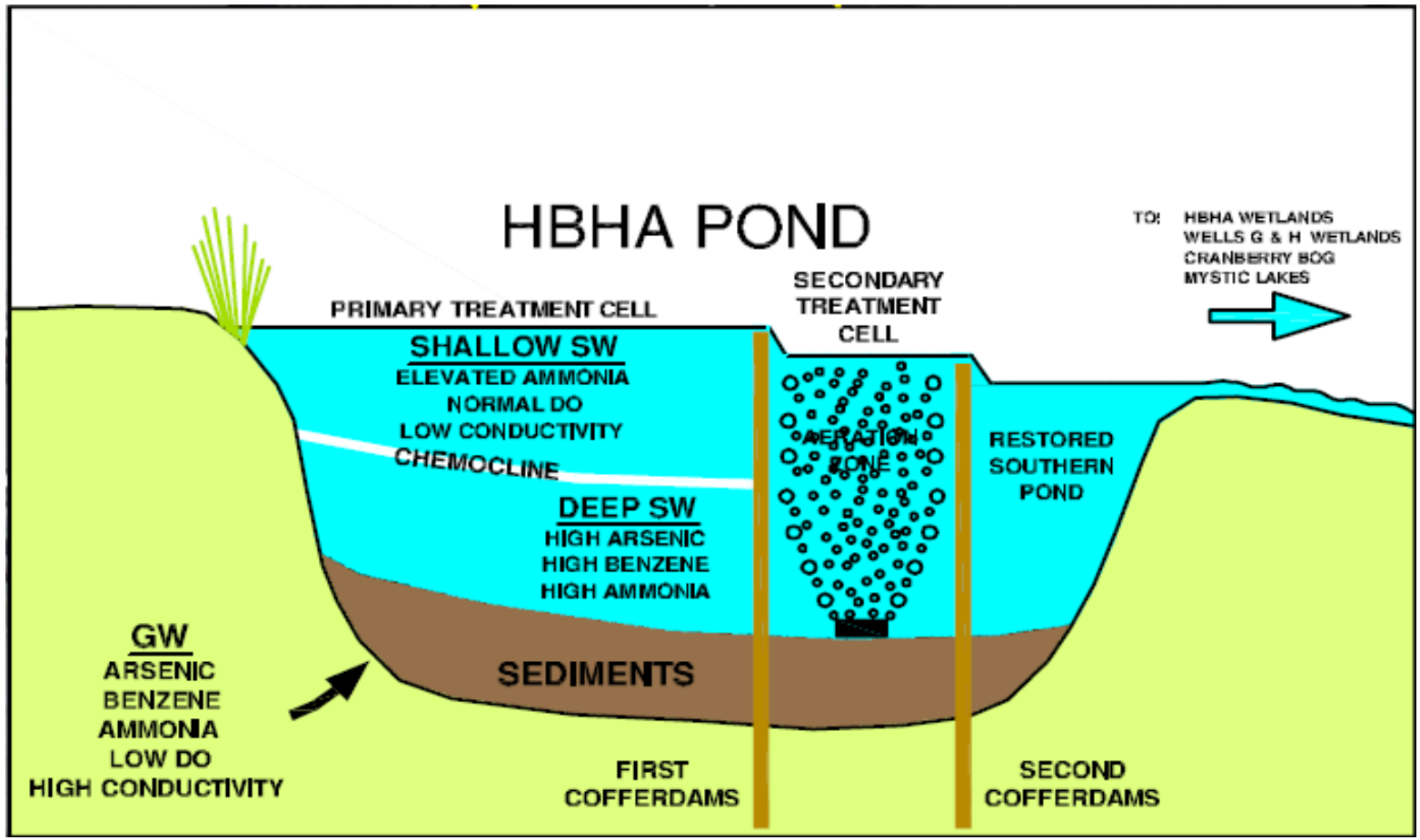
- HBHA Pond Alternative:

  → Northern Portion divided into two stage sequestering/ treatment cells with storm water by pass system;

  → Portions of accumulated sediments in Northern Portion periodically dredged;

  → Southern Portion dredged and restored.


SOIL AREA WITH PERMEABLE CAP (AREA A6)
STREAM CHANNEL WITH IMPERMEABLE CAP (NEW BOSTON STREET DRAINWAY)
NORTHERN PORTION OF HBHA POND
SECONDARY TREATMENT CELL
HALLS BROOK
PRIMARY TREATMENT CELL
SOUTHERN PORTION OF HBHA POND
STORM WATER BY-PASS
HBHA POND
ST
ROESSLER
N
LEGEND
ALTERNATIVE HBHA-4: STORMWATER BYPASS AND SEDIMENT RETENTION WITH PARTIAL DREDGING AND PROVIDING AN ALTERNATE HABITAT
GRAPHIC SCALE
0'
300'


HBHA POND
TO: HBHA WETLANDS
WELLS G & H WETLANDS
CRANBERRY BOG
MYSTIC LAKES
PRIMARY TREATMENT CELL
SECONDARY TREATMENT CELL
SHALLOW SW
ELEVATED AMMONIA
NORMAL DO
LOW CONDUCTIVITY
CHEMOCLINE
AERATION ZONE
RESTORED SOUTHERN POND
DEEP SW
HIGH ARSENIC
HIGH BENZENE
HIGH AMMONIA
GW
ARSENIC
BENZENE
AMMONIA
LOW DO
HIGH CONDUCTIVITY
SEDIMENTS
FIRST COFFERDAMS
SECOND COFFERDAMS

RESULTS/CONCLUSIONS

- EPA's January 31, 2006 Record of Decision documented the remedy selection at the Industri-plex Superfund Site.

- EPA estimates that approximately **$13 MILLION** was saved by selecting the HBHA Pond remedy component. The next likely alternative would have been groundwater plume interception upstream of the HBHA Pond via pump and treatment.

- Understanding fate and transport mechanisms may yield cost effective solutions at other hazardous waste sites (e.g. landfills).

- Additional information regarding Industri-plex Superfund Site available on-line at www.epa.gov/ne/superfund/sites/industriplex, or contact:

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