

ENVIRONMENTAL INDICATORS ASSESSMENT  
and  
FINAL REMEDY NOMINATION  
*Century Brass Products, Inc. (Conveyed Parcel)*  
*Waterbury, CT*

Compiled by:  
Connecticut Department of Environmental Protection  
Waste Management Bureau  
Waste Engineering and Enforcement Division (WEED)  
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I. Introduction

The former Century Brass industrial complex, located in Waterbury, CT, was divided into two separate property parcels in 1987 to facilitate a real estate transaction. Each parcel has now been assigned a distinct RCRIS ID number; consequently, the parcels are considered distinct regulatory entities (both parcels are subject to RCRA Corrective Action requirements). These now discrete parcels are termed the "retained parcel" (ID: CTD060008307) and the "conveyed parcel" (ID: CTR000003012; Figures 1, 2). This Environmental Indicators Assessment Report pertains only to the conveyed parcel.

A. Facility Operations

The conveyed parcel, located near the center of Waterbury with frontage on I-84 (Figure 2), is an approximately 90-acre tract with almost 200 years of heavy industrial usage. The dominant industry on site from @ 1802-1989 was metal products manufacturing; former owner/operators during the sustained manufacturing period include, in chronologic order: Able Porter & Company, Scovill Manufacturing, Century Brass Products, Inc., and

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Rostra Engineered Components. The complex has been largely vacant since 1989, although a number of buildings had been leased to various light industries. The site was fully developed during its active manufacturing history, containing approximately 90 largely interconnected standing buildings with remaining open areas paved. For convenience, the conveyed parcel has been divided into three subareas, termed the East Plant, West Plant, and Mill Plant (Figure 2). All the buildings have now been demolished as part of site preparation for construction of a regional shopping mall (see below).

The largely abandoned conveyed parcel is a classic brownfields site. The site was prioritized for remediation by the Connecticut Department of Environmental Protection's (CT DEP) Urban Sites Program and the CT Department of Economic Development in 1993, when Homart Development Company initially expressed interest in construction of a regional retail shopping mall on the parcel. Remediation activities were undertaken in accordance with a Consent Order (CO SRD-052; see Appendix 1) issued by the CT DEP to Brass Center, Ltd. (site operator). CT DEP retained the services of Malcolm Pirnie, Inc., an independent environmental services contractor, to oversee on-site remediation activities and ensure adherence to the technical requirements set forth in CO SRD-052. Ownership of the property was transferred in 1996 from then site owner and operator (respectively, New Waterbury Ltd. and Brass Center, Ltd.) to General Growth Properties, Inc., who is now proceeding with construction and operation of the mall.

### B. Facility Setting

#### 1. Geology

Bedrock is a fine to medium grained gneiss designated as the Waterbury Formation; the surface of bedrock ranges from approximately 12 to 35 ft below grade beneath the site. The bedrock is overlain by, in ascending stratigraphic sequence: (1) a discontinuous till unit (ranging from 0 to >14.3 ft thick), (2) stratified sands and gravels interpreted as glaciofluvial outwash deposits (ranging from approximately 3.5 to  $\geq$  71 ft thick), containing minor glaciolacustrine silt lenses, (3) discontinuous alluvial silts and sands (ranging from approximately 3 to 11.5 ft thick), and (4) introduced fill, comprising silty sand with minor amounts of gravel, bricks, and concrete (ranging from 0 to approximately 15 ft thick).

## 2. Hydrogeology

Depth to the top of ground water ranges from grade surface at the Mad River to approximately 15 ft below grade in the unconsolidated strata and bedrock beneath the site. There appear to be no confining layers of site-wide extent to segregate ground water flow in the unconsolidated strata from that in the underlying bedrock, although intermittent presence of till over the bedrock may locally impede vertical flow. Site ground water flows toward and discharges to the Mad River (Figure 3).

Ground water beneath the site and surrounding areas has been classified as GB by the CT DEP, indicating that it has been degraded by historic urban/industrial activities and is presumed unsuitable for human consumption without treatment. Public water supply service is available in all areas classified as GB in CT.

## 3. Surface Water

The conveyed parcel is situated in the valley floor of the Mad River, which flows through the site from southeast (inlet elevation approx. 320 ft asl) to northwest (outlet elevation approx. 285 ft asl), roughly parallel to the long axis of the parcel (Figures 2, 3). The river is channelized or directed through culverts along much of its course through the site, and has been dammed in the eastern part of the parcel to form "John D's Pond." The site's surface storm water drainage system and site ground water discharge directly to the Mad River.

The surface waters of the Mad River within Waterbury are designated as Class B by the CT DEP, indicating that they should be suitable for recreational use, as fish and wildlife habitat, for agricultural and industrial supply, and other legitimate uses including navigation. Despite its Class B designation, an ecological risk assessment focussing on the Mad River section passing through and immediately upstream and downstream of the conveyed parcel has concluded that this reach is markedly degraded (Fugro East, Inc., 1994). The aquatic communities at all sampled locations within, and proximally upstream and downstream of the site are severely impoverished in both relative numbers of species and numbers of conspecific individuals. However, impacts on the aquatic ecosystems cannot be unequivocally attributed to on-site sources, because the on-site and proximal upstream sampled locations are comparably degraded.

#### 4. Potential Receptors

The following discussion regarding potential receptors is conservative in that it assumes a "no action" remedial scenario; however, it should be noted that remedial activities at the site have been implemented in order to achieve applicable risk-based performance standards as set forth in the Connecticut Remediation Standard Regulations (=RSRs; RCSA, 1996).

The identification of groups of potential receptors, both human and ecologic, reflects consideration of the impacted media, exposure pathways and land use (present and future). Major groups of potential receptors include: (1) workers involved in site demolition, remediation, and construction activities, (2) workers and/or occupants on adjoining properties during site preparation activities, (3) mall workers and shoppers, (4) recreational users of the Mad River, and (5) biota of the Mad River.

Given the local industrial/commercial setting and planned future use of the conveyed parcel as a regional shopping mall, a non-residential (ie., industrial) exposure scenario for all human potential receptors is most plausible. Workers involved with site demolition, remediation, and construction activities would potentially be subject to direct exposures via dermal contact, ingestion, and inhalation of all contaminated media, especially soils. Off-site human receptors on adjoining properties may be exposed via inhalation of dust generated during these site preparation activities. It is noted that on-site remediation activities have been completed; remaining activities comprise construction of mall building structures. Construction is scheduled to be completed in late 1997.

Following completion of soil remediation and mall construction activities, the direct exposure pathways of dermal contact with soils, soil ingestion, and dust inhalation will be eliminated. However, indoor mall workers and shoppers may potentially be subject to inhalation of gases generated by volatilization of residual VOCs in sub-slab soils and from VOC-contaminated ground water. A soil vapor survey completed in areas beneath the footprint of proposed mall structures indicated that VOC concentrations in media below the proposed structures either met the applicable standards, including the volatilization criteria specified in the RSRs (Haley & Aldrich, 1994b; RCSA, 1996), or were scheduled for remediation to meet those standards (small area beneath former building 140; Haley & Aldrich, 1994b).

Ingestion of contaminated ground water is not a probable

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exposure pathway, because the parcel is located in a non-residential, GB ground water area (see Hydrogeology above) in which the ground water is not considered suitable for consumption without treatment; a public water supply is available.

Human recreational users and the biota of the Mad River could potentially be exposed to contaminants via dermal contact and ingestion of surface waters (and contaminated site ground water which discharges to the Mad River; see Hydrogeology above).

## II. Site Assessment

Known manufacturing-related wastes generated on-site include: metal pickling, plating, and tumbling wastes, wastewater containing heavy metals from metal finishing operations, metal hydroxide sludge generated by industrial wastewater treatment plant, spent chlorinated degreasing solvents, flammable wastes, dust from foundry and metal casting operations, cyanide salts, waste cutting and lubricating oils, PCB-containing dielectric and hydraulic oils, boiler feed water treatment compounds, and laboratory reagents. In addition, asbestos-based insulation and lead-based paint were identified as constituents of concern associated with various buildings.

During the course of site investigations, AOCs were grouped into clusters within relatively discrete areas, each area generally characterized by a particular history of operation. These areas were identified as: CL (chemical laboratory) area, CS (casting shop) area, EP (east powerhouse) area, IW (industrial wastewater treatment plant) area, OD (ordinance department) area, OR (oil reclamation) area, PL (plating) area, RM (rolling mill) area, RO (Rostra) area, WH (warehouse) area. A RFA performed by CDM (1992) identified 49 Areas of Concern (AOCs) on the conveyed parcel (Section 1 of Appendix 2). Beginning prior to, and continuing after the CDM RFA (1992), Haley & Aldrich performed a phased series of extensive site investigations ( H & A, 1988, 1989a, 1989b, 1989c, 1993a, 1993b, 1993c, 1994a, 1994b, 1994c, 1995; TRC, 1993) to refine the identification of areas of concern, and to further generally characterize site soil, ground water, sediment, surface water, and structural materials. The investigations included literature reviews, file reviews of various sources, oral interviews, field instrumentation screening (incl. PID, XRD), visual surveys, chip sampling, soil borings, soil vapor survey, monitoring well installation, sediment sampling, and surface water sampling.

The identification of AOCs in which contaminant releases

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occurred to such a degree that implementation of corrective measures would be required (Section 2 of Appendix 2; Haley & Aldrich, 1994c, 1994d, 1995, 1996b, 1996c) was based on comparison of observed contaminant concentrations to risk-based standards as set forth in the Connecticut Remediation Standard Regulations (RSR; RCSA, 1996). The RSR standards thus assumed a dual role, serving as: (1) action levels used to identify AOCs requiring remediation, and (2) performance standards which remediation of the AOCs must meet. The locations of samples in which risk-based standards were exceeded, thereby triggering corrective action, are illustrated in Appendices 3 (sitewide maps) and 4 (AOC maps).

The RSRs were in draft form during much of the site investigation; however, standards applied to the site were continuously adjusted to reflect changes in the draft RSRs as they evolved through the time of their final adoption (RCSA, 1996). Consequently, the performance standards implemented at the site are fully consistent with the final version of the RSRs (RCSA, 1996).

Remediation standards applied to the site are as follow:

- (1) soils: background, or: the more stringent of residential direct exposure criteria and industrial pollutant mobility criteria (PMC; industrial PMC values applicable to soils overlying ground water classified as GB; RCSA, 1996);
- (2) ground water: background, or: surface water protection criteria for ground waters discharging to surface waters (RCSA, 1996; drinking water standards not directly applicable to ground water beneath site, because the site is in a GB area, in which ground water is already presumed degraded and unsuitable for direct consumption);
- (3) surface water: background, or: surface water quality criteria (CT DEP, 1996);
- (4) sediments: standards applicable to sediment were either:
  - (a) designated by CT DEP (PCB and TPH), (b) derived from a consideration of numeric water quality criteria (aquatic biota) and standard partitioning equations supplied in US EPA guidance documents (metals and PAH), or (c) derived from a comparison of sediment leachate data to respective water quality criteria (aquatic biota; metals and PAH) (Haley & Aldrich, 1994b).

Flow charts depicting the remedial standards and remedial action decision-making process are presented in Appendix 5. Specifications for handling of contaminated materials in AOCs requiring remediation are presented in Haley & Aldrich (1993d, 1993e, 1993f, 1993g, 1993h, 1993i).

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In addition to the AOCs identified as requiring corrective measures (as described above), a RCRA Regulated Unit comprising a container storage area located in former Building 109 was subject to RCRA closure (Haley & Aldrich, 1996d, 1996e). A certification of clean closure of the unit (Haley & Aldrich, 1996e) was approved by CT DEP on 24 May 1996 (correspondence from D. Nash, CT DEP; to Brass Center Ltd).

### III. Corrective Measures

#### A. Corrective Measures Implemented

Implementation of corrective measures at the specified AOCs has been documented in a series of "Field Reports" (Fusco/Langan 1995a-m, 1996a-e; Haley & Aldrich, 1995a, 1995b). CT DEP has issued a written approval (dated 30 May 1996; Appendix 6) of a certification letter submitted by Brass Center, Ltd. (dated 30 May 1996; Appendix 6), which documents that all approved remedial actions have been completed in accordance with Step B.1.e of Consent Order No. SRD-052 (Appendix 1).

The remediation standards applied to the conveyed parcel are (1) risk-based, (2) promulgated as state regulation (RCSA, 1996), and (3) stipulated to be applicable to the site as per documents cited in Consent Order SRD-052 (Appendix 1). Consequently, in acknowledgment of completion of the specified remedial activities and achievement of the pertinent remediation standards as noted above, the CT DEP considers that no further remedial action is warranted. In accordance with the US EPA Memorandum titled "Coordination between RCRA Corrective Action and Closure and CERCLA Site Activities" (US EPA, 1996), the completed remedial actions and risk-based remediation standards (= media protection standards) as specified above should be considered equivalent to a Final Remedy under the RCRA Corrective Action program.

In addition to the certification of completion of remedial activities, a long term environmental monitoring program focussing on surface water (Mad River) and ground water has been established to confirm the continued effectiveness of the corrective measures as implemented (Haley & Aldrich, 1994b, 1996a). A statement of final compliance with Consent Order No. SRD-052 will not be approved by CT DEP until the long-term environmental compliance monitoring period has expired, and that said monitoring has shown no evidence of adverse impacts attributed to contaminant releases from the site.

Century Brass Conveyed Parcel

B. Corrective Measures Documented (RCRIS Data Entry)

Completion of site-wide corrective measures has not been documented by data entry in RCRIS (see section IV.A below).

IV. Environmental Indicators

A. Human Exposures Controlled Determination (CA 725)

Based upon guidance specified in the July 24, 1994 U.S. EPA "RCRIS Corrective Action Environmental Indicator Event Codes" memorandum (US EPA, 1994), one or both of the following two criteria must be met for a "YE" determination. These are:

1.) Remedial measures have been implemented with the result that all maximum contaminant concentrations detected or reasonably suspected are less than or equal to their respective action levels (e.g., MCLs for groundwater, a  $10^6$  risk level for other contaminants, or any other number designated as the action level) or do not exceed an Agency specified cleanup standard for the facility (US EPA, 1994).

OR

2.) There is no unacceptable human exposure to any contaminant concentration above action levels that has been detected or is reasonably suspected based on current contaminant concentrations and current site conditions. Although contamination remains at the facility that may require further remediation, action has been taken or site conditions are otherwise such that unacceptable threats to human health from actual exposure to the contamination are not plausible based on current uses of the site. Such actions may include the use of physical barriers or institutional controls (e.g., deed restrictions or alternative water supply) (US EPA, 1994).

Risk-based, State-specified media protection standards have been achieved for all media at all recognized AOCs on-site, as documented above (Section II.B.1). Consequently, both of the above criteria have been met. It is recommended that the status code "YE" be entered for the CA 725 Event Code, reflecting the determination that human exposures have been controlled.

B. Ground Water Releases Controlled Determination (CA 750)

Based upon the guidance memorandum cited in section A above

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(US EPA, 1994), one or both of the following two criteria must be met for a "YE" determination. These are:

For all known or reasonably suspected groundwater contamination at the facility in excess of action levels, or in excess of an Agency specified clean-up level:

1.) An engineered system has been installed that is designed and operating (including performance monitoring) to effectively control further migration beyond a designated boundary such as the engineered system, the facility boundary, a line up gradient of receptors, or the leading edge of the plume as defined by the levels above the Agency established action levels or clean-up standards.

OR

2.) The Agency has determined that the groundwater clean-up objectives can be met without the use of an engineered system through the remedial measures selected including facilities where the contamination will naturally attenuate.

Risk-based, State-specified media protection standards have been achieved for all media at all recognized AOCs on-site, as documented above (Section II.B.1). Consequently, both of the above criteria have been met. It is recommended that the status code "YE" be entered for the CA 750 Event Code, reflecting the determination that groundwater releases have been controlled.

## V. Recommended Actions

It is recommended that the status code "YE" be entered in each of the RCRIS Corrective Action Environmental Indicator Event Codes, CA 725 and CA 750, as noted above (Sections III.A and III.B). Furthermore, it is recommended that, in accordance with US EPA's "Coordination" memorandum (US EPA, 1996), the demonstrated achievement of risk-based, State-specified media protection criteria (RCSA, 1996) at the Century Brass Products, Inc. Conveyed Parcel site be considered equivalent to a Final Remedy under the RCRA Corrective Action program.

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- Appendix 4: Soil Exceedance Maps: AOCs
- Appendix 5: Remedial Standards and Remedial Action Flow Diagrams
- Appendix 6: CT DEP Approval of Remediation Performed in Accordance with CO SRD-052

## FIGURES

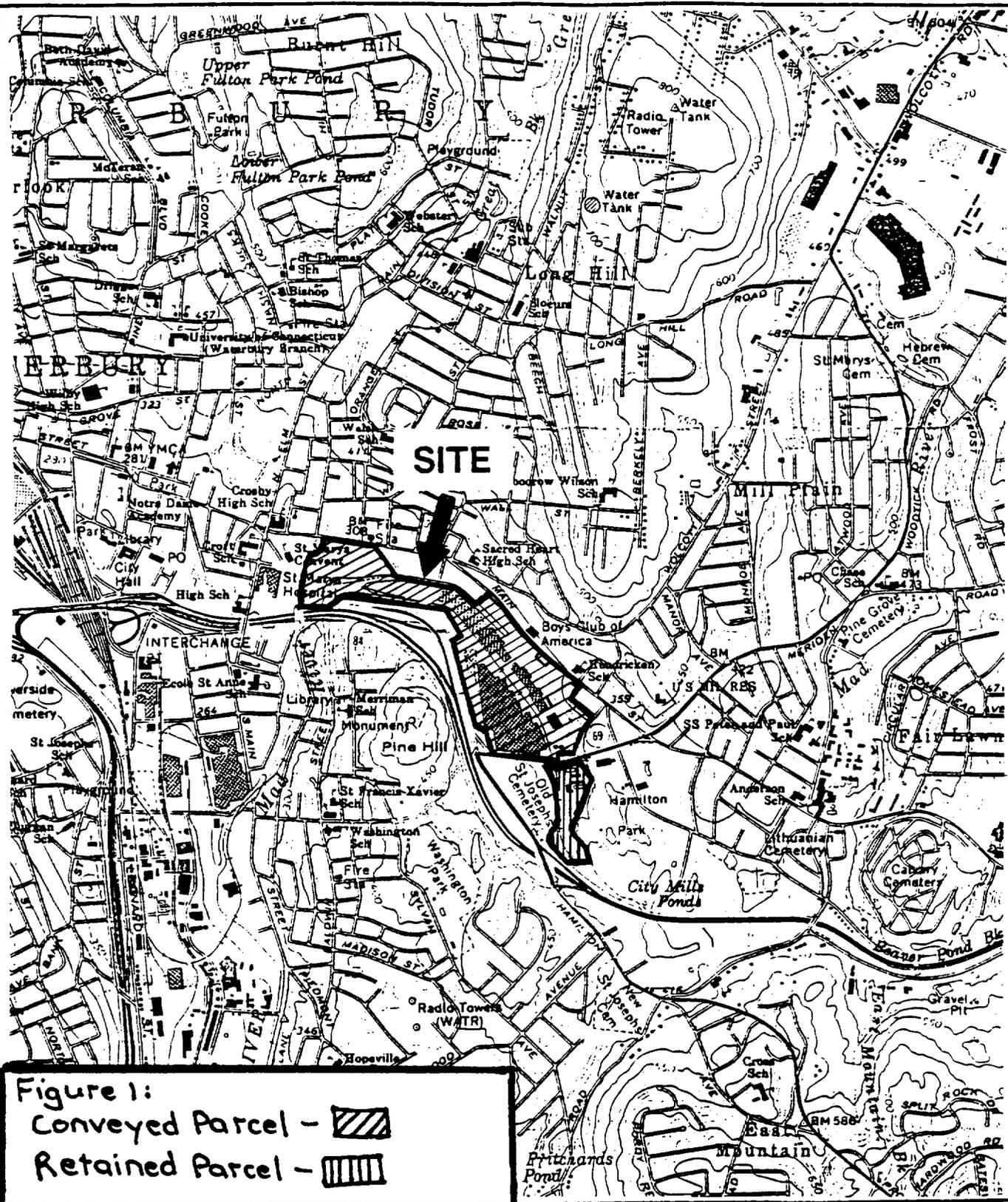
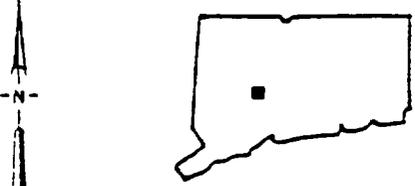


Figure 1:  
 Conveyed Parcel -   
 Retained Parcel - 

SITE COORDINATES: 41°32'49"N 73°01'40"E



U.S.G.S. QUADRANGLE: WATERBURY, CT



Haley & Aldrich, Inc.  
 Consulting Geotechnical Engineers, Geologists and Hydrogeologists

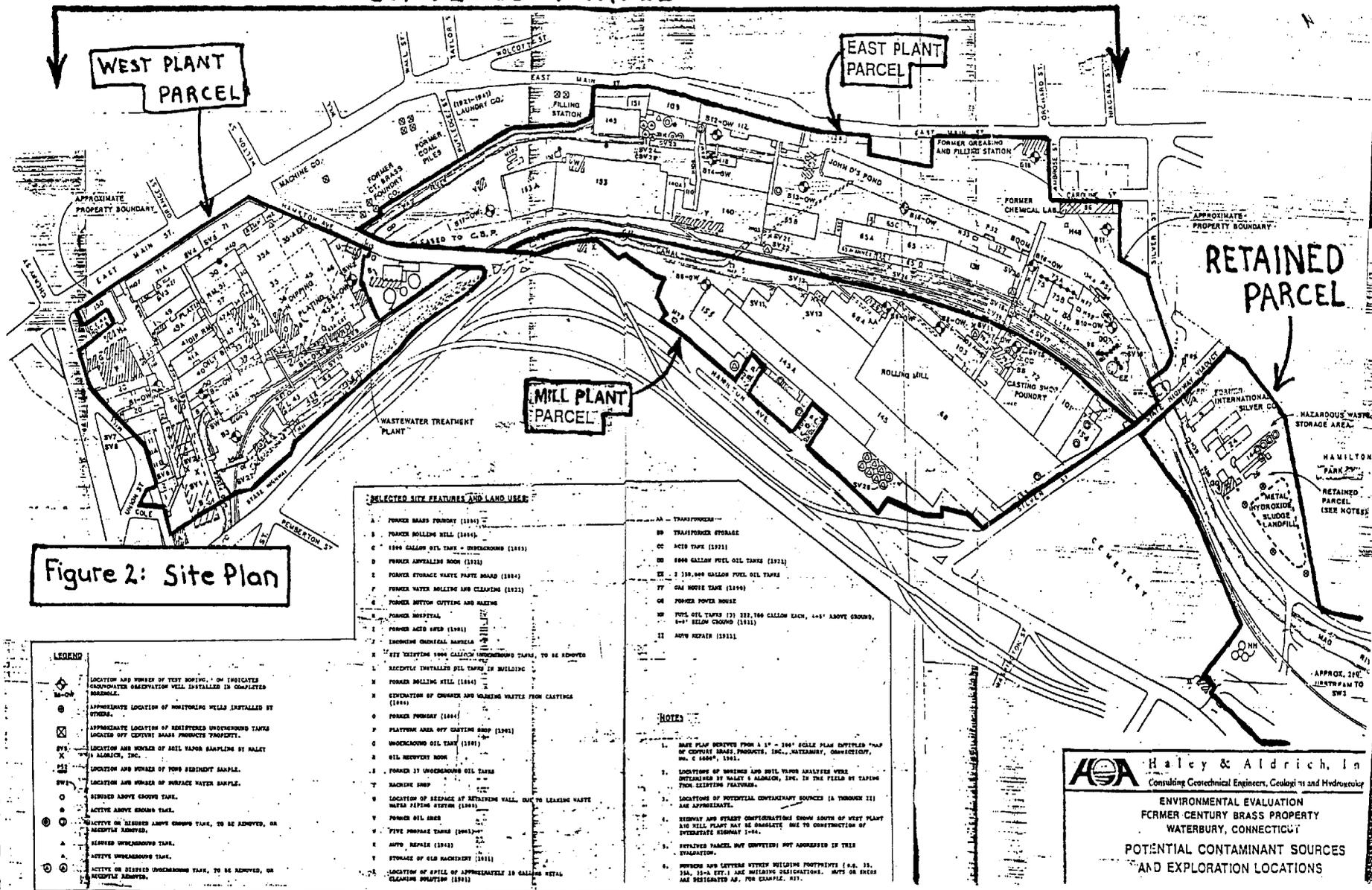
ENVIRONMENTAL SITE ASSESSMENT UPDATE  
 NEW WATERBURY PROPERTY  
 WATERBURY, CONNECTICUT  
 PROJECT LOCUS

APPROX. SCALE 1:24,000

FEBRUARY 1993

FILE NO. 90668-40

# CONVEYED PARCEL



**Haley & Aldrich, Inc.**  
 Consulting Geotechnical Engineers, Geologists and Hydrologists

**ENVIRONMENTAL EVALUATION  
 FORMER CENTURY BRASS PROPERTY  
 WATERBURY, CONNECTICUT**

**POTENTIAL CONTAMINANT SOURCES  
 AND EXPLORATION LOCATIONS**

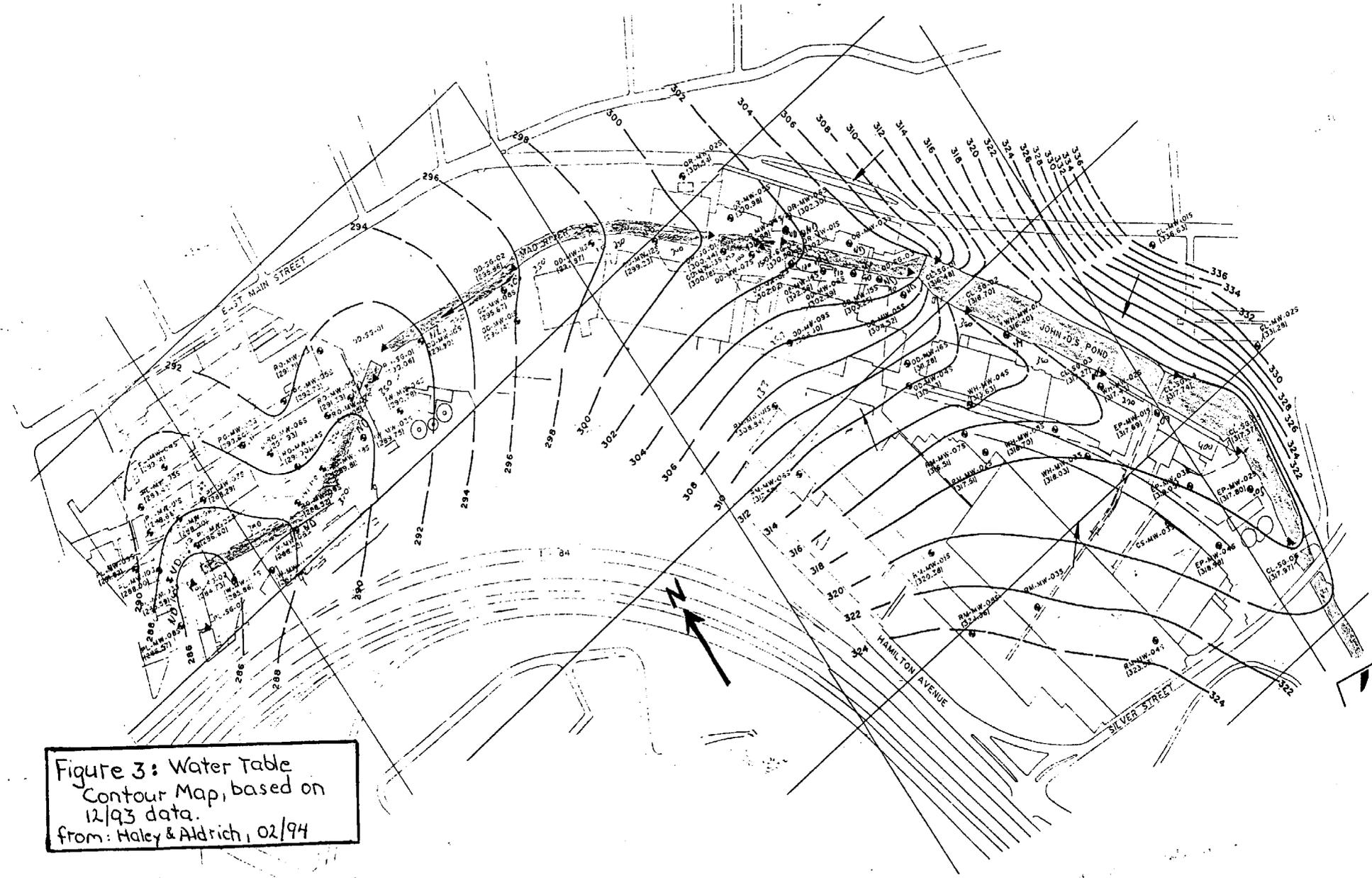


Figure 3: Water Table  
 Contour Map, based on  
 12/93 data.  
 from: Maley & Aldrich, 02/94