CERTIFICATION OF COMPLETION

FINAL CORRECTIVE MEASURES ADDRESSING SOIL AND SEWER CONTAMINATION

FORMER BORDEN RESIN FACILITY – BAINBRIDGE, NEW YORK

Prepared for:

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ENGINEER'S CERTIFICATION

In accordance with Condition X of Consent Order Index No. A7-0121-87-09, entered into by Borden, Inc. and NYSDEC, this document has been prepared by an engineer licensed to practice in the State of New York.

Scott Fennell, P.E.	Date	Seal

1.0 INTRODUCTION

1.1 Background

In March 1999, Cherokee Environmental Risk Management, LP (Cherokee) submitted to the New York State Department of Environmental Conservation (NYSDEC) a plan to remediate contaminated soil and sewers at the former Borden Resin Facility in Bainbridge, New York. (The plan also addressed groundwater contamination, which is outside the scope of this certification.) The plan was entitled "Remedial Design and Start-up Monitoring Plan" ("Plan"). Figures 1A and 1B illustrate the location, topography, and surroundings of the former Borden site. Figure 2 illustrates the areas identified for remediation (a.k.a. corrective measures) at the site.

In a letter dated April 14, 1999, NYSDEC conditionally approved the Plan. An Addendum to the Plan addressing outstanding agency requirements was submitted (May 13, 1999) and subsequently approved by NYSDEC (May 18, 1999). During remedial implementation, the remediation contractor requested further modifications to the Plan due to unanticipated field conditions. All Plan modifications were approved by NYSDEC prior to implementation.

Corrective measures addressing contaminated soil and sewers were conducted during warm-weather periods between September 1999 and August 2001. MACTEC, Inc. of Alpharetta, Georgia was the primary remediation contractor. MACTEC or by an independent contractor, Alan Springett of Bainbridge, New York, collected verification samples. Adirondack Laboratories of Albany, New York (1999) and Integrated Analytical Laboratories (IAL) of Randolph, New Jersey (2000 – 2001) performed sample analyses. Lynn Pullis, L.S., of Binghamton, New York performed location and elevation surveys.

1.2 Purpose

This document provides a professional engineer's certification that corrective measures were implemented in accordance with the agency-approved "Remedial Design and Start-up

Monitoring Plan", as modified. A professional engineer's certification is required by Condition X of the Consent Order entered into by Borden, Inc. and NYSDEC.

1.3 Basis of Certification

The basis of certification was discussed with all parties and was documented in a letter from the certifying engineer to Cherokee dated September 24, 1999. As agreed with the NYSDEC, the certifying engineer provides certification of completion of specified Plan activities based upon the following:

1. Site observation of soil excavation, stockpiling, and loading procedures.

2. Site observation of final soil excavations and comparison with Plan excavation requirements (e.g., vertical and horizontal extent of excavation). Site observation for indications of contamination left in place (e.g., odors, sludge, staining, sheens), and specification of additional verification sampling in questionable areas.

3. Site observation of verification soil sampling procedures (conducted by the remediation contractor) and review of analytical results (supplied by the remediation contractor and/or contract laboratory).

4. Site observation of soil stockpile and decontamination basin construction.

5. Site observation of sewer removal activities. Review of post-decontamination video documenting jet-washing of sewers left in-place. Review of contractor photographs of sewer cleaning, excavation and bedding sampling procedures.

6. Review of soil and sediment disposal records (e.g., manifests) and comparison to estimated non-hazardous and hazardous soil and sediment disposal quantities. (Review of hazardous versus non-hazardous waste characterization [sampling and analysis] was not included, inasmuch as the generator signature on the waste manifest addressed this certification requirement.)

7. Site observation of PCB-water treatment system during operation.

8. Review of contractor-supplied PCB-water treatment records (treatment volumes and treated-water sample results) and comparison to estimated volumes and discharge requirements.

Note that the certifying engineer reviewed analytical laboratory reports and soil disposal manifests provided by the contractors during the preparation of this certification. These documents are not included as appendices to this certification due to the volume of these supporting documents.

Note also that "site observation" activities described above did not entail continuous observation by the certifying engineer of all activities. Rather, "site observation" entailed:

1. Site observation of one or more representative non-critical events (e.g., soil excavation, stockpiling and/or loading),

2. Site observation of all critical events (e.g., final soil and sewer bedding excavations prior to backfilling, verification sample locations),

3. Review of photographs and/or videos of unobserved events prepared by the contractor.

During the period of soil and sewer remediation field activities, the certifying engineer made numerous trips to the site. During the site visits, all specified site observations were made except for the decontamination of excavation equipment, which was not performed concurrent with the engineer's site visits. All requirements of the Plan (e.g., pre-excavation marking of grid locations, excavation and stockpiling procedures, extent of excavation, verification sampling, etc.) appeared to be in accordance with the Plan. Selected photographs taken during final corrective measures implementation are included as an attachment to this report.

Secondly, NYSDEC made numerous trips to the site throughout the period of implementation to observe remedial activities. On several occasions, NYSDEC collected soil and/or water samples for chemical analysis. These activities provide an additional level of confidence that corrective measures were implemented in accordance with the Plan.

2.0 CORRECTIVE MEASURES ADDRESSING CONTAMINATED SOILS

Corrective measures addressing contaminated soils primarily consisted of excavation and off-site disposal (i.e., landfilling) of the waste material as either hazardous or non-hazardous waste. Initially, soil was excavated in accordance with the vertical and horizontal limits specified in the Plan. At most remediation areas (i.e., Bone Yard, River Lagoon, etc.), additional soil excavation was necessary in order to achieve remedial criteria specified in the Plan. Most soil excavation was completed between September and December 1999, although additional excavation was conducted through October 2000.

For each remediation area, the certifying engineer verified the following:

- Pre-excavation location of grid/excavation markers relative to benchmarks.
- Post-excavation horizontal and vertical extent of excavation.
- Post-excavation achievement of remedial criterion (e.g., 25 mg/kg PCBs in the Bone Yard) at all specified verification sample locations based upon a review of contractor-supplied sampling data. (Excluding consideration of laboratory QA/QC data.)
- Comparison of estimated and actual disposal tonnage based upon a review of contractor-supplied waste manifests, and contractor-specified origins.

2.1 Bone Yard

After excavation of the Bone Yard in accordance with the limits specified in the Plan, verification samples were collected from the original grid sample locations. Based upon the results of laboratory PCB analysis, four of 25 grid locations did not achieve the remedial criterion of 25 mg/kg PCBs (grid locations 4E, 14I, 15C, 16A). Additionally, the certifying engineer observed the excavation at this time and specified four additional verification sample locations due to visible evidence of potential contamination (i.e., fiber drums containing off-spec resin, black soil). Two of these engineer-specified additional samples (SF-2 and SF-3) did not achieve the remedial criterion. Therefore, a total of six areas in the Bone Yard required re-excavation.

An additional one foot of soil was excavated from areas exhibiting PCB concentrations above the remedial criterion. Upon re-excavation, all locations achieved the remedial criterion with one exception. Sample SF-2 (from the vicinity of 15E) did not achieve the remedial criterion. A third round of excavation was required before sample SF-2 achieved the remedial criterion.

Bone Yard grid locations and the horizontal extent of excavation are illustrated on Figure 3. Table 1 summarizes the results of contractor verification sampling and final excavation depths at each excavation grid location required to achieve the remedial criterion of 25 mg/kg PCBs. Note that where verification samples exceeded the remedial criterion (bold type), subsequent samples (collected after re-excavation of an additional one foot of soil) met the remedial criterion.

Table 2 summarizes the total tonnage of soil removed from the Bone Yard versus the total tonnage estimated in the Plan. As illustrated in Table 2, the estimated and actual tonnages excavated from the Bone Yard are comparable.

Because the remedial criterion of 25 mg/kg exceeds the unrestricted landuse criterion of 10 mg/kg PCBs, landuse restrictions such as deed notification, fencing, and posting will be required in the Bone Yard. Figure 4 illustrates the post-remediation areas and soil depths in the Bone Yard exceeding the unrestricted landuse criterion (i.e., PCBs between 10 and 25 mg/kg). (Data from non-excavated grid locations were obtained from the RCRA Facility Investigation Reports, July 1992 and August 1996.) If unrestricted landuse is desired in the future, these areas would have to be remediated. Surveyed benchmarks are provided on Figure 4 to facilitate identifying these areas for future remediation, if desired.

After confirmation that all contaminated soils above the remedial criterion were removed, the Bone Yard excavations were backfilled with imported fill and re-graded to mitigate potential fall hazards.

2.2 River Lagoon

After excavation of the River Lagoon in accordance with the limits specified in the Plan, verification samples were collected from the original grid sample locations and analyzed for PCBs. Based upon the results of PCB laboratory analysis, the remedial criterion of one mg/kg PCBs was not achieved at 21 of 44 grid locations after removal of the material specified in the Plan. Additionally, excavation revealed the former bottom of the lagoon as evidenced by a visible sludge layer. The sludge layer consisted of a black material, a reddish layer, and/or a white material (thought to be lime used to dry the sludge) with a thickness varying between two and 18 inches. The sludge layer was determined by subsequent laboratory analysis to contain the highest concentrations of PCBs (e.g., some locations > 100 mg/kg PCBs). Below the sludge layer was a low permeability silt-clay layer (i.e., the original bottom of the lagoon) which was determined by multiple analyses to be uncontaminated by PCBs. Above the sludge layer was an overburden soil material (i.e., material used to backfill the lagoon) determined to be marginally contaminated with PCBs.

In addition to the sludge layer, excavation revealed an area containing approximately five buried drums in the vicinity of the former spillway near grid location 10G. The drums were not intact, but apparently contained a semi-solid material, some of which hardened upon exposure to the atmosphere. Based upon historic waste management at the resin facility and subsequent laboratory analysis, the drums were determined to contain phenolic material, presumably off-spec resin. The drums and contents were ultimately disposed of with contaminated soil as non-hazardous waste. Waste characterization and disposal were outside the scope of certifying engineer activities.

To complete corrective actions at the River Lagoon consistent with the discovery of the above-discussed scenario, a modified remedial approach was agreed upon. (The modified approach was documented in letters from the remediation contractor to NYSDEC dated November 1 and November 9, 1999. NYSDEC provided written approval of these documents on November 2 and November 15, 1999.) Utilizing the modified approach, the overburden material was excavated, stockpiled, sampled, and disposed of as either hazardous or non-hazardous waste. Next, the sludge layer was similarly excavated and disposed of. Excavation to the native clay layer at all grid locations, based upon visual observation, was the modified remedial criterion for the River Lagoon. Additionally, a limited number of verification samples was collected from the exposed native clay layer and analyzed by the laboratory to verify that the remedial criterion of one mg/kg PCBs was achieved.

Table 2 summarizes the total tonnage of soil ultimately removed from the River Lagoon versus the total tonnage estimated in the Plan. As illustrated by Table 2, it was necessary to remove approximately twice the estimated soil tonnage in order to achieve the remedial criterion in the River Lagoon.

Table 3 summarizes the final verification sample data for each gird location in the River Lagoon. The visual criterion (i.e., native clay layer) was achieved at all 72 grid locations based upon contractor observations, limited certifying engineer and NYSDEC observations, and limited photographic observation. [It was not possible for the certifying engineer or NYSDEC to observe the clay layer at many locations due to inundation and/or backfilling required to provide access to the excavator.] Additionally, all 32 native clay layer samples submitted for laboratory confirmation achieved the remedial criterion of one mg/kg.

Figure 5 illustrates the horizontal and vertical limits of the final River Lagoon excavation. The horizontal limits of excavation, confirmed in the field by the certifying engineer, are not significantly different than the horizontal limits specified in the Plan. However, the depth of excavation increased significantly over the excavation depths specified in the Plan. Apparently the original soil sampling program "missed" much of the sludge layer, perhaps because the layer was too soft for consistent collection in the split-spoon sampler. Note that the excavation depths illustrated in Figure 5 are based upon contractor-reported measurements. The certifying engineer verified that contractor-reported depths meet or exceed the excavation depths specified in the Plan.

After the completion River Lagoon excavation and soil disposal, the contractor collected a sample of the surface soils at the location of the River Lagoon soil stockpile staging area. Due to elevated PCB concentrations, the surface soil was subsequently scraped away and disposed of. A second stockpile location sample, plus two topographically downgradient samples, were collected and determined to meet the River Lagoon clean-up criterion. The stockpile location sampling results are summarized below:

Final Verification Sampling Results – River Lagoon Stockpile Staging Area

Sample Location	Contractor Sample I.D.	Sample Date	PCBs (mg/kg)
Stockpile location	HMSPA-1	12/9/99	**14**
	RLST (resample)	8/4/00	0.965
Downgradient	RLDG1	8/4/00	< 0.164
	RLDG2	8/4/00	< 0.143

After confirmation that all contaminated soils were removed, the River Lagoon was re-graded to remove steep scarps that may have been hazardous to people or livestock.

2.3 Trenches in the Land Application Area

After excavation of the Central Trenches in the Land Application Area in accordance with the limits specified in the Plan, verification samples were collected from the original grid sample locations. Based upon the results of laboratory PCB analysis, grid location 5I did not achieve the remedial criterion of 25 mg/kg PCBs. An additional foot of soil was removed from location 5I and the location was re-sampled. As illustrated below, all final post-excavation samples achieved the remedial criterion:

Final Verification Sampling Results – Central Trenches Excavation

Contractor Sample I.D.	Excavation / Sample Depth (ft)	Sample Date	PCBs (mg/kg)
LA-5F-030928	2	9/29/99	< 1
LA-5I-030928	2	9/29/99	**240**
LA-01 (re-sample of 5I)	3	11/4/99	4.9

Table 2 summarizes the total tonnage of soil removed from the Central Trenches (included by the contractor in the Bone Yard total) versus the total tonnage estimated in the Plan. As illustrated in Table 2, the estimated and actual tonnages are comparable.

Figure 6 illustrates the sampling grid and remediation excavation locations in the Central Trenches area. After sampling data demonstrated that the remedial criterion of 25 mg/kg PCBs was achieved throughout the Trenches, approximately 100 tons of imported backfill was placed at grid location 5I, and the area was re-graded to mitigate potential fall hazards.

Because the remedial criterion of 25 mg/kg exceeds the unrestricted landuse criterion of 10 mg/kg, landuse restrictions such as deed notification, fencing, and posting will be required in the Trenches area. Figures 6 and 7 illustrate the post-remediation areas and depths in the North, Central, and South Trenches areas exceeding the unrestricted landuse criterion (i.e., PCBs between 10 and 25 mg/kg). If unrestricted landuse is desired in the future, these areas would have to be remediated. Surveyed benchmarks are provided on Figures 6 and 7 to facilitate identification of these areas for future remediation, if desired.

2.4 PCB Area

Corrective measures in the PCB Area were primarily the removal of coarse-grained fill, pipe fragments, rubble, and wooden pilings that had become contaminated with PCB-containing oil. The underlying native silt-clays were determined by prior sampling to be uncontaminated.

In 1999, after initial excavation of contaminated material in accordance with the Plan, verification samples were collected and analyzed for PCBs. Based upon initial verification sampling, the remedial criterion of 10 or 25 mg/kg PCBs was not achieved throughout the excavation. Additionally, the remediation contractor was unable to cut off the contaminated portion of the 104 wooden pilings within the excavation as planned, due to the expansion of the wood during cutting and resultant binding of the saw blades. Subsequent sampling of the pilings demonstrated that the most significant PCB contamination was limited to the surface of the pilings. Drill shavings from the core of the pilings were only marginally contaminated.

To account for actual field conditions, excavation of contaminated materials was continued in an iterative process of re-excavation and re-sampling until the clean-up criterion was achieved. Additionally, a modified remedial approach was agreed upon to address the wooden pilings. The modified approach developed by the remediation contractor (letter of November 1, 1999) and approved by NYSDEC (letter of November 2, 1999) prescribed that the wooden pilings were to be pressure washed to remove surficial contamination. After washing, core samples from three of the pilings were to be analyzed to verify that remaining PCB concentrations were less than the remedial criterion.

In August 2000, remediation of the PCB Area continued. During the iterative re-excavation process, the certifying engineer selected verification sampling locations representative of the excavation, and biased towards locations exhibiting visual signs of potential contamination (e.g., black soil, sheens, oil droplets, etc.).

Figure 8 illustrates the horizontal limits of the 1999 and 2000 PCB Area excavations, as well as final bottom and sidewall verification sample locations. The final depth of the PCB Area excavation was approximately seven to eight feet. Final verification results for the 22 excavation samples and three wooden piling cores are summarized in Table 4. All analytical results are below the un-restricted clean-up criterion of 10 mg/kg PCBs.

Table 2 summarizes the total tonnage of soil removed from the PCB Area versus the total tonnage estimated in the Plan. As illustrated in Table 2, significantly more tonnage was required to remediate the PCB Area than originally estimated.

After all significantly contaminated materials were removed from the PCB Area, the excavation was restored to the original grade and topography with site-derived concrete rubble (e.g., chimney stack and building foundation rubble) and imported fill. Given that all residual PCB concentrations are less than the unrestricted landuse criterion of 10 mg/kg PCBs, no further restrictions or requirements apply to the PCB Area. However, to facilitate relocation of the excavation if necessary in the future, the surveyed coordinates of a corner of the excavation are provided on Figure 8.

2.5 Phenol Recovery Area

In 1999, contaminated soil in the Phenol Recovery Area (PRA) was excavated as specified in the Plan. Excavation extended vertically to approximately three feet below the water table, or seven feet total depth. The Plan specified that the excavation was to proceed outward from monitoring well MW-29 until soil headspace screening results achieved the remedial criterion of 50 ppm in the vapor phase (ppmv).

As excavation progressed outward, verification samples were collected from excavation sidewalls at a ten-foot horizontal interval and three-foot depth. Headspace screening was performed by filling jars or plastic bags half-full of soil to be tested, sealing the containers, allowing the containers to equilibrate at room temperature, then sampling the headspace utilizing a photoionization detector (PID). (Although a flame ionization detector was specified in the Plan, a PID was deemed to be an acceptable substitute because the PID can detect and quantify the primary soil contaminants, toluene and phenolics.)

Figure 9 is a sketch of the 1999 excavation, excavation sample locations, and headspace results. The remedial criterion of 50 ppmv was achieved at all excavation perimeter locations except in the vicinity of the PCB Tank. Elevated soil vapor concentrations in this area coincided with visual purple staining of the unsaturated soils. Excavation was terminated in 1999 due to concerns about compromising the structural integrity of the PCB Tank.

In 2000, the PCB Tank and the adjacent concrete building pad foundation were removed to allow continued excavation of contaminated soil (Section 4.3). Soil excavation was extended to approximately seven feet below grade, and laterally outward until visual and odor indications of contamination were removed. (During the 2000 excavation, PID readings were determined to provide inaccurate indications of the extent of significant contamination. For example, numerous samples exhibited headspace readings of approximately 1,000 ppmv, yet did not exhibit other signs of contamination such as staining or odor. Additionally, several of the verification sample locations that achieved the clean-up criterion in 1999 were re-tested and failed in 2000. Different instruments were used in 1999 versus 2000, which may partially explain the discrepancies.) The final extent of the Phenol Recovery Area excavation, including the area beneath the former PCB Tank, is illustrated on Figure 10.

Table 2 summarizes the total tonnage of soil removed from the Phenol Recovery Area versus the total tonnage estimated in the Plan. All contaminated soil generated in 1999, and a relatively small portion of the soil generated in 2000, was disposed of off-site as non-hazardous waste. However, due to the significant added volume of contaminated soil (estimated 2,500 tons), and given the bio-treatability of the contaminants (phenol and toluene), all parties agreed that the additional excavated soil could be treated on-site (NYSDEC and ERMC email correspondence dated October 24 and 27, 2000).

Initially, the additional volume of soil was landfarmed in low stockpiles (2 – 3 feet high) to promote volatilization and aeration/biodegradation. To mitigate stormwater run-on/run-off and leaching, the soils were placed on asphalt and encapsulated in plastic. Meanwhile, MACTEC submitted a plan (March 12, 2001), subsequently approved by NYSDEC (April 2, 2001), specifying final soil treatment criteria and the use of an ex-situ, batch treatment, soil vapor extraction (SVE) system.

In accordance with the plan, the soil was treated in two batches until remedial criteria were achieved. As illustrated in Table 5, both pre- and post-SVE treatment analytical results were well below treatment objectives developed for the target constituents, phenol and toluene. Therefore, SVE soil treatment was terminated after the second criterion was achieved, a minimum four-week treatment period per batch.

After SVE treatment was completed, the original excavations were partially backfilled with treated soil and decontaminated concrete. Backfilling of the excavation will be completed in the near future to allow re-installation of monitoring well MW-29, which was destroyed during excavation. Corrective measures addressing groundwater contamination in the Phenol Recovery Area are on-going (i.e., pump-and-treat, pilot-scale biosparging), and are outside the scope of this certification. However, groundwater monitoring conducted in the Phenol Recovery Area after soil excavation indicates that groundwater contaminant levels have declined significantly in the vicinity of the excavation.

3.0 CORRECTIVE MEASURES ADDRESSING CONTAMINATED SEWERS

Based upon investigations conducted for the RCRA Facility Investigation, sewers associated with former plant operations were determined to contain PCB-contaminated sediments. Additionally, water in the sewers (where present) was contaminated with trace levels of PCBs due to the presence of contaminated sediments. The original plan for corrective measures addressing sewers was to remove contaminated sediments by jet-washing with high pressure water.

In 1999, corrective measures addressing contaminated sewers were limited to investigative activities consisting of the following:

1. Manholes on the subject site and adjacent sites were identified, mapped, and accessed. A long-term former Borden employee (Cliff Reynolds) walked the site with the contractor and provided his recollections of sewer layouts and past sewer removals.

2. A video camera was placed inside selected manholes in order to determine the layout and condition of pipes. Due to blockages and/or murky water, use of the video camera was unsuccessful.

3. Sewer layouts (including connections and terminations) were determined by probing the sewer pipes from the manholes and/or by pumping water from selected manholes and observing for dewatering at adjacent manholes.

4. Sediment and water samples were collected from selected manholes on the western sewer segments and analyzed for PCBs.

Based upon the findings of the 1999 and previous investigations, corrective measures addressing sewers were implemented in 2000. Due to the degree of blockage encountered while attempting to scope the sewers, it was determined to remediate contamination by sewer excavation and removal where practicable.

3.1 Western Sewers

On the western portion of the site, two separate sewer systems were identified. An 8-inch sanitary sewer was historically used to discharge sanitary waste from the former Resin Facility and the adjacent Elmer's Glue Plant to the Village of Bainbridge treatment plant. This system was disconnected from the Village plant in 1997 by filling the manhole nearest the Village line with concrete (Figure 11). In 1999, water and sediment samples were collected upstream of the plugged manhole to determine whether corrective actions would be required. Manhole sample locations are illustrated on Figure 11, and analytical results are summarized below:

Sanitary Sewer Manhole Sampling Results – October 1999

Manhole I.D.	Contractor Sample I.D.	Sediment PCBs (mg/kg)	Water PCBs (mg/L)
W1A	WS-W1A-041005 WS-W1AS-111005	2.34	0.0015
W1B	WS-W1B-051005 WS-W1BS-121005	3.7	0.002
W1C	WS-W1C-061005 WS-W1CS-131005	0.84	0.0015
W2	WS-W2-031005 WS-W2S-101005	3.02	0.00062
W3	WS-W3-021005	Not sampled	0.00131

The sanitary sewer segment in question is located on the Resin Facility property, and therefore subject to the on-site soil clean-up criterion of 10 mg/kg PCBs. Sediment concentrations were below the criterion, and water concentrations were insignificant and represent isolated water. Therefore, additional corrective actions addressing the sanitary sewer were not deemed necessary.

The second western sewer system was a 24-inch industrial sewer that discharged industrial wastewater from the Resin Facility to the River Lagoon. The southern portion of this sewer, from south of Route 7 to the River Lagoon, was removed in 1993 (Figure 12). Additionally, the manholes north of the railroad line had been plugged with concrete (in the mid-1980s according to Cliff Reynolds). Based upon sewer probing conducted in 1999, MACTEC determined that the sewer grout extended from the manholes to just south of the railroad.

In 1995 and 1999, water and sediment samples were collected from manholes to determine whether corrective actions would be required on the remaining portions of the western industrial sewer system. Manhole sample locations are illustrated on Figure 12, and analytical results are summarized below:

Western Industrial Sewer Manhole Sampling Results – 1996 and October 1999

Manhole Location	Contractor Sample I.D.	Sediment PCBs (mg/kg)	Water PCBs (mg/L)
WIS 1	WS-WOWS-031006	0.278	Not sampled
SE of WIS 2	WS-W2WS-021006	2.56	Not sampled
NW of WIS 14	WS-W3WS-011006	0.566	Not sampled
SE of WIS 14	WS-W4-071005	Not sampled	0.0014
NE of WIS 15	WS-W5-011005	Not sampled – Concrete plugged	0.00097
SE of WIS 17	WS-W6-091005	Not sampled	0.00068
Same as above	See RFI Report, Aug-96	5.8	0.00028

Most of the above-referenced western industrial sewer sample locations were located outside the property boundary of the site, and were subject to lower off-site clean-up criterion of one mg/kg PCBs. Corrective measures were therefore implemented on the confirmed-contaminated portion of the sewer exhibiting sediment concentrations above one mg/kg PCBs (manhole at WIS 1 to termination where the sewer was removed in 1993), as well as the presumed-contaminated on-site portion of the sewer.

Where possible, sewers were remediated by excavation and removal of the sewers and sediments. Procedures for excavation and removal of sewers were documented in a letter from the remediation contractor (November 22, 1999) and subsequently approved by NYSDEC (November 30, 1999.) The agreed procedures were generally as follows:

1. Sewer overburden was excavated and set aside for use as backfill.

2. If practical, any water within the pipe was pumped off into a tank truck for subsequent treatment in the on-site PCB-contaminated water treatment system.

3. After dewatering, the pipe, pipe sediments, and any visually impacted bedding material were excavated and stockpiled for subsequent off-site disposal as non-hazardous waste (based upon waste characterization sampling). Final disposal quantities are summarized in Table 2.

4. Grab samples were taken from the pipe bedding at the bottom of the pipe excavation at 100-foot intervals. Any soils determined to exceed the remedial criterion of one mg/kg were re-excavated and re-sampled.

5. After the remedial criterion was achieved throughout the reach of the sewer, the excavations were backfilled with the previously removed overburden, plus imported clean fill where necessary.

After completion of sewer removal as described above, 19 verification samples were collected from the sample locations illustrated on Figure 12. Verification sampling locations included sewer bedding from the removed portion of the sewer, as well as bedding from influent pipes that were left in place. (The contractor was instructed by the certifying engineer to sample sediment from influent pipes, if present, but reported influent pipes did not contain sediments.) As documented in Table 6, all bedding samples achieved the off-site clean-up criterion of one mg/kg PCBs. The sewer excavations were therefore backfilled with overburden and imported fill.

It was not practical to excavate and remove sewer segments running under the railroad line and under Route 7. As previously stated, the segment under the railroad was grouted in the mid-1980s and no further action was required. The segment under Route 7 was jet-washed with high-pressure water to remove sediments as proposed in the original remedial design.

The procedure for jet-washing of sewers was generally as follows:

1. The downstream end of the sewer segment to be jet-washed was excavated and breached.

2. The jet was inserted into the pipe and advanced in an upstream direction. The water jet operated at 2,300 psi and 100 gpm. Sludge/sediment within the pipe was dislodged by the force of the water and transported downstream by gravity.

3. Washwater and sludge were removed from the downstream excavation by a 3,000 gallon vacuum truck, and subsequently transported to the on-site PCB-contaminated water treatment system.

4. Multiple passes were generally required to remove sewer sediments. Jetting was determined to be complete when the jet reached the end of the sewer segment, and when the recovered washwater was visually free from sediment. Additionally, where possible videos or pictures were taken of the interior of the pipe to verify the removal of sediments.

Jet-washing was performed by a subcontractor to MACTEC, Petroclean Environmental, Inc. of Pittsburg, Pennsylvania. Sewer videos were recorded by Basic Technical Services, Inc. of Sewickley, Pennsylvania.

After jet-washing of the western industrial sewer under Route 7, the segment was filled with grout as specified by a Department of Transportation access agreement.

3.2 Eastern Sewers

The Eastern Sewer was a 15-inch vitrified tile line that historically transported wastewater from the Phenol Recovery Area to the former River Lagoon adjacent to the Susquehanna River. The total length of the sewer was approximately 2,400 feet. Based upon prior sampling of sediments accumulated in a manhole, it was determined that the Eastern Sewer contained PCB-contaminated sludge. In consultation with NYSDEC, and in response to field conditions, the Eastern Sewer segments were remediated by excavation (sewer removal) and jet-washing as described above. An additional requirement of remediating the Eastern Sewer was working in the stream bed of Beatty Creek. Prior to and during excavation and jet washing of sewer segments beneath the stream bed, stream water was diverted around the work area to prevent the release of PCB contamination to the stream. PCB-contaminated water, sludge, sewer pipe, and bedding were collected, characterized, and disposed of as appropriate.

In the following sections, remediation of the Eastern Sewer is discussed according to sewer segments. Sewer segments are illustrated on Figure 13 (north of Route 7) and Figure 14 (south of Route 7).

Segment A. Sewer Segment A ran from a manhole at the former on-site wastewater treatment system (Phenol Recovery Area) to a buried manhole in Beatty Creek (Figure 13). (Note that the sewer segment upstream of Segment A, between the resin formulation facilities and the Phenol Recovery Area, was previously removed during Interim Corrective Measures in 1991.) Based upon an interview with former Borden employee Cliff Reynolds, Segment A had been grouted with concrete soon after facility closure (late 1980s) due to leakage of sewer water from the lower manhole located in the creek bed. The leak was presumably attributable to downstream blockage of the sewer pipe. Reynolds reports that he observed concrete being pumped into the upper manhole and flowing to the lower manhole, indicating that the sewer pipe was filled completely. In 1999, MACTEC excavated to the sewer near the upper manhole and visually confirmed that the sewer was full of concrete at this location. An exploratory excavation was not completed at the lower manhole due to the close proximity of Village water and sewer lines. No additional corrective measures were deemed necessary to address Segment A.

Segment B. Sewer segment B runs beneath the stream bed and beneath the railroad bridge (Figure 13). This run coincides with the location of Village of Bainbridge sewer and water lines. In 2000, MACTEC breached Segment B 21 feet south of the railroad crossing, installed a temporary manhole, and jet-washed this segment approximately 70 feet northward until refusal. Presumably, refusal was due to concrete placed in the line while filling Segment A. Due to the high flow of stream water infiltrating into the pipe (despite stream diversion as described above), it was not possible to video this segment. However, MACTEC reports that throughout the jetting process, visible sludge/sediment was absent. Therefore, it is concluded that Segment B contained an insignificant volume of sludge even prior to remediation. During jet-washing, approximately 6,000 gallons of washwater were recovered for treatment in the on-site water treatment system (Section 4).

Segment C. Sewer segment C ran beneath the stream bed between the railroad crossing and Route 7 (Figure 13). In 2000, this segment was excavated and removed by MACTEC, and sewer pipe and sludge were disposed of as non-hazardous waste (based upon characterization sampling). During excavation, a second 15-inch vitrified tile sewer was discovered. A 1958 facility sewer map indicated that the second sewer was an abandoned line that tied into and ran parallel to segments B and C of the known line (Figure 13). According to the drawing, the known line was the "new" line, presumably installed due to damage or plugging of the "old" (pre-1958) abandoned line. A sample of sludge was collected from the abandoned sewer line and determined to be contaminated. Therefore, the abandoned sewer segment was also excavated and removed. MACTEC reports that the entire abandoned line was removed, based upon encountering the ends of the pipe just south of the railroad crossing and at a "Y" connection into the known line. Additionally, the former Village utilities superintendent, Tim Mayes, reported that the portion of the abandoned line under the railroad crossing was exposed during installation of the Village sewer line in approximately 1995. The Village flushed out this segment and used it as a conduit/sleeve for the Village sewer, thus simplifying their installation under the railroad crossing.

After removal of both pipes, verification bedding samples were collected from sample locations illustrated on Figure 13. Analytical results summarized below demonstrate that the off-site clean-up criterion of one mg/kg PCBs was achieved in Segment C.

Final Verification Sampling Results – Eastern Sewer Segment C

Contractor Sample I.D.	Sample Date	PCBs (mg/kg)
ESBC – NEAR LINE	10/5/00	< 0.077
ESBC – OLD LINE	10/5/00	< 0.077
ESBC – PIPE JOINT	10/5/00	< 0.075
ESBC – END PIPE	10/5/00	< 0.076

Segment D. Sewer segment D runs beneath the Route 7 culverts (Figure 13), precluding excavation and removal. In 2000, MACTEC jet-washed this segment, which is approximately 140 feet in length. During jet-washing, approximately 64,000 gallons of sewer sludge and washwater were recovered by vacuum tanker truck and treated in the on-site PCB-water treatment system. During the jet-washing process, the contractor reports that washwater progressed from heavy sludge content to visual clarity.

A video of the pipe interior was obtained progressing in a downstream direction from the upstream temporary manhole. It was only possible to video the upper 70 feet of pipe because the camera was obstructed by a large rock that could not be transported by the jet washwater. Additionally, due to excessive infiltration of water at pipe joints, it was only possible to verify a sediment-free pipe bottom for the upper 50 feet of pipe. However, based upon the 50 feet of visually clean pipe interior, and clear washwater collected at the downstream excavation, Segment D is considered clean. After remediation, the excavations at both ends of sewer Segment D were backfilled with native materials.

Segment E. Sewer Segment E ran from approximately 25 feet south of Route 7 culvert to the former River Lagoon (Figure 14). Approximately 700 feet of the sewer run was under the Beatty Creek stream bed. Approximately 1,300 feet of the sewer length ran diagonally across a farm field ("Benson's Field") to the River Lagoon. Segment E included three manholes.

In 2000, MACTEC excavated the entire Segment E sewer run, including sludge, pipe, and manholes. After excavation was completed, verification samples were collected at 100-foot intervals from the bedding beneath the pipe. The verification sample locations are illustrated on Figure 14, and verification results are summarized in Table 7. Note that at two locations, re-excavation of one-foot increments was required due to slightly elevated PCB concentrations in the bedding material. Verfication samples collected after re-excavation demonstrated that the clean-up criterion (one mg/kg PCBs) was achieved along the entire reach of sewer removal.

"Benson Lake". For some number of years prior to remediation of the Eastern Sewer in 2000, the sewer pipe connection to the lower manhole had been breached and water from the sewer was released to the ground surface during wet weather conditions. This water pooled in a topographic low area (Figure 14), and NYSDEC raised the concern of PCB accumulation in this low area. Although previous sampling performed for the RCRA Facility Investigation indicated non-detectable levels of PCBs in water and sediments from this ephemeral pool, additional sediment samples were collected during the final remediation phase from the locations illustrated on Figure 14. Sample results, summarized in Table 7, confirm non-detectable concentrations of PCBs. Therefore, no corrective measures were required to address the "Benson Lake" area.

4.0 PCB-CONTAMINATED WATER MANAGEMENT

4.1 PCB-Contaminated Water Treatment and Discharge

During implementation of corrective measures, PCB-contaminated water was generated as a result of sewer and soil excavation de-watering and sewer jet-washing. Contaminated water was pumped to an above-ground holding tank ("PCB Tank") for primary clarification, then subsequently treated utilizing particulate filtration (one micron bag filter) and two activated carbon canisters placed in series. Treated water was discharged into a second holding tank ("IRM Tank"), where it was tested prior to ultimate discharge under permit to Beatty Creek. As reported by MACTEC, the total volume of contaminated water collected, treated, and discharged was 95,600 gallons in 1999 and 264,800 gallons in 2000 (360,400 gallons total).

The pumping and treatment system was observed during operation by the certifying engineer, and was observed to be operating properly (e.g., no visual leaks, all components operable). Additionally, treated water testing data provided by the contractor were reviewed, and testing results were confirmed to meet discharge criteria. Testing data were previously provided to NYSDEC in Semi-Annual Groundwater Monitoring and IRM Reports.

4.2 Water Management at the River Lagoon

Groundwater was also encountered while excavating the River Lagoon. Based upon laboratory analysis, unfiltered excavation water was determined by the contractor to contain 0.0021 mg/L PCBs. It was agreed to manage water at the River Lagoon without transport to and treatment at the on-site PCB-water treatment system for the following reasons:

- the concentration of PCBs was low and directly related to soil contamination,
- the volume of water in the excavation was large, and
- the groundwater infiltration rate into the excavation has high, making de-watering impractical.

River Lagoon water was managed by pumping water from actively excavated areas to inactive excavations ("cells"). Where necessary, cells were hydraulically isolated by installing earthen berms. In order to minimize the possible transport of contaminated sediments, pump suction lines were maintained near the water surface (i.e., floating intake) and fitted with bag filters. Water management procedures were documented in a letter from the contractor to NYSDEC dated November 9, 1999.

At the completion of excavation, the River Lagoon water management cells were verified to be clean by collecting bottom clay samples from grid location 10E and 8A (see Table 3). Analytical results were below the River Lagoon remediation criterion of one mg/kg. Additionally, an excavation water sample (Contractor ID "PEW-1", collected 12/07/99) from the vicinity of grid location 9C exhibited only trace PCBs below the treated water discharge limit (0.238 versus 0.3 ug/L PCBs). Based upon these results, the handling of nominally-contaminated water at the River Lagoon (i.e., without carbon treatment) had no significant adverse impact on corrective measures.

4.3 Decontamination and Demolition of the PCB Tank

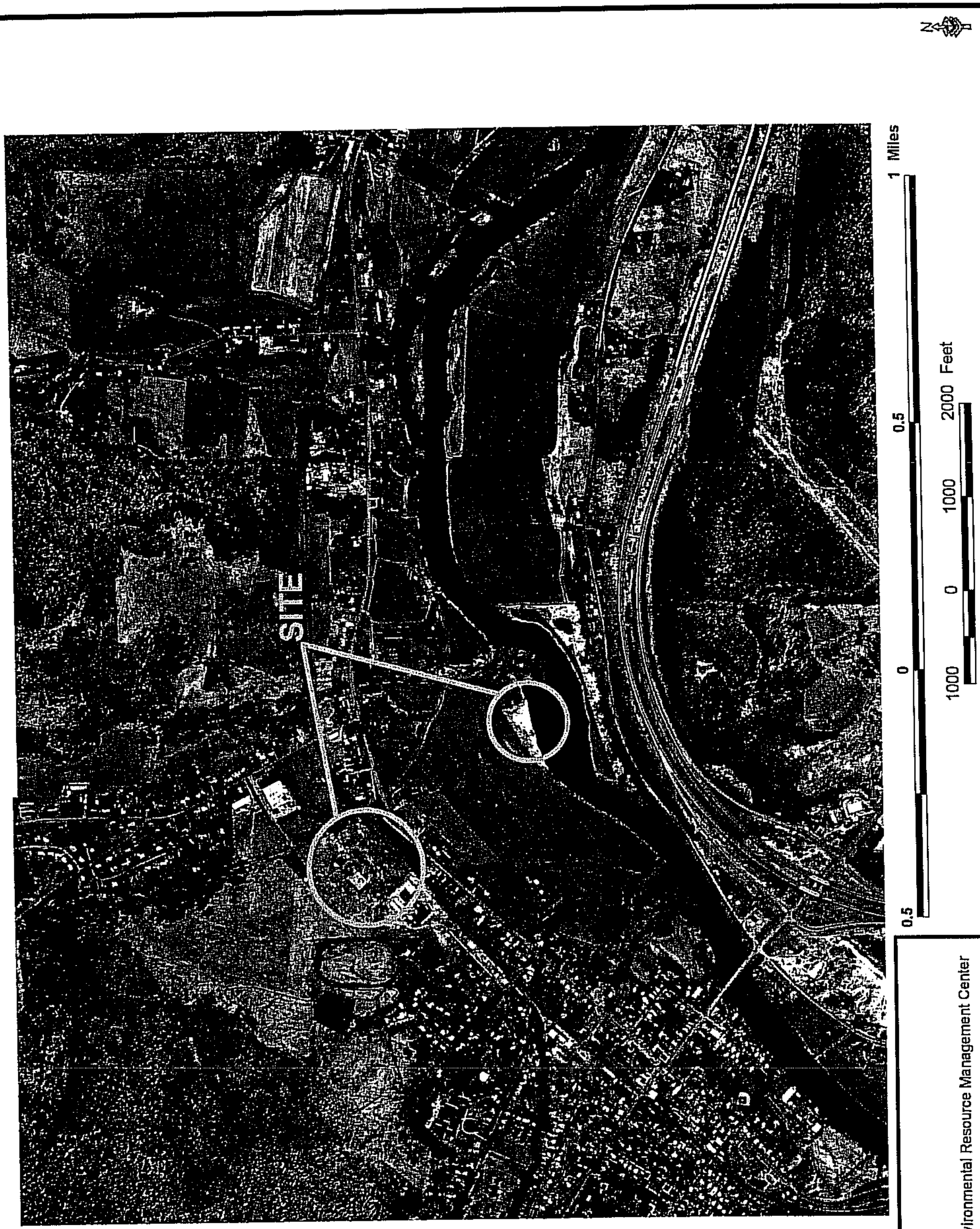
After completion of all PCB-contaminated water management, the PCB Tank was removed in order to facilitate final remediation excavation in the Phenol Recovery Area (Section 2.5). Prior to demolition, sludge at the bottom of the tank was characterized (results summarized below), removed, and disposed of with contaminated soils and sewer sediments. The tank interior was then decontaminated by pressure washing, and the steel shell was cut and shipped off-site for recycling. The concrete floor of the tank was broken up and removed, except for a five-foot deep foundation footer that remains in place (Figure 10). Wipe samples collected from the interior surface of the concrete floor material verified that PCB residuals had been removed. Analytical results are provided below:

Sampling Results – PCB Tank Decontamination and Demolition

Material	Contractor Sample I.D.	Sample Date	PCBs
Sludge	10-12-S PCB Tank Sludge	10/12/00	25.7 mg/kg
Concrete floor	10-18-Wipe Tank #1	10/18/00	< 0.002 mg/100 cm^2
Concrete floor	10-18-Wipe Tank #2	10/18/00	< 0.002 mg/100 cm^2

Appendix A

Tables and Figures



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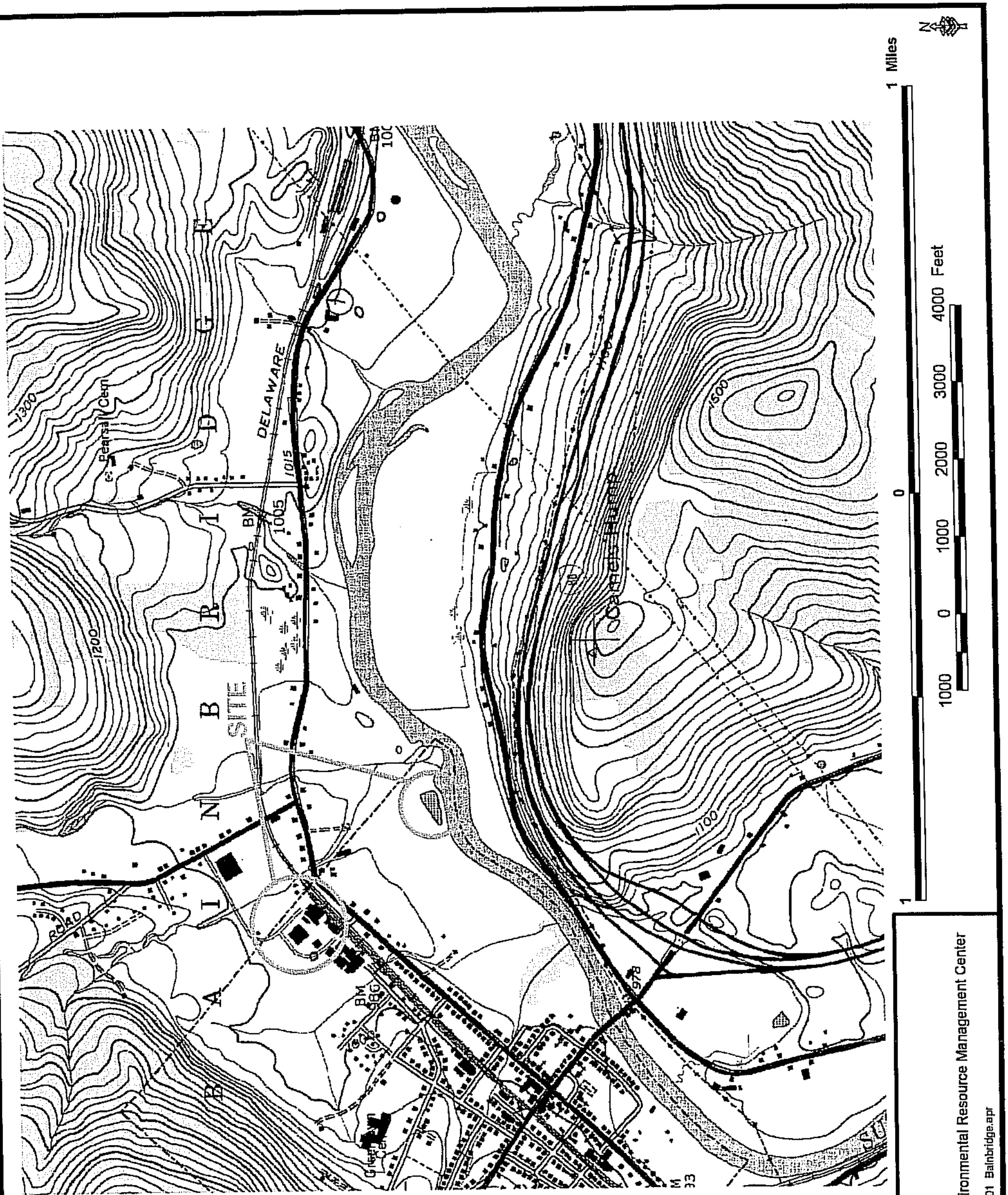
Former Borden Resin Facility - Bainbridge, New York
Figure 1A
Orthophotograph circa 1998



Former Borden Resin Facility - Bainbridge, New York
Figure 1B
Site Location - Sidney, New York, USGS SW Quadrangle circa 1990

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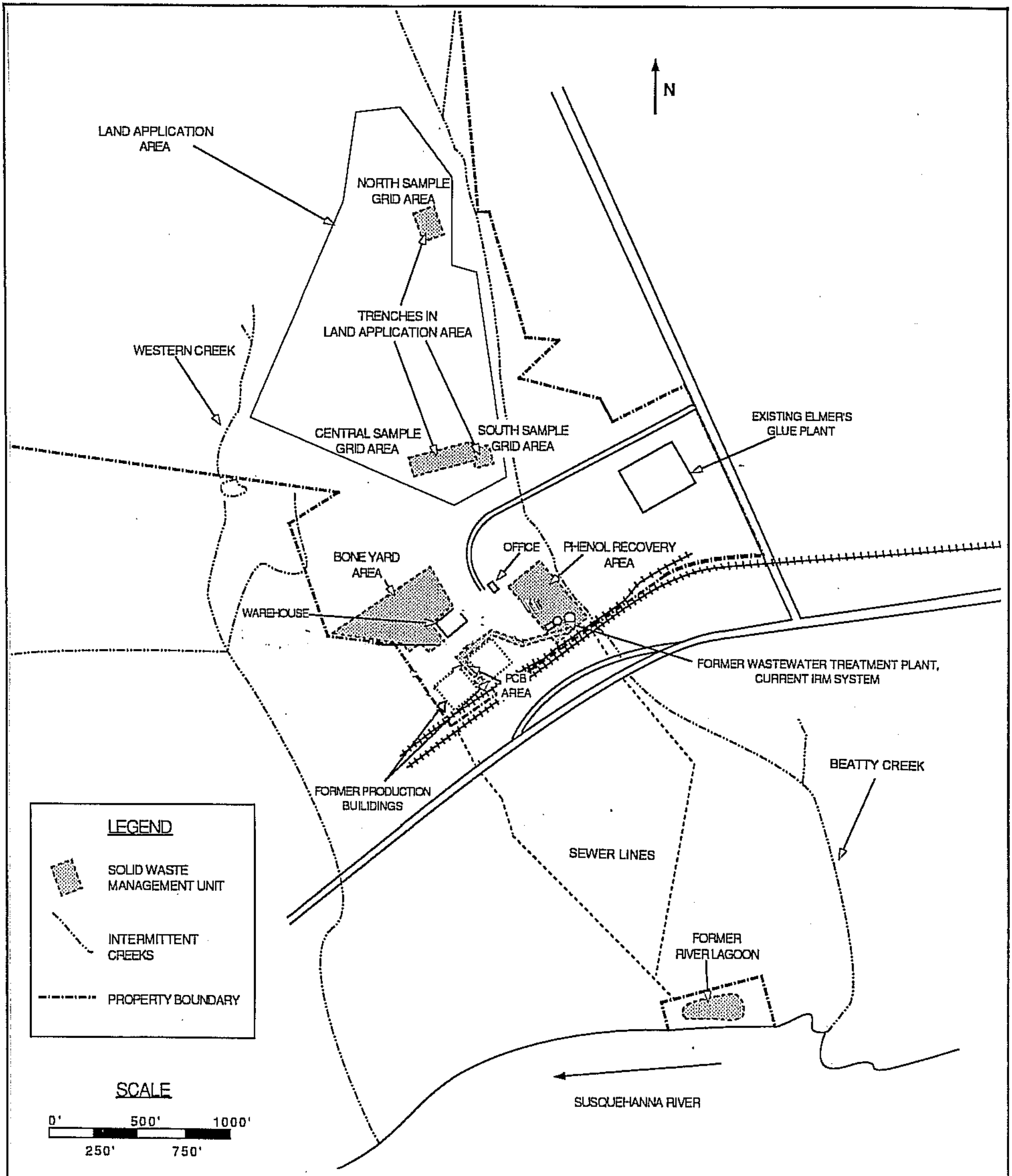
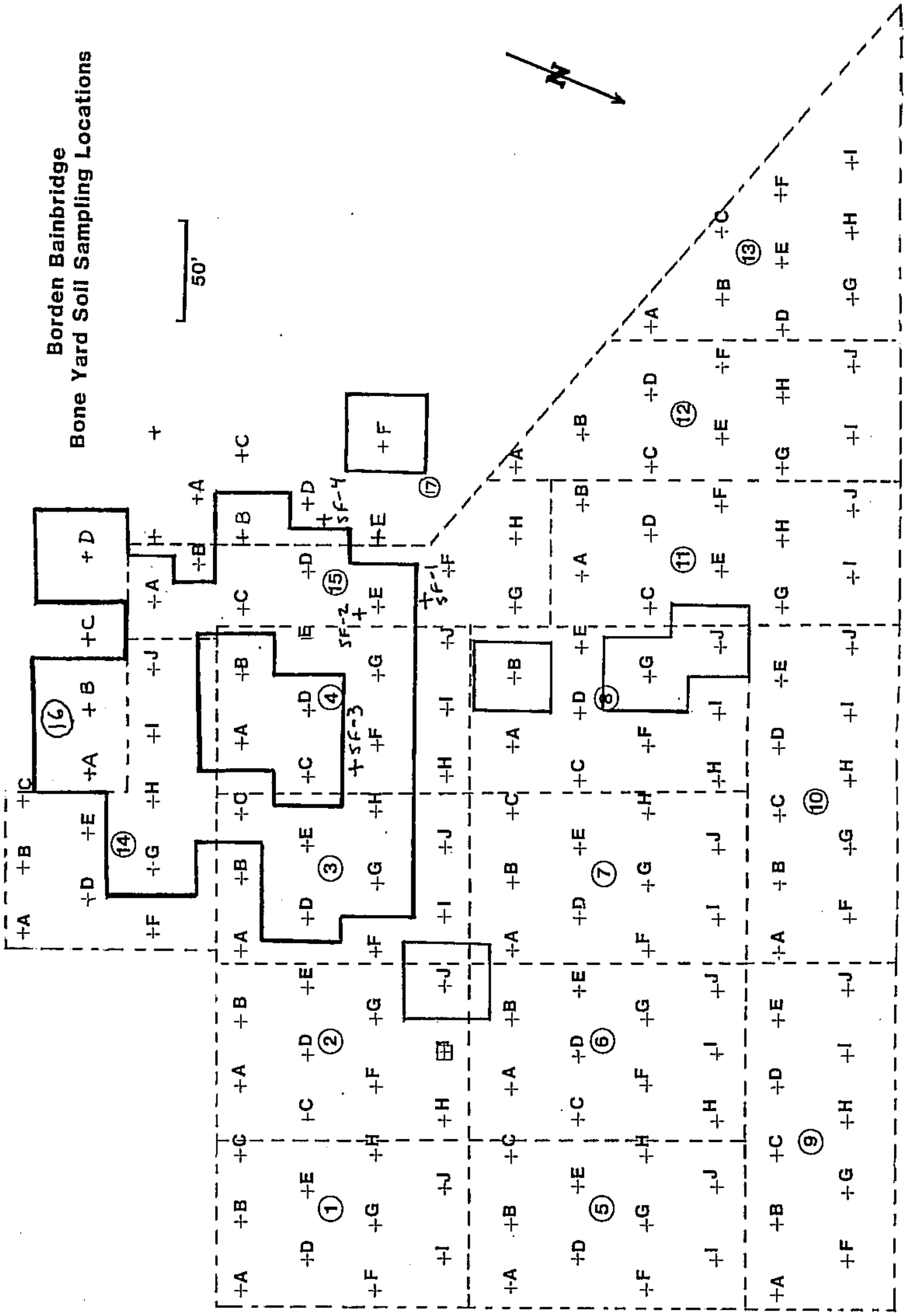


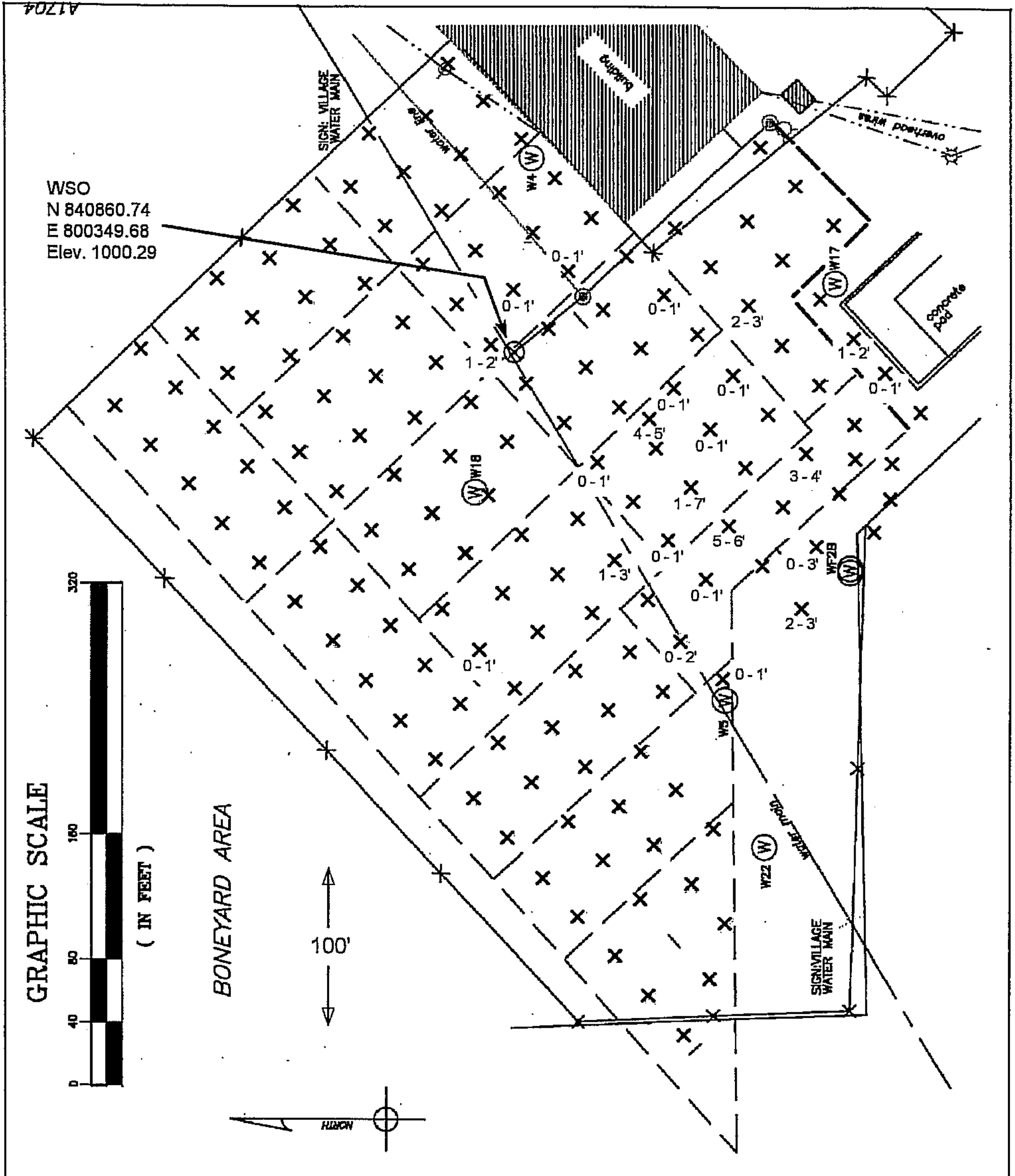
Former Borden Resin Facility - Bainbridge, New York
Figure 2
Areas Requiring Corrective Measures

Base map adapted from RFI Report, 1996



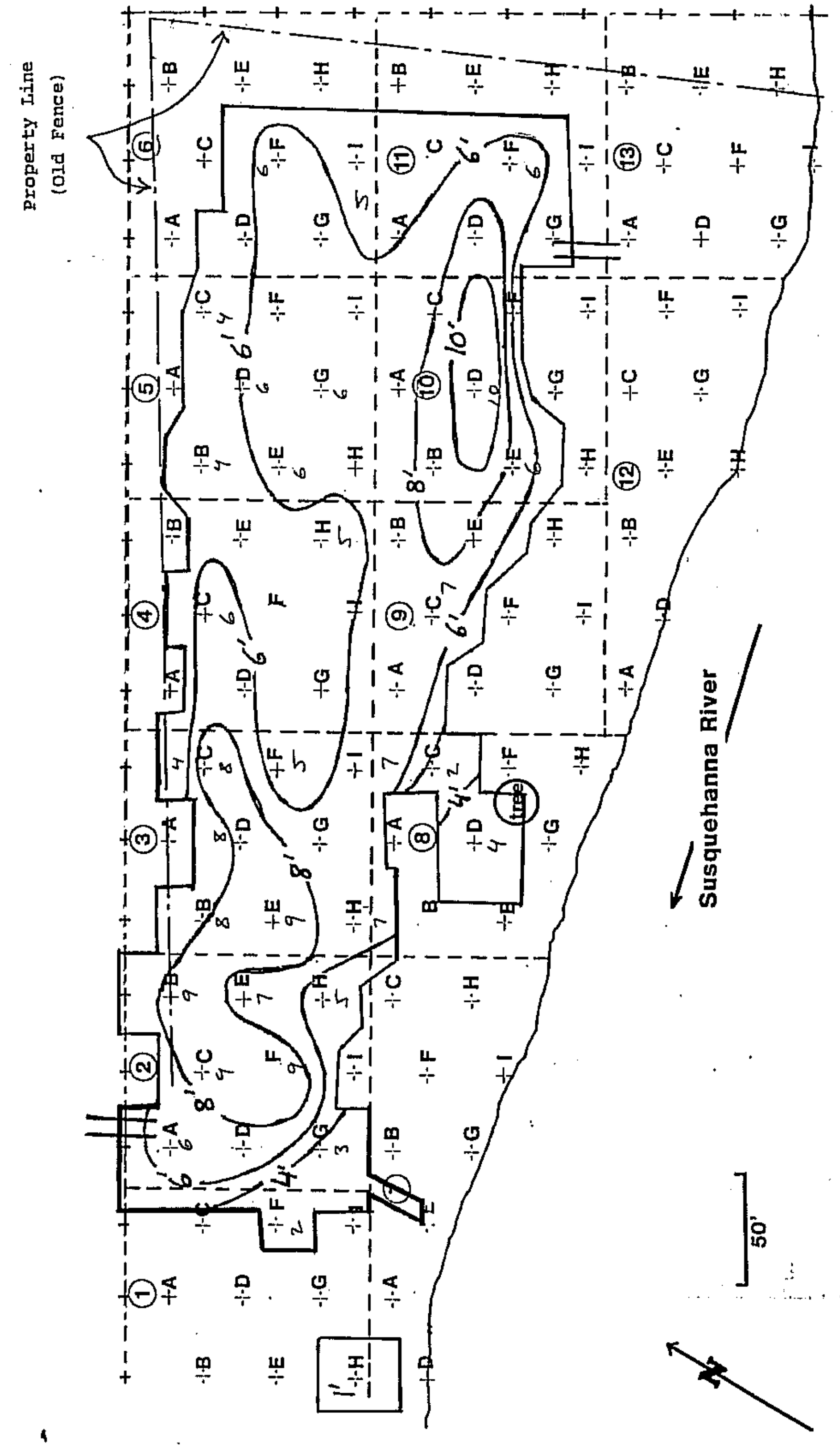
Former Borden Resin Facility - Bainbridge, New York
Figure 3
Bone Yard Sample Grid and Excavation Limits

Base map adapted from RFI Report, 1992



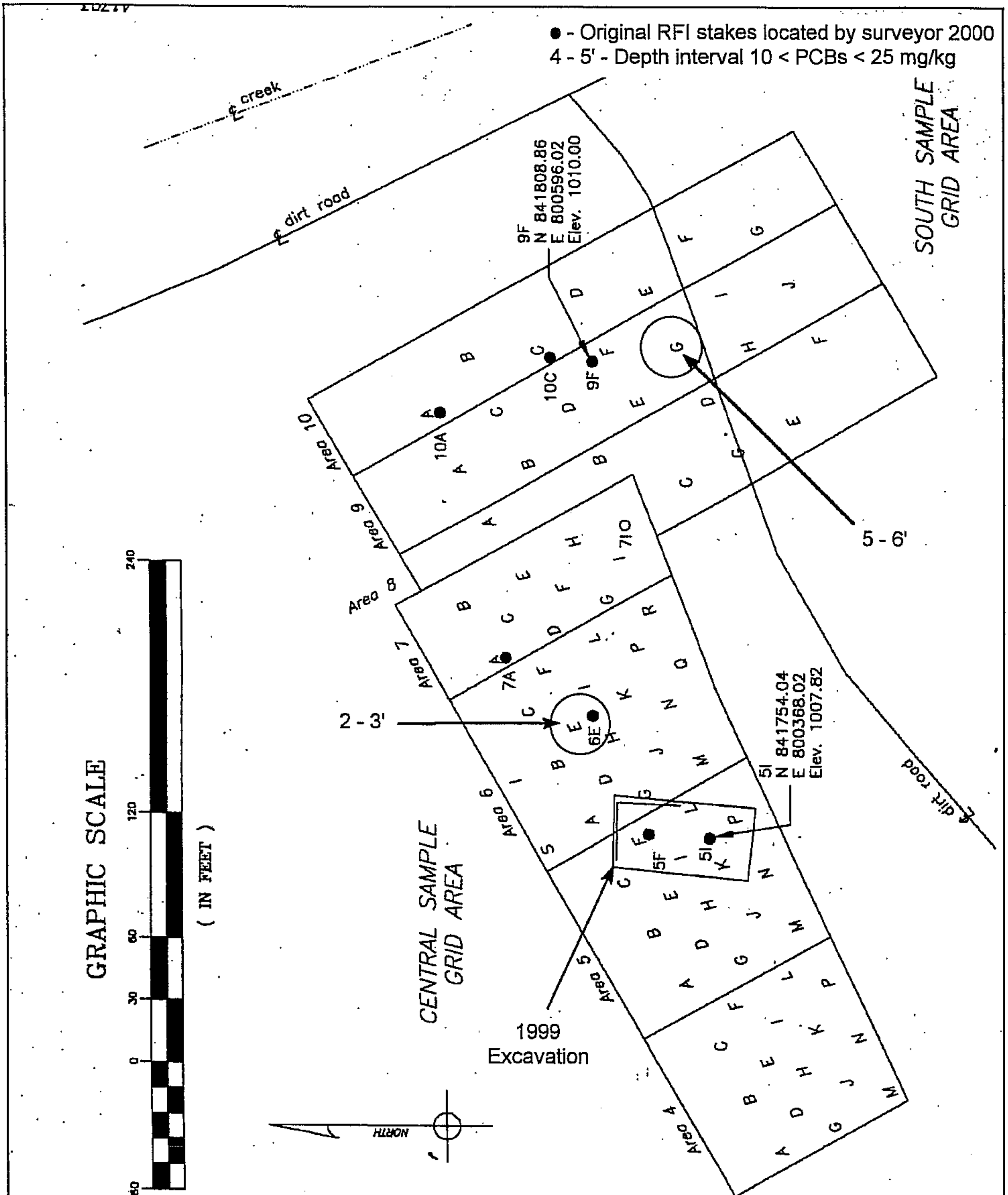
Former Borden Resin Facility - Bainbridge, New York
Figure 4
Bone Yard Areas Exhibiting 10 < PCBs < 25 mg/kg

Base map adapted from Lynn Pullis survey (2000), data from RFI Reports (1992, 1996) and Table 1.



Former Borden Resin Facility - Bainbridge, New York
Figure 5
River Lagoon Sample Grid and Excavation Limits

Base map adapted from RFI Report, 1992. Excavation depths reported by MACTEC, 1999.

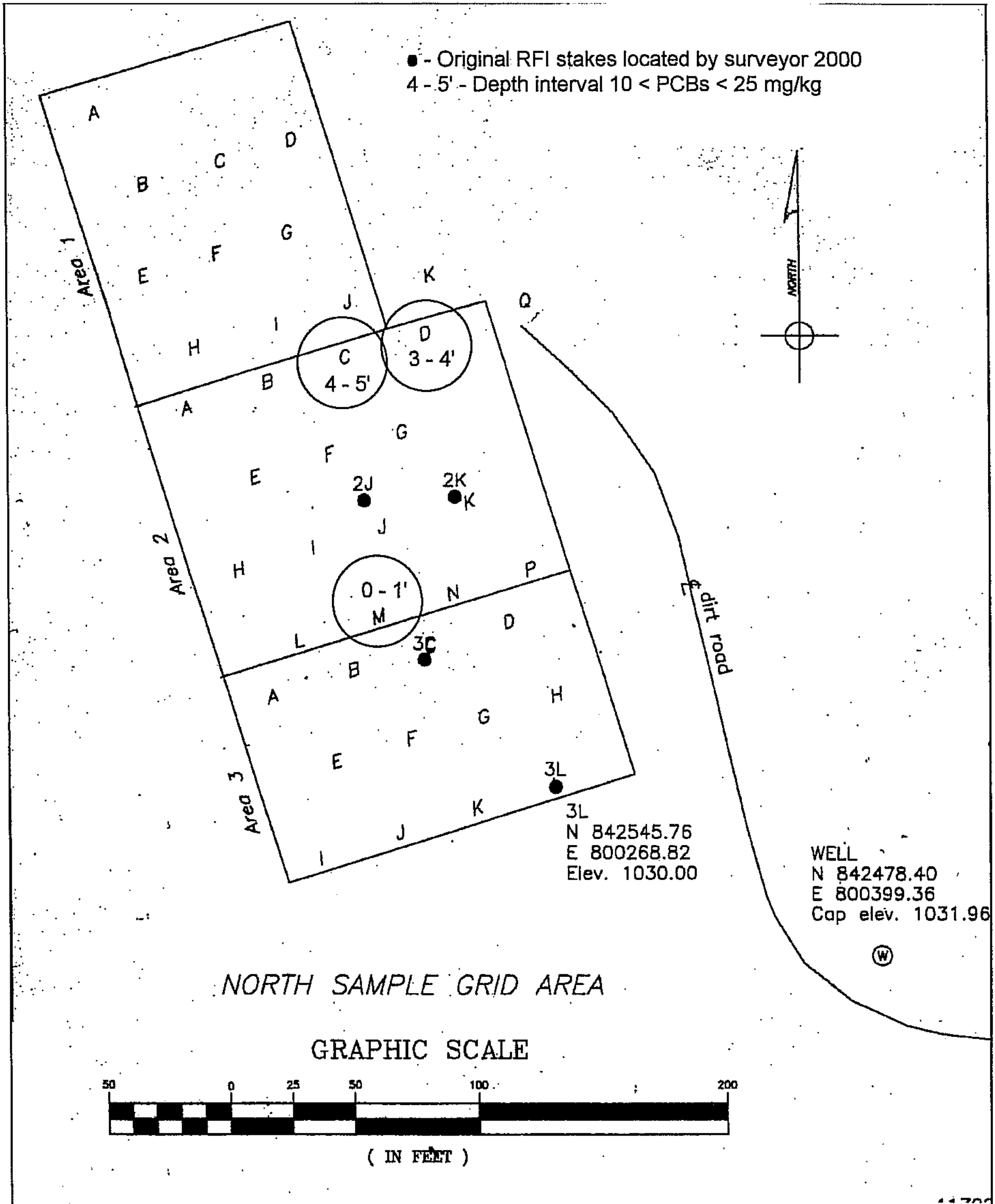


Former Borden Resin Facility - Bainbridge, New York

Figure 6

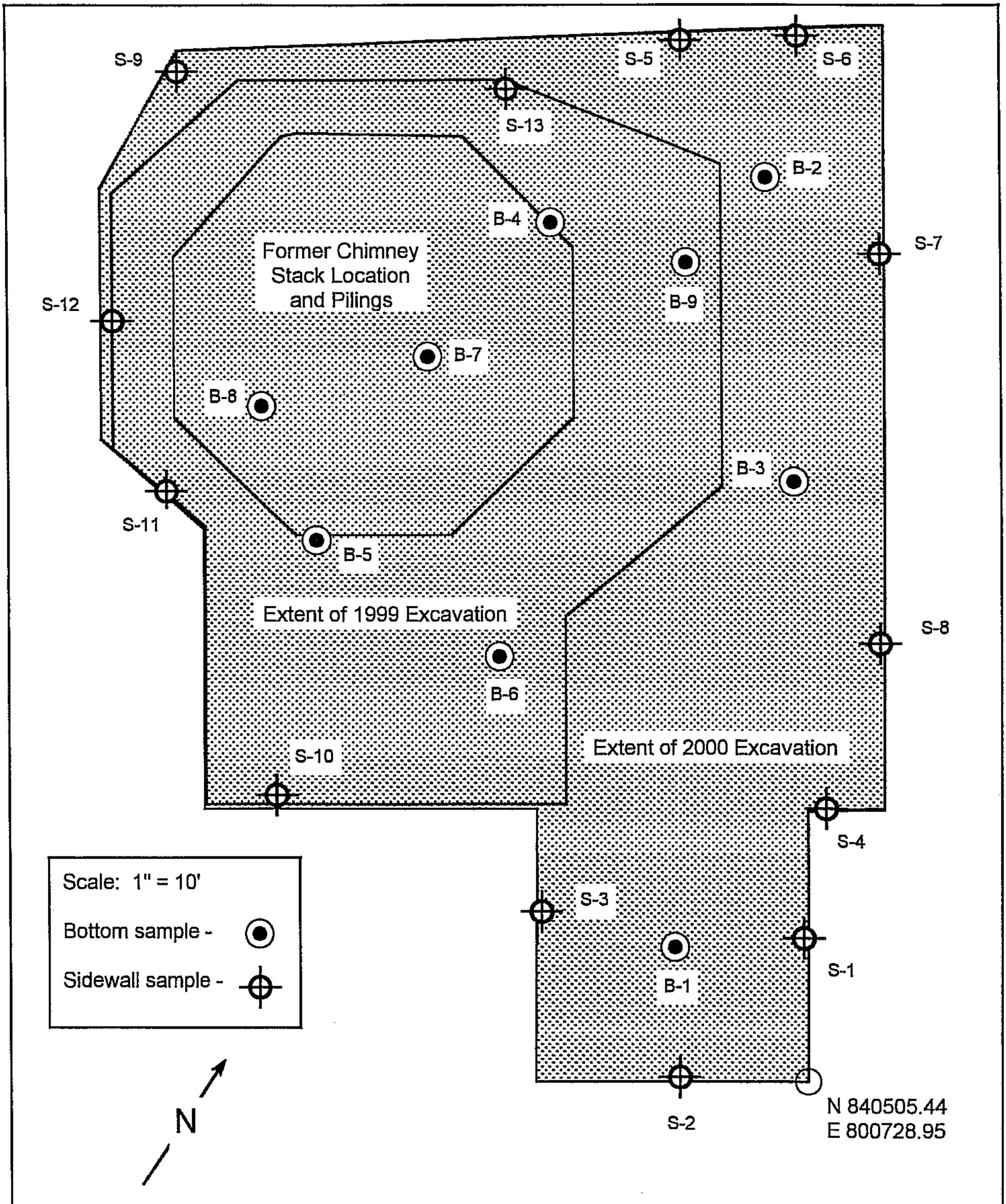
Central and South Trenches Excavation and Areas Exhibiting 10 < PCBs < 25 mg/kg

Basemap from Lynn Pullis, L.S. survey, 2000.

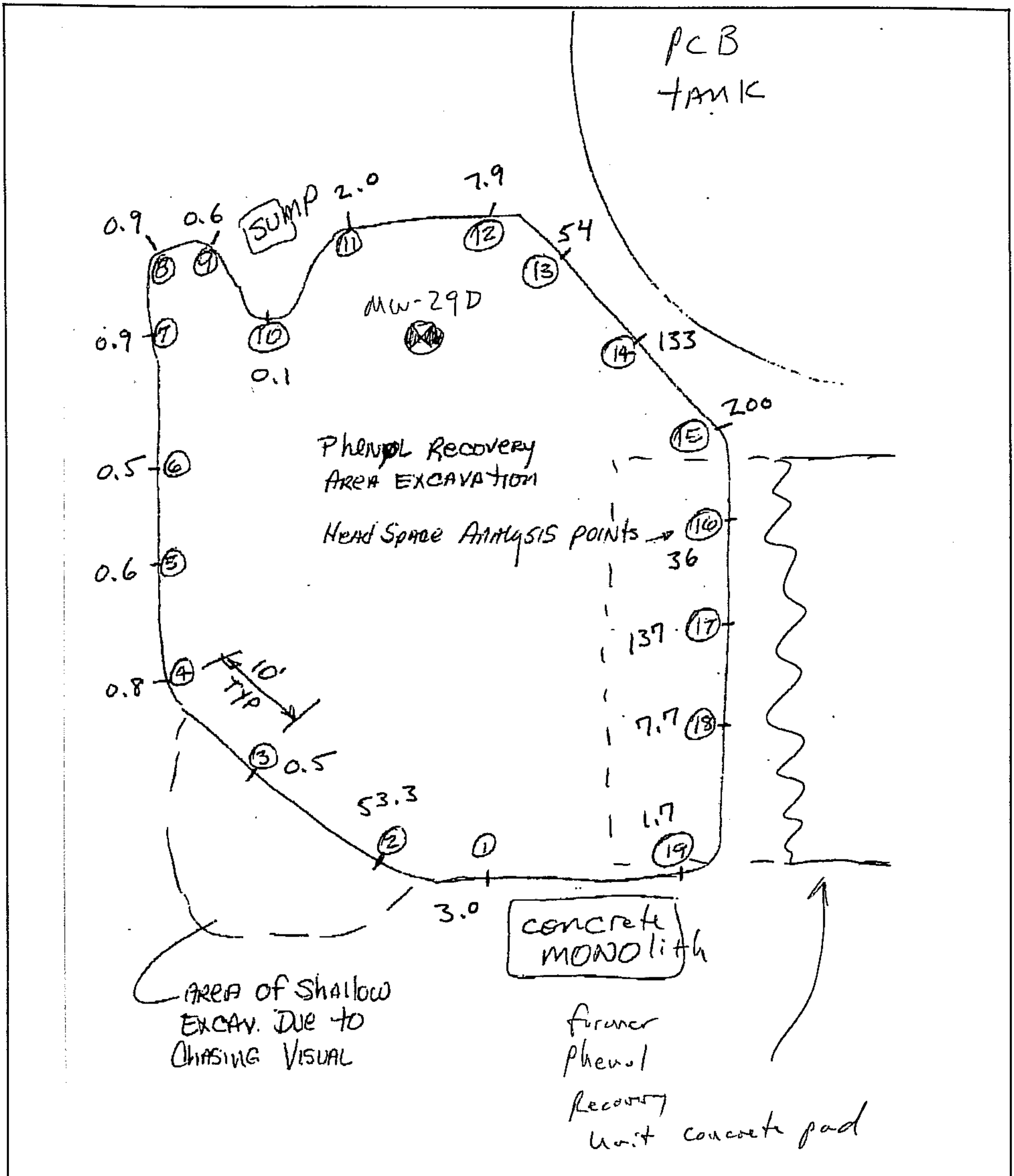


Former Borden Resin Facility - Bainbridge, New York
Figure 7
North Trenches Areas Exhibiting 10 < PCBs < 25 mg/kg

Basemap from Lynn Pullis, L.S. survey, 2000.

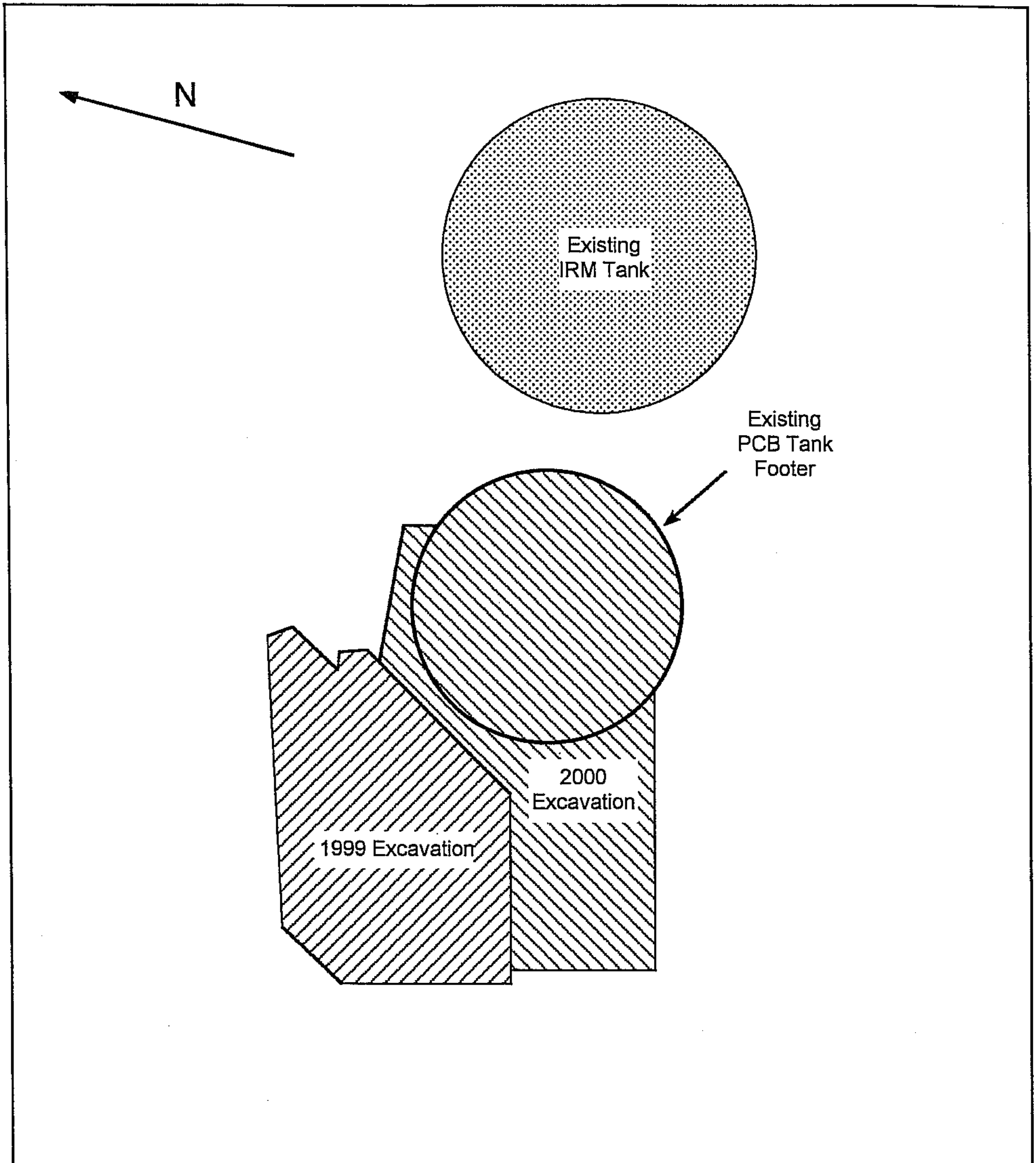


Former Borden Resin Facility - Bainbridge, New York
Figure 8
Final PCB Area Excavation and Verification Sample Locations



Former Borden Resin Facility - Bainbridge, New York
Figure 9
1999 Phenol Recovery Area Excavation

Base map adapted from MACTEC field sketch, 1999



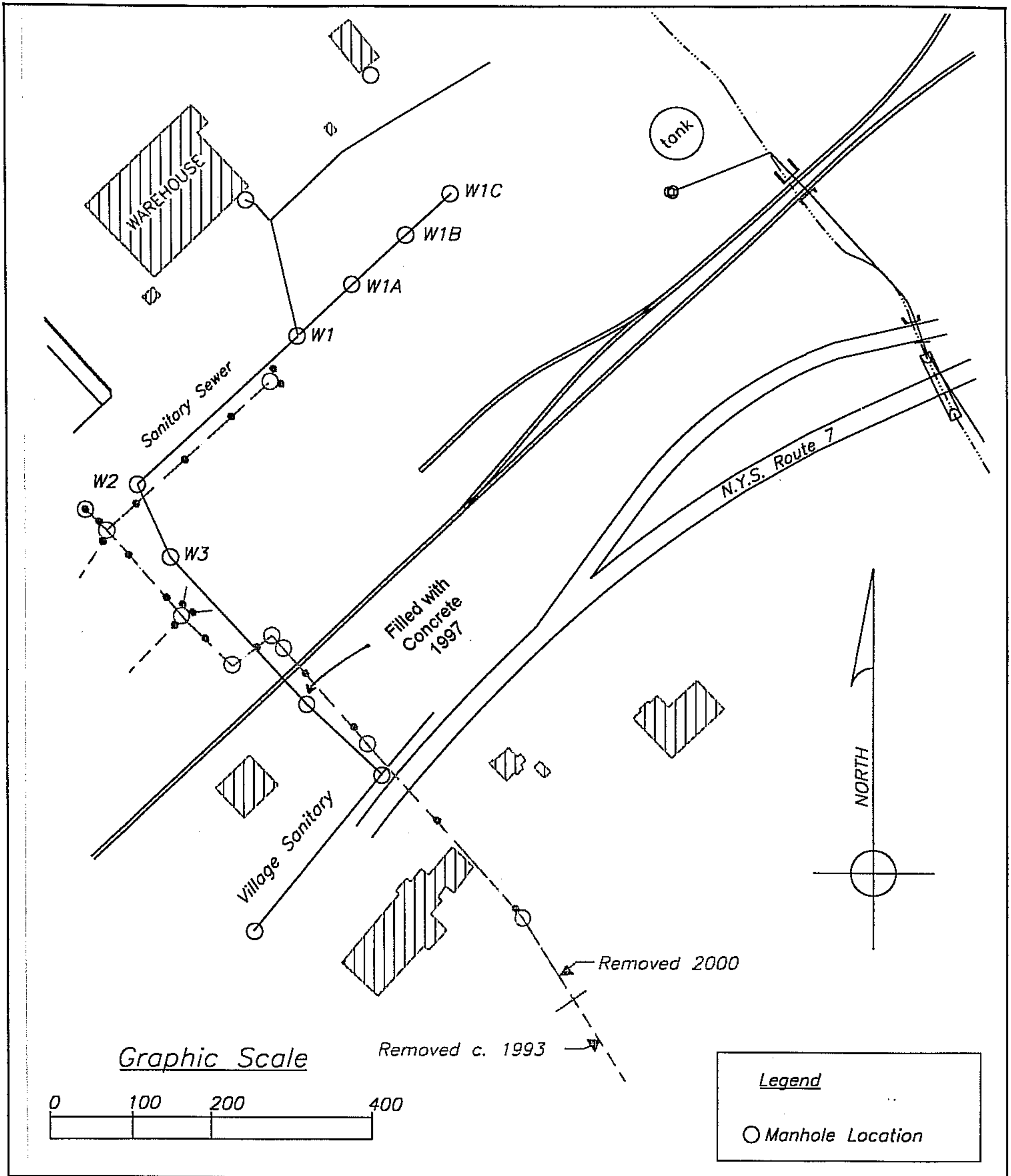
Former Borden Resin Facility - Bainbridge, New York

Scale 1" = 30'

Figure 10

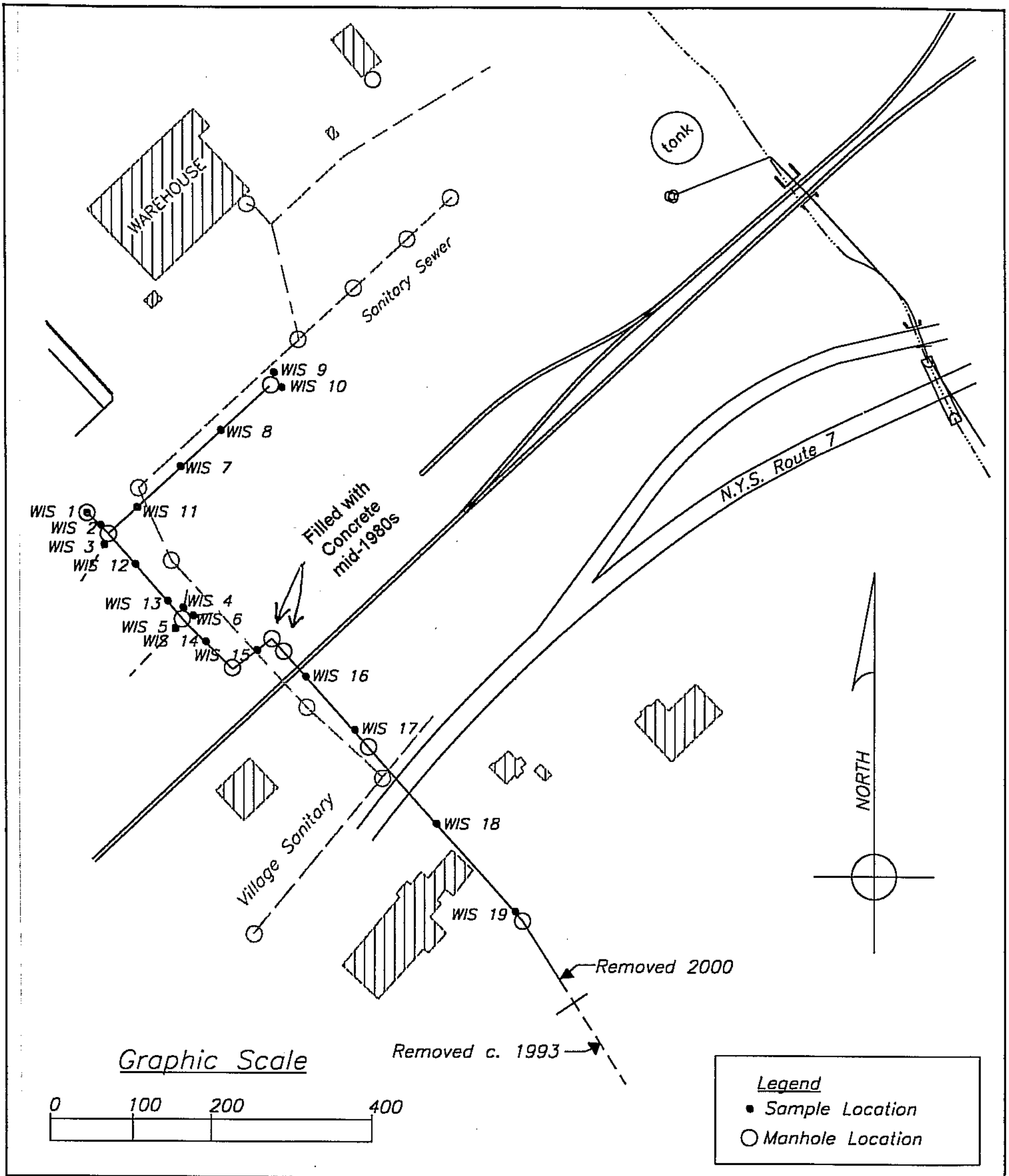
Final Extent of Phenol Recovery Area Excavation

Map developed by ERMC from field measurements by Springett, 2000



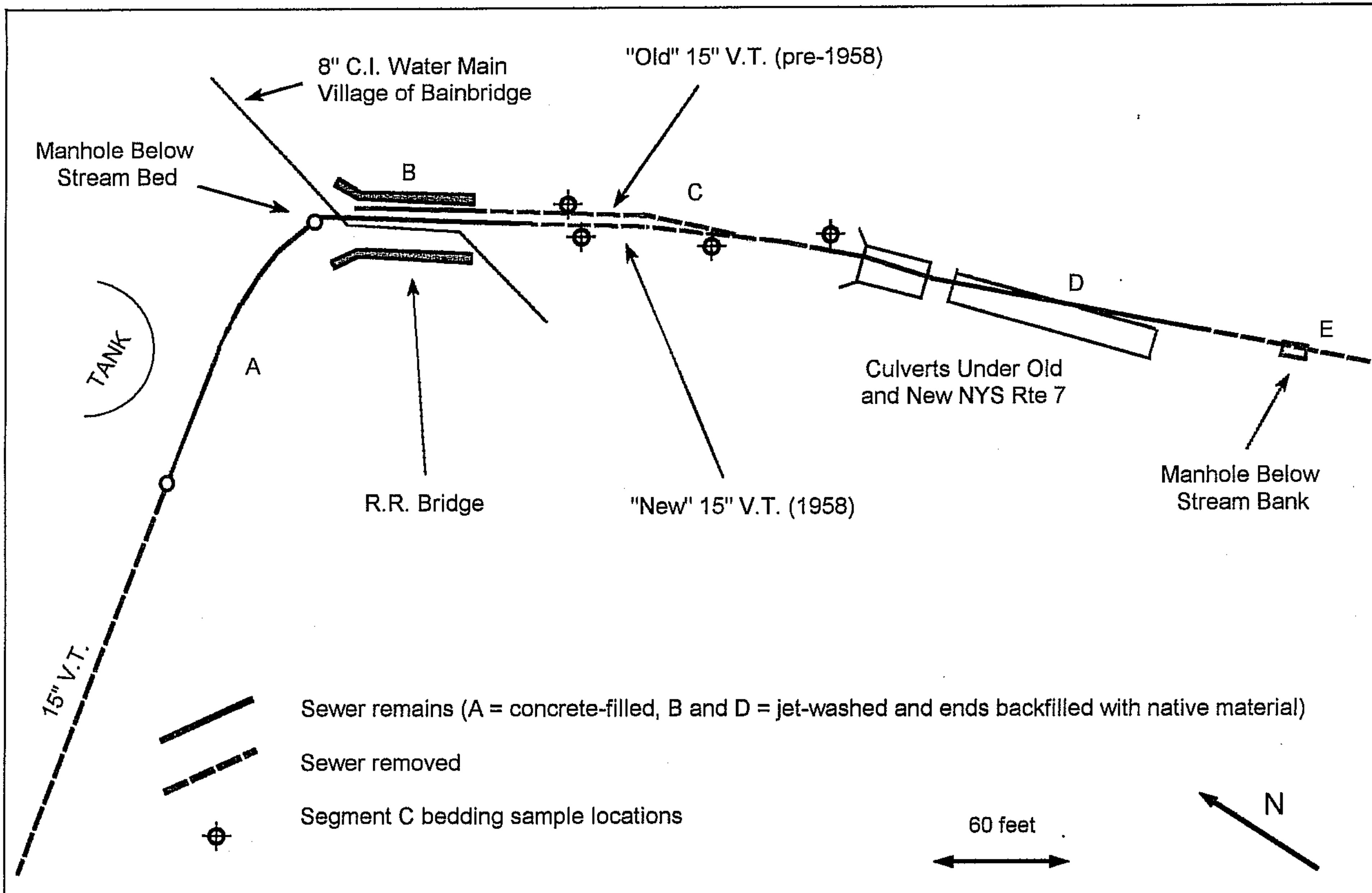
Former Borden Resin Facility - Bainbridge, New York
Figure 11
Western Sanitary Sewer

Base map adapted from Lynn Pullis, L.S. survey



Former Borden Resin Facility - Bainbridge, New York
Figure 12
Western Industrial Sewer

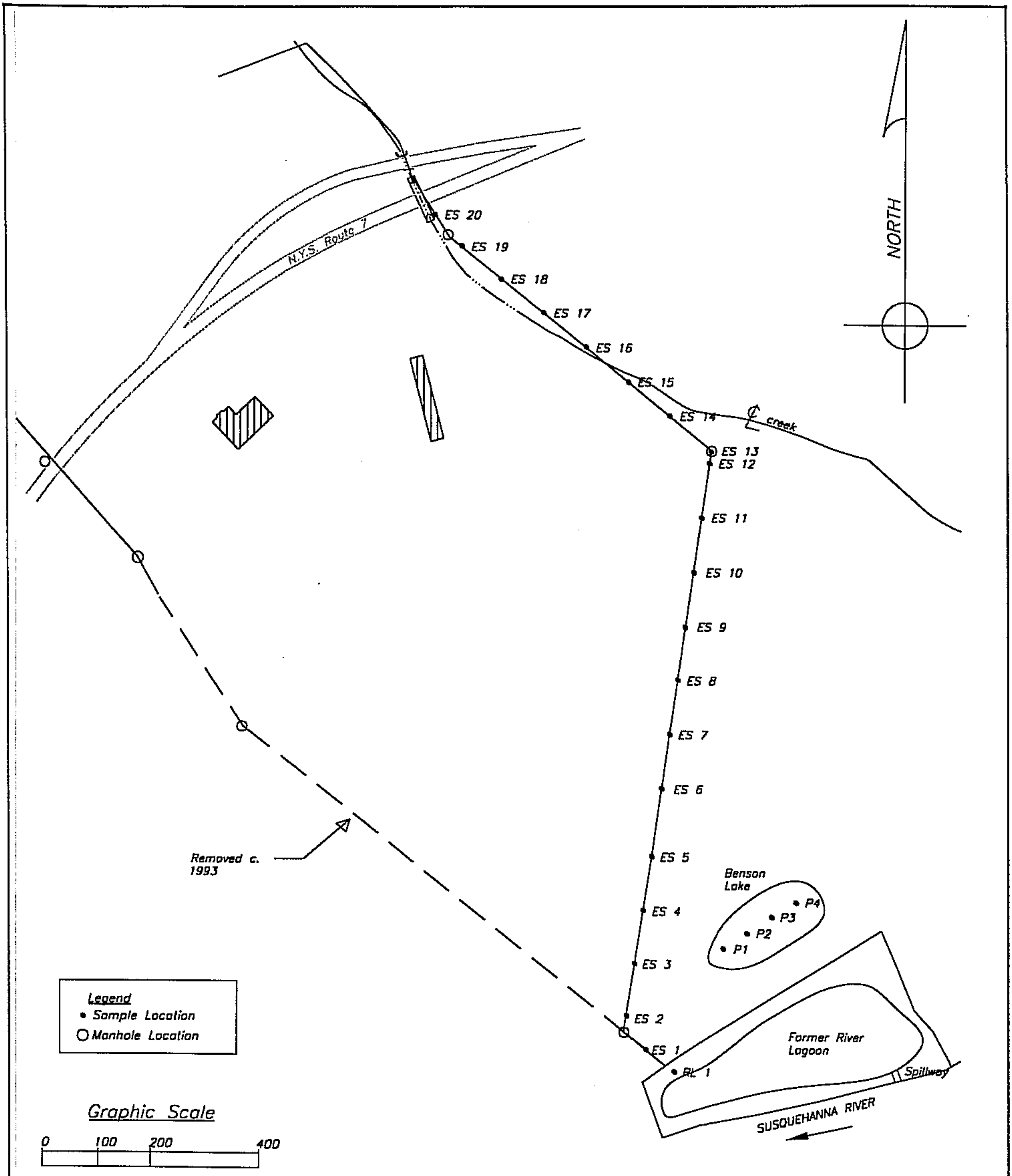
Base map adapted from Lynn Pullis, L.S. survey



Former Borden Resin Facility - Bainbridge, New York
Figure 13
Eastern Sewer - North of Route 7

(base map adapted from 1958 facility sewer map)

ERMC-NKU (Aug-01)



Former Borden Resin Facility - Bainbridge, New York
Figure 14
Eastern Sewer - South of Route 7

Base map adapted from Lynn Pullis, L.S. survey

Former Borden Resin Facility - Bainbridge, New York
Table 1
Final Verification Sample Results - Bone Yard

Grid Location	Excavation / Sample Depth (ft)	Contractor Sample I.D.	Sample Date	PCBs (mg/kg)
2J	1	BY-2JS-051008	10/8/99	18.000
3C	1	BY-3CS-221008	10/8/99	1.800
3D	1	BY-3DS-071008	10/8/99	8.400
3E	1	BY-3ES-1008	10/8/99	2.700
3G	1	BY-3GS-061008	10/8/99	5.600
3H	5	BY-3HS-101008	10/8/99	0.930
4E	3	BY-4ES-131008	10/8/99	**28.000**
	4	BY4E 810S	8/10/00	< 0.148
4F	3	BY-4FS-11008	10/8/99	2.300
4G	1	BY-4GS-121008	10/8/99	18.000
8B	1	BY-8BS-031008	10/8/99	5.000
8G	1	BY-8GS-021008	10/8/99	2.700
8J	1	BY-8JS-011008	10/8/99	0.330
14G	1	BY-14GS-241008	10/8/99	5.100
14H	2	BY-14HS-231008	10/8/99	16.000
14I	2	BY-14IS-211008	10/8/99	**28.000**
	3	BY-04	11/4/99	10.000
14J	1	BY-14JS-191008	10/8/99	0.730
15A	1	BY-15AS-171008	10/8/99	2.100
15C	2	BY-15CS-161008	10/8/99	**53.000**
	3	BY-02	11/4/99	13.000
15D	9	BY-15DS-011011	10/11/99	0.180
15E	5	BY-15ES-041008	10/8/99	11.000
16A	1	BY-16AS-201008	10/8/99	**77.000**
	2	BY-06	11/4/99	1.300
16B	1	BY-16BS-181008	10/8/99	18.000
16D	1	BY-16DS-141008	10/8/99	5.700
17B	3	BY-17BS-151008 *	10/8/99	0.122
17F	2	BY-17FS-091008	10/8/99	11.000
SF-1 **	sidewall near 15E	BY-15EIR-011013	10/13/99	10.000
SF-2 **	5	BY-152R-021013	10/13/99	**120.000**
	6	BY-01	11/4/99	**27.000**
	7	BY-15E-3	12/2/99	0.049
SF-3 **	3	BY-4FIR-031013	10/13/99	**110.000**
	4	BY-03	11/4/99	14.000
SF-4 **	sidewall near 15D	BY-15DIR-041013	10/13/99	21.000

* - Per contractor notice, misidentified as sample BY-15BS-141008 in lab reports.
** - Additional sample locations specified by the certifying engineer based upon visual indications.

Former Borden Resin Facility - Bainbridge, New York
Table 2
Estimated versus Actual Excavation and Disposal Quantities

Area		Plan Estimate (tons)	Actual (tons)	
Bone Yard plus Land Application Area Trenches				
	Hazardous	1,550	1,995	
	Non-hazardous	1,550	1,427	
River Lagoon				
	Hazardous	2,200	4,193	
	Non-hazardous	5,800	13,541	
PCB Area				
	Hazardous	200	1,156	
	Non-hazardous	-	-	
Phenol Recovery Area				
	Hazardous	-	-	
	Non-hazardous	1,400	1,086	
	On-site landfarm/SVE	Not estimated	2,500	(Approx.)
Sewers	Non-hazardous	Not estimated	546	
Total		12,700	26,444	

Former Borden Resin Facility - Bainbridge, New York
Table 3
Verification Sample Results - River Lagoon

Grid Location	Contractor Sample I.D.	Sample Date	PCBs (mg/kg)
1A	na		Visual Clay
1C	RL-1C-SW	11/19/99	0.056
1F	RL-1F-SW	11/19/99	0.190
1H	RL-1HS-011016	10/16/99	0.024
1I	RL-1I-SW	11/19/99	0.045
2A	RL-2AS-041016	10/16/99	< 0.043
2B	RL-2BS-071016	10/16/99	<0.041
2C	RL-2CS-061016	10/16/99	<0.042
2D	RL-2D-Base	11/19/99	0.061
2E	na		Visual Clay
2F	RL-2FS-051016	10/16/99	0.470
2G	RL-2G-Base	11/19/99	0.065
2H	na		Visual Clay
2I	na		Visual Clay
3B	RL-3B	11/17/99	< 0.041
3C	na		Visual Clay
3D	na		Visual Clay
3E	RL-3ES-101021	10/21/99	<0.045
3F	na		Visual Clay
3G	RL-3GS-041021	10/21/99	<0.044
3H	na		Visual Clay
3I	RL-3IS-111021	10/21/99	<0.048
4A	na		Visual Clay
4B	RL-4B-I	11/9/99	<0.043
4C	RL-4CS-101021	10/21/99	0.092
4D	na		Visual Clay
4E	na		Visual Clay
4F	na		Visual Clay
4G	na		Visual Clay
4H	RL-4HS-041022	10/22/99	0.080
4I	na		Visual Clay
5A	na		Visual Clay
5B	na		Visual Clay
5C	na		Visual Clay
5D	RL-5D-I	11/6/99	<0.044
5E	RL-5E-I	11/6/99	<0.046
5F	RL-5F	11/5/99	0.280
5G	RL-5G-I	11/6/99	0.029
5H	RL-5H-I	11/7/99	0.015
5I	RL-5I-I	11/6/99	<0.042
6D	RL-6D	11/5/99	<0.043
6F	RL-6F	11/5/99	<0.044
6G	na		Visual Clay
6I	RL-6I	11/5/99	0.160
7B	na		Visual Clay
7C	na		Visual Clay
8A	G8A/ESE	12/7/99	0.870
8C	na		Visual Clay
8D	RL-8DS-011021	10/21/99	<0.043
9A	na		Visual Clay
9B	RL-9B-I	11/9/99	<0.045
9C	na		Visual Clay
9D	na		Visual Clay
9E	na		Visual Clay
9F	na		Visual Clay
9H	na		Visual Clay
10A	G10A/ESE	12/7/99	< 0.049
10B	RL-B10B-I	11/7/99	<0.043
10C	na		Visual Clay
10D	RL-10D-I	11/7/99	<0.052
10E	na		Visual Clay
10F	na		Visual Clay
10G	na		Visual Clay
11A	na		Visual Clay
11B	na		Visual Clay
11C	RL-11-C	12/7/99	<0.042
11D	RL-11-D	12/7/99	<0.042
11E	na		Visual Clay
11F	na		Visual Clay
11G	na		Visual Clay
11H	na		Visual Clay
11I	na		Visual Clay

na - Not Analyzed.

Former Borden Resin Facility - Bainbridge, New York
Table 4
Final Verification Results - PCB Area

Figure 4 ID No.	MACTEC ID No.	Lab ID No.	Sample Date	Sample Depth (ft)	PCBs (mg/kg)
Excavation Sidewalls					
S-1 *	PCB-C/05-East	5769-001	9/15/00	5	< 1
S-2 *	PCB-C/05-South	5769-002	9/15/00	4.5	< 1
S-3 *	PCB-C/05-West	5769-003	9/15/00	6	< 1
S-4 *	PCB-Sidewall #5	5531-008	9/6/00	2	< 1
S-5 *	PCB-Sidewall #1	5531-001	9/6/00	4	2.570
S-6 *	PCB-Sidewall #2	5531-002	9/6/00	6	3.040
S-7 *	PCB-Sidewall #3	5531-005	9/6/00	6	< 1
S-8 *	PCB-Sidewall #4	5531-006	9/6/00	6	< 1
S-9 *	PCB-Sidewall 1	5013-003	8/16/00	5	0.285
S-10 *	PCB-Sidewall 2	5013-004	8/16/00	5	5.940
S-11	Results from pre-1999 excavation sampling (see CMS Rpt)			3	1.000
S-12	Results from pre-1999 excavation sampling (see CMS Rpt)			3	< 1
S-13	Results from pre-1999 excavation sampling (see CMS Rpt)			3	< 1
Excavation Bottom					
B-1	PCB-C/05-Bottom	5769-004	9/15/00	7 (clay)	0.518
B-2 *	PCB-Pondbottom #1	5531-003	9/6/00	7 (clay)	0.617
B-3 *	PCB-Pondbottom #2	5531-004	9/6/00	7 (clay)	< 1
B-4	PCB - Pond 1	5014-001	8/16/00	7 (clay)	< 1
B-5	PCB - Pond 2	5014-002	8/16/00	7 (clay)	< 1
B-6	PCB - Pond 3	5014-003	8/16/00	7 (clay)	< 1
B-7 *	Pylon Ground 1	5013-001	8/16/00	7 (clay)	1.260
B-8 *	Pylon Ground 2	5013-002	8/16/00	7 (clay)	3.030
B-9 *	Pond Bottom 1	5013-003	8/16/00	7 (clay)	< 1
Wooden Pilings					
	PCB-Pole Core 1	4977-001	8/15/00	Core shavings	< 1
	PCB-Pole Core 2	4977-002	8/15/00	Core shavings	1.310
	PCB-Pole Core 3	4977-003	8/15/00	Core shavings	2.510

Notes: Excludes interim sample results used to iteratively define the extent of contamination.
* - Sample location specified by certifying engineer based upon observed conditions (e.g., soil color, proximity to prior-removed contamination)

Former Borden Resin Facility - Bainbridge, New York
Table 5
SVE Treatment Data - Phenol Recovery Area

Date of Soil Excavation / Landfarm: Oct-00

Pre-SVE Treatment Data

Sample collection date: 04/11/01

Contractor Sample ID	Phenol (mg/kg)	Toluene (mg/kg)
S Pile 01	21.40	0.59
S Pile 02	7.18	0.55
S Pile 03	11.80	0.24
S Pile 04	6.75	< 0.1
N Pile 05	7.52	0.72
N Pile 06	6.01	0.20
N Pile 07	7.29	1.10
N Pile 08	5.11	0.97
N Pile 09	5.65	0.31
N Pile 10	2.74	0.29
Average	8.15	0.55

Batch 1 Post-treatment Data

Treatment period: 05/02 - 06/21/01
Sample collection date: 06/01/01

Contractor Sample ID	Phenol (mg/kg)	Toluene (mg/kg)
Ex-Situ 1A	11.50	0.49
Ex-Situ 1B	16.20	0.93
Ex-Situ 1C	8.47	0.97
Ex-Situ 1D	3.49	0.23
Ex-Situ 1E	12.20	0.61
Average	10.37	0.65

Batch 2 Post-treatment Data

Treatment period: 06/21 - 08/30/01
Sample collection date: 08/14/01

Contractor Sample ID	Phenol (mg/kg)	Toluene (mg/kg)
Ex-Situ 2A	3.57	< 0.002
Ex-Situ 2B	15.40	< 0.002
Ex-Situ 2C	4.83	< 0.002
Ex-Situ 2D	4.74	< 0.002
Ex-Situ 2E	3.00	< 0.002
Average	6.31	< 0.002

Clean-up Criteria:	Phenol (mg/kg)	Toluene (mg/kg)
	594	225

plus four weeks minimum treatment

Former Borden Resin Facility - Bainbridge, New York
Table 6
Verification Sample Results - Western Industrial Sewer

Sample Location	Contractor Sample I.D.	Sample Date	PCBs (mg/kg)
WIS 1	WOW	08/04/00	< 0.150
WIS 2	8-15-S W2W-E1	08/15/00	< 0.164
WIS 3	8-15-S W2W-E2	08/15/00	< 0.152
WIS 4	8-15-S W3W-E1	08/15/00	< 0.160
WIS 5	8-15-S W3W-E2	08/15/00	< 0.148
WIS 6	8-15-S W3W-E3	08/15/00	< 0.148
WIS 7	8-15-S W1W-A	08/15/00	< 0.147
WIS 8	8-15-S W1W-A-1	08/15/00	< 0.142
WIS 9	8-15-S W1W-E-1	08/15/00	< 0.147
WIS 10	8-15-S W1W-E-2	08/15/00	< 0.147
WIS 11	W1WB 810S	08/15/00	< 0.165
WIS 12	W2WA 810S	08/15/00	< 0.163
WIS 13	W2WB 810S	08/15/00	< 0.165
WIS 14	W3WA 810S	08/15/00	< 0.163
WIS 14 Duplicate	DUPLICATE	08/15/00	< 0.157
WIS 15	W4WA 809S	08/15/00	< 0.145
WIS 16	8-24-S SEWER #1	08/24/00	< 0.143
WIS 17	8-24-S SEWER #2	08/24/00	< 0.149
WIS 18	8-24-S SEWER #3	08/24/00	< 0.149
WIS 19	8-24-S SEWER #4	08/24/00	< 0.162

Former Borden Resin Facility - Bainbridge, New York
Table 7
Verification Sample Results - Eastern Sewer South of Route 7

Sample Location	Contractor Sample I.D.	Sample Date	PCBs (mg/kg)
ES 1	8-21-S ESBF-#12	8/21/00	< 0.164
ES 2	8-21-S ESBF-#11	8/21/00	< 0.176
ES 3	8-21-S ESBF-#10	8/21/00	< 0.185
ES 4	8-21-S ESBF-#9	8/21/00	< 0.176
ES 5	8-21-S ESBF-#8	8/21/00	< 0.182
ES 6	8-18-S ESBF7	8/18/00	< 0.172
ES 7	8-18-S ESBF6	8/18/00	< 0.167
ES 8	8-18-S ESBF5	8/18/00	< 0.167
ES 9	8-18-S ESBF4	8/18/00	< 0.170
ES 10	8-18-S ESBF3	8/18/00	< 0.167
ES 11	8-18-S ESBF2	8/18/00	< 0.169
ES 12	8-18-S ESBF1	8/18/00	1.55
ES 12 resample	8-24-S ESBF #1	8/24/00	0.221
ES 13	9-22-S ESBS #1	9/22/00	< 0.163
ES 14	9-22-S ESBS #2	9/22/00	0.609
ES 15	9-22-S ESBS #3	9/22/00	< 0.142
ES 16	9-22-S ESBS #4	9/22/00	0.187
ES 17	9-22-S ESBS #5	9/22/00	0.358
ES 18	9-23-S ESBS #6	9/23/00	2.580
ES 18 resample	10-3-S ESBS #6 Resample	10/3/00	1.050
ES 18 resample	10-9-S ESBC #6 Resample #2	10/9/00	< 0.074
ES 19	9-23-S ESBS #7	9/23/00	0.203
ES 20	9-23-S ESBS #8	9/23/00	0.822
RL1	RLG	8/4/00	< 0.156
P1	8-21-S BF- POND-1	8/16/00	< 0.169
P2	8-21-S BF- POND-2	8/16/00	< 0.177
P3	8-21-S BF- POND-3	8/16/00	< 0.166
P4	8-21-S BF- POND-4	8/16/00	< 0.169