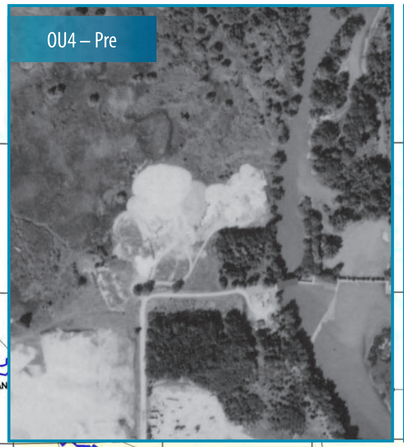
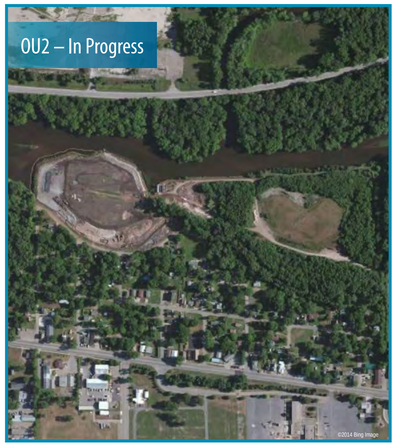
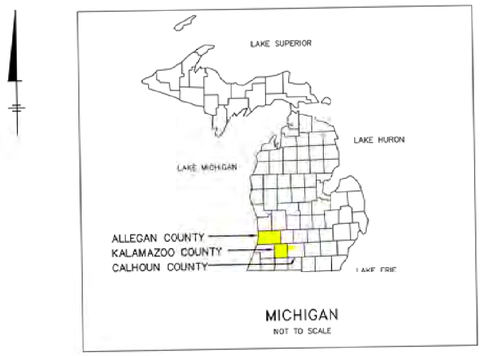
Kalamazoo River Superfund Project





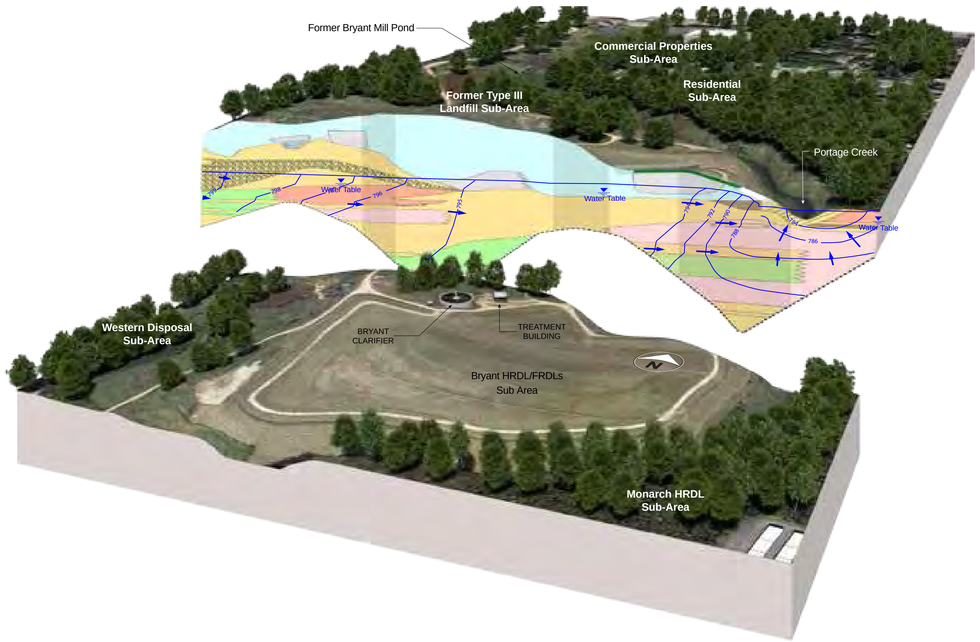


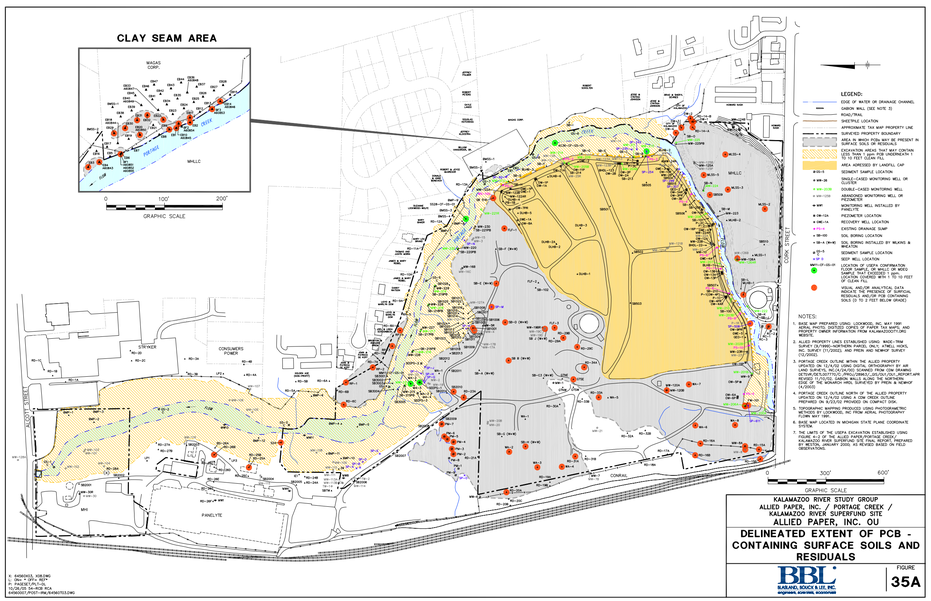
NOTE:

ALLEGAN, KALAMAZOO AND CALHOUN COUNTY MAPPING OBTAINED FROM MICHIGAN RESOURCE INFORMATION SYSTEM.

- OU1: Allied Paper Landfill
- OU2: Willow Boulevard/A Site Landfill
- OU3: King Highway Landfill
- OU4: 12th Street Landfill
- OU5: Kalamazoo River and Portage Creek

Conceptual Site Model





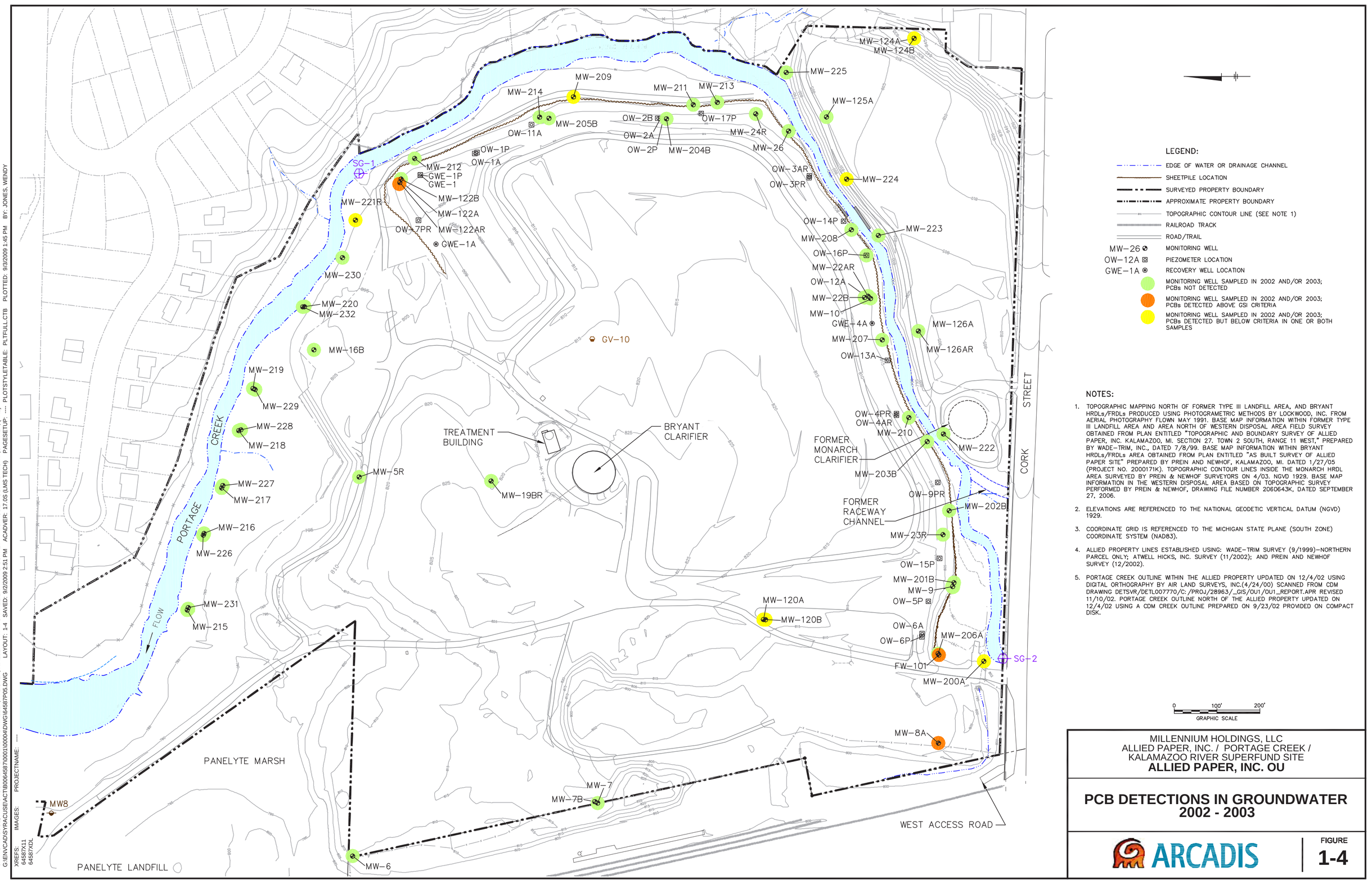
The primary exposure pathways at OU1 are associated with the following:

- Consumption of fish.
- Direct contact with residuals.
- Inhalation of dust and volatile emissions from floodplain soils and consolidated residuals.
- Ingestion of or direct contact with groundwater.

Transport mechanisms that may result in completed exposure pathways include:

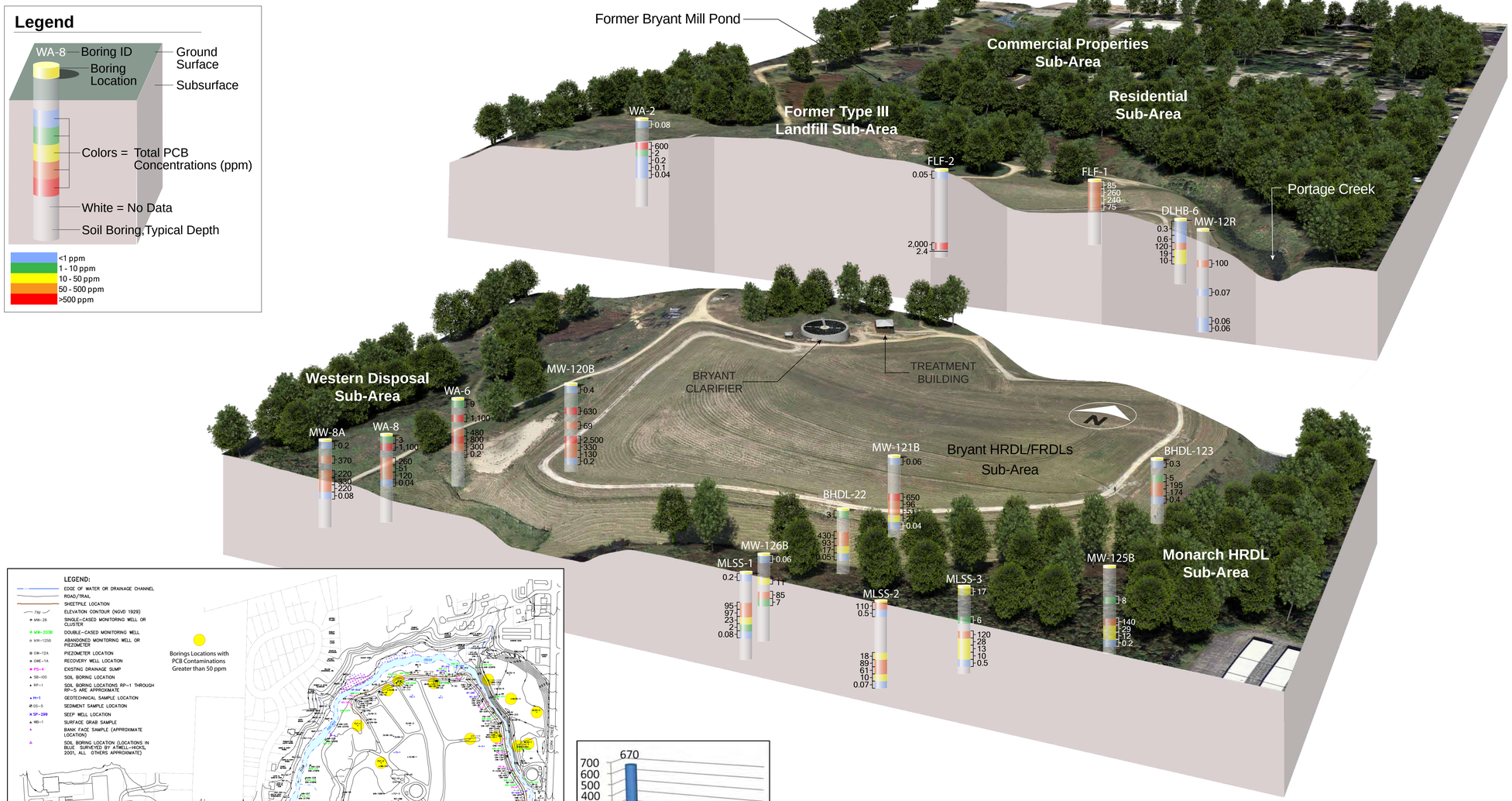
- Colloidal transport in groundwater.
- Surface water runoff.
- Wind dispersion of exposed residuals.
- Erosion of contaminated materials to Portage Creek and Kalamazoo River System.

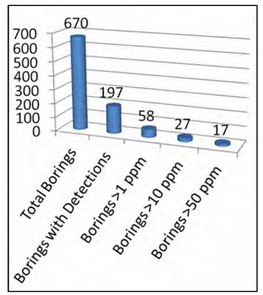
PCB Detections in Groundwater at Allied Landfill



- 357 groundwater samples collected from 1993 through 2003.
- 2002 and 2003 sampling event best represents current conditions after TCRA was performed.
  - 57 groundwater locations were sampled for PCBs in 2002/2003.
  - 10 of the 57 locations had PCB detections.
  - 3 of the 10 locations had PCB concentrations above GSI criteria. The 3 exceedances of GSI groundwater criteria occurred in wells screened within or immediately adjacent to the residuals.
- No current evidence of PCBs in groundwater and/or impacts to Portage Creek and fish in Portage Creek.

PCB Distribution in Subsurface





Soil Borings with PCB Concentrations Greater than 50 ppm
Allied Paper OU-1
Kalamazoo River Superfund Site
Kalamazoo, Michigan

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ES122013120057GNV Allied_OU-1_Wells_CSM_rev3.ai 1/30/2014 DCD

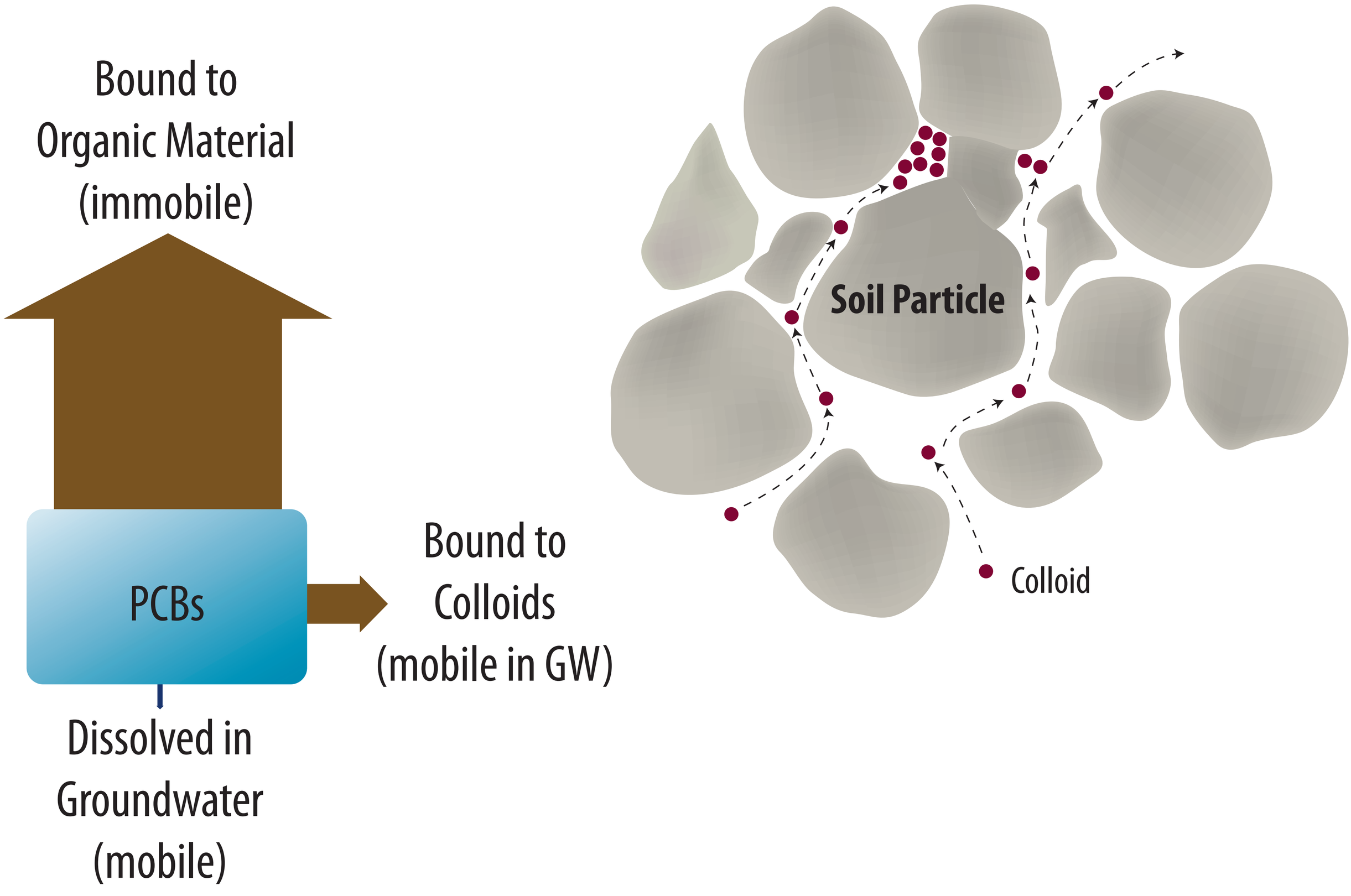
Nature of PCBs in the Environment

PCBs do not dissolve readily and typically stay bonded to particulates.

- PCBs bind strongly to organic material.
- Residuals are grey clay and fibrous wood material, high in organics content.
- 65 of the 66 soil or sediment samples with PCB concentrations >10 mg/kg contained residuals.

PCB mobility also affected by soil density, particle size distribution, moisture content, and soil permeability.

- PCBs attached to small mobile particulates (colloids) may travel in groundwater.
- Residuals at Allied Landfill similar to clays and allow little water flow through them.



Remedial Action Objectives (RAO)

RAOs are goals for protecting human health and the environment.

RAO 1 – Mitigate the potential for human and ecological exposure to materials at OU1 containing COC concentrations that exceed applicable risk-based cleanup criteria.

RAO 2 – Mitigate the potential for COC-containing materials to migrate, by erosion or surface water runoff, into Portage Creek or onto adjacent properties.

RAO 3 – Prevent contaminated waste material at the OU1 landfill from impacting groundwater and surface water.

NCP Criteria

In evaluating the cleanup alternatives at all Superfund sites, EPA uses a specific set of nine criteria (called the NCP Criteria) that ask the following questions about each alternative:

Threshold Criteria – must be met for an alternative to be eligible.

1. **Overall protection of human health and the environment.** Is it protective? How are risks eliminated, reduced, or controlled?
2. **Compliance with ARARs.** Does it meet environmental laws or provide grounds for a waiver?

Balancing Criteria –determines relative strengths and weaknesses among the criteria that meet threshold.

3. **Long-term effectiveness and permanence.** Does it provide reliable protection over time?
4. **Reduction of toxicity, mobility, or volume through treatment.** Does it use a treatment technology? This is preferred, if possible.
5. **Short-term effectiveness.** Will the remedy be implemented fast enough to address short-term risks, and will there be adverse effects (human health or environmental) during construction/implementation?
6. **Implementability.** How difficult will it be to implement (e.g. availability of materials or coordination of Federal, State, and local agencies)?
7. **Cost effectiveness.** What are the estimated capital and operation and maintenance costs in comparison to other, equally-protective alternatives?

Modifying Criteria – implemented once all public comments are evaluated. They may prompt modifications to the preferred alternative to achieve the end result of a preferred alternative for cleanup in which EPA and the community can be confident.

8. **State acceptance.** Does the State agree with, oppose, or have no comment on it?
9. **Community acceptance.** Does the community support, have reservations about, or oppose it?

The Superfund Process

RI/FS

- Remedial Investigation determines the nature and extent of contamination at the site.
- Feasibility Study identifies technologies capable of treating the contamination, and evaluates the cost and performance of alternatives that could be used to clean up the site.

Proposed Plan

- EPA releases Proposed Plan identifying the preferred alternative for the site.
- EPA issues a Public Notice.
- Public Comment period on the Proposed Plan.

Record of Decision

- Explains which cleanup alternative was selected for the site.
- Contains Responsiveness Summary to public comments on the Proposed Plan.

Remedial Design

- Engineering evaluations performed to design a safe and protective remedy.
- Plans and specifications are developed for construction.

Ranking

- Prioritization Panel reviews and compares all of the Superfund projects that are construction ready (i.e., have designs completed) and require Federal funding.
- Process is used to distribute Superfund funding to start or continue construction at selected sites.

Remedial Action

- Construction of the alternative selected in the ROD.
- Length of the remedial action can be affected by the amount of funding available each year.

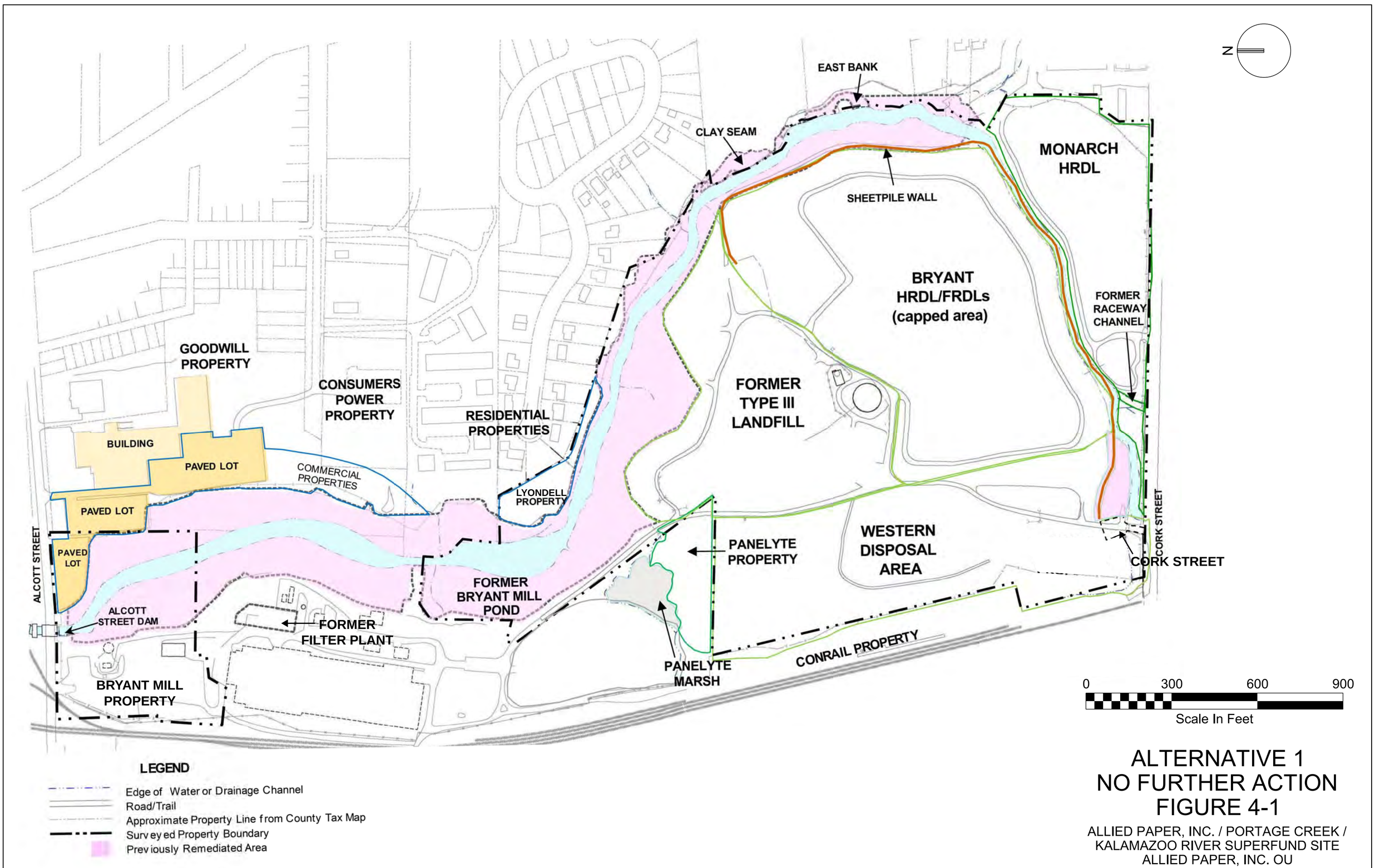
O&M

- Operation and maintenance with any alternative where wastes remain onsite.

5-Year Review

- Performed every 5 years with any alternative where wastes remain onsite.

Alternative 1 – No Further Action

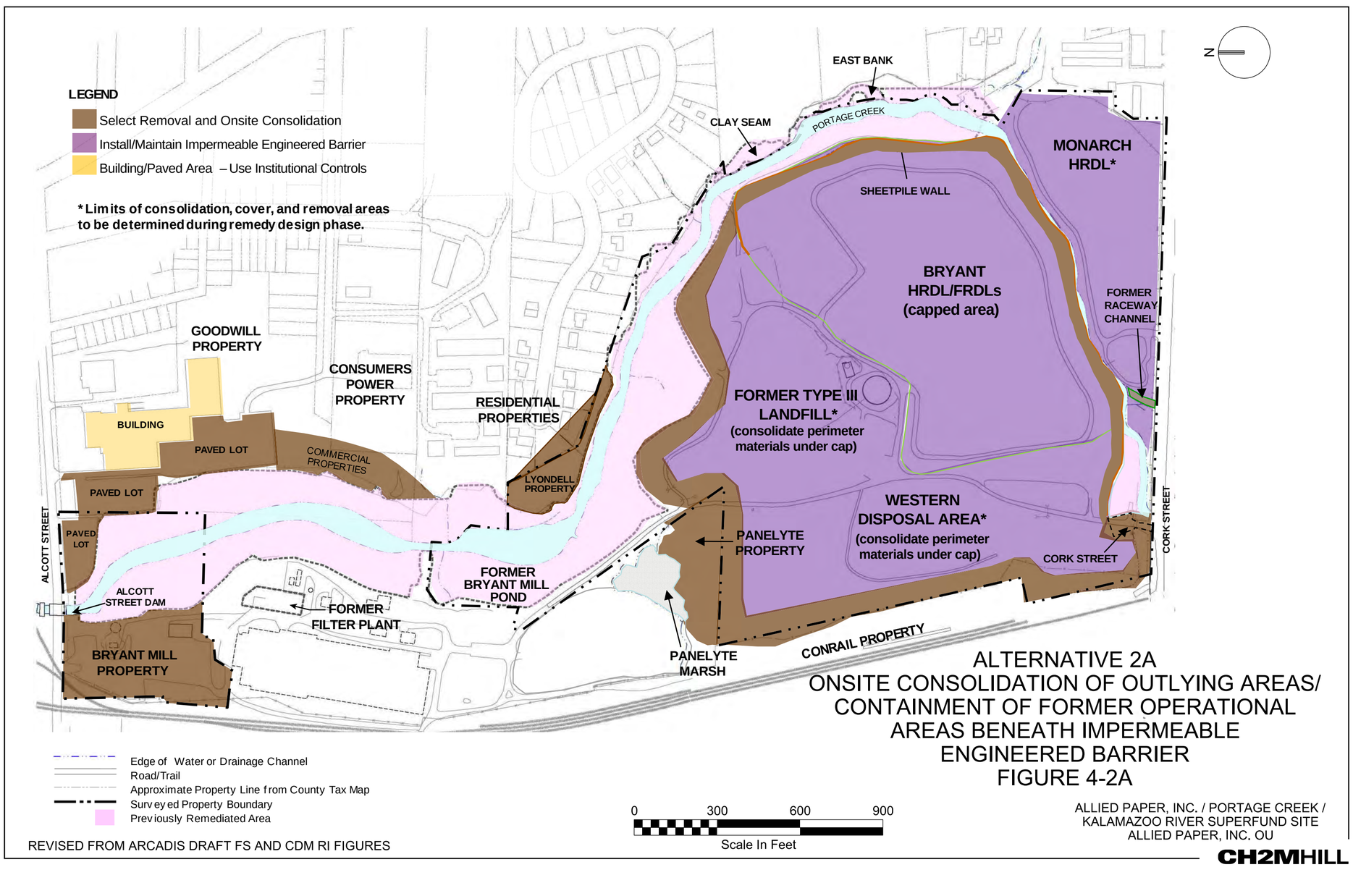


- Evaluation of this alternative is required under the National Contingency Plan.
  - Not protective of human health and environment. Does not achieve RAOs.
  - Does not comply with ARARs.
- No removal or consolidation of wastes.
- No maintenance of existing cap.
- Cost: $120,000.

Alternative 2 – Options Consolidation & Engineered Cap

Alternative 2A

- Excavate soils above cleanup criteria outside future cap limits and place under two engineered caps, one on Monarch and one on the Former Operations Areas.
- Estimated 39,000 truckloads.
- Includes long-term groundwater monitoring network.
- Construction Duration: 2 years.
- Cost: $43 Million.



ALTERNATIVE 2A
ONSITE CONSOLIDATION OF OUTLYING AREAS/ CONTAINMENT OF FORMER OPERATIONAL AREAS BENEATH IMPERMEABLE ENGINEERED BARRIER
FIGURE 4-2A

REVISED FROM ARCADIS DRAFT FS AND CDM RI FIGURES

ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE
ALLIED PAPER, INC. OU

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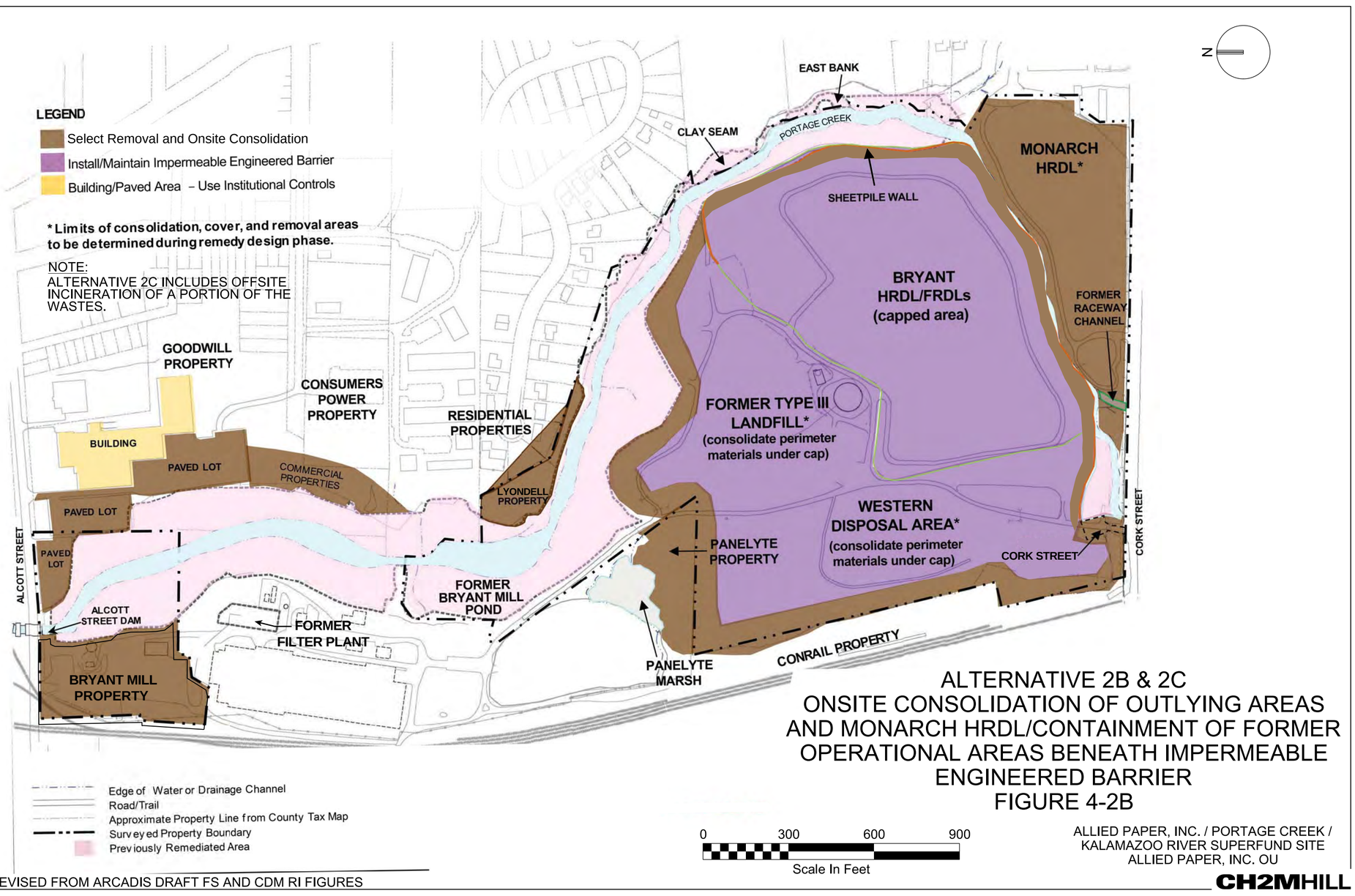
Alternative 2B

- Excavate soil above cleanup criteria outside future cap limits and place under an engineered cap.
- Material from Monarch is moved to Former Operations Area.
- Smaller capped area for maintenance and restricted use.
- Estimated 49,000 truckloads.
- Includes long-term groundwater monitoring network.
- Construction Duration: 2 years.
- Cost: $41 million.



ALTERNATIVE 2B & 2C
ONSITE CONSOLIDATION OF OUTLYING AREAS AND MONARCH HRDL/CONTAINMENT OF FORMER OPERATIONAL AREAS BENEATH IMPERMEABLE ENGINEERED BARRIER
FIGURE 4-2B

REVISED FROM ARCADIS DRAFT FS AND CDM RI FIGURES

ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE
ALLIED PAPER, INC. OU

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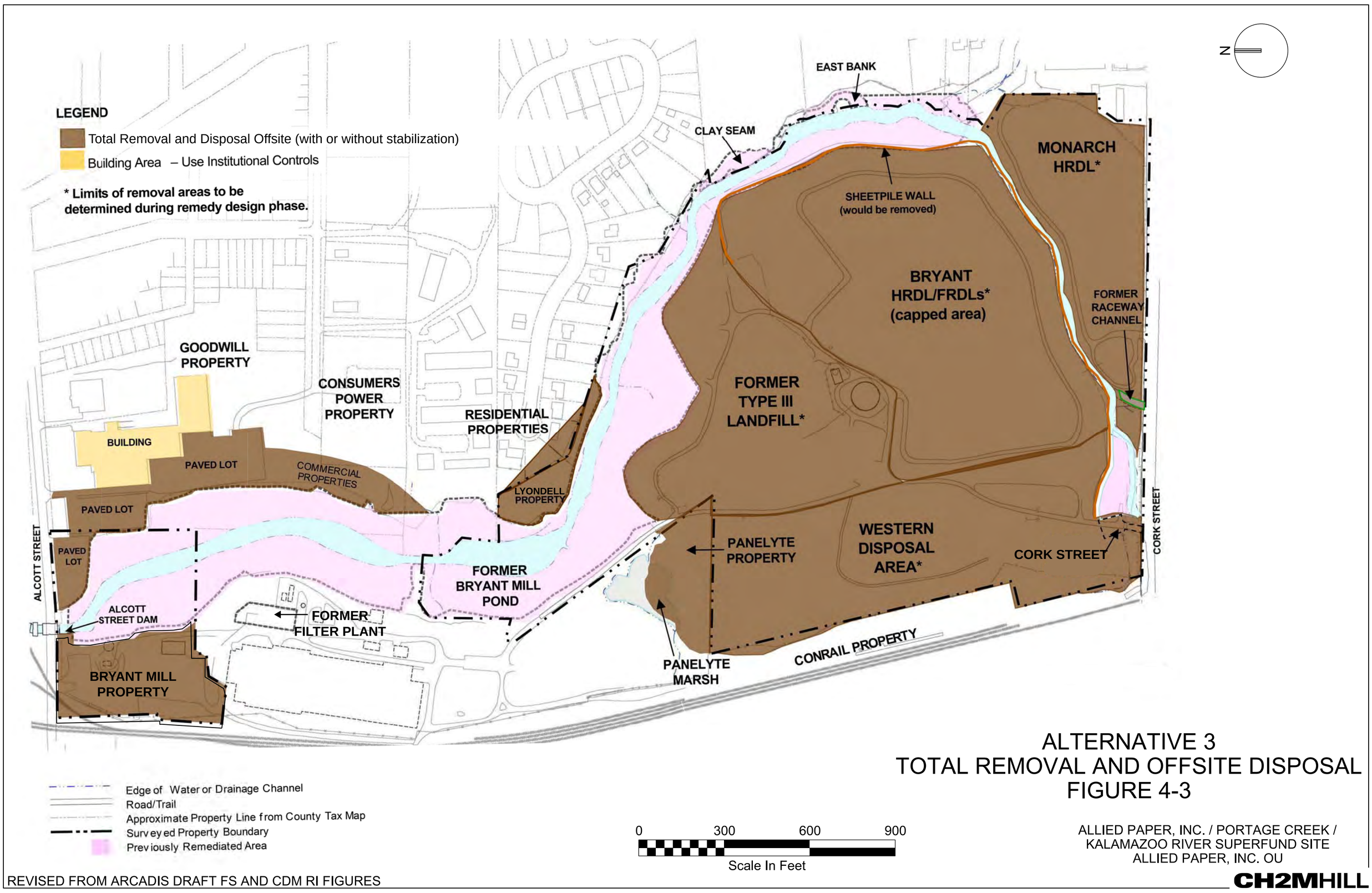
Alternative 2C

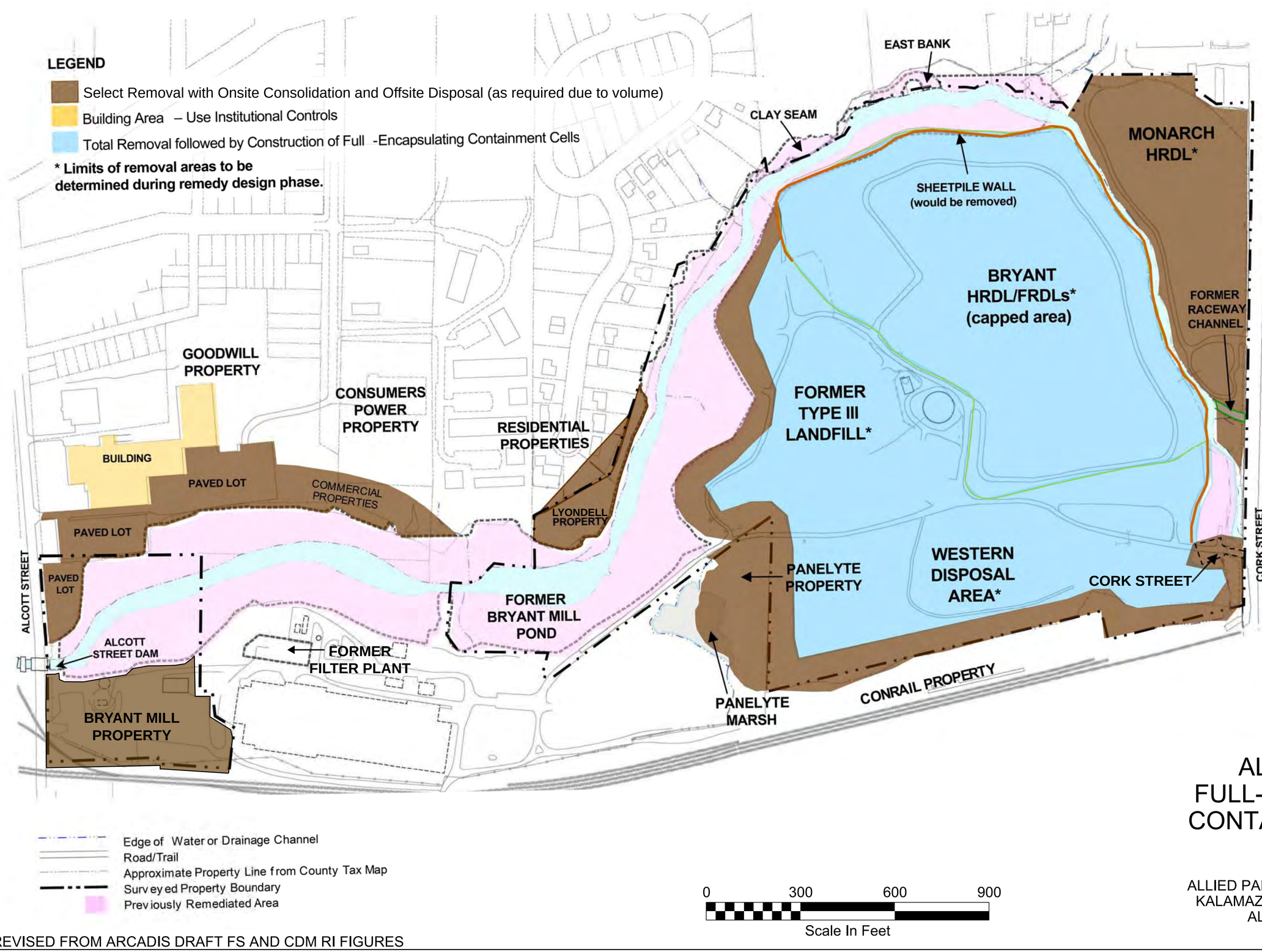
- Alternative 2B plus offsite incineration of 15,000 cubic yards with PCBs >500 ppm.
- Increased risk due to offsite transport for incineration.
- Estimated 50,000 truckloads.
- Construction Duration: 2 years.
- Cost: $62 million.

Alternative 3 – Offsite Disposal



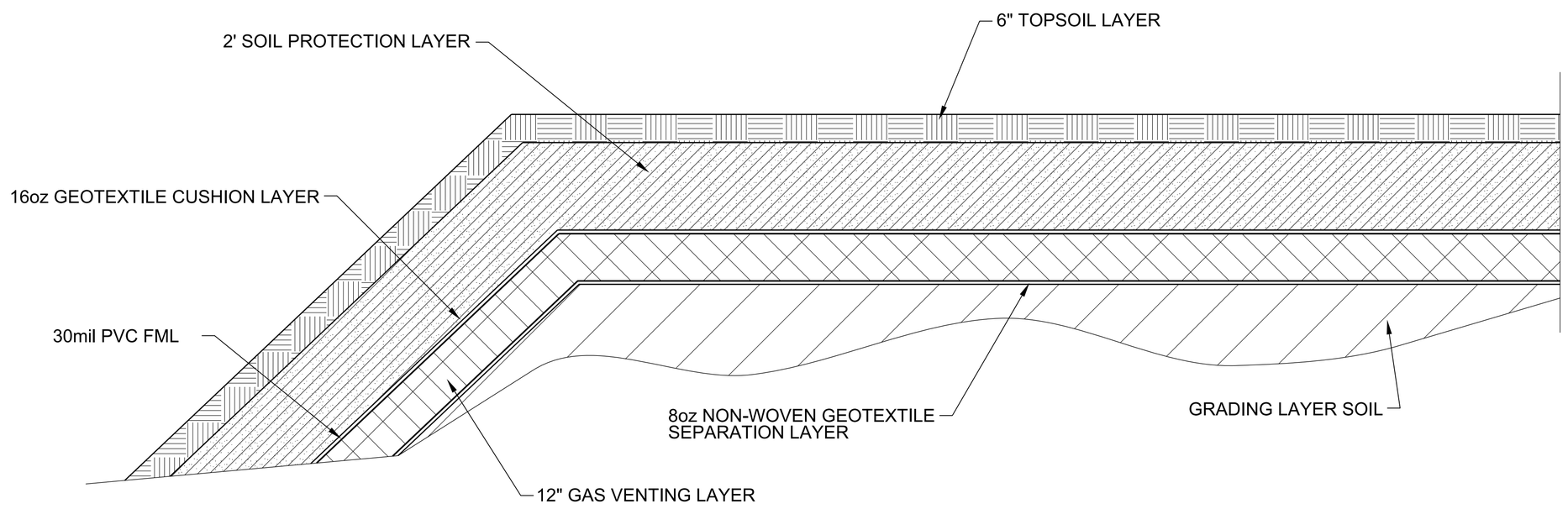
- Excavate 1.6 million cubic yards of waste material and soil above site cleanup criteria.
- Offsite transportation and disposal.
- Backfill the excavation to above the water table.
- Estimated 150,000 truck trips or an average of 115 trucks per day.
- Construction Duration: 5 years.
- Cost: $189 million.

Alternative 4 – Construction of Fully Encapsulating Landfill



- Excavate 1.6 million cubic yards of soil above clean up criteria.
- Import 800,000 cubic yards of clean soil to raise bottom elevation above water table and construct bottom liner.
- 1.1 million cubic yards placed in landfill constructed onsite and 500,000 cubic yards of materials offsite for disposal due to limited capacity.
- Estimated 116,000 truck trips or an average of 90 trucks per day.
- Includes long-term groundwater monitoring network.
- Construction Duration: 10 years.
- Cost: $136 million.

Landfill Cap Construction Details



ALTERNATIVE 2A, B & C
CONTAINMENT SYSTEM
CAP LINER SECTION
FIGURE 4-2C

ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE
ALLIED PAPER, INC. OU

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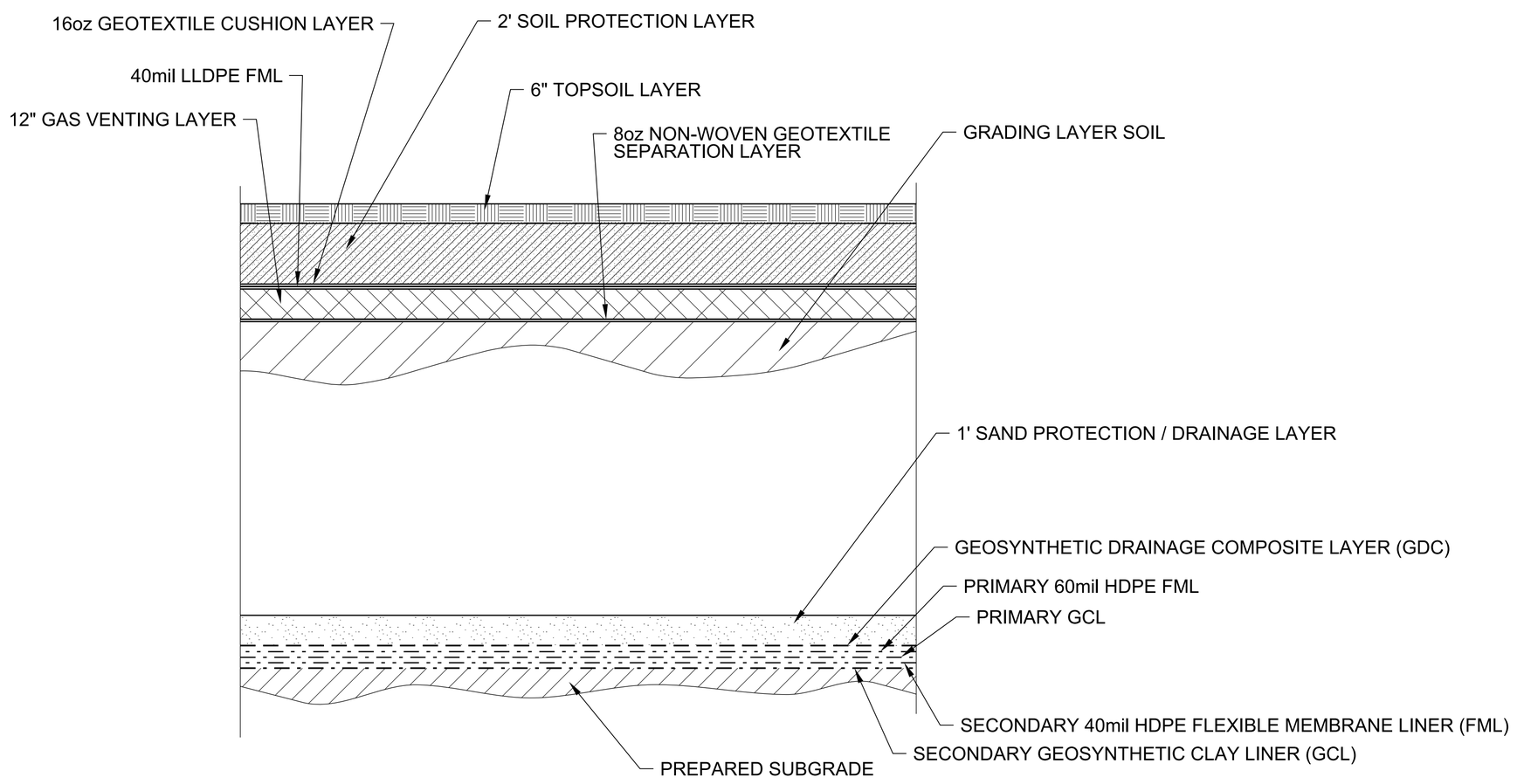

ALTERNATIVE 4
CONTAINMENT SYSTEM CAP
AND BASE LINER SECTION
FIGURE 4-4A

ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE
ALLIED PAPER, INC. OU

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Key Feasibility Study Assumptions

- **Clean up criteria will be dependant on land use and vary throughout the site.**
  - Residential Soil Criteria: 1 mg/kg
  - Non-Residential Soil Criteria: 10 mg/kg
  - Sediment Criteria: 0.33 mg/kg
  - Visually identified residuals will be removed and followed by analytical testing to determine extents.
  - Actual criteria will be established in the Record of Decision.
- **Design investigation is required to refine quantities and extents of contamination.**
- **Sources for imported soils are assumed to be within 40 miles of the site.**
- **Disposal facilities are assumed as follows:**
  - <40 miles for soils <50 mg/kg (Alternatives 3 and 4)
  - 150 miles for soils >50 mg/kg (Alternative 3)
  - 1,200 miles for soils >500 mg/kg (Alternative 2C)
- **Construction is assumed to be limited to Monday through Friday, from 7:00 am to 6:00 pm.**
- **Construction is generally expected to be performed between the months of April and November.**