FINAL SITE INSPECTION PRIORITIZATION REPORT
FOR
JOHN J. RILEY
WOBURN, MASSACHUSETTS

Prepared For:
U.S. Environmental Protection Agency
Region I
Office of Site Remediation and Restoration
John F. Kennedy Federal Building
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Final Site Inspection Prioritization Report
John J. Riley Co.
Woburn, Massachusetts

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INTRODUCTION

The Roy F. Weston, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START) was requested by the U.S. Environmental Protection Agency (EPA Region I), Office of Site Remediation and Restoration to perform a Site Inspection Prioritization (SIP) of the John J. Riley Co. (Riley Co.) property at 228 Salem Street in Woburn, Massachusetts. Tasks were conducted in accordance with the SIP scope of work and technical specifications provided by EPA Region I. On the basis of the information provided in the Preliminary Assessment (PA) Report and Site Inspection (SI) Report prepared by Ecology & Environment (E&E) under contract to EPA, the Riley Co. SIP was initiated.

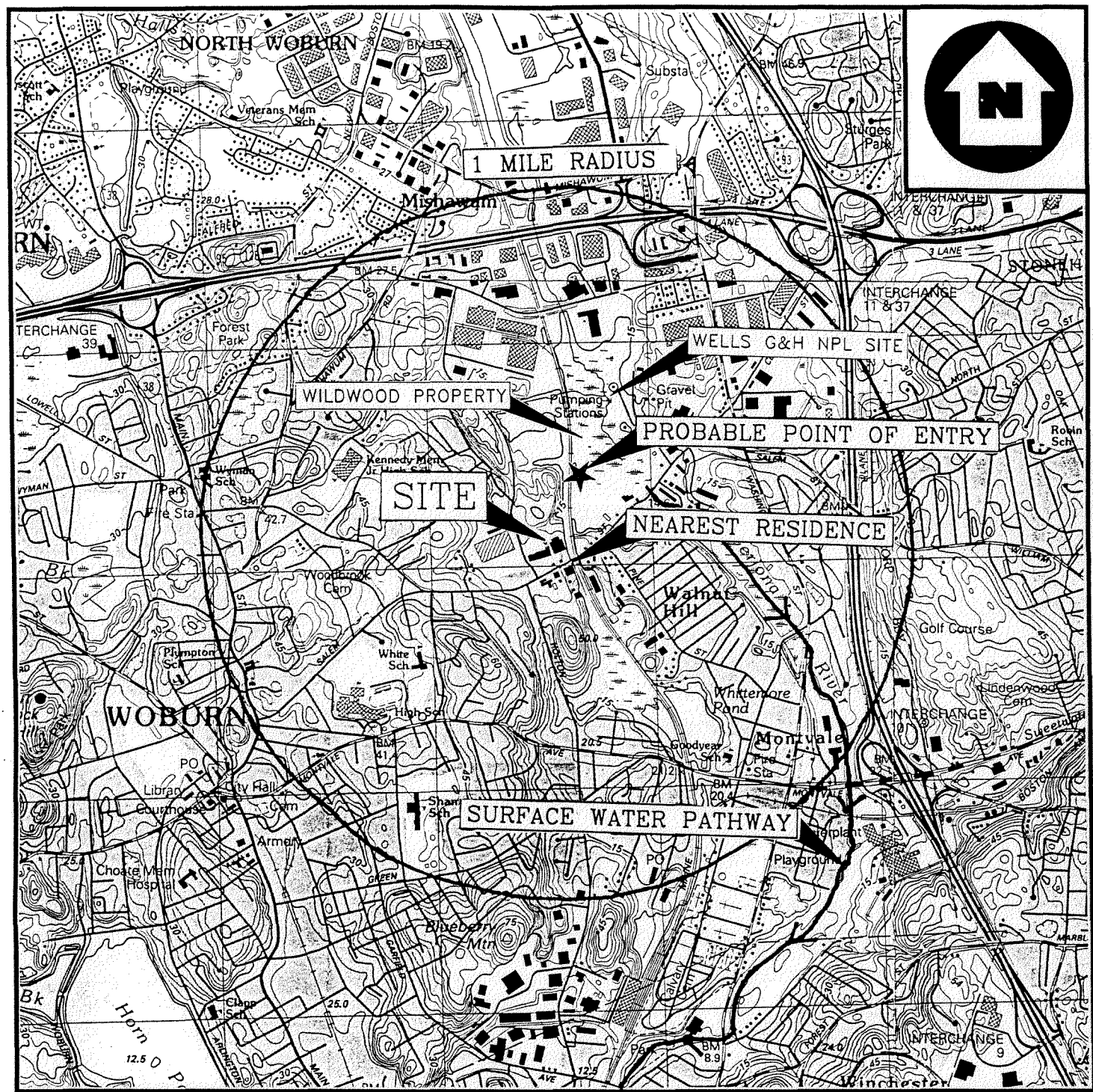
Background information used in the generation of this report was obtained through file searches conducted at the EPA Region I and Massachusetts Department of Environmental Protection (MA DEP), telephone interviews with town officials, conversations with persons knowledgeable of the Riley Co. property, and conversations with other Federal, State, and local agencies.

This package follows the guidelines developed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, commonly referred to as Superfund. However, these documents do not necessarily fulfill the requirements of other EPA Region I regulations such as those under the Resource Conservation and Recovery Act (RCRA) or other Federal, State, or local regulations. SIPs are intended to provide a preliminary screening of sites to facilitate EPA Region I's assignment of site priorities. They are limited efforts and are not intended to supersede more detailed investigations.

SITE DESCRIPTION

The Riley Co. property is located at 228 Salem Street in Woburn, Middlesex County, Massachusetts. According to the 1977 Woburn Assessor's tax maps, the property occupies Block 16004, Lot No. 37 and Block 16004, Lot No. 96. The property is located at latitude 42° 29' 26.1" North and longitude 71° 7' 37.6" West. The property comprises 15.8 acres and is located approximately 2,500 feet (ft) west of the Aberjona River, 3,350 ft northeast of Woburn High School, and 2,700 ft northwest of Whittemore Pond (Figure 1). The property is bordered by greenhouses to the west, residences to the south, Boston & Maine (B&M) Railroad tracks to the east, and the properties occupied by BASF and Toxikon Laboratories to the north [3, p. 2; 43].

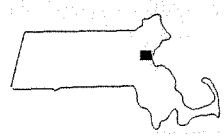
A wooded area, formerly owned by the Riley Co., is located across the B&M Railroad tracks, northeast of the Riley Co. This area is currently owned by the Wildwood Conservation Trust. An industrial supply production well (PW-02), which was formerly utilized for operations at Riley Co., exists in this area (Figure 2) [3, pp. 3-4]. The Wildwood Conservation parcel is also referred to as the Wildwood property. In addition, two of the City of Woburn's public drinking water supply



BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15' U.S.G.S. QUADRANGLE(S):
BOSTON NORTH, MASS 1985; READING, MASS 1987.

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET



QUADRANGLE LOCATION

LOCATION MAP

JOHN J. RILEY CO.

228 SALEM STREET

WOBURN, MASSACHUSETTS

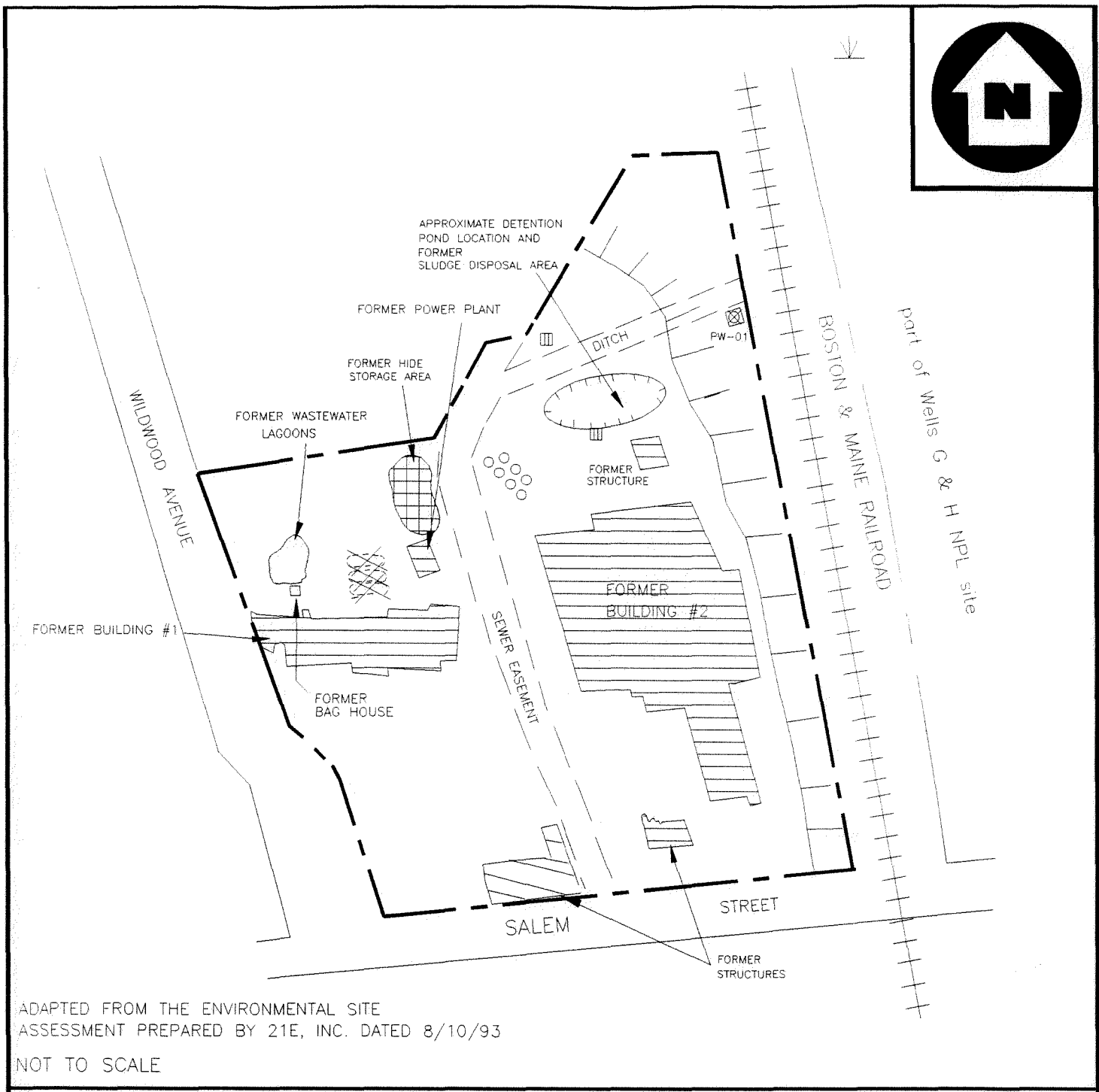
HWRE

Civil•Environmental•Hydrologic•Structural•Environmental•Hazardous Waste Engineering

REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TDD #	DRAWN BY:	DATE
98-05-0151	G. SOUZA	9/24/98

FILE NAME:	
HW-156\LOCATION	FIGURE 1



SITE SKETCH – FORMER TANNERY

JOHN J. RILEY CO.
228 SALEM STREET
WOBURN, MASSACHUSETTS

HWRE
Civil•Environmental•Hydrologic•Structural•Hazardous Waste Engineering•Surveying
REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TDD #	DRAWN BY:	DATE
98-05-0151	P.H.S.	9/29/97

FILE NAME:	
HW-156/SITESKCH	FIGURE 2

wells, designated Wells G and H, are located approximately 2,000 ft northeast of the property. The Wildwood property is currently being remediated as a part of the Superfund Wells G & H National Priority List (NPL) site cleanup. At the direction of EPA Region I, the Wildwood property is not discussed as part of the Riley Co. SIP [43, p. 4].

On 18 September 1997, START personnel conducted an on-site reconnaissance of the Riley Co. property. During their visit, START personnel observed that three of the lots on the property had newly constructed buildings with paved parking lots. Due to the new construction, no evidence of the former tannery structures was visible on these lots. The subdivided lot Block No. 16004 Lot No. 12 remained as an undeveloped property [43, p. 2].

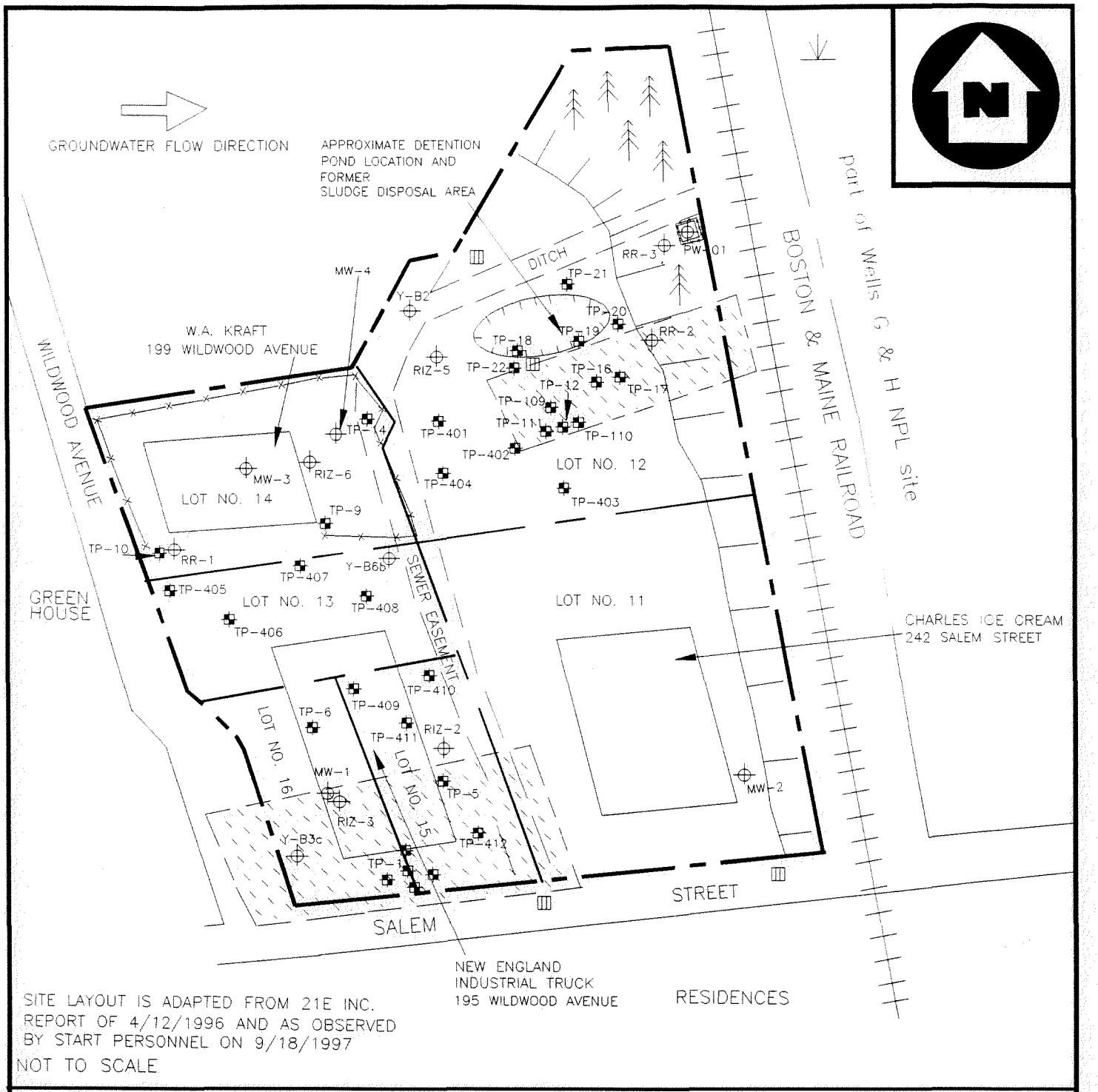
On Block No. 16004, Lot No. 12, START personnel did not observe any visible signs of contamination associated with the tannery. A detention pond (shown on Figure 3) was located on the northwest portion of the property and was empty and overgrown with trees and shrubs. However, START did not obtain any information in the available files on the past use of this detention pond. Construction debris, presumably associated with the Riley tannery, was noted in several locations on this lot. START personnel also observed and located one of the two catchbasins shown on Figure 3 and the production well house (PW-01) associated with the former tannery. The condition of the well house could not be determined as the area was inaccessible on a steep downward slope and was fenced. Furthermore, START personnel located two monitoring wells on the property. One of the monitoring wells was locked and appeared to be in good condition. The other well was not locked and its condition is unknown [43, p. 2-5].

START personnel located the ditch on the northwestern portion of the property shown on the site sketch prepared by 21E, Inc. in their 1990 and 1993 Environmental Site Assessment (ESA) Report. The ditch was partially filled with debris and was not flowing at the time of the on-site reconnaissance [43, p. 3]. START personnel observed five 55-gallon drums (containing toluene, xylene, benzene, motor oil, and Zep 11263, respectively) in the drum storage area of W.A. Kraft at 199 Wildwood Avenue. Zep 11263 contains sodium hydroxide, sodium carbonate, and sodium alkyl napthalene sulfonate. The drums were located on a concrete floor with no floor drains. There was no evidence of leaks or spills in the area [43, p. 4].

OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS

The Riley Co., owned by Mr. John J. Riley, operated as a tannery on the property for approximately 74 years from 1915 until 1989. From December 1978 to January 1982, the company continued operations on site but was owned by Beatrice Foods, Inc. Mr. Riley, the president of the tanning company, reacquired the business from Beatrice Foods, Inc. in 1983. Tannery operations continued until 1989 at which time all the equipment was removed and operations ceased. In June 1994, the Maggiore Companies (property developers), subdivided the property into six lots and labeled them as Lot Nos. 11 through 16 (Figure 3) [1, p. 3-2; 3, p. 3; 5, p. 3; 15].

In August 1994, Charles Ice Cream Inc. purchased and developed Lot No. 11 and started their operations at 242 Salem Street. In October 1994, W.A. Kraft Corporation purchased and developed Lot No. 14 and started their operations at 199 Wildwood Avenue. New England Industrial Truck located on Lot Nos. 13, 15, and 16 at 195 Wildwood Avenue started their operations in 1997. Lot



LEGEND

MONITORING WELL
FENCE
CATCHBASIN
TEST PIT
SUBDIVIDED LOT LINES
CONTAMINATED SOIL AREA
PROPERTY BOUNDARY
PRODUCTION WELLS
TREES/WOODED
WETLANDS

SITE SKETCH – CURRENT CONDITIONS

JOHN J. RILEY CO.
228 SALEM STREET
WOBURN, MASSACHUSETTS

HWRE
Civil•Environmental•Hydrologic•Structural•Hazardous Waste Engineering•Surveying
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FIGURE 3

No. 12, west of 242 Salem Street, is not developed and does not have a postal address. This lot is owned by Wedel Corporation, Seabrook, New Hampshire which is owned by Mr. John J. Riley (Figure 3) [15; 43, p. 2]. Table 1 indicates the current owners for each of the lots and current operations on the property.

Table 1

Current Ownership Information for the John J. Riley Co.

Parcel	Company Name & Contact	Comments
Block No. 16004, Lot Nos. 13, 15, 16 195 Wildwood Avenue Woburn, MA 01801	New England Industrial Truck Mr. Mark Krueger (781) 935-9105	Commercial facility for distribution of fork-lift equipment. Redeveloped since use by Riley Co. (1997)
Block No. 16004, Lot No. 14 199 Wildwood Avenue Woburn, MA 01801	W.A. Kraft Corporation Mr. James Ritchie Tel: (781) 938-9100	Commercial facility for distribution of electrical generators. Redeveloped since use by Riley Co. (October 1994)
Block No. 16004, Lot No. 11 242 Salem Street Woburn, MA 01801	Charles Ice Cream Inc. Mr. Charles Rotondo Tel: (781) 935-6611	Commercial facility for manufacture of ice cream products. Redeveloped since use by Riley Co. (August 1994)
Block No. 16004, Lot No. 12 Woburn, MA 01801	Vacant Lot Wedel Corporation Mr. John J. Riley Tel: (603) 474-3969	Occupied by a detention basin and drainage swale. Not redeveloped since use by Riley Co.
Block No. 16005, Lot No. 42 Wildwood Conservation	Wildwood Conservation Trust Contact: EPA Region I Ms. Mary E. Garren Remedial Project Manager Tel: (617) 573-9613	Site access was not granted to EPA Region I. This property is being remediated as part of the Wells G & H NPL site cleanup and is no longer considered part of the Riley Co. property.

[14; 15]

The Riley Co., while in business, operated two production wells, PW-01 (located on the northeast portion of the property) and PW-02 (Figure 2). The production wells and Wells G and H were found by MA DEQE to be contaminated with volatile organic compounds (VOCs) in 1979. Wells G and H were subsequently listed on the EPA Superfund NPL as the Wells G & H site. Several environmental investigations have been performed on the Riley Co. and other industrial facilities located to the south and east of the property. In 1987, the Riley Co. was listed with the MA DEQE as a Location to be Investigated (LTBI) due to the contamination in the production wells and trace contamination discovered in soil borings on the property. However, the investigations concluded that the Riley Co. was not a probable source of the contamination detected in the four wells [4, p. 9].

According to MA DEP, the tanning operations on the property included primarily the "chrome" tanning of hides into shoe leather. The facility was considered by MA DEP as a medium-sized operation. The facility reportedly used hexavalent chromium as a raw material in the "chrome" tanning process. However, prior to the introduction into the tanning process, hexavalent chromium was converted to trivalent chromium [2; 3].

According to the Final ESA Report completed in 1993 by 21E, Inc., the following hazardous chemicals were also formerly used on the property: benzidene-based dyes, phenolic-based detergents for soaking hides, ortho-dichlorobenzene for disinfecting, butyl acetate as a solvent for cleaning lacquers and finishing products, and 1,1,1-trichloroethane (1,1,1-TCA) for cleaning an embossing plate prior to 1979. Several other substances, including butoxyethanol, diisobutyl ketone, methoxyethanol, and other VOCs were also used as solvents for cleaning lacquers and finishing products. A former power plant located on the property was fired by fuel oil [3, p. 4].

The tanning process utilized at the Riley Co. produced several waste products. Waste sludge was reportedly collected in two lagoons (former) located in the southwest portion of the property. The solids in the lagoon and downstream catchbasins were dredged periodically and disposed of in the former sludge disposal area on the property. However, extraction procedure (EP) toxicity tests for samples collected from the former sludge disposal area indicated that the levels of metals, including hexavalent chromium and total chromium, were within State-acceptable limits [3, p. 4]. Buffing dust, which primarily is composed of leather particles, was also produced during the tanning process and disposed of in the former lagoon on the property. EPA and the MA DEP did not consider buffing dust a hazardous material. In 1991, Mr. Riley indicated that the buffing dust had been removed from the property and shipped off-site; however, START personnel were unable to obtain any records documenting the removal [3].

Between November 1980 and March 1981, E&E, under contract to EPA, conducted a PA and a SI on the property. Groundwater samples were collected from production wells PW-01 and PW-02. The results revealed VOCs in samples from both wells. The source of the well contamination was not determined by E&E [3, p. 5]. START personnel could not obtain any other information from available files.

In 1983, Yankee Environmental Engineering and Research Services, Inc. (YE^2ARS) conducted subsurface investigations on the property and excavated nine test pits on the 15.8-acre Riley Co. property. Six overburden monitoring wells were installed on the property (Y-B1 through Y-B6). Groundwater samples were collected and analyzed for chlorinated VOCs by EPA Method 601. YE^2ARS noted that there was a substantial decrease in the concentrations of VOCs in PW-01 compared to those reported in the 1980/1981 E&E Investigations. The YE^2ARS report also concluded that the Riley Co. tannery was not a probable source of the contamination documented in PW-02 and Woburn Wells G and H [3, p. 5].

In November 1989, the Woburn Fire Department witnessed the removal of three underground storage tanks (USTs) from the property by Clean Harbors, Inc. Two of these tanks were used for the storage of No. 6 fuel oil and the third for No. 2 fuel oil. Each of these tanks had a capacity of 15,000 gallons and was reportedly installed in 1981. Reportedly, no evidence of a release from these tanks was observed. One soil sample was collected from the tank bed and contained 110 parts per million

(ppm) total petroleum hydrocarbons (TPHs), which is below the Massachusetts Contingency Plan (MCP) action level of 500 ppm [4, p. 12-13; 3, p. 6].

In 1990, 21E, Inc. conducted an ESA of the Riley Co. property. During the ESA, it was noted that the wells installed by YE^{2}ARS were no longer on the property. However, 21E, Inc. did note that three additional wells were located on the property. Mr. Riley informed 21E, Inc. that these wells, designated RR-1 through RR-3, were installed under authorization of Beatrice Foods, Inc. through instruction by their legal counsel, Hale & Dorr. These wells were reportedly installed in July 1989 by Geraghty & Miller, Inc. [2, p. 5; 3, p. 6]. No other information was available regarding these wells.

In May 1990, 21E, Inc. installed four additional monitoring wells, designated MW-1 through MW-4, on the property. Soil samples from the four new soil borings, and seven groundwater samples from both existing (RR-1 through RR-3) and new wells were collected by 21E, Inc. The soil and groundwater samples were analyzed for RCRA-8 metals, VOCs, TPHs, semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs) [2; 3, pp. 6-7]. No VOCS, TPHs, SVOCs, or pesticides/PCBs were detected in any of the groundwater or soil samples. Metals were detected but not above the MA DEP Drinking Water Standards. Analytical results of groundwater and soil samples are discussed in detail in the Groundwater Pathway and Soil Exposure Pathway sections of this evaluation.

On 16 April 1993, 21E, Inc. conducted another ESA of the property. A dark, tar-like substance appeared to be advancing through the cracks in the pavement in the north central portion of the property. The advancement of the substance was attributed by 21E, Inc. to heavy rains and melting snow conditions, since the material was only observed on the visits during heavy rain periods. It was the opinion of 21E, Inc. personnel that the material was asphaltic in nature [3, p. 8].

In 1993, 21E, Inc. collected groundwater samples from the seven existing monitoring wells and analyzed the samples for VOCs, TPHs, RCRA-8 metals, and SVOCs [3, pp. 19-22]. No samples were collected from a well upgradient of the property to establish background concentrations. No VOCS, TPHs, SVOCs, or pesticides/PCBs were detected in any of the groundwater samples. Metals including arsenic, chromium, and lead were detected in sample from monitoring well MW-4. Analytical results of groundwater samples are discussed in detail in the Groundwater Pathway section of this evaluation.

Based on the sampling results, 21E, Inc. reported that there was no evidence of a release of oil or hazardous materials to the groundwater from the property located at 228 Salem Street in Woburn, Massachusetts (Riley Co. property). In addition, based on the data from this investigation and previous investigations, 21E, Inc. concluded that tannery operations at the property have not adversely affected the environmental integrity of the property [3, p. 25].

On 7 March 1994, 21E, Inc. submitted a Licensed Site Professional (LSP) Evaluation Opinion Statement (EOS) on behalf of Wedel Corporation (owned by John J. Riley), the potentially responsible party (PRP) and Maggiore Companies (property developers) to MA DEP for the 228 Salem Street property (which was listed as a LTBI site by MA DEP on 15 January 1987) pursuant to Massachusetts General Laws (MGL) 21E and 310 CMR 40.0000 [5].

On 29 September 1995, MA DEP issued a Notice of Audit (NOA) informing Mr. Paul Maggiore of Maggiore Companies, that MA DEP was conducting an audit of the 7 March 1994 LSP EOS submitted for the 228 Salem Street property [5].

On 4 January 1996, MA DEP issued a Notice of Noncompliance and NOA Findings to Wedel Corporation. MA DEP determined that the LSP EOS submittal was in noncompliance with one or more laws, regulations, orders, licenses, permits, or approvals enforced by MA DEP. In addition, the audit identified that inadequate information was available on the extent of release, vertical and horizontal extent of contamination, and risk characterization [5].

On 25 January 1996, 21E, Inc. on behalf of Wedel Corporation, submitted a Plan of Activities in response to the NOA findings to the MA DEP for approval. The Plan of Activities included: the excavation of test pits and the collection of soil samples across the undeveloped lots at the property; laboratory analysis of selected soil samples; and preparation of a site map which would include all potential source areas. The plan was subsequently approved by the MA DEP [12, pp. 1-2].

On 30 and 31 January 1996, during the MA DEP-approved soil sampling program conducted by 21E, Inc., 28 test pits (TP-1 through TP-28) were excavated across the undeveloped lots at the Riley Co. property (Lot Nos. 12, 13, 15, and 16). Surficial soil samples were collected from the test pits. All soil samples were screened in the field for VOCs with a photoionization detector (PID). Selected surficial soil samples were submitted for laboratory analysis for RCRA-8 metals. Soil samples from two areas in the southern and northwestern portions of the property were found to be contaminated with arsenic. The levels of arsenic in the soil samples collected from the vicinity of TP-1 triggered an imminent hazard condition [12].

Tannery wastes were encountered during the excavation of TP-16. However, none of the wastes consistent with those found in TP-16 were visible during the excavation of TP-17. On 31 January 1996, the excavation of TP-16 continued in an attempt to define the horizontal extent of the observed tannery wastes. A total of approximately 200 to 250 cubic yards of tannery wastes and associated soil were excavated from around TP-16, and stockpiled, and covered with polyethylene sheeting. Four distinct layers were observed in the TP-16 excavation. A grab sample from each layer was submitted for laboratory analysis for RCRA-8 metals and extractable organic compounds. No extractable organic compounds were detected in any of the samples above the detection limit. However, metals including chromium, lead, and arsenic were detected in the four layers [12].

On 12 February 1996, MA DEP received oral notification from Ms. Hebert of a release/threat of release of oil/hazardous material at the Riley Co. property. In a 8 March 1996 meeting with MA DEP, Ms. Hebert indicated that the extent of arsenic in the vicinity of TP-1 had not been completely defined and that 21E, Inc. was in the process of developing a plan for collection of additional samples. She also informed MA DEP that all visible tannery wastes would be removed and confirmatory soil samples collected or, if applicable (depending on the nature and extent of the wastes), an Activity Use Limitation (AUL) would be filed and the wastes left in place [8].

On 12 April 1996, an Immediate Response Action (IRA) Plan was submitted to MA DEP by 21E, Inc. on behalf of Wedel Corporation. The objective of the IRA was to mitigate the release of arsenic detected in the two areas (southern and northwestern portions as shown in Figure 3) on the property [9].

On 25 April 1996, 21E, Inc. submitted a status report entitled, "Report of Activities and Soil Excavation Plan - Tannery Waste and Soil Contamination" for the Riley Co. property and submitted to the MA DEP [12].

On 11 June 1996, 21E, Inc., submitted an IRA Status Report to MA DEP on behalf of Wedel Corporation. The report stated that the excavation of the contaminated soil was conducted on 29 and 30 May and 4 June 1996. The soil was excavated from the southern and northwestern area of the property using a backhoe, bulldozer, and small Bobcat excavator. The excavated soil, totaling approximately 850 cubic yards, was stockpiled and covered with polyethylene sheeting. Once the contaminated soil was excavated, confirmatory samples were collected from the excavation and analyzed for the presence of arsenic [9; 10]. Review of background levels of arsenic and confirmatory results for arsenic in soils which remain on-site indicated that there were at least two samples with concentrations of arsenic in soils greater than three times the background concentration. Analytical results of surficial soil samples are discussed in the Soil Exposure Pathway section of this evaluation.

On 4 June 1996, four additional test pits were excavated on Lot Nos. 12 and 13 respectively (TP-401 through TP-408) and four test pits were excavated on lot 15 (TP-409 through TP-412). The test pits were excavated to determine if the material observed in the original excavation was present in these test pits. None of the test pits had materials observed in the original excavation [12, pp. 3-7].

According to a Bill of Lading, dated 24 June 1996, 2,966.40 tons of soil excavated from the property were disposed of at New Hampshire Waste Management's lined landfill in Rochester, New Hampshire [12].

A Method I Risk Characterization was completed by 21E, Inc., in accordance with the guidelines of the MCP, 310 CMR 40.0000, to determine if a "Level of No Significant Risk" existed on the property. Method I was chosen to demonstrate that a "Level of No Significant Risk" existed since only soil contamination was reported on the property [12, p. 7]. The groundwater at the property was classified as GW-1 because the property is located within a Massachusetts Interim Wellhead Protection Area. The soil category was chosen as S-1 because the soil was considered accessible since the depth of soil samples collected was less than 1 ft below ground surface (bgs) [12, pp. 8-9].

According to 21E, Inc., exposure point concentration for arsenic was 9.99 ppm which was calculated by averaging the post removal sampling concentrations for arsenic. Background arsenic levels were evaluated by collecting and analyzing soil samples between the two areas of soil contamination. The average background levels for arsenic in soils was estimated to be 6.24 ppm [12, p. 10-11]. 21E, Inc., further stated that according to James Dragun's The Soil Chemistry of Hazardous Materials (1988), the typical range of arsenic concentrations in Woburn (native) soils is between 1.0 ppm and 40.0 ppm. Therefore, comparing the average exposure point concentration to background data from the property and to that reported in the literature, it was concluded by 21E, Inc. that the conditions

at the property did not pose any significant risk and hence a Permanent Solution had been achieved meeting the requirements of MCP regulations [12, p. 11].

Table 2 presents identified structures or areas on the Riley Co. property that are documented or potential sources of contamination, the containment factors associated with each source, and the relative location of each source.

Table 2

Source Evaluation for John J. Riley Co. Property

Source Area	Containment Factors	Spatial Location
Contaminated Soil	None	Southern and northwestern portions of the property
Drums (containing VOCs)	Indoors, with concrete floor and no floor drains	199 Wildwood Avenue

[34, pp. 1-7]

Table 3 summarizes the types of potentially hazardous substances which have been disposed, used, or stored on the Riley Co. property.

Table 3

Hazardous Waste Quantity for John J. Riley Co. Property

Substance	Quantity or Volume/Area	Years of Use/Storage	Years of Disposal	Source Area
Metals including arsenic; barium; cadmium; chromium (III); chromium (IV); lead; and silver.	15.8 acres	1915 to 1989	74 years	Contaminated Soil
VOCs including benzene, toluene, and xylene	Approximately 400 square foot	unknown	unknown	199 Wildwood Avenue

[1]

There are a number of other potential sources of contamination in the vicinity of the Riley Co. property. Approximately five State-listed sites are located within 0.5-radial miles of the property. Three Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) facilities are located within 0.5-radial miles of the property. Seven RCRA generators are located within 0.5-radial miles of the property. The Wells G & H Site, currently a NPL site, is located 2,000 ft northeast of the property.

WASTE/SOURCE SAMPLING

In May 1990, 21E, Inc., advanced four borings and completed them as monitoring wells, designated MW-1 through MW-4, on the property. Soil samples from the four new soil borings were collected by 21E, Inc. The soil samples were analyzed for RCRA-8 metals, VOCs, TPHs, SVOCs, pesticides/ PCBs. Analytical results did not reveal any VOCs, TPHs, SVOCs, or pesticides/PCBs in any of the soil samples collected. Five metals including arsenic, barium, cadmium, chromium, and lead were detected in the soil samples collected from the property. However, 21E Inc. concluded that all the metals detected were within the commonly expected range found in soils in the region [2; 3, pp. 6-7]

Surficial soil samples were collected by 21E, Inc. on 30 and 31 January 1996. The analytical results of these soil samples are discussed in detail in the Soil Exposure Pathway section of this evaluation.

GROUNDWATER PATHWAY

Approximately 60% of the property is covered by asphalt paving or buildings. The mean annual precipitation for Reading, Massachusetts, measured approximately 3.5 miles northeast of the property, is 46.64 inches [21].

Bedrock beneath the property consists of diorite and gabbro subordinate metavolcanic rocks and intrusive granite and granodiorite. No bedrock outcrops were observed at or in the vicinity of the property [4; p. 15]. No bedrock formations mapped within 4-radial miles of the property exhibit karst characteristics.

Groundwater is approximately 10 ft beneath the property and flows easterly towards the Aberjona River [10]. The primary aquifer in the Aberjona River valley is the stratified drift deposits (outwash sand and gravel) that underlie the property and surrounding area. The primary recharge source for the aquifer is precipitation and surface water infiltration. The transmissivity of the primary aquifer has been mapped as > 4,000 square ft per day (ft^2/day) with an estimated potential well yield of > 300 gallons per minute (gpm) [49, p. 48].

All or part of the following Massachusetts cities and towns are located within 4-radial miles of the Riley Co. property: Burlington (population 23,301), Medford (population 56,702), Reading (population 22,671), Stoneham (population 22,183), Winchester (population 20,405), Wilmington (population 18,488), and Woburn (population 36,407) [16-19; 29].

There are no active drinking water supply wells located in the vicinity of the property. The nearest documented groundwater source of drinking water are the Woburn Water Department Horn Pond wells located approximately 2.3 to 2.5 miles southwest of the property [19; 22]. Woburn Municipal Wells G & H are located approximately 2,000 ft northeast of the property, east of the Aberjona River. These two wells are not considered drinking water supplies because they were closed in 1979 due to VOC contamination (mainly trichloroethene (TCE), 1,1,1-TCA, and perchloroethylene) alleged to have originated from industrial properties in the area [49, p. 22]. However, according to MA DEP, the property is located in an interim wellhead protection area [12, pp. 8-9].

Two million gallons of water per day are supplied to the City of Woburn Water Department by the Massachusetts Water Resource Authority (MWRA) from the Quabbin Reservoir. The remaining water for Woburn is supplied by the six public supply wells located near Horn Pond. Since no single source in the system contributes more than 40% of the total supply, the 36,407 persons served by the system are apportioned evenly among the seven sources [26; 34].

Wilmington's public drinking water is supplied by eight groundwater wells located throughout the town. Five of the wells are within 4-radial miles of the property. Since no single source in the system contributes more than 40% of the total supply, the 18,488 persons served by the system are apportioned evenly among the eight sources [30; 35].

Medford and Stoneham's public drinking water is supplied 100% by the MWRA [33; 41]. Winchester's public drinking water is supplied by North Reservoir, Middle Reservoir, and South Reservoir, none of which are located downstream of the property [40].

Reading's public drinking water is supplied by nine groundwater wells, eight of which are located off of Strout Avenue and the other is located at the end of Beverly Road. All of the wells are located within 4-radial miles of the property. Since no single source in the system contributes more than 40% of the total supply, the 22,671 persons served by the system are apportioned evenly among the nine sources [32; 36]. Burlington's public drinking water is a blended system supplied by five groundwater wells and the Mill Pond Reservoir, none of which are located within 4-radial miles of the property [31]. Table 4 summarizes the populations which rely on public groundwater sources for drinking water within 4-radial miles of the property.

Table 4

Public Groundwater Supply Sources Within 4-Radial Miles of John J. Riley Co.

Distance/Direction From Site	Source Name	Location of Source[a]	Est. Pop. Served	Source Type[b]
2.2 miles Southwest	Horn Pond Wells A,B,&C	Woburn	15,603	Three overburden wells
2.3 miles Southwest	Horn Pond Well D	Woburn	5,201	One overburden well
2.5 miles Southwest	Horn Pond Well E & F	Woburn	10,402	Two overburden wells
2.6 miles Northwest	Chestnut St. Wells 1 & 2	Wilmington	4,622	Two overburden wells
2.9 miles Northwest	Main St. Well	Wilmington	2,311	One overburden well
3.0 miles North	Beverly Road Well	Reading	2,519	One overburden well
3.5 miles Northwest	Butters Row Wells 1 & 2	Wilmington	4,622	Two overburden wells
3.9 miles North	Strout Ave Wells 1 through 8	Reading	20,152	Eight overburden wells

[a] Indicates town in which well is located
[b] Overburden, Bedrock, or Unknown

[19; 23; 25; 27-29]

Private groundwater supplies located within 4-radial miles of the property were estimated using equal distribution calculations of U.S. Census CENTRACTS data identifying population, households, and private water wells for "Block Groups" which lie within or partially within individual radial distance rings measured from the Riley Co. property. The nearest private well is estimated to be located between 0.25- and 0.5-radial miles from the property, but has not been specifically identified due to lack of private well information for Woburn [11]. Table 5 summarizes the total population which relies on groundwater within 4-radial miles of the property.

Table 5

Estimated Drinking Water Populations Served By Groundwater Sources Within 4-Radial Miles of John J. Riley Co.

Radial Distance From Riley Co. (miles)	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Population Served by Groundwater Sources Within the Ring
≥ 0.00 to 0.25	0	0	0
> 0.25 to 0.50	3	0	3
> 0.50 to 1.00	12	0	12
> 1.00 to 2.00	91	0	91
> 2.00 to 3.00	166	40,658	40,824
> 3.00 to 4.00	229	24,774	25,003
TOTAL	501	65,432	65,933

[11; 19; 23; 25; 27-29]

From November 1980 to March 1981, E&E, under contract to the EPA, conducted a SI and sampled groundwater from wells PW-01 and PW-02. The results revealed VOCs in both wells. Total VOCs in PW-02 ranged from 28 parts per billion (ppb) to 1,372 ppb and total VOCs ranged from 10 ppb to 53 ppb in PW-01. The source of contamination was not determined by E&E [3, p. 5].

In 1983, YE^{2}ARS conducted subsurface investigations of the property and excavated nine test pits on the 15.8-acre Riley Co. property. Six overburden monitoring wells (which no longer exist on the property) were also installed on the property by YE^{2}ARS in 1983 and designated Y-B1 through Y-B6. Groundwater samples were collected from monitoring wells Y-B1, Y-B2, and PW-01 and analyzed for chlorinated solvents by EPA Method 601. No chlorinated solvents above the instrument detection limit of 0.1 ppb were noted in monitoring well Y-B1. The sample from PW-01 was found to contain 0.4 ppb of trans-1,2-dichloroethene and 0.4 ppb of TCE. There was a substantial decrease in the concentrations of VOCs in PW-01 than those reported in 1980/1981 by E&E. The YE^{2}ARS report concluded that the Riley Co. tannery was not a probable source of the contamination documented in PW-02 and Woburn Wells G and H [3, p. 5].

In July 1989, Geraghty & Miller, Inc installed three wells designated RR-1 through RR-3, under authorization of Beatrice Foods, Inc. In May 1990, 21E, Inc. installed four additional monitoring wells, designated MW-1 through MW-4, on the property, and collected groundwater samples from both existing (RR-1 through RR-3) and new wells. The groundwater samples were analyzed for RCRA-8 metals, VOCs, TPHs, SVOCs, pesticides, and PCBs. No VOCs, TPHs, SVOCs, pesticides/PCBs were detected in any of the seven groundwater samples. No metals were detected above MA DEP Drinking Water Standards [2; 3, pp. 6-7].

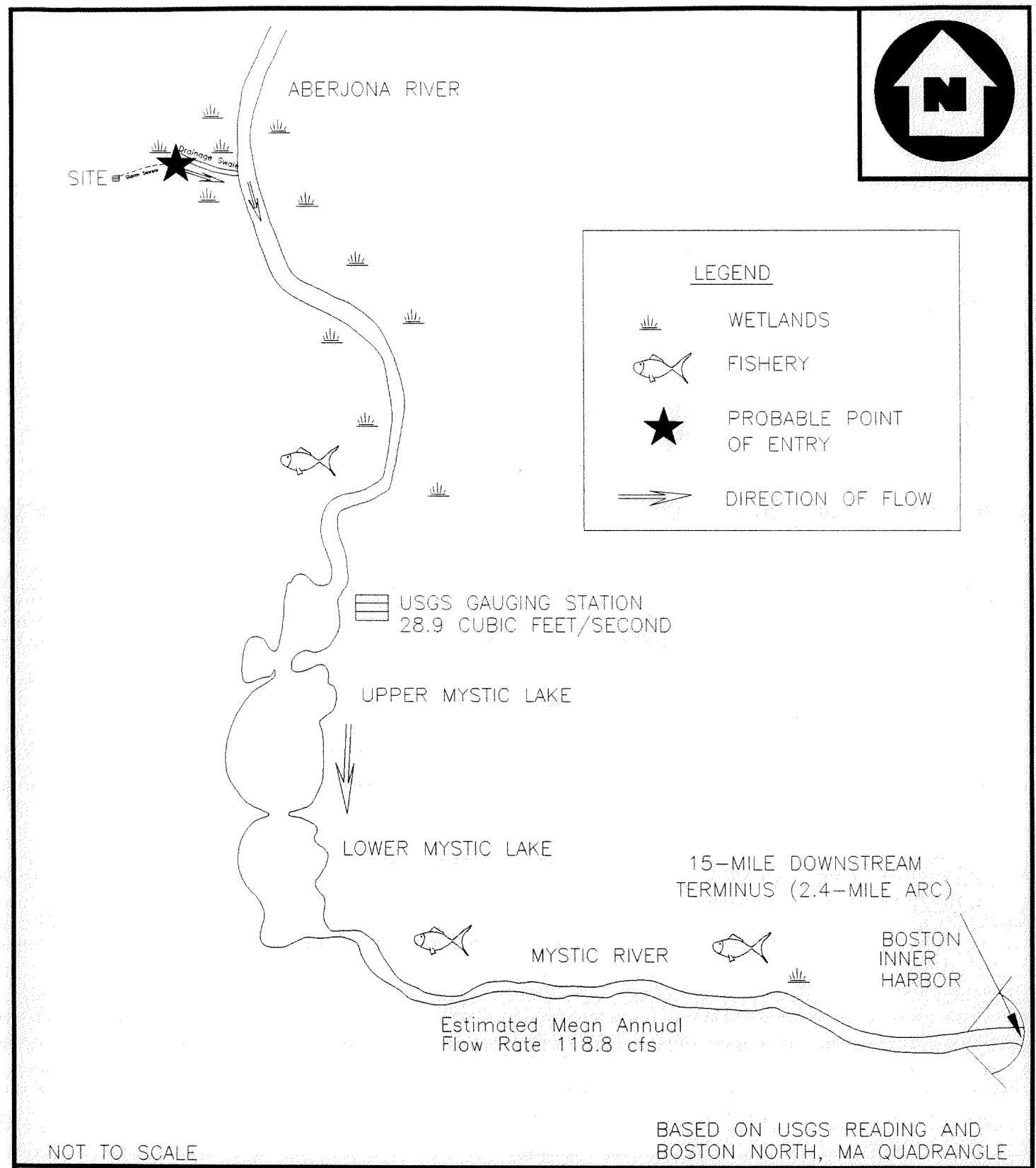
On 16 April 1993, 21E, Inc. collected groundwater samples from monitoring wells MW-1, MW-4, and RR-1 through RR-3 and analyzed the samples for VOCs by EPA Method 8240, for TPHs, for RCRA-8 metals, and for SVOCs by EPA Method 625. VOCs and TPHs were not detected above their respective detection limits in any of the samples collected. Metals, including arsenic at 0.16 ppm, chromium at 0.57 ppm, cadmium at 0.019 ppm, and lead at 0.11 ppm, were present in sample MW-4. RR-1 contained concentrations of arsenic at 0.021 ppm, chromium at 0.11 ppm, and lead at 0.02 ppm. RR-1 did not contain cadmium above the detection limit. However, the report did not include the value for the detection limit. START selected groundwater sample RR-1 as the reference sample to represent the background conditions as it contained the lowest concentrations of metals. RR-2 was reported to contain arsenic at 0.066 ppm, and chromium at 0.20 ppm. SVOCs, including butylbenzyl phthalate at 23 ppb and di-n-butyl phthalate at 30 ppb, were reported in RR-2. However, both of these compounds were detected in the laboratory blank samples as well [3, pp. 19-22].

START did not perform groundwater sampling as part of the Riley Co. SIP. Based on analytical results from previous groundwater samples collected by 21E, Inc. from the Riley Co. property, groundwater beneath the property has been impacted by a release of hazardous substances which appears to be attributable to on-site sources; however, due to the distance of active drinking water sources (i.e., greater than 2 miles) from the property and the presence of other industrial sites in the area, no drinking water sources are known or suspected to have been impacted by the release from on-site sources.

SURFACE WATER PATHWAY

START personnel located one of the two on-site catchbasins and the ditch shown on the site sketch prepared by 21E, Inc. in their 1990 and 1993 ESA Reports. However, based on conditions observed during the START on-site reconnaissance of the property, most of the runoff from the paved portions of the property flows toward catchbasins located on Salem Street [43, pp. 2-4].

Surface water runoff from the property flows via catchbasins and storm sewers located on Salem Street towards the wetlands associated with a drainage swale located approximately 1,500 ft east of the property. These wetland areas, which are contiguous with the Aberjona River, remain wet for most of the year (Figure 4). The swale is classified by the U.S. Geological Survey (USGS) as an intermittent stream and has a length of reach of approximately 1,000 ft. The swale eventually drains into the Aberjona River located approximately 2,500 ft east of the property [3, pp. 3-4]. The Aberjona River flows south for 5.9 miles and drains into the Mystic Lakes which in turn discharge into the Mystic River. For the purposes of this SIP, the Mystic Lakes are considered to be part of the Mystic River. The Mystic River continues for 6.5 miles and discharges into Boston Inner Harbor. The 15-mile downstream pathway terminus occurs as a 2.4-mile arc in the Boston Inner Harbor [16-19].



SURFACE WATER PATHWAY SKETCH

JOHN J. RILEY CO.
228 SALEM STREET
WOBURN, MASSACHUSETTS

HWRE
Civil•Environmental•Hydrologic•Structural•Hazardous Waste Engineering•Surveying
REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TDD #	DRAWN BY:	DATE
97-06-0019	J.K.	8-26-97

FILE NAME:	
HW156/SURFWATER	FIGURE 4

The wetlands have a mean annual flow rate of less than 10 cubic ft per second (cfs) at the probable point of entry (PPE) to the downstream surface water pathway. The Aberjona River at its confluence with the drainage swale has a mean annual flow rate of < 28.9 cfs. A USGS gauging station, located approximately 3.5 miles downstream of the PPE, has a recorded mean annual flow rate of 28.9 cfs. No additional USGS gauging stations are located on the Aberjona River [30]. The mean annual flow rate for the Mystic River was estimated to be 118.8 cfs by using the drainage basin area to calculate the flow rate [37]. Table 6 summarizes the characteristics of surface water bodies located within 15-downstream miles of the property.

Table 6

Surface Water Bodies Along the 15-Mile Downstream Pathway from John J. Riley Co.

Surface Water Body	Descriptor[a]	Length of Reach (miles)	Flow Characteristics (cfs)[b]	Length of Wetlands (miles)
Wetlands	Minimal stream	0.2	< 10 cfs	0.2
Aberjona River	Small to moderate stream	5.9	28.9	2.0
Mystic River	Moderate to large stream	6.5	118.8	0.7
Boston Inner Harbor	Coastal tidal waters	2.4-mile arc	NA	0.00

[a] Minimal stream < 10 cfs. Small to moderate stream 10-100 cfs. Moderate to large stream > 100-1,000 cfs. Coastal tidal waters (flow not applicable).
[b] Cubic ft per second.

[8; 22-25; 30; 36]

No surface water drinking water intakes are located along the 15-mile downstream pathway from the Riley Co. property [38]. The Aberjona and Mystic Rivers are designated as Class B waterways by MA DEP along their entire lengths. They are further noted as warm water fisheries along their entire lengths [42]. Approximately 2.9 miles of wetland frontage exists within 15-downstream miles of the property [22-25]. Habitats for seven State-threatened species, one State-endangered species, two Federal-candidate species, and two Federal-endangered species are located along the Aberjona and Mystic Rivers within 15-downstream miles of the property [39]. Table 7 summarizes the sensitive environments within 15-downstream miles of the property.

Table 7

Sensitive Environments Along the 15-Mile Downstream Pathway from John J. Riley Co.

Sensitive Environment Name	Sensitive Environment Type	Surface Water Body	Downstream Distance from PPE (miles)	Flow Rate at Environment (cfs)[a]
Wetlands	0.2 miles of Wetlands	Wetlands	0 to 0.2	< 10
Clean Water Act	Clean Water Act	Aberjona River	0.2	28.9
Aberjona River Wetlands	2.0 miles of Wetlands	Aberjona River	0.2 to 6.1	28.9
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	2.33	28.9
Invertebrates Insecta	State-threatened Species Habitat	Aberjona River	2.54	28.9
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	2.54	28.9
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	2.58	28.9
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	2.62	28.9
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	2.70	28.9
Mystic River Wetlands	0.7 miles of Wetlands	Mystic River	6.1 to 12.6	118.8
Vertebrates Aves	Federal-candidate Species Habitat	Mystic River	9.77	118.8
Vertebrates Aves	Federal-endangered Species Habitat	Mystic River	9.94	118.8
Vertebrates Aves	State-endangered Species Habitat	Mystic River	10.86	118.8
Vertebrates Aves	Federal-candidate Species Habitat	Mystic River	11.46	118.8
Vertebrates Aves	Federal-endangered Species Habitat	Mystic River	11.58	118.8
Migratory Pathway for Alewife	Anadromous Fish Migratory Pathway	Boston Inner Harbor	14.0	NA

[a] Cubic ft per second
CWA = Clean Water Act
PPE = Probable Point of Entry

[22-25; 39]

No surface water sampling associated with the Riley Co. property has been conducted to date [12]. Given the distance from the property to the PPE, and the location of other industries between the property and the PPE, an observed release to surface water would be difficult to document. Thereby, no known release to the surface water pathway has been documented and no impacts to the Aberjona River are known or suspected.

SOIL EXPOSURE PATHWAY

There are 56 full-time employees on the Riley Co. property who work for Charles Ice Cream, W. A. Kraft, and New England Trucking Co. [43]. There are no residents on the property; the nearest residence is located at 250 Salem Street approximately 200 ft south of the property [43, p. 5]. The nearest school to the property is the White School located approximately 3,200 ft southwest of the property [17]. No terrestrial sensitive environments are noted on the property [43]. An estimated 9,806 persons live within 1-radial mile of the property [20].

On 30 and 31 January 1996, during a MA DEP-approved soil sampling program, 28 test pits (TP-1 through TP-28) were excavated by 21E, Inc. at 228 Salem Street which was listed as LTBI by MA DEP. The majority of the test pits were excavated systematically in a 200-ft interval grid pattern in the northwestern and southern portions of the property. TP-9 was excavated in the vicinity of the former USTs; TP-10 was excavated in the vicinity of the former bag house; TP-14 was excavated in the former hide storage area; TP-19, TP-20, and TP-21 were excavated in the vicinity of the former sludge disposal area; and TP-18 and TP-22 were excavated in the vicinity of the former catchbasin. Soil samples were collected from the surface at each test pit location and at changes in lithology. All soil samples were screened in the field for VOCs using a PID. Selected soil samples were submitted for laboratory analysis for RCRA-8 metals [12, p. 2].

The analytical results indicated that the 0 to 1 ft sample from TP-1 contained arsenic at 95 ppm, and the 0 to 0.5 ft sample from TP-12 contained arsenic at 40 ppm triggering an Imminent Hazard condition [12, p. 3]. Three additional test pits, TP-109, TP-110, and TP-111, were excavated around TP-12 in an attempt to delineate the extent of surficial arsenic contamination. Soil samples collected from 0.5 to 1 ft from TP-109 contained elevated levels of chromium and arsenic, while the 0 to 0.5 ft soil samples contained lower levels of these compounds and did not present an Imminent Hazard condition [12, p. 2-3].

On 11 June 1996, 21E, Inc. submitted an IRA Status Report to MA DEP on behalf of Wedel Corporation. The report stated that the excavation of the contaminated soil was conducted on 29 and 30 May and 4 June 1996. Soil was excavated from the test pits to a depth of 1 ft bgs. The excavated soil, totaling approximately 850 cubic yards, was stockpiled and covered with 6 mm thick polyethylene sheeting. Once the contaminated soil was excavated, confirmatory samples were collected and analyzed for the presence of arsenic [9; 10]. Confirmatory samples collected 0 to 1 ft bgs indicated arsenic concentrations ranging from 3.9 ppm to 29 ppm. Soil samples from test pits around TP-1, collected 0 to 0.5 ft bgs, contained arsenic levels ranging from 13 ppm to 29 ppm [12, p. 9].

The sample collected from TP-208 contained the highest concentration of arsenic. Background levels of arsenic were determined on the property by collecting samples between the two areas of arsenic contamination and from locations surrounding the property. Sample TP-6 contained arsenic at 8.6 ppm and this is the highest level of background arsenic concentration in the property and surrounding soils.

Due to the availability of third party soil data, START personnel did not collect soil samples as part of the Riley Co. SIP. Based on soil sampling conducted by 21E, Inc. on 4 June 1996, a release of hazardous substances to surficial soils from on-site sources has been documented. However, based site observations and conditions and the lack of public use of the property, no impacts to nearby residential populations is known or suspected.

AIR PATHWAY

There are 56 full-time employees on the property who work for Charles Ice Cream, W.A. Kraft, and New England Trucking Co. [43]. There are no residents on the property; the nearest residence is located at 250 Salem Street approximately 200 ft south of the property [43, p. 5]. An estimated 147,048 persons live within 4-radial miles of the property [20]. Table 8 summarizes the estimated population within 4-radial miles of the property.

Table 8

Estimated Populations Within 4-Radial Miles of John J. Riley Co.

Radial Distance from the John J. Riley Co. (miles)	Estimated Population
On a Source	56
> 0.00 to 0.25	446
> 0.25 to 0.50	1,644
> 0.50 to 1.00	7,716
> 1.00 to 2.00	36,299
> 2.00 to 3.00	45,717
> 3.00 to 4.00	55,226
TOTAL	147,048*

* excludes on-site workers

[20]

Approximately 2,000 acres of wetlands are located within 4-radial miles of the property. In addition, habitats for 11 State-threatened, and/or endangered species and two Federal-candidate species are located within 4-radial miles of the property [32]. Table 9 summarizes the sensitive environments located within 4-radial miles of the property.

Table 9

Sensitive Environments Located Within 4-Radial Miles of John J. Riley Co.

Radial Distance from John J. Riley Co. (miles)	Sensitive Environments/Species (status)
> 0.00 to 0.25	Water body protected by Clean Water Act
	23 acres wetlands
> 0.25 to 0.50	43 acres wetlands
> 0.50 to 1.00	62 acres wetlands
> 1.00 to 2.00	258 acres wetlands
> 2.00 to 3.00	Seven State-threatened species habitats
	One State-endangered species habitat
	592 acres wetlands
> 3.00 to 4.00	Two State-threatened species habitats
	One State-endangered species habitat
	Two Federal candidate species habitats
	1,022 acres wetlands

[22-25; 39; 50]

No air sampling has been conducted on the property to date [1-12; 43]. During the START on-site reconnaissance, ambient air was monitored using a PID. No readings above background were noted [43].

No laboratory qualitative air samples are known to have been collected from the Riley Co. property. Neither a release to the ambient air from on-site sources nor impacts to nearby residential populations or sensitive environments are known or suspected.

SUMMARY

John J. Riley Co. (Riley Co.) property is located at 228 Salem Street in Woburn, Middlesex County, Massachusetts. The property comprises 15.8 acres and is located approximately 2,500 feet (ft) west of the Aberjona River, and 3,350 ft northeast of Woburn High School. The property is bordered by greenhouses to the south, residences to the east, Boston & Maine (B&M) Railroad tracks to the northeast, and the properties occupied by BASF and Toxikon Laboratories to the west.

The Riley Co., while in business, operated two production wells PW-01 (located on the northeast portion of the property) and PW-02. A wooded area, formerly owned by the Riley Co., is located across the B&M Railroad tracks, northeast of the Riley Co. This area is currently owned by the Wildwood Conservation Trust, and is the location of a former production well for the Riley Co. (PW-02). The two inactive City of Woburn public water supply wells (Wells G and H) are located approximately 2,000 ft northeast of the property. The production well, as well as Wells G and H, were found by Massachusetts Department of Environmental Quality and Engineering (MA DEQE) to be contaminated with volatile organic compounds (VOCs) in 1979. Wells G and H were subsequently listed on the Environmental Protection Agency (EPA) Superfund National Priority List (NPL) as the Wells G & H site.

The Riley Co., owned by Mr. John J. Riley, operated as a tannery on the property for approximately 74 years from 1915 until 1989. From December 1978 to January 1982, the company continued operations on site but was owned by Beatrice Foods, Inc. Mr. Riley, the president of the tanning company, reacquired the business from Beatrice Foods, Inc. in 1983. Tannery operations continued until 1989 at which time all the equipment was removed and operations ceased. In June 1994, the Maggiore Companies (property developers), subdivided the property into six lots and labeled them as Lot Nos. 11 through 16.

Several environmental investigations have been performed on the Riley Co. and other industrial facilities located to the south and east of the property. In 1987, the Riley Co. was listed with the MA DEQE as a Location to be Investigated (LTBI) due to the contamination in the production wells and trace contamination discovered in soil borings on the property. However, the investigations concluded that the Riley Co. tannery was not a probable source of contamination found in the four wells.

According to Massachusetts Department of Environmental Protection (MA DEP, formerly MA DEQE), the tanning operations on the property included primarily the "chrome" tanning of hides into shoe leather. The facility was considered by MA DEP as a medium-sized operation. The facility reportedly used hexavalent chromium as a raw material in the "chrome" tanning process. However, prior to the introduction into the tanning process, hexavalent chromium was converted to trivalent chromium.

Between November 1980 and March 1981, Ecology & Environment, Inc. (E&E), under contract to the EPA, conducted a Preliminary Assessment (PA) and a Site Inspection (SI) on the property. In 1983, Yankee Environmental Engineering and Research Services, Inc. (YE^2ARS) conducted subsurface investigations of the property and excavated nine test pits on the 15.8-acre Riley Co.

property. Six overburden monitoring wells were installed on the property (Y-B1 through Y-B6). Groundwater samples were collected and analyzed for chlorinated VOCs by EPA Method 601. YE^{2}ARS noted that there was a substantial decrease in the concentrations of VOCs in PW-01 compared to those reported in the 1980/1981 E&E Investigation. The YE^{2}ARS report concluded that the Riley Co. tannery was not a probable source of the contamination documented in PW-02 and Woburn Wells G and H.

In 1990 and 1993, 21 E, Inc., conducted Environmental Site Assessments (ESAs) on the Riley Co. Property. Monitoring wells were installed and groundwater and soil samples were collected from the property. Based on the sampling results, 21E, Inc. reported that there was no evidence of a release of oil or hazardous materials to the groundwater from the Riley Co. property. In addition, based on the data from these investigations, 21E, Inc. concluded that tannery operations at the property have not adversely affected the environmental integrity of the property.

On 7 March 1994, Ms. Sandra M. Hebert, Licensed Site Professional (LSP) for 21E, Inc. submitted an LSP Evaluation Opinion Statement (EOS) on behalf of Wedel Corporation, the potentially responsible party (PRP) and Maggiore Companies (property developers) to MA DEP for the 228 Salem Street property (which was listed as a LTBI site by MA DEP on 15 January 1987) pursuant to Massachusetts General Laws (MGL) 21E and 310 CMR 40.0000.

On 4 January 1996, MA DEP issued a Notice of Noncompliance and Notice of Audit (NOA) Findings to Wedel Corporation. MA DEP determined that the LSP EOS submittal was in noncompliance with one or more laws, regulations, orders, licenses, permits, or approvals enforced by MA DEP. In addition, the audit identified that inadequate information was available on the extent of release, vertical and horizontal extent of contamination, and risk characterization.

On 30 and 31 January 1996, during the MA DEP-approved soil sampling program conducted by 21E, Inc., 28 test pits (TP-1 through TP-28) were excavated across the undeveloped lots at the Riley Co. property (Lot Nos. 12, 13, 15, and 16). Surficial soil samples were collected from the test pits. All soil samples were screened in the field for volatile organic compounds (VOCs) with a photoionization detector (PID). Selected surficial soil samples were submitted for laboratory analysis for RCRA-8 metals. Soil samples from two areas in the southern and northwestern portions of the property were found to be contaminated with arsenic. The levels of arsenic in the soil samples collected from the vicinity of TP-1 triggered an "imminent hazard condition".

On 11 June 1996, 21E, Inc., submitted an Immediate Response Action (IRA) Status Report to MA DEP on behalf of Wedel Corporation. The report stated that the excavation of the contaminated soil was conducted on 29 and 30 May and 4 June 1996. The soil was excavated from the southern and northwestern area of the property using a backhoe, bulldozer, and small Bobcat excavator. The excavated soil, totaling approximately 850 cubic yards, was stockpiled and covered with polyethylene sheeting. Once the contaminated soil was excavated, confirmatory samples were collected from the excavation and analyzed for the presence of arsenic.

A Method I Risk Characterization was completed by 21E, Inc., in accordance with the guidelines of the MCP, 310 CMR 40.0000, to determine if a "Level of No Significant Risk" existed on the property. Method I was chosen to demonstrate that a "Level of No Significant Risk" existed since only soil contamination was reported on the property.

According to 21E, Inc., exposure point concentration for arsenic was 9.99 ppm which was calculated by averaging the post removal sampling concentrations for arsenic. Background arsenic levels were evaluated by collecting and analyzing soil samples between the two areas of soil contamination. The average background levels for arsenic in soils was estimated to be 6.24 ppm. In addition, according to The Soil Chemistry of Hazardous Materials, the typical range of arsenic concentrations in Woburn (native) soils is between 1.0 parts per million (ppm) and 40.0 ppm. Therefore, comparing the average exposure point concentration to the background data from the property and to that reported in the literature, it was concluded by 21 E, Inc. that the conditions at the property did not pose any significant risk and hence a Permanent Solution had been achieved meeting the requirements of MCP regulations.

There are no active drinking water supply wells located in the vicinity of the property. The nearest documented groundwater source of drinking water is the Woburn Water Department's Horn Pond wells located approximately 2.2 miles southwest of the property. The nearest private water supply well is estimated to be located between 0.25 and 0.5-radial miles of the property. Approximately 65,933 persons rely on groundwater for drinking water within 4-radial miles of the property. Groundwater beneath the property is documented to be contaminated with metals such as arsenic, chromium, and lead.

The property lies within the Aberjona River Basin. Surface water runoff from the property flows via catchbasins and storm sewers located on Salem Street towards the wetland areas associated with a drainage swale located approximately 1,500 ft east of the property. No surface water drinking water intakes are located within the 15-mile downstream pathway from the Riley Co. property. Approximately 2.9 miles of wetland frontage exists within 15-downstream miles of the property. Habitats for eight State-threatened species, one State-endangered species, two Federal-candidate species, and two Federal-endangered species are located along the Aberjona and Mystic Rivers within 15-downstream miles of the property.

There are 56 full-time employees on the property who work for Charles Ice Cream, W.A. Kraft, and New England Trucking Co. There are no residents on the property; the nearest residence is located at 250 Salem Street approximately 200 ft northeast of the property. An estimated 9,806 persons and 147,048 persons live within 1-radial mile and 4-radial miles of the property, respectively.

JOHN J. RILEY CO.
REFERENCES

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[3] 21E, Inc. 1993. Final Report Environmental Site Assessment for 228 Salem Street. 10 August.

[4] Paragon Environmental Services, Inc., 1994. Comprehensive Site Assessment for Lot 14, Wildwood Avenue, Woburn, Massachusetts. 30 October.

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