Associated Earth Sciences,

March 26, 2004
Project No. KE04045B

Jack in the Box, Inc.
8909 SW Barbur Boulevard, Suite 250
Portland, Oregon 97219
Attention: Mr. Steve Moncur

Jerome O'Leary
Associate Broker
GVA Kidder Mathews
1201 Pacific Avenue, Suite 1400
Tacoma, Washington 98402

Subject: Site Characterization and
Remedial Action Evaluation
Former Auburn Auto Wrecking Yard Property
6th Street SE at A Street SE
Auburn, Washington

Gentlemen:

This letter accompanies a report by Associated Earth Sciences, Inc. (AESI) documenting the results of a Site Characterization and Remedial Action Evaluation performed on the former auto wrecking yard property located in the northeast quadrant of the intersection of 6th Street SE and A Street SE in Auburn, Washington. The findings and conclusions in this report are based on our interpretation of information currently available, and are subject to the limitations in the attached report.

We appreciate the opportunity to work with you on this project. If you have questions regarding the scope of our study or our conclusions, please do not hesitate to contact us at (425) 827-7701.

Sincerely,
**ASSOCIATED EARTH SCIENCES, INC.**
**Kirkland, Washington**

Gary A. Flowers, P.G., P.E.G.
Principal

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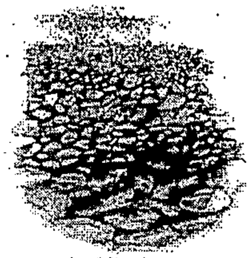

Geotechnical Engineering

Water Resources

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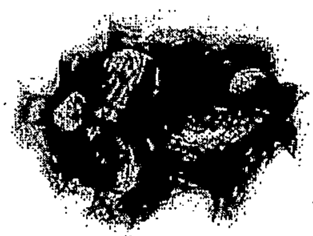

Geologic Assessments

# Associated Earth Sciences, Inc.

Site Characterization and
Remedial Action Evaluation

# FORMER AUBURN AUTO WRECKING YARD PROPERTY

6th Street SE at A Street SE
Auburn, Washington

Prepared for

**Jack in the Box, Inc.**
**Jerome O'Leary**

Project No. KE04045B
March 26, 2004

## SITE CHARACTERIZATION AND REMEDIAL ACTION EVALUATION

# FORMER AUBURN AUTO WRECKING YARD PROPERTY

## $6^{th}$ Street SE at A Street SE
## Auburn, Washington

*Prepared for:*
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March 26, 2004
Project No. KE04045B

# 1.0 INTRODUCTION

This report presents the results of a Site Characterization and Remedial Action Evaluation of a former auto wrecking yard property performed and documented by Associated Earth Sciences, Inc. (AESI) at a site located in Auburn, Washington.

## 1.1 Location and Legal Description

The subject property is a semi-rectangular parcel comprised of two tax lots in Auburn, Washington. The address of tax lot 182105-9184 is 524 SE A Street (23,625 square feet). The address of tax lot 182105-9253 is 512 SE A Street (79,661 square feet). The locations of the subject properties are shown in Figure 1 (Vicinity Map). Two dilapidated structures are located on-site. The inside of these structures was not inspected. It is unknown whether or not the buildings contain hazardous materials or sumps where waste oils may have been dumped. Our study is limited to the areas of the site AESI had access to. The subject property is located in an area of residential and commercial properties, with an operating Union 76 gasoline station located approximately 200 feet southeast of the southeast corner of the site. The property is bounded by a Denny's restaurant along the eastern boundary of the site, the embankment for State Route (SR) 18 along the northern boundary, 6$^{th}$ Street SE along the southern boundary, and A Street SE and a small privately owned parcel along the western boundary.

## 1.2 Site History

Anecdotal reports indicate that the subject property was used as an automotive repair and auto wrecking business. Lead, cadmium, and petroleum hydrocarbons were discovered during the initial investigation of the property. These contaminants may be related, at least in part, to auto wrecking operations, especially car batteries. Other possible contributing sources of anthropogenic lead and cadmium include the airborne dusts from past Asarco smelter operations or lead-tainted automobile exhaust from nearby roads. Based on our initial findings, additional site characterization was recommended to assess the extent of the contamination, both aerially and vertically, and to evaluate remediation options for the subject property.

# 2.0 SITE CHARACTERIZATION SAMPLING ACTIVITIES

The purpose of the site characterization was to determine the lateral and vertical distribution of heavy metals lead and cadmium and heavy oil petroleum hydrocarbons in the surficial sediments. Ground water impacts were not considered during this phase of the study, since heavy oil range petroleum hydrocarbons and lead and cadmium salts are, from a practical standpoint, insoluble and typically do not migrate downward to the water table. Selected soil samples were tested for diesel and heavy oil range petroleum hydrocarbons based upon visual observations and a positive response from a photoionization detector.

On March 8, 2004, AESI arrived on-site and staked the subject property with a grid using approximate 50-foot centers. The layout of the grid is shown in Figure 2 (Grid Layout). A total of 54 sampling stations were established on the site. Three samples were collected at each sampling station; a composite sample from 0 to 6 inches below grade (ibg) and discrete samples at 12 and 18 ibg.

Soil samples were screened in the field using a photoionization detector (PID) and sheen testing. All but one of the sampling stations exhibited nondetectable levels of petroleum hydrocarbons based upon the two field screening methods. There is no reliable field test for heavy metals such as lead and cadmium. The samples were submitted to the analytical laboratory to check for diesel and heavy oil range petroleum hydrocarbons and total lead and cadmium.

Shallow fill soils were observed across the site at depths ranging from the surface to 3 to 12 ibg. Some buried debris was encountered in the sample stations mostly in the upper 6 to 12 inches.

Site conditions, sample locations, and procedures are detailed in Sections 2.1 through 2.2 below. Soil samples were collected from the auger bucket using clean, stainless steel sampling spoons rinsed with distilled, de-ionized water. The auger bucket was cleaned between sampling stations. Composite soil samples were collected from the auger bucket in the upper 0 to 6 ibg. Soil samples were collected from the center of the auger bucket at the discrete sample depths of 12 and 18 ibg.

Samples collected for analysis were placed in borosilicate glass sample containers with Teflon-lined lids supplied by the laboratory. After the samples were logged in, they were placed in a cooler, chilled with frozen gel packs, and transported by courier under chain-of-custody protocols directly to Friedman & Bruya, Inc. laboratories in Seattle, Washington for analysis. The laboratory chain-of-custody is located in Appendix A.

## 2.1 Site Soil and Ground Water Conditions

The generalized sequence of sediments encountered during our previous assessment of the site in the eastern portion of the property were fine-grained sands from the surface to approximately 2 to 3 feet below grade (fbg) underlain by sand and gravels to 8 fbg. The western portion of the property was predominantly fine-grained sand and silt. The lateral distribution of the sediments is typical of fluvial deposits laid down by a meandering river, with fine-grained silty, backwater deposits grading to higher energy, channel deposits. There was no field evidence of environmentally significant levels of petroleum hydrocarbons in the exploration pits below the thin mantle of surficial fill material (3 to 12 ibg). Small pieces of miscellaneous automotive debris were randomly distributed within the surficial fill material. Ground water was encountered at a depth greater than 15 feet based upon field observations during a geotechnical study of the site during which an exploration boring was drilled using a hollow-stem auger.

## 2.2 Site Soil Characterization Sampling Nomenclature

Three soil characterization samples were collected from each hand-auger boring. Sampling nomenclature is described as follows:

1) Project: Jack in the Box Auburn Property (JIB)
2) Grid Number: A1..A10, B1..B10, etc.
3) Depth: sample depth in inches below grade.

As an example, sample **JIB-A4-12** was collected from the **Jack In the Box** project from grid location **A4** at **12** ibg.

# 3.0 ANALYTICAL RESULTS

Analytical results for samples collected during site characterization activities are given in Tables 1 through 5. Results are discussed in Section 3.1 below. Figure 2 shows the locations of the hand-auger sampling stations. Complete analytical certificates are located in Appendix A.

**Table 1**
**Site Soil Characterization Analytical Results**
**NWTPH-Dx - Total Petroleum Hydrocarbons as Diesel Extended to Include Motor Oil**
**(Analytical results are in parts per million [ppm])**

| Sample Number | Date Collected | Depth (ibg)[1] | Diesel | Motor Oil |
|---|---|---|---|---|
| JIB-A4-12 | 3/8/04 | 12 | 99 | 300 |
| JIB-C7-6 | 3/10/04 | Surface-6 | 240 | 290 |
| JIB-B8-6 | 3/10/04 | Surface-6 | 19 | <50 |
| JIB-C8-6 | 3/10/04 | Surface-6 | 280 | 320 |
| JIB-A9-6 | 3/10/04 | Surface-6 | <10 | <50 |
| *MTCA Method A CL*[2] | | | *2,000* | *2,000* |

[1] ibg = inches below grade.
[2] Model Toxics Control Act (MTCA) Method A cleanup levels.

**Table 2**
**Site Soil Characterization Analytical Results**
**Total Lead and Cadmium**
**EPA Method 6010 by Inductively Coupled Plasma (ICP)**
**(Analytical results are in parts per million [ppm])**

| Sample Number | Date Collected | PID/Sheen | Depth (ibg)[1] | Cadmium | Lead |
|---|---|---|---|---|---|
| JIB-A1-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | <1 | 20 |
| JIB-A1-12 | 3/8/04 | 0 ppm /ND | 12 inches | NA[2] | NA |
| JIB-A1-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B1-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | <1 | 60 |
| JIB-B1-12 | 3/8/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-B1-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B2-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | <1 | 66 |
| JIB-B2-12 | 3/8/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-B2-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-C1-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | <1 | **320** |
| JIB-C1-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 150 |
| JIB-C1-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-C2-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **3.3** | **1,300** |
| JIB-C2-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 15 |
| JIB-C2-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D1-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **2.7** | **1,400** |
| JIB-D1-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 93 |
| JIB-D1-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D2-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **17** | **1,800** |
| JIB-D2-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 190 |
| JIB-D2-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D3-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **9.8** | **2,900** |
| JIB-D3-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 8.4 |
| JIB-D3-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-A2-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | 1.7 | 62 |
| JIB-A2-12 | 3/8/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-A2-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-A3-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | <1 | 56 |
| JIB-A3-12 | 3/8/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-A3-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B3-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **5.7** | **1,200** |
| JIB-B3-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 92 |
| JIB-B3-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-C3-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **13** | **430** |
| JIB-C3-12 | 3/8/04 | 0 ppm /ND | 12 inches | **2.7** | 8.0 |
| JIB-C3-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D4-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **6.7** | **1,900** |
| JIB-D4-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 11 |
| JIB-D4-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-E1-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **29** | **500** |

MTCA-A 2 250

| Sample Number | Date Collected | PID/Sheen | Depth (ibg)[1] | Cadmium | Lead |
|---|---|---|---|---|---|
| JIB-E1-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 5.1 |
| JIB-E1-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-E3-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **8.9** | **740** |
| JIB-E3-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 4.3 |
| JIB-E3-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB- C4-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **9.8** | **1,200** |
| JIB-C4-12 | 3/8/04 | 0 ppm /ND | 12 inches | 1.7 | 79 |
| JIB-C4-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-A4-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | 1.6 | 91 |
| JIB-A4-12 | 3/8/04 | **5.2 ppm** /ND | 12 inches | NA | NA |
| JIB-A4-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-A5-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **3.0** | 140 |
| JIB-A5-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 5.7 |
| JIB-A5-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B4-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **1.7** | 210 |
| JIB-B4-12 | 3/8/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-B4-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B5-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **4.9** | **630** |
| JIB-B5-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 4.2 |
| JIB-B5-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-C5-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **5.4** | **690** |
| JIB-C5-12 | 3/8/04 | 0 ppm /ND | 12 inches | **2.8** | 16 |
| JIB-C5-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D5-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **8.2** | 220 |
| JIB-D5-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 14 |
| JIB-D5-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-E2-6 | 3/8/04 | 0 ppm /ND | Surface-6 inches | **9.1** | **730** |
| JIB-E2-12 | 3/8/04 | 0 ppm /ND | 12 inches | <1 | 6.6 |
| JIB-E2-18 | 3/8/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-A6-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **3.7** | **300** |
| JIB-A6-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 17 |
| JIB-A6-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B6-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **8.1** | **990** |
| JIB-B6-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 30 |
| JIB-B6-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-C6-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **8.4** | **3,800** |
| JIB-C6-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 19 |
| JIB-C6-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D6-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **3.3** | **390** |
| JIB-D6-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 5.8 |
| JIB-D6-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-A7-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | <1 | **89** |
| JIB-A7-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-A7-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B7-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **9.7** | **1,000** |
| JIB-B7-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 2.2 |

MTCA-A 2 250

| Sample Number | Date Collected | PID/Sheen | Depth (ibg)[1] | Cadmium | Lead |
|---|---|---|---|---|---|
| JIB-B7-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-C7-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **14** | **640** |
| JIB-C7-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 2.3 |
| JIB-C7-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D7-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **7.9** | **1,100** |
| JIB-D7-12 | 3/10/04 | 0 ppm /ND | 12 inches | 1.3 | 14 |
| JIB-D7-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-E4-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **11** | **730** |
| JIB-E4-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 8.8 |
| JIB-E4-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-A8-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **2.7** | 150 |
| JIB-A8-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 3.1 |
| JIB-A8-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B8-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **2.7** | 180 |
| JIB-B8-12 | 3/10/04 | 0 ppm /ND | 12 inches | **6.2** | **480** |
| JIB-B8-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-C8-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **8.1** | **640** |
| JIB-C8-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 3.9 |
| JIB-C8-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D8-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **7.1** | **650** |
| JIB-D8-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 3.2 |
| JIB-D8-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-E5-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | 1.4 | 71 |
| JIB-E5-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-E5-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-A9-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **2.1** | 66 |
| JIB-A9-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 5.3 |
| JIB-A9-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B9-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **5.1** | **490** |
| JIB-B9-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 5.3 |
| JIB-B9-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-C9-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **2.5** | 100 |
| JIB-C9-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 4.9 |
| JIB-C9-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D9-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **8.6** | **260** |
| JIB-D9-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 2.5 |
| JIB-D9-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-E6-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | 1.2 | 63 |
| JIB-E6-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-E6-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-A10-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | <1 | 59 |
| JIB-A10-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-A10-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-B10-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | <1 | 46 |
| JIB-B10-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-B10-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |

MTCA-A 2 250

| Sample Number | Date Collected | PID/Sheen | Depth (ibg)[1] | Cadmium | Lead |
|---|---|---|---|---|---|
| JIB-C10-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | 1.7 | 76 |
| JIB-C10-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-C10-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-D10-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | <1 | 5.4 |
| JIB-D10-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-D10-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-E7-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | <1 | 120 |
| JIB-E7-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-E7-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-F7-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | <1 | 89 |
| JIB-F7-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-F7-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-F6-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | <1 | 79 |
| JIB-F6-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-F6-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-F5-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | 1.6 | 120 |
| JIB-F5-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-F5-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-F4-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | <1 | 26 |
| JIB-F4-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-F4-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-F3-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | 1.6 | 100 |
| JIB-F3-12 | 3/10/04 | 0 ppm /ND | 12 inches | NA | NA |
| JIB-F3-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-F2-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **2.1** | 210 |
| JIB-F2-12 | 3/10/04 | 0 ppm /ND | 12 inches | <1 | 13 |
| JIB-F2-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| JIB-F1-6 | 3/10/04 | 0 ppm /ND | Surface-6 inches | **5.3** | **600** |
| JIB-F1-12 | 3/10/04 | 0 ppm /ND | 12 inches | **2.8** | **310** |
| JIB-F1-18 | 3/10/04 | 0 ppm /ND | 18 inches | NA | NA |
| *MTCA Method A CL*[3] | | | | *2* | *250* |

[1] ibg = inches below grade.
[2] NA = Not Analyzed.
[3] Model Toxics Control Act (MTCA) Method A cleanup levels.
Analytical results in **bold** are above MTCA Method A cleanup levels.

## 3.1 Discussion of Site Characterization Analytical Results

Diesel and heavy oil organics in the samples tested were below Model Toxics Control Act (MTCA) Method A cleanup levels. Lead and cadmium were present above MTCA Method A cleanup levels in the majority of samples collected with the exception of the southwest, southeast, and northeast corners of the property. Contour maps showing the approximate limits of surficial soils (0 to 6 ibg) that tested above the MTCA Method A cleanup levels of 250 parts per million (ppm) for lead and 2 ppm for cadmium are shown in Figures 3 and 4, respectively. The contours delineate broad areas where anomalous levels of lead and cadmium were found, which appear to be associated with past auto wrecking and possible battery recycling operations.

Analytical results for samples collected at 12 ibg were well below MTCA Method A cleanup levels with the exception of samples JIB-F1-12 (310 ppm lead and 2.8 ppm cadmium) and JIB-B8-12 (480 ppm lead and 6.2 ppm cadmium). Sample JIB-F1-12 was collected in the northwest corner of the property from an area of fill that extended below 12 ibg. Given the site history, the presence of fill at this station with anomalous levels of lead and cadmium correlate with our observation that the heavy metals are associated with fill soils impacted by past operations. Sample JIB-B8-12 exhibited levels of lead at 180 ppm and cadmium at 2.7 ppm at the interval of 0 to 6 ibg (sample JIB-B8-6). Lead increased to 480 ppm and cadmium to 6.2 ppm at 12 ibg in this sample. The presence of these metals at 12 ibg appears to indicate the possible presence of fill or a past discharge of liquid battery acid into the subsurface at this sample location.

## 4.0 REMEDIATION OPTIONS

Remediation options for the site are as follows:

1) **Off-site disposal option:** Scrape off the upper 6 inches of soil impacted by lead and cadmium and stockpile on-site. Resample the soil stockpiles to determine representative level of metals and petroleum hydrocarbon-based compounds present prior to disposal, including Toxicity Characteristic Leaching Procedure (TCLP) tests for metals. If soils are nonhazardous, then transport to a soil disposal facility. If the stockpiles fail the TCLP tests, then the soil may have to be transported to a hazardous waste landfill. The exposed soil must then be re-sampled and re-tested to confirm that impacted soils have been removed and to assure compliance with MTCA Method A cleanup levels. Additional soil may have to be removed based upon cleanup confirmation sampling results. Implementation and documentation of this method would facilitate any future real estate transactions or financing, and minimize potential future impact to ground water resources. Mowing and removing the grass and weeds would reduce the bulk and weight of the waste stream. An alternative to this would be to spray the site with an herbicide such as Round Up prior to the onset of the vegetative growth cycle to prevent additional growth of vegetation.

   Advantages: Contaminated soil and sod are removed from the site, preventing possible future ground water impact and facilitating future real estate transactions and funding. The potential for future enforcement actions by the Washington State Department of Ecology (Ecology) are greatly reduced.

Disadvantages: The client may incur a degree of future liability if the impacted soil is disposed of at a landfill. An attorney experienced in this area of law best can assess the actual risk of the disposal option. If the soil fails the TCLP testing and the waste is determined to be hazardous, then the cost of disposal is greatly increased.

Cost Analysis: The cost of disposal ranges approximately from a low of $23.00/ton (Waste Management's Columbia Ridge Landfill in Oregon) to $30.00/ton (Allied Waste's Roosevelt Regional Landfill in Washington). If the contractor pays the disposal fee, then the entire contract amount would be subject to a varying markup and sales tax of approximately 8.8%. If the client sets up an account and pays the landfill directly, then the final disposal fee at the Columbia Ridge Landfill would be subject to an Oregon Department of Environmental Quality (DEQ) fee of $0.30/ton (if the soil is used as cover) to $1.24/ton (if the soil must be disposed of directly into the landfill). Although there would be no sales tax charged for disposal at the Columbia Ridge Landfill, the waste would reportedly be subject to a 3.6% Washington State refuse tax. Allied Waste does not charge sales tax, refuse tax, or DEQ fees since the soil would be used as cover at the Roosevelt Regional Landfill in Washington State. The fees for handling the soil, including stripping, loading, and transport (minus disposal costs) would be $18.00/ton plus sales tax of approximately 8.8%. The price quoted is based upon a bid supplied by Saybr Contractors, Inc.

If the waste fails the TCLP test for lead, cadmium, or some other constituent, and is designated as a hazardous waste, then the soil would have to be stabilized and disposed of as hazardous waste in a specially designed landfill. The disposal costs for hazardous waste is $125.00/ton for disposal at the hazardous waste landfill in Arlington, Oregon plus a DEQ fee of $2.00/ton and a 3.6% Washington State refuse tax. Transportation using a long haul truck would be approximately $30.00/ton. The fees for handling the soil, including stripping, loading, *minus transport and disposal costs* would be $20.00/ton plus sales tax of approximately 8.8%. The price quoted is based upon a bid supplied by Saybr Contractors, Inc. using Level C personal protective equipment.

2) **On-site disposal/stabilization option:** Scrape off surficial soils and stockpile on-site. Re-sample as in Option 1 above. If this material proves to be nonhazardous waste, then process and stabilize soil to minimize possible leaching of contaminants. The stabilization techniques that may be employed include mixing the soil with Portland cement, burying the soil inside of a plastic-lined encapsulation, or placing the soil in mounds with an impervious cap and bottom to prevent the possible generation of leachate from meteoric waters migrating through the sediment. AESI recommends that if this method is chosen, that the work be performed under the Voluntary Cleanup Program (VCP) from the start to ensure that Ecology does not object to the use of the on-site stabilization option.

Advantages: Contaminated soil and sod are stabilized, minimizing possible future ground water impact.

Disadvantages: Future real estate transactions and funding may be more difficult due to the continued presence of the contamination on the site. The site may be subject to future Ecology enforcement actions. The presence of such material on-site may cloud the title. The space required for on-site stabilization may also be a limiting factor of this option.

Cost Analysis: The cost of waste stabilization is highly variable depending on stabilization techniques used and the amount of handling required. The presence of organics (sod) complicates the stabilization process. The stabilized waste may be unsuitable as fill under asphalt due to the presence of organics (sod). The application rate of Portland cement is reportedly 10 to 20% by weight, or approximately 290 to 580 tons of cement. Estimation of the actual costs of this method is beyond the scope of this characterization. Due to the potential cost, apparent lack of on-site disposal capacity, and future liability concerns, this method is not recommended by AESI.

3) **Soil recycling option:** Scrape off the upper 6 inches of soil impacted by lead and cadmium and stockpile on-site. Re-sample the stockpiles as in Option 1 above. If this material proves to be nonhazardous waste, then transport the soil to one of two recycling facilities (TPS Technologies in Tacoma or Lafarge Industries in Seattle). The exposed soil should then be re-sampled to confirm that impacted soils have been removed and to assure compliance with MTCA Method A cleanup levels. Additional soil may have to be removed based upon cleanup confirmation sampling results. Implementation and documentation of this method would facilitate any future real estate transactions or financing, and minimize potential future impact to ground water resources. Mowing and removing the grass and weeds would reduce the bulk and weight of the waste stream. An alternative to this would be to spray the site with an herbicide such as Round Up prior to the onset of the vegetative growth cycle to prevent additional growth of vegetation.

Advantages: Since the soil would be recycled into the manufacturing process, the potential for future liability would be at a minimum. Contaminated soil and sod are removed from the site, preventing possible future ground water impact and facilitating future real estate transactions and funding. The potential for future enforcement actions by Ecology are greatly reduced. The overall cost of the method compares favorably with other remediation methods considered. AESI recommends Lafarge Industries as the preferred facility, since the recycled material would be processed and stabilized by incorporating this material into the concrete manufacturing process.

Disadvantages: If the soil fails the TCLP testing and the waste is determined to be hazardous, then at least a portion of the soil may have to be treated as hazardous waste with the corresponding substantial cost of disposal and associated potential liability.

Cost Analysis: The cost of recycling ranges from approximately a low of $25.00/ton (Lafarge Industries) to $28.00/ton (TPS Technologies). If the contractor pays the recycling fee, then the entire contract amount would be subject to markup and sales tax of approximately 8.8%. If the client sets up an account and pays the recycler directly, then the recycling charges are exempt from sales tax. The rational is that the material is a raw product used in the manufacturing process with sales tax being charged to the end user. The fees for handling the soil, including stripping, loading, and transport (minus recycling costs) would be $18.00/ton plus sales tax of approximately 8.8%. The price quoted is based upon a bid supplied by Saybr Contractors, Inc.

4) **No action option:** Leave site soils untreated and in place. No development.

Advantages: Low cost.

Disadvantages: Contaminated soil and sod remain on the site, with possible future ground water impact and potentially complicating future real estate transactions and funding. The potential for future enforcement actions by Ecology are the highest with this method.

Cost Analysis: No immediate cost. Future cost unknown depending on Ecology.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon analytical results, surficial soils (0 to 6 inches) on the subject property are impacted with the heavy metals cadmium and lead. The soil horizon below this depth does not appear to be impacted by the relatively insoluble salts of lead and cadmium. Stripping and removal of the upper 6-inch soil horizon is recommended. This method, as opposed to on-site stabilization, facilitates future funding and property transfers, and minimizes the risks of intervention by Ecology. Based on our analysis of remediation options for the subject property, AESI recommends recycling of the soil to minimize potential future liabilities. If some of the stockpiled soil fails TCLP testing, then at least a portion of the removed soils may have to be transported to the hazardous waste landfill in Arlington, Oregon.

Mowing of the property is also recommended to reduce the bulk of the waste stream and to minimize potential soil processing (screening) issues. Spraying with an herbicide early in the season would also provide a means of reducing the bulk of organics, especially if the vegetation is allowed to dry out thoroughly. The use of an approved herbicide that does not leave residues in the soil is recommended.

## 6.0 LIMITATIONS

This report is for the exclusive use of Jack in the Box, Inc., Mr. Jerome O'Leary, and their associates. The report is based upon data and information collected by AESI. The findings in this report are representative of the specific areas tested during our site visit. The recommendations and conclusions contained in this report represent our professional opinions. These opinions were derived in accordance with currently accepted environmental practices at this time and location. Other than this, no warranty is implied or intended.

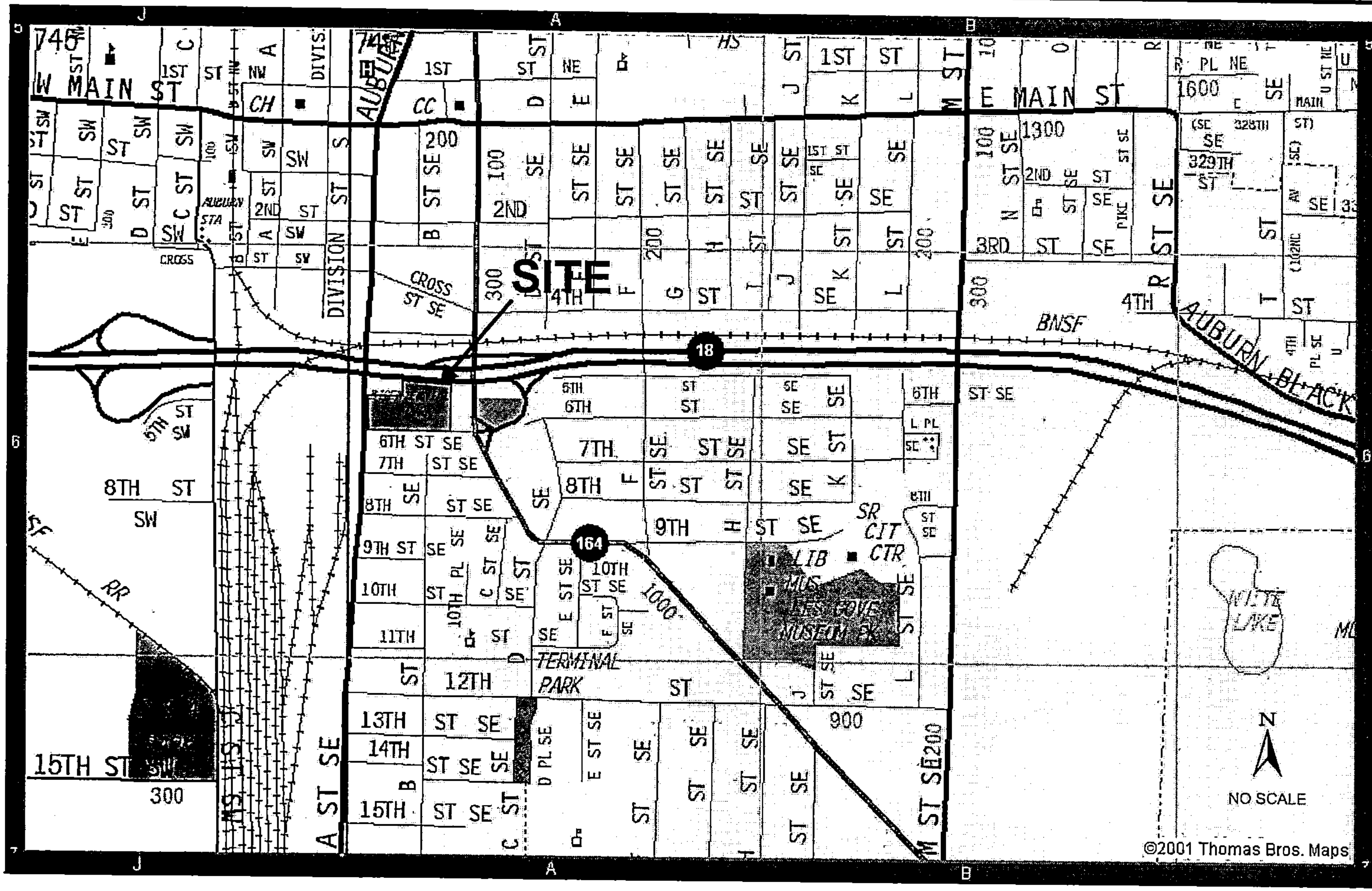
Sincerely,
**ASSOCIATED EARTH SCIENCES, INC.**
**Kirkland, Washington**

**Richard N. Simpson, P.G., P.Hg.**
**Project Environmental Geologist**

**Gary A. Flowers, P.G., P.E.G.**
**Principal**

Attachments:

| | | |
|---|---|---|
| Figure 1: | Vicinity Map | |
| Figure 2: | Grid Layout | |
| Figure 3: | Contour Map: | Lead Levels |
| Figure 4: | Contour Map: | Cadmium Levels |
| Appendix A: | Laboratory Analytical Results | |

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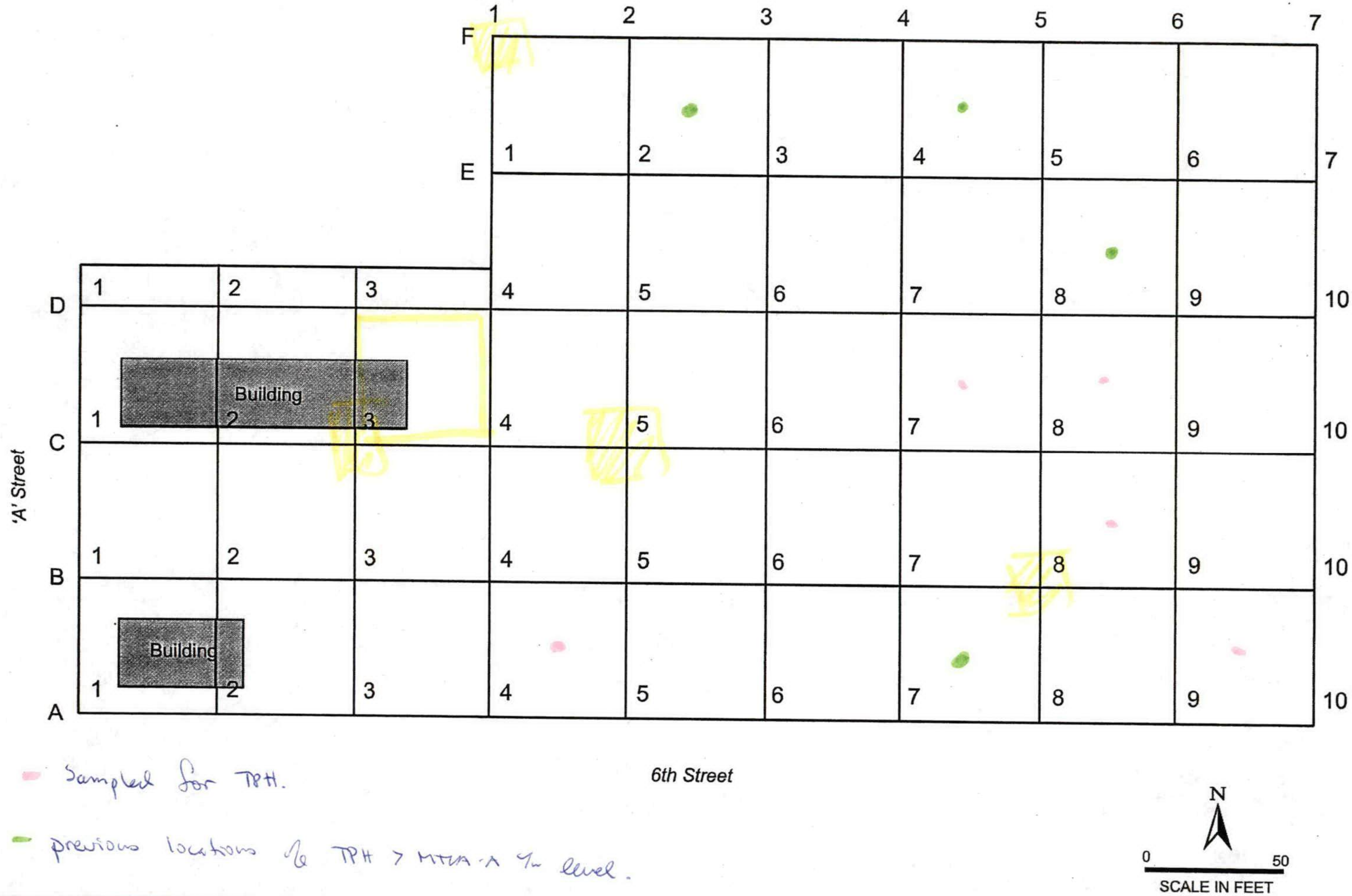
## VICINITY MAP
### JACK IN THE BOX
### AUBURN, WASHINGTON

FIGURE 1

DATE 02/04

PROJ. NO. KV04045A

04045 jlb\04045 vicinity.cdr

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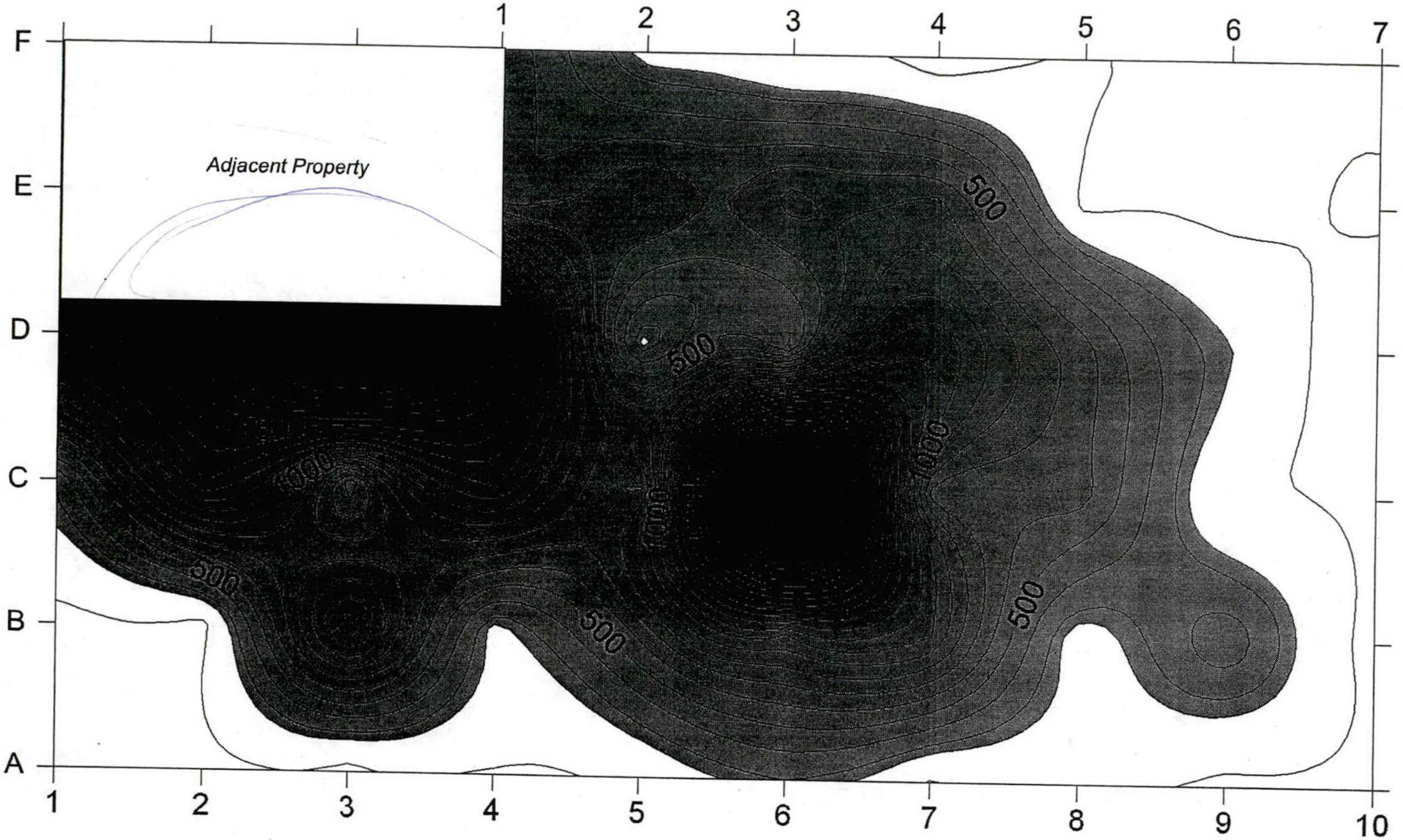
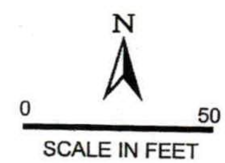
**GRID LAYOUT (50' CENTERS)**
**JACK IN THE BOX**
**AUBURN, WASHINGTON**

FIGURE 2
DATE 04/03
PROJ. NO. KE04045A

04045 jack in the box\04045 grid.cdr




Sampling interval = 0 to 6 inches
Countour interval = 100 ppm
MCTA Method A Cleanup Level = 250




04045 jack in the box\04045 lead.cdr

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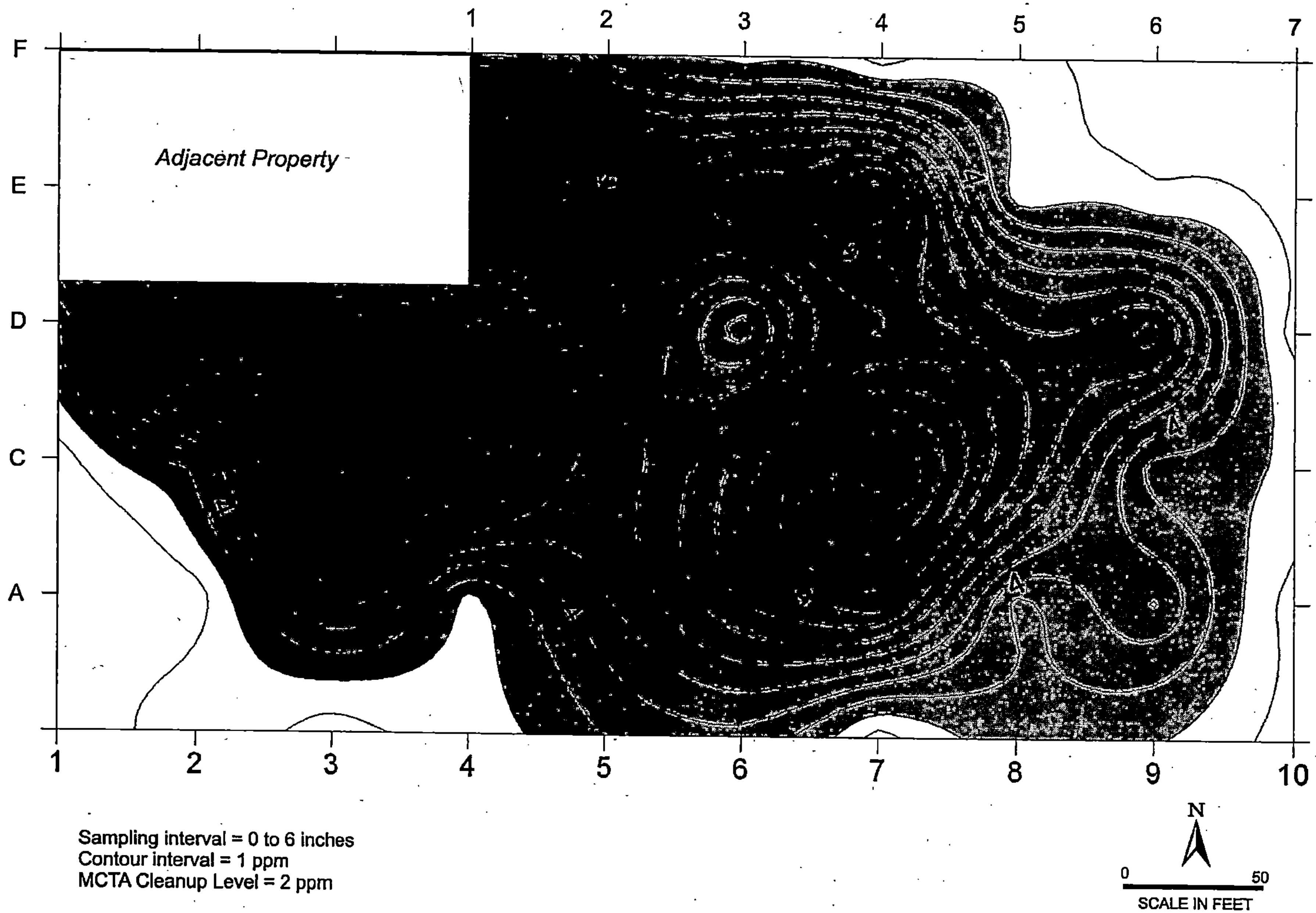
**CONTOUR MAP - LEAD LEVELS**
**JACK IN THE BOX**
**AUBURN, WASHINGTON**

FIGURE 3

DATE 04/03

PROJ. NO. KE04045A




Sampling interval = 0 to 6 inches
Contour interval = 1 ppm
MCTA Cleanup Level = 2 ppm

04045 jack in the box\04045 cadmium.cdr

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**CONTOUR MAP - CADMIUM LEVELS**
**JACK IN THE BOX**
**AUBURN, WASHINGTON**

FIGURE 4

DATE 04/03

PROJ. NO. KE04045A

# APPENDIX A

# Laboratory Analytical Results

Date of Report: 03/30/04
Date Received: 03/09/04
Project: Jack-in-the-Box KE04045B, F&BI 403084
Date Extracted: 03/29/04
Date Analyzed: 03/29/04

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLE FOR TCLP METALS IN ACCORDANCE WITH 40 CFR PART 261**

Results Reported as mg/L (ppm)

| Sample ID<br>Laboratory ID | Lead |
|---|---|
| JIB-E1-6<br>403084-10 | <0.5 |
| Method Blank | <0.5 |