# PHASE I SUMMARY REPORT
# FOR
# DETROIT LEAD ASSESSMENT PROJECT
# GREAT LAKES SMELTING – 1640 EAST EUCLID STREET
# DETROIT, WAYNE COUNTY, MICHIGAN

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY**
**REMEDIATION AND REDEVELOPMENT DIVISION**
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Prepared by:

**WESTON SOLUTIONS OF MICHIGAN, INC.**
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**March 2004**

W.O. No.: 20083.028.001

# EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This Summary Report addresses sampling that was conducted in the vicinity of the former Great Lakes Smelting Company (the Facility), 1640 East Euclid Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution, and statistical analysis to determine if the lead at the adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 6, 7 and 10 November 2003, WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. The data collected during the Phase I sampling does not support that an identifiable aerial release occurred from the Facility during historic smelting operations. Because lead concentrations exceeding the screening level were detected downwind, it is recommended that additional work be performed at the Facility including:

- Obtain access to the Facility for:
    - Review of existing information related to property transfer (Phase I, Phase II, and development planning):
    - Interview past employees regarding historical Facility operations;
    - Perform a Facility walk through to determine existing conditions;
    - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Facility (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to confirm and/or determine the extent of downwind contamination.

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# SECTION 1

# INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the project) in Detroit, Wayne County, Michigan. This Summary Report addresses sampling that was conducted in the vicinity of the former Great Lakes Smelting (the Facility) – 1640 East Euclid Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols for this work are described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project* (Comprehensive Summary).

This Phase I Summary Report for Great Lakes Smelting has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Summary Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Site Information,
- **Section 3** – Field Activities and Procedures,
- **Section 4** – Phase I Analytical Results, and
- **Section 5** – Recommendations.

Attachments to this Summary Report include the following:

- **Attachment A** – Figures,
- **Attachment B** – Tables,
- **Attachment C** – Wind Rose Plot,
- **Attachment D** – Photographs of Sampling Locations,
- **Attachment E** – Concentration Graph, and
- **Attachment F** – Statistical Distribution.

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# SECTION 2

# SITE INFORMATION

## 2.1 SITE DESCRIPTION

The Facility, located at 1640 East Euclid Street in Detroit, Wayne County, Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the *"Summary Report for Data Investigation, Detroit Lead Assessment Project"* dated September 2003, concluded that the Facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of off-site properties sampled are presented in **Table 1** located in **Attachment B**.

### 2.1.1 Site Location

The Facility appears to be located north of some warehouses and south of the American Axle plant surrounding the Holbrook site. The parking lot is fenced in with a Stress Con Industries Inc. Plant 6 sign posted. The area five blocks to the north of the Facility is industrial, mainly consisting of the American Axle parking lot. The area five blocks to the south of the Facility is industrial, mainly warehouses. The area five blocks east of the Facility is industrial, mainly the American Axle Plant. The area five blocks west of the Facility is industrial, mainly freeway with residences west of the freeway.

### 2.1.2 Site History

A review of the Bresser's city directory review indicated that East Side Metal Company and Schuster Max D atty owned the property in 1946; Great Lakes Smelting and Schuster Max D atty in 1951; and Jeffrey P Berger, Max D Schuster, and GR Lakes Smelting Company in 1961. There are no listings for the address from 1971 to the present.

Review of the Sanborn maps for this address show the following chronology: 1951 Scrap Metal Stage present with Steel Truss & Joists; 1968 Scrap Metal Stage present; 1970 to 2002 vacant lot and/or building present.

The aerial photograph review indicated that this area has been industrial from 1957 to the present with the nearest residential area located approximately 900 feet (ft.) west of the address. Structures identified from the most recent aerial photograph (2003 GlobeXplorer™) include a large building which occupies almost the entire property. Review of the drive by information indicates that land use is consistent with the aerial photograph and Sanborn maps.

During the investigation of the fire records, no records were found for the Facility.

Review of the BEA for nearby "1614 and 1660 Clay Avenue", dated September 1998, prepared by Vision Environmental Inc. for Wintor-Swan Associates L.L.C., indicates that lead was detected on the Sites at levels up to 28,000 milligrams/kilograms (mg/kg) and exceeded the MDEQ Part 201 Residential Direct Contact Criteria (400 mg/kg).

## 2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

# SECTION 3

# FIELD ACTIVITIES AND PROCEDURES

## 3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations consistent with smelter-related releases are present off-site and could be attributed to the Facility. The general sampling protocol presented in **Section 2** of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1,000 foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for this Facility.

Prior to sample collection, upwind and downwind sampling areas were established, 1,900 and 1,800 ft. from the Facility, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C.** Soil samples were collected from City and/or State owned properties located within these established areas.

The City and/or State owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual City and/or State owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

Sampling activities (sample collection, record keeping, and photo documentation) were conducted as described in the Comprehensive Summary. Because 12 City and/or State owned parcels were not available in the sample radius for the Facility, WESTON collected samples from six City and/or State owned parcels in the upwind direction and four greenways in the downwind direction in the vicinity of the Facility. Two composite samples were collected from each of the six upwind parcels. Eight composite samples were collected from two larger downwind greenways because they encompassed approximately four average sized parcels, and

four composite samples were collected from two average sized greenways. A total of 24 composite samples were collected from the area upwind and downwind of the Facility and are shown on the sample sketches included in **Attachment A**.

## 3.2 FIELD ACTIVITIES

WESTON personnel conducted field sampling on 6, 7 and 10 November 2003. Since City and/or State owned parcels were not available in the downwind direction, WESTON selected greenways, prior to the sampling event, and submitted them to the City of Hamtramck to obtain their approval and access. When greenways were not located on the same street as the mailing address of the nearest building, the number of the building was used in conjunction with the street of the greenway. For example, a building located on 8435 Aubin Street with a greenway located across the street off of Denton Street, would be identified as DEN – 08435. These changes were noted in the logbook and can be viewed on the "Summary Table For Sample Properties" (located in **Attachment B**) and the sample sketches (located in **Attachment A**).

WESTON collected samples from four downwind greenways: Two composite samples were collected from two of the downwind greenways and eight composite samples were collected from two larger upwind greenways for a total of 12 upwind samples. Also, two composite samples were collected from each of the six upwind city and/or state owned parcels for a total of 12 upwind samples. Twenty-four soil samples were submitted for analysis. Five samples were designated as matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP.

# SECTION 4
# PHASE I ANALYTICAL RESULTS

## 4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Facility project area:

- 12 composite soil samples in the upwind direction, and
- 12 composite soil samples in the downwind direction.

Sample locations from both the upwind and downwind areas are listed in **Table 1** included in **Attachment B**.

In accordance with the QASP, a total of 24 samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. One sample collected from properties upwind of the Facility contained concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. Four samples collected from properties downwind of the Facility contained concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

**Phase I Summary of Results**

| Location | Number of Samples | Number equal or greater than 400 mg/kg | Range of Values (mg/kg) |
|---|---|---|---|
| Upwind | 12 | 1 | 92-440 |
| Downwind | 12 | 4 | 37-790 |
| Total | 24 | 5 | 37-790 |

## 4.2 ATMOSPHERIC CONDITIONS

During Phase I soil sampling activities, upwind and downwind parcels were selected based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind direction in the City of Detroit Metropolitan area. If smelting operations occurred, lead in soils resulting from aerial deposition would be found downwind in the northeast direction from

the Facility. Parcels ranging from 1,600 ft. to 1,900 ft. were chosen southwest in the upwind direction of the Facility. Parcels ranging from 1,000 ft. to 1,750 ft. were chosen northeast, as close to the mean downwind direction of the Facility due to the presence of residential properties. Lead concentrations were detected in the upwind and downwind direction of the Facility. A detailed analysis of upwind and downwind concentrations is contained in **Section 4.3 Spatial Analysis**.

## 4.3 SPATIAL ANALYSIS

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus, the Phase I investigation was designed to determine if an off-site airborne release had occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the Facility in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead greater than the screening level occurs within the primary downwind and upwind envelopes.

To determine the distribution of the lead concentrations in soils as the distance from the Facility increases, WESTON evaluated the lead concentration of samples versus the distance from the Facility by graphing the data in relation to each other. Evaluation of this graph **(Attachment E)** indicated similar concentrations of lead in the upwind and downwind direction. Elevated levels of lead were detected in both directions and do not show any clear indication downwind of a decreasing concentration. This condition would be expected if an aerial release of lead had occurred due to smelting operations. These conclusions were confirmed by a linear regression of the concentration versus distance data (**Attachment E**).

## 4.4 STATISTICAL ANALYSIS

Analytical data was entered into a spreadsheet and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F** the downwind logmean is 5.1 mg/kg and the upwind logmean is 5.0 mg/kg indicating the downwind and upwind

concentrations are similar. Comparison of the relative frequency histogram (**Attachment F**) for the downwind and upwind data indicates, a higher frequency of occurrence for both data sets between 0 and 200 mg/kg and a greatly decreasing frequency above 300 mg/kg also indicating the data are similar. Comparison of the upwind and downwind data sets indicates the lead concentrations are similar to each other both in mean concentration and distribution to conclude that the data represent the same conditions.

## 4.5 CONCLUSIONS

The pattern of analytical results for lead in soil samples collected for the Facility does not suggest that lead contamination detected in downwind locations is attributable to historic releases from historic smelting operations at the Facility. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils (400 mg/kg), as established under Part 201 Environmental Response of the Natural Resources and Environmental Protection Act 1994, as amended.

Samples collected from upwind and downwind of the Facility contained concentrations of lead above the screening level. Additionally, the downwind samples do not show a clear trend of decreasing concentration with increasing distance with levels of lead starting under 50 mg/kg and rising to 790 mg/kg approximately 1,700 ft. from the Facility. The data collected during the Phase I sampling does not support that an identifiable aerial release occurred from the Facility during historic smelting operations. However, the presence of lead at concentrations above the screening level downwind of the Facility does not allow a definitive conclusion of this finding.

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# SECTION 5

# RECOMMENDATIONS

The results of this investigation do not indicate that soils at downwind properties have been impacted by releases of lead from the Facility as a result of aerial deposition related to historic smelting operations. Because lead concentrations exceeding the screening level were detected downwind, it is recommended that additional work be performed at the Facility including:

- Obtain access to the Facility for:
    - ° Review of existing information related to property transfer (Phase I, Phase II, and development planning):
    - ° Interview past employees regarding historical Facility operations;
    - ° Perform a Facility walk through to determine existing conditions;
    - ° Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Facility (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to confirm and/or determine the extent of downwind contamination.

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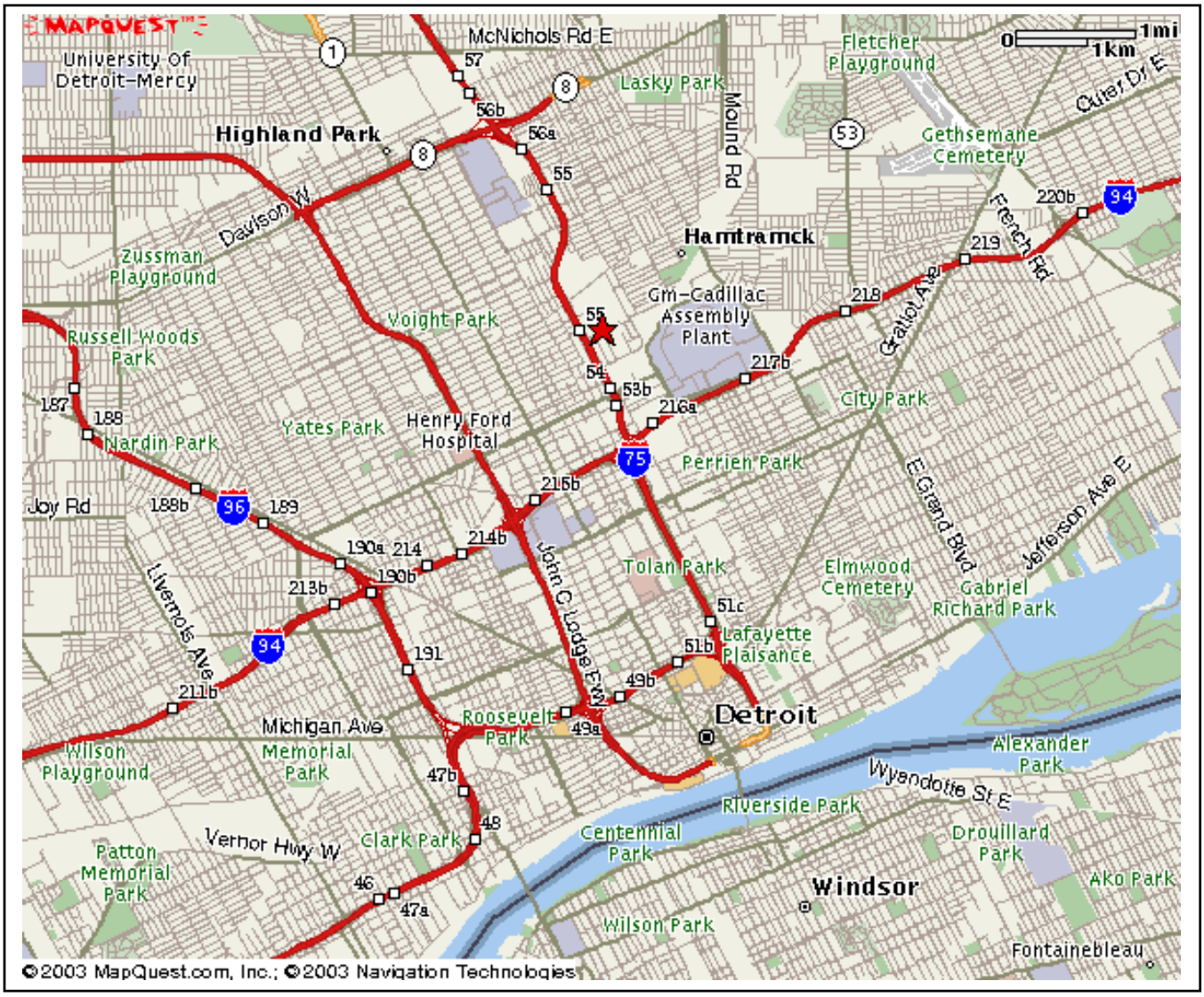
# ATTACHMENT A

# FIGURES

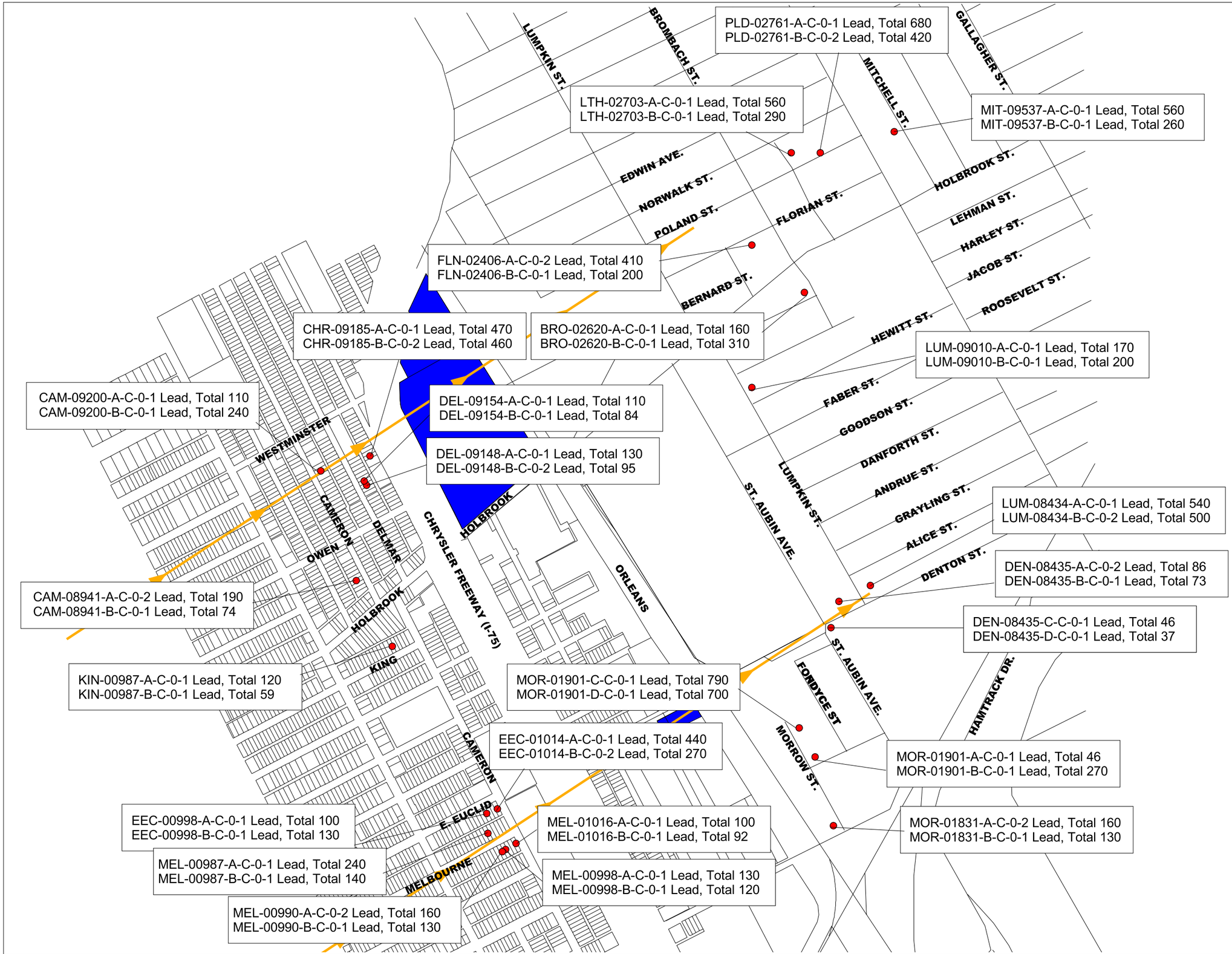
# FIGURE 1
## Site Location Map
## 1640 East Euclid Street




**WESTON SOLUTIONS, INC. OF MICHIGAN**

**300 River Place, Suite 2800**
**Detroit, Michigan 48207**

**Detroit Lead Assessment Project**
**Detroit, Wayne County, Michigan**
**W.O. No. 20083.028.001**




LEGEND:

EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

- Sampling Locations
- Wind Direction
- Parcel Boundaries and Roads (Approximate)
- Facility of Concern

Note: All Lead, Total analytical resutls are shown in mg/kg.

N

0 700 Feet

WESTON SOLUTIONS SM

PROJECT NAME:

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan


Weston Soultions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207


DRAWING TITLE:

Analytical Results Map

Acme Metal Co
1436 Holbrook Street
Great Lakes Smetling
1640 E. Euclid Street

| | | |
|---|---|---|
| WORK ORDER No.: 20083.028.001 | PROJECT MANAGER: | |
| DRAWN BY: JLT | CHECKED BY: | |
| DRAWING NAME: | DIRECTORY/ FOLDER: JTD:\DLAP\apr\09_09_03.apr | |
| CONTRACT No.: | DELIVERY ORDER No.: | |
| SCALE: | REPORT DATE: | |
| DATE: January 2004 | REVISION No.: | FIGURE No.: 2 |

WESTON® MANAGERS DESIGNERS/CONSULTANTS

SHEET 1 of 1

CLIENT/SUBJECT Euclid W.O. NO. _____

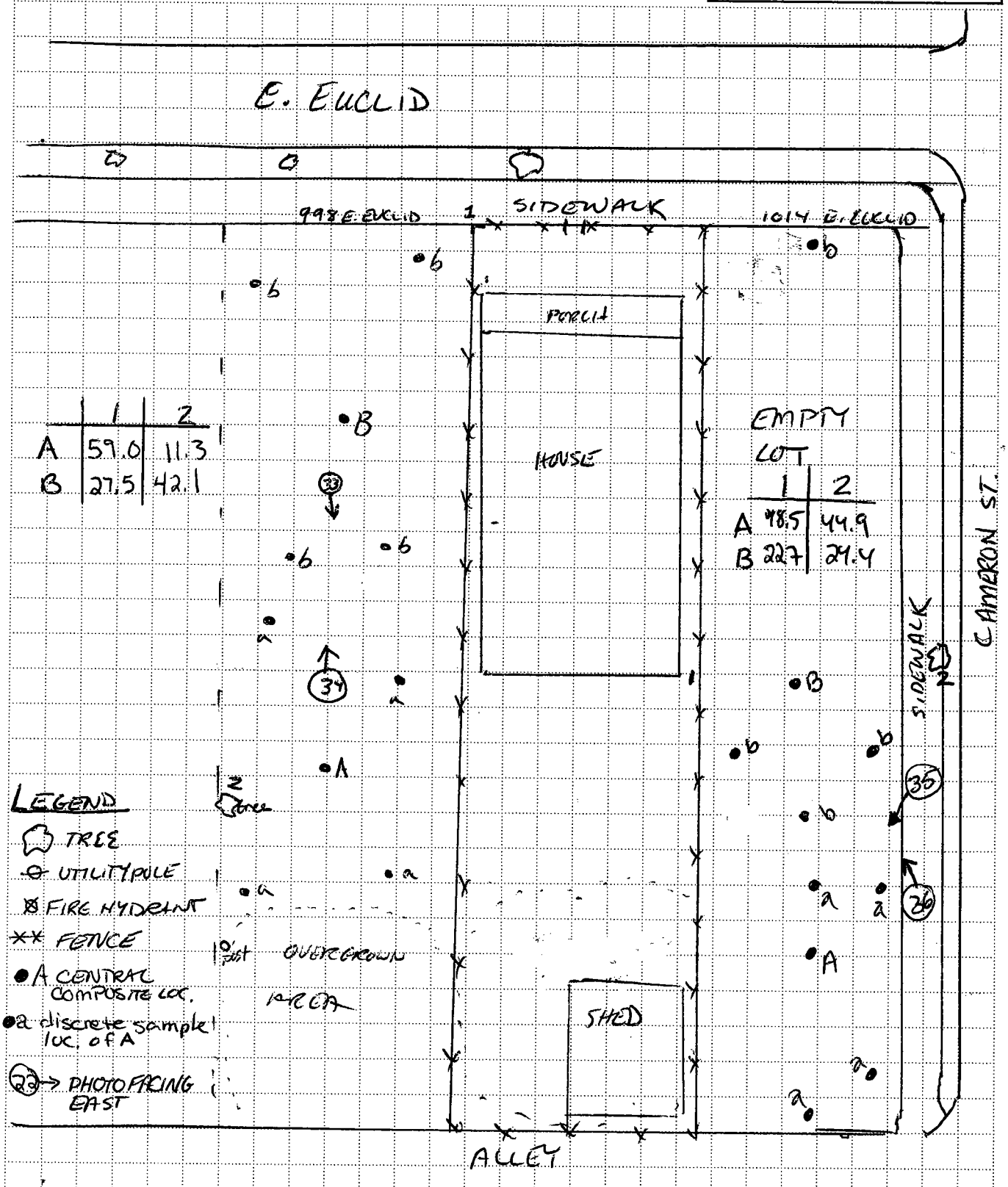
TASK DESCRIPTION EEC-00998 A+B, EEC-1014 Euclid TASK NO. _____

PREPARED BY R. Nemirovsky DEPT _____ DATE 11/07/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY _____ DEPT _____ DATE _____




| | 1 | 2 |
|---|---|---|
| A | 59.0 | 11.3 |
| B | 27.5 | 42.1 |

| | 1 | 2 |
|---|---|---|
| A | 98.5 | 44.9 |
| B | 22.7 | 29.4 |

RFW 10-05-003/A-5/85

WESTON® MANAGERS DESIGNERS/CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT Euclid W.O. NO. ____

TASK DESCRIPTION MEL-01016 A+B TASK NO. ____

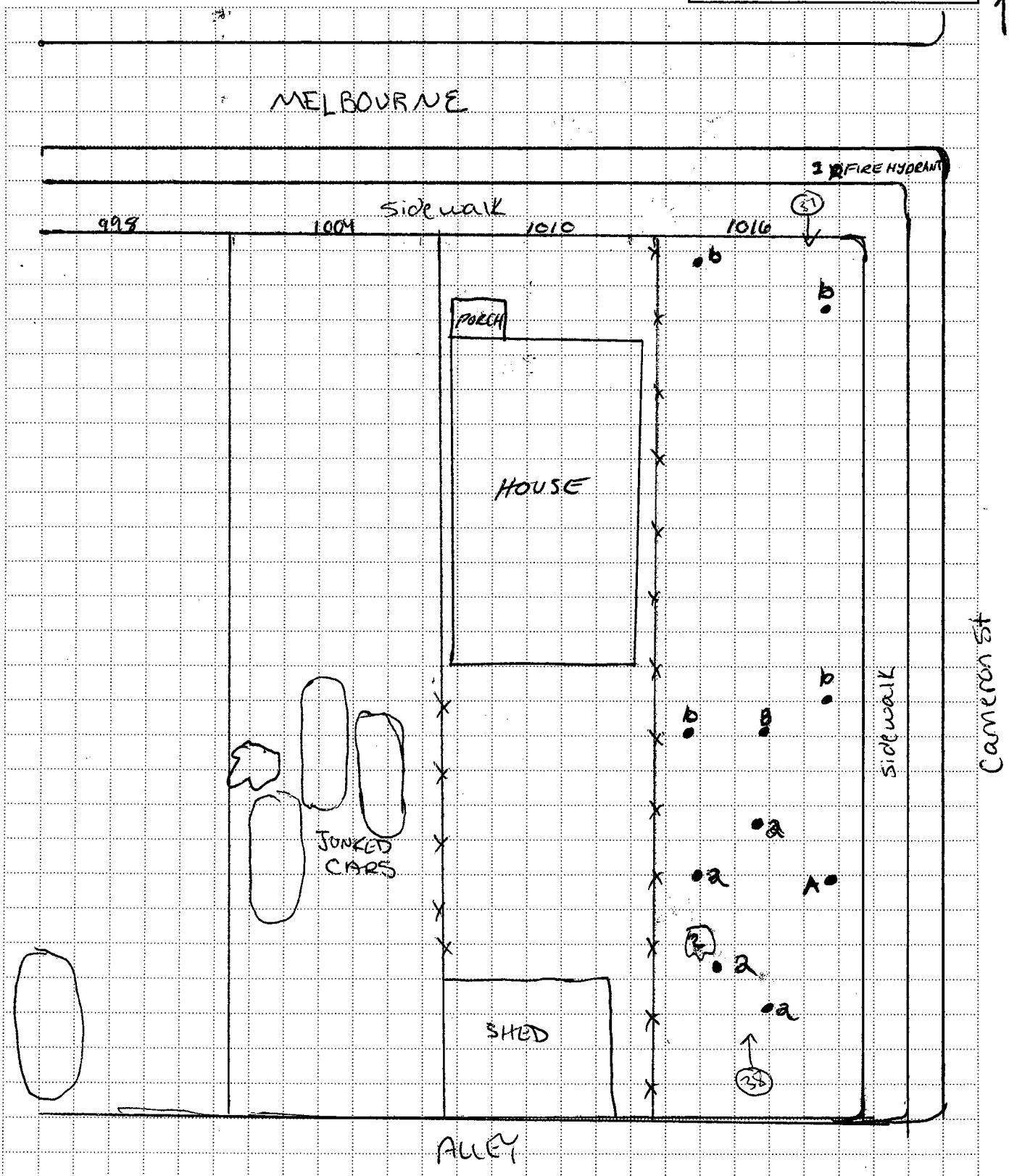
PREPARED BY A. Freeman DEPT ____ DATE 11/7/03

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY

DEPT ____ DATE ____



WESTON
MANAGERS DESIGNERS/CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT Euclid W.O. NO. ____

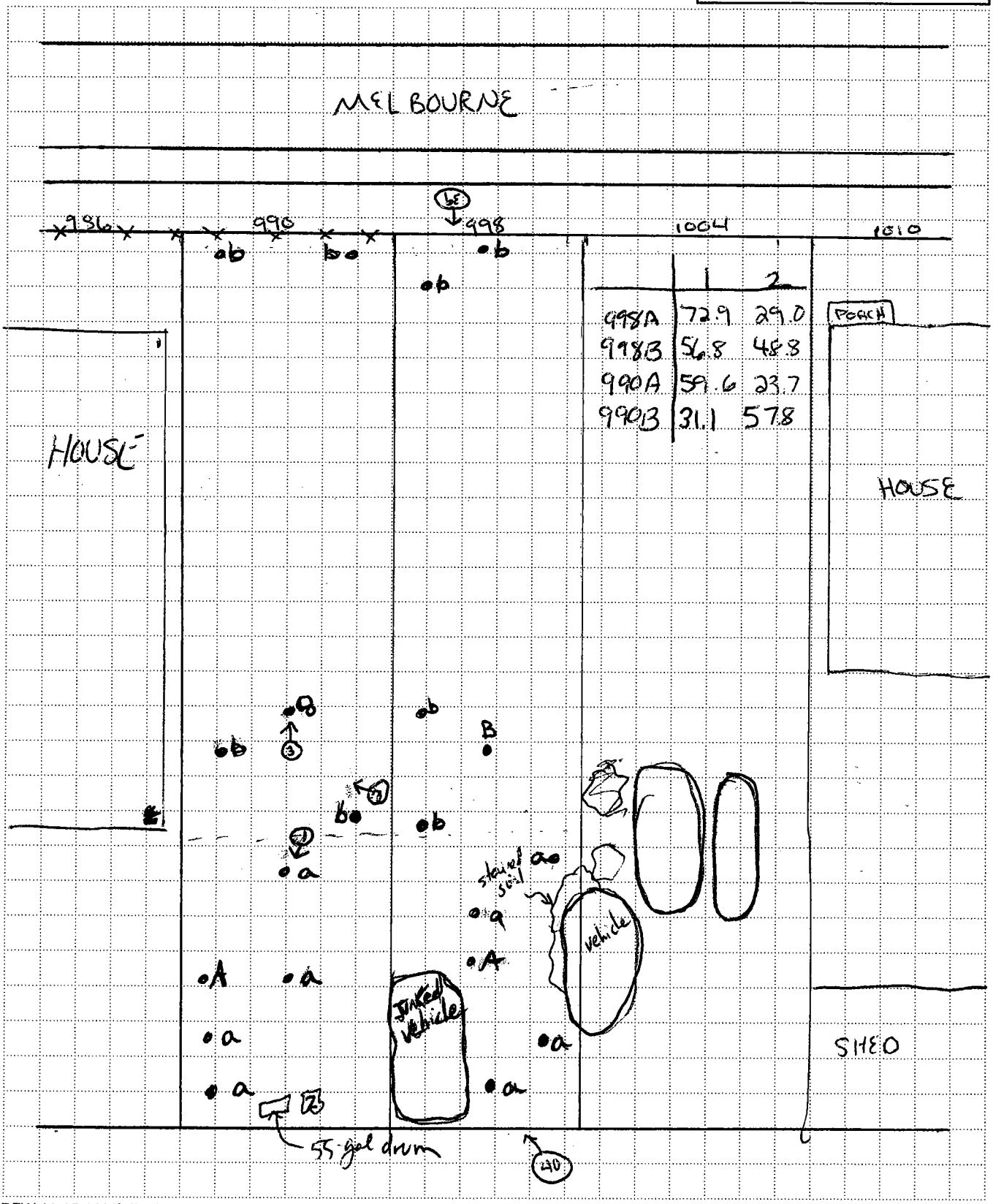
TASK DESCRIPTION MEL-00998 A+B MEL-00990 A+B TASK NO. ____

PREPARED BY A. Freeman DEPT ____ DATE 11-7-03

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY ____ DEPT ____ DATE ____




RFW 10-05-003/A-5/85

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SHEET ____ of ____

CLIENT/SUBJECT Euclid W.O. NO. ____

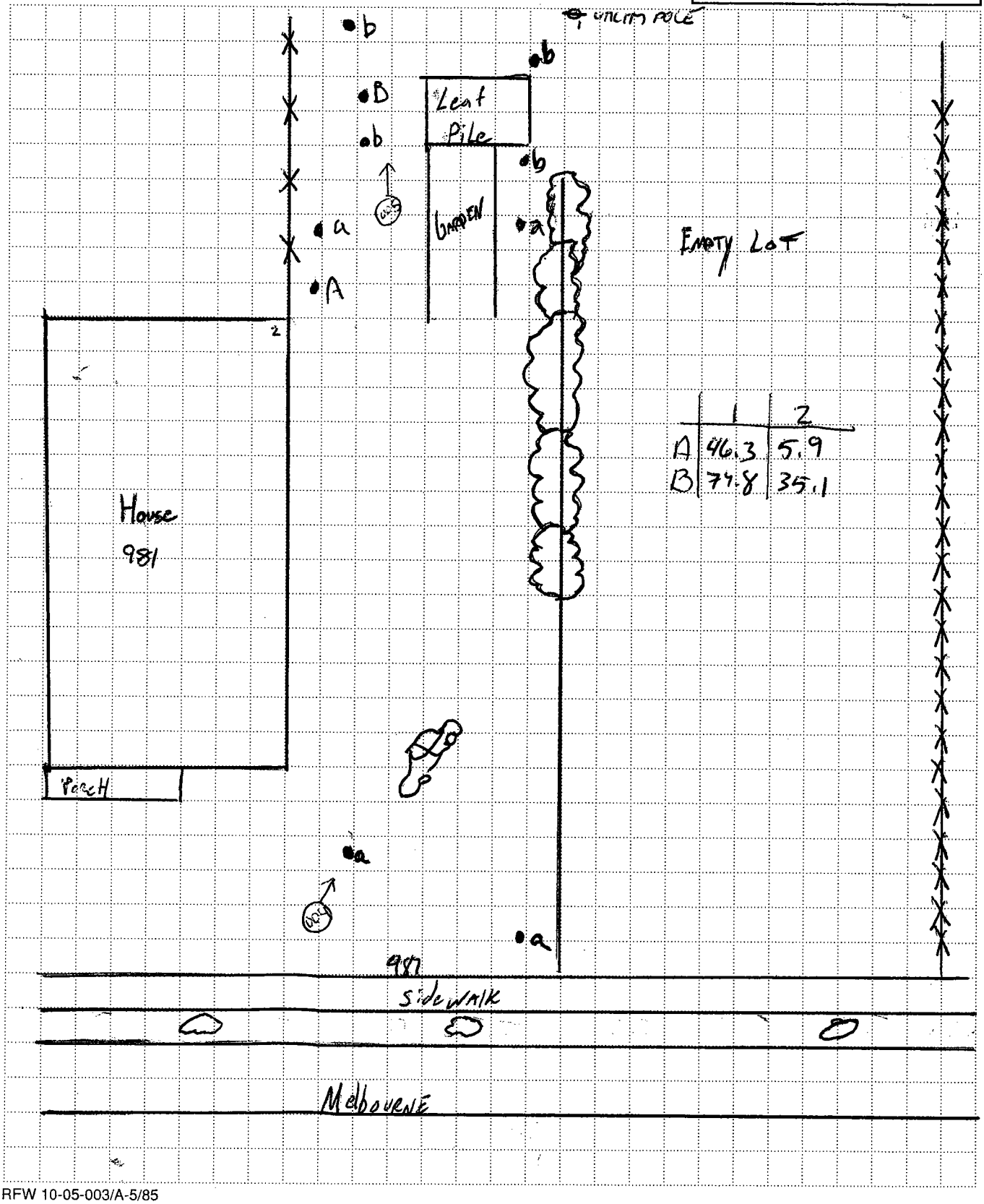
TASK DESCRIPTION MEL-00987 ATTB TASK NO. ____

PREPARED BY E. MARTINSON DEPT ____ DATE 11/10/03

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY ____ DEPT ____ DATE ____




| | 1 | 2 |
|---|---|---|
| A | 46.3 | 5.9 |
| B | 74.8 | 35.1 |

WESTON MANAGERS DESIGNERS/CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT Euclid W.O. NO. ____

TASK DESCRIPTION DEV-08435 A,B,C,D + LUM-08434 A+B TASK NO. ____

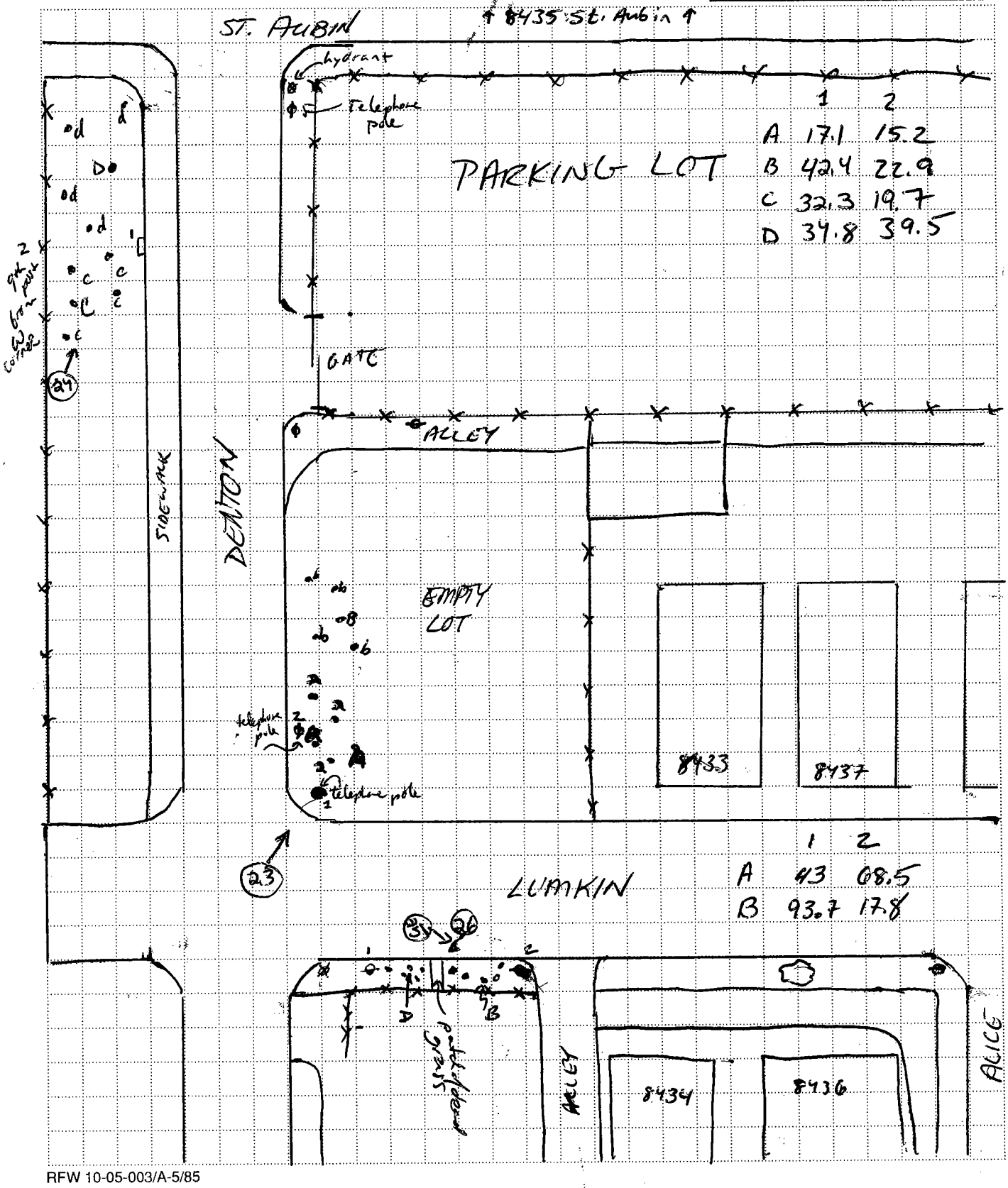
PREPARED BY R. Niemiensko DEPT ____ DATE 11/06/03

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY

DEPT ____ DATE ____




RFW 10-05-003/A-5/85

WESTON MANAGERS DESIGNERS/CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT Euclid W.O. NO. ____

TASK DESCRIPTION MOR-01901 A THROUGH D TASK NO. ____

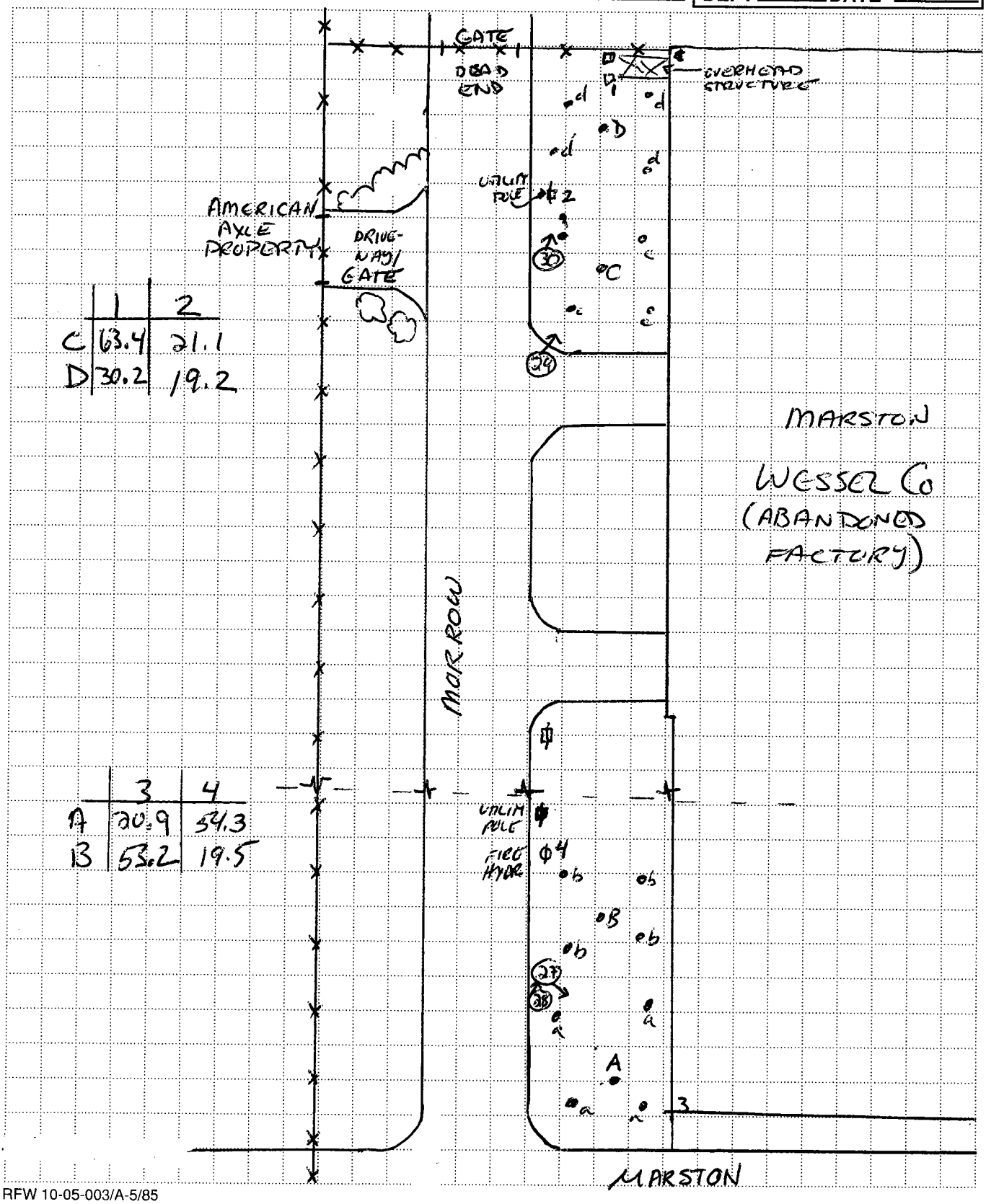
PREPARED BY R Nemirovsky DEPT ____ DATE 11/07/03

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY

DEPT ____ DATE ____




| | 1 | 2 |
|---|---|---|
| C | 63.4 | 21.1 |
| D | 30.2 | 19.2 |

| | 3 | 4 |
|---|---|---|
| A | 20.9 | 54.3 |
| B | 53.2 | 19.5 |

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MANAGERS DESIGNERS/CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT EUCLID W.O. NO. ____

TASK DESCRIPTION MOR-01831 A+B TASK NO. ____

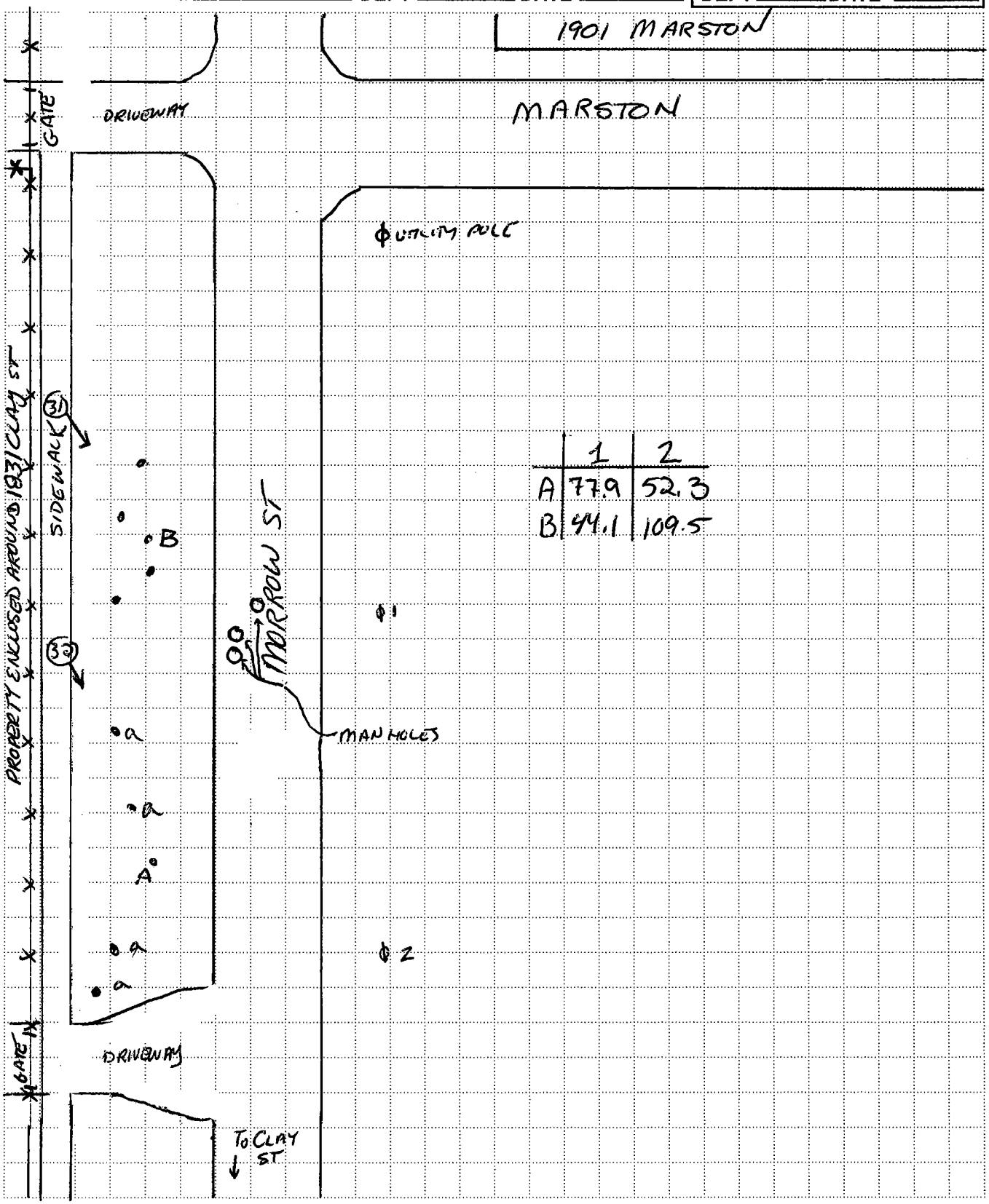
PREPARED BY R. NEMIROVSKY DEPT ____ DATE 11/07/03

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY

DEPT ____ DATE ____




| | 1 | 2 |
|---|---|---|
| A | 77.9 | 52.3 |
| B | 44.1 | 109.5 |

# ATTACHMENT B

# TABLES

## TABLE 1

## SUMMARY OF SAMPLED PROPERTIES

| ***Upwind Properties*** | | |
|---|---|---|
| **Address** | **Description** | **Sample Identification** |
| 998 East Euclid | Vacant property located on the south side of East Euclid St. | EEC-00998-A-C-0-1 |
| | | EEC-00998-B-C-0-1 |
| 1014 East Euclid | Vacant property located on the south side of East Euclid St and at the corner of East Euclid and Cameron St. | EEC-01014-A-C-0-1 |
| | | EEC-01014-B-C-0-2 |
| 1016 Melbourne | Vacant property located on the south side of Melbourne St and at the corner of Melbourne and Cameron St. | MEL-01016-A-C-0-1 |
| | | MEL-01016-B-C-0-1 |
| 998 Melbourne | Vacant property located on the south side of Melbourne St and in between two other vacant lots. | MEL-00998-A-C-0-1 |
| | | MEL-00998-B-C-0-1 |
| 990 Melbourne | Vacant property located on the south side of Melbourne St and to the west of property at 998 Melbourne. | MEL-00990-A-C-0-2 |
| | | MEL-00990-B-C-0-1 |
| 987 Melbourne | Vacant property located on the north side of Melbourne St and to the west of another vacant property. | MEL-00987-A-C-0-1 |
| | | MEL-00987-B-C-0-1 |
| ***Downwind Properties*** | | |
| **Address** | **Description** | **Sample Identification** |
| 8435 St Aubin | Greenway of vacant lot located across the street and to the east of 8435 St Aubin and to the north of Denton St. | DEN-08435-A-C-0-2 |
| | | DEN-08435-B-C-0-1 |
| | Greenway located across the street and to the east of 8435 St Aubin and to the south of Denton St. | DEN-08435-C-C-0-1 |
| | | DEN-08435-D-C-0-1 |
| 8434 Lumpkin | Greenway located to the east of Lumpkin St in front of a fenced in lot and to the south of the property at 8434 Lumpkin. | LUM-08434-A-C-0-1 |
| | | LUM-08434-B-C-0-2 |
| 1901 Marston | Greenway located on the east side of Morrow St and on the corner of Morrow and Marston St. On the west side of the greenway is Wessel Co, an abandoned Factory. | MOR-01901-A-C-0-1 |
| | | MOR-01901-B-C-0-1 |
| | Greenway located on the east side of Morrow St and across the street from an American Axle Plant gated driveway. | MOR-01901-C-C-0-1 |
| | | MOR-01901-D-C-0-1 |
| 1831 Clay | Greenway located to the west of Morrow St and to the east of an enclosed property located on the corner of Clay and Morrow St. | MOR-01831-A-C-0-2 |
| | | MOR-01831-B-C-0-1 |

*Notes:

Greenway identifiers were taken from the street the greenway was parallel to and not the actual street to which the property belonged.

## TABLE 2

## ANALYTICAL RESULTS

| Sample Address | Sample ID | Concentration of Lead (mg/Kg) |
|---|---|---|
| **Upwind** | | |
| 998 East Euclid | EEC-00998-A-C-0-1 | 100 |
| 998 East Euclid | EEC-00998-B-C-0-1 | 130 |
| 1014 East Euclid | EEC-01014-A-C-0-1 | **440** |
| 1014 East Euclid | EEC-01014-B-C-0-2 | 270 |
| 1016 Melbourne | MEL-01016-A-C-0-1 | 100 |
| 1016 Melbourne | MEL-01016-B-C-0-1 | 92 |
| 998 Melbourne | MEL-00998-A-C-0-1 | 130 |
| 998 Melbourne | MEL-00998-B-C-0-1 | 120 |
| 990 Melbourne | MEL-00990-A-C-0-2 | 160 |
| 990 Melbourne | MEL-00990-B-C-0-1 | 130 |
| 987 Melbourne | MEL-00987-A-C-0-1 | 240 |
| 987 Melbourne | MEL-00987-B-C-0-1 | 140 |
| **Downwind** | | |
| 8435 St Aubin | DEN-08435-A-C-0-2 | 86 |
| 8435 St Aubin | DEN-08435-B-C-0-1 | 73 |
| 8435 St Aubin | DEN-08435-C-C-0-1 | 46 |
| 8435 St Aubin | DEN-08435-D-C-0-1 | 37 |
| 8434 Lumpkin | LUM-08434-A-C-0-1 | **540** |
| 8434 Lumpkin | LUM-08434-B-C-0-2 | **500** |
| 1901 Marston | MOR-01901-A-C-0-1 | 46 |
| 1901 Marston | MOR-01901-B-C-0-1 | 270 |
| 1901 Marston | MOR-01901-C-C-0-1 | **790** |
| 1901 Marston | MOR-01901-D-C-0-1 | **700** |
| 1831 Clay | MOR-01831-A-C-0-2 | 160 |
| 1831 Clay | MOR-01831-B-C-0-1 | 130 |

*Notes

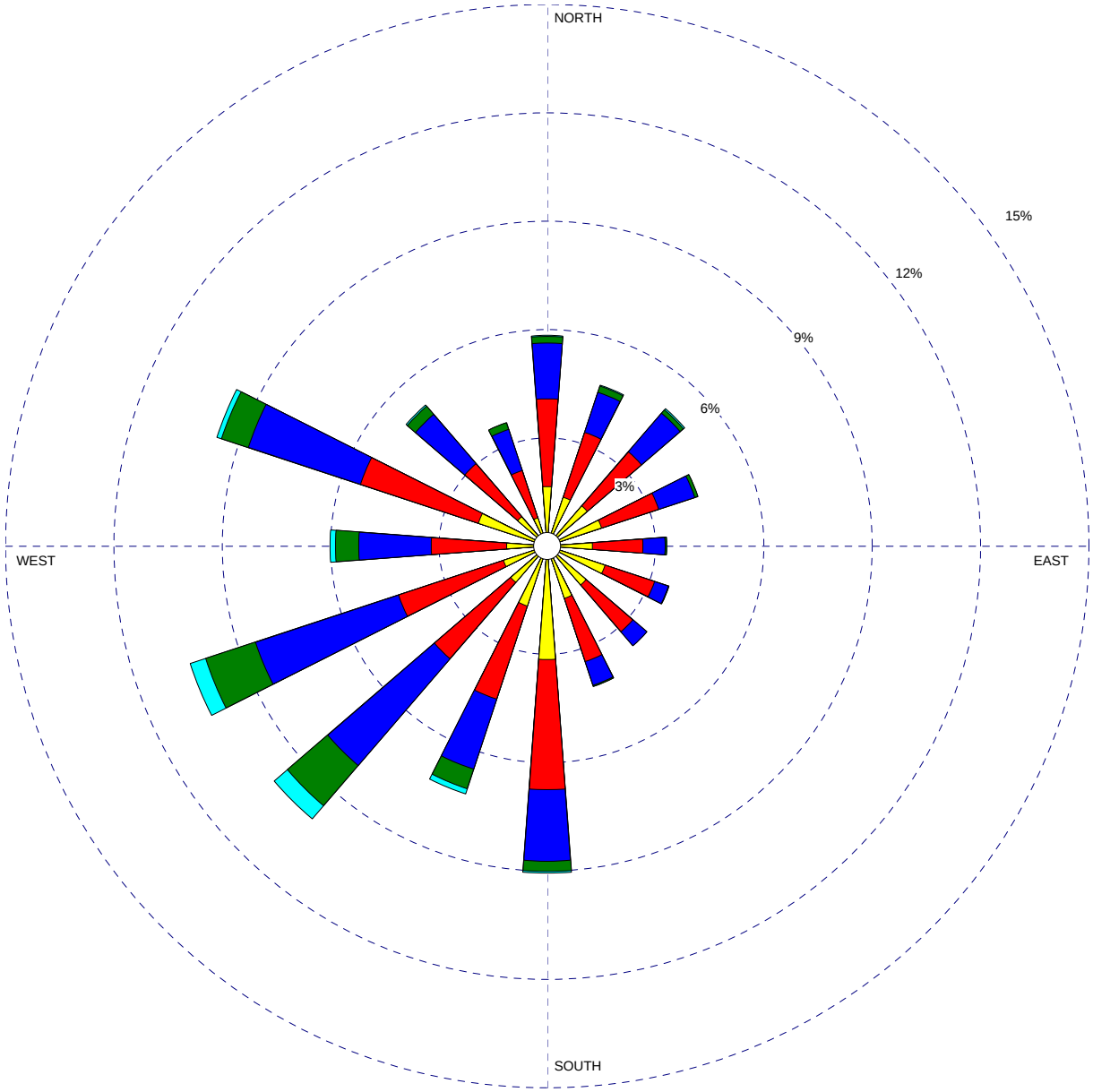
1) Bold indicates results equal or greater than to 400 mg/Kg

**ATTACHMENT C**

**WIND ROSE PLOT**

WIND ROSE PLOT

**STATION #94847 - DETROIT/METROPOLITAN ARPT, MI**




Wind Speed (m/s)

> 10.8
8.8-10.8
5.7- 8.8
3.6- 5.7
2.1- 3.6
0.5- 2.1

| | | |
|---|---|---|
| | DATE<br>**2/3/2003** | **Weston Solutions, Inc.** |
| DISPLAY<br>**Wind Speed** | UNIT<br>**m/s** | **Years**<br>**1984-1991** |
| AVG. WIND SPEED<br>**5.06 m/s** | CALM WINDS<br>**3.67%** | |
| ORIENTATION<br>**Direction**<br>**(blowing from)** | PLOT YEAR-DATE-TIME<br>**84 85 86 87 88 89 90 91**<br>**January 1 - December 31**<br>**Midnight - 11 PM** | **ATTACHMENT C** |

*WRPLOT View 2.22 by Lakes Environmental Software - www.lakes-environmental.com*

# ATTACHMENT D

# PHOTOGRAPHS OF SAMPLING LOCATIONS

**Former Great Lakes Smelting – 1640 East Euclid**

**998 East Euclid** – Vacant property located on the south side of East Euclid St.

Looking south along the vacant property at 5 discrete sample A locations.

Looking north along the vacant property at 5 discrete sample B locations.

**East Euclid (cont'd)**

**1014 East Euclid** – Vacant property located on the south side of East Euclid St and at the corner of East Euclid and Cameron St.

Looking southwest along the vacant property at 5 discrete sample A locations.

Looking northwest along the vacant property at 5 discrete sample B locations.

**East Euclid (cont'd)**

**1016 Melbourne** – Vacant property located on the south side of Melbourne St and at the corner of Melbourne and Cameron St.

Looking south along the vacant property at 10 total of discrete sample B and A locations, respectively.

**East Euclid (cont'd)**

**998 Melbourne** – Vacant property located on the south side of Melbourne St and in between two other vacant lots.

Looking south along the vacant property at 10 total of discrete sample B and A locations, respectively.

**East Euclid (cont'd)**

**990 Melbourne** – Vacant property located on the south side of Melbourne St and directly to the west of the vacant property at 998 Melbourne.

Looking south along the vacant property at 5 discrete sample A locations.

Looking west along the vacant property at 3 of the 5 discrete sample B locations.

Looking north along the vacant property at 3 of the 5 discrete sample B locations. One location repeated in photo.

**East Euclid (cont'd)**

**987 Melbourne** – Vacant property located on the north side of Melbourne St and to the west of another vacant property.

Looking northeast along the vacant property at 5 discrete sample A locations. Sample B locations further to the north. 1 location is not seen in the photo because it is to the southeast of the car.

Looking north along the vacant property at 5 discrete sample B locations. 2 locations located behind the leaf/straw pile so they are not in seen in the photo.

**East Euclid (cont'd)**

**8435 St Aubin** – Greenway of a vacant property on the corner of Denton St and St Aubin. It is located to the north of Denton St and across the street and to the east of the American Axle Facility at 8435 St Aubin. A separate greenway also sampled is located to the south of Denton St and also across the street and to the east of 8435 St Aubin.

Looking northwest along the vacant property at 10 total discrete sample A and B locations, respectively.

Looking northwest along the greenway at 10 total discrete sample C and D locations, respectively.

**East Euclid (cont'd)**

**8434 Lumpkin** – Greenway located to the east of Lumpkin St in front of a fenced in lot and to the south of the property at 8434 Lumpkin.

Looking south along the greenway at 5 discrete sample A locations.

Looking north along the greenway at 5 discrete sample B locations.

**East Euclid (cont'd)**

**1901 Marston** – Greenway located on the east side of Morrow St and on the corner of Morrow and Marston St. On the west side of the greenway is Wessel Co, an abandoned Factory. Another greenway located on the east side of Morrow St and across the street from an American Axle Plant gated drive.

Looking southeast along the greenway at 5 discrete sample A locations.

Looking northeast along the greenway at 5 discrete sample B locations.

**East Euclid (cont'd)**

**1901 Marston (cont'd)**

Looking northeast along the greenway at 10 total discrete sample C and D locations, respectively.

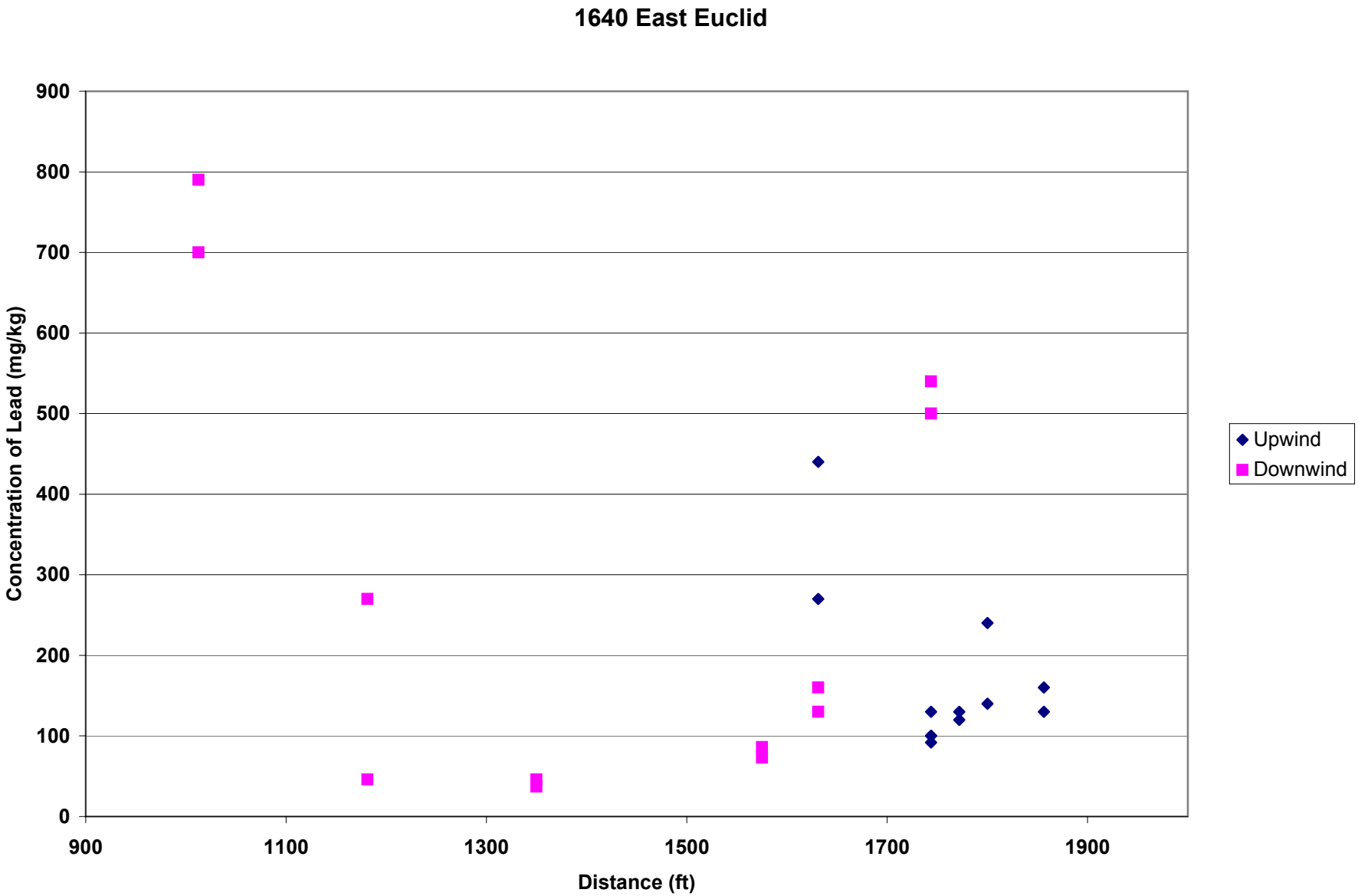
**East Euclid (cont'd)**

**1831 Clay** – Greenway located on the west side of Morrow St and to the east of an enclosed property at 1831 Clay, located on the corner of Clay and Morrow St.

Looking southeast along the greenway at 10 total discrete sample B and A locations respectively.

**ATTACHMENT E**

**CONCENTRATION GRAPH**


1640 East Euclid
Concentration of Lead (mg/kg)
900
800
700
600
500
400
300
200
100
0
900
1100
1300
1500
1700
1900
Distance (ft)
Upwind
Downwind

Great Lakes

*** Linear Model ***

```
Call: lm(formula = Lead.ppm ~ Location + Distance + Distance:Location, data =
        GreatLakes, na.action = na.exclude)
Residuals:
   Min     1Q Median    3Q   Max
 -308.8 -86.34    -46 80.66 382.4

Coefficients:
                  Value Std. Error    t value   Pr(>|t|)
     (Intercept)  1663.9577  1513.5062     1.0994     0.2846
        Location  -939.6765  1548.5366    -0.6068     0.5508
        Distance    -0.8493     0.8604    -0.9872     0.3354
Distance:Location     0.5365     0.8900     0.6029     0.5534

Residual standard error: 203.9 on 20 degrees of freedom
Multiple R-Squared: 0.1878
F-statistic: 1.542 on 3 and 20 degrees of freedom, the p-value is 0.2346

Analysis of Variance Table

Response: Lead.ppm

Terms added sequentially (first to last)
             Df Sum of Sq  Mean Sq  F Value     Pr(F)
       Location  1   73261.5  73261.5 1.762245 0.1992993
       Distance  1  103924.1 103924.1 2.499808 0.1295462
Distance:Location  1   15110.7  15110.7 0.363475 0.5533585
      Residuals 20  831456.3  41572.8
```

*** Linear Model ***

```
Call: lm(formula = LogLead ~ Distance + Location + Location:Distance, data =
        GreatLakes, na.action = na.exclude)
Residuals:
   Min      1Q   Median     3Q   Max
 -1.528 -0.4877 -0.02754 0.4326 1.371

Coefficients:
                Value Std. Error  t value Pr(>|t|)
     (Intercept)  10.8553   6.5704     1.6522   0.1141
        Distance  -0.0033   0.0037    -0.8880   0.3851
        Location  -5.0657   6.7224    -0.7536   0.4599
Location:Distance   0.0028   0.0039     0.7336   0.4717

Residual standard error: 0.8851 on 20 degrees of freedom
Multiple R-Squared: 0.05113
F-statistic: 0.3592 on 3 and 20 degrees of freedom, the p-value is 0.7831

Analysis of Variance Table

Response: LogLead

Terms added sequentially (first to last)
             Df Sum of Sq   Mean Sq   F Value     Pr(F)
       Distance  1   0.35144 0.3514445 0.4485785 0.5106701
       Location  1   0.07122 0.0712197 0.0909038 0.7661438
Location:Distance  1   0.42167 0.4216677 0.5382103 0.4716885
      Residuals 20  15.66925 0.7834627
```

# ATTACHMENT F

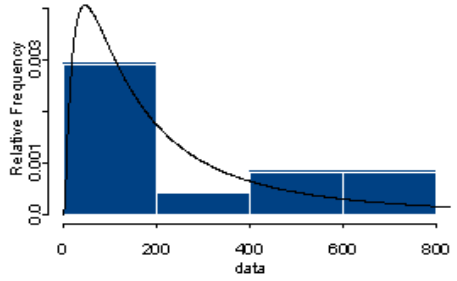
# STATISTICAL DISTRIBUTION

**GREAT LAKES SMELTING**
**STATISTICAL DISTRIBUTION**

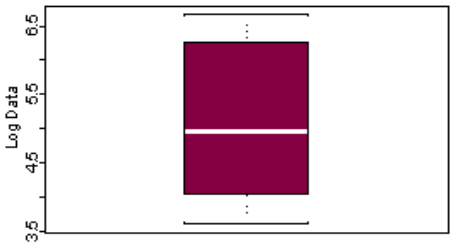
## Lognormal Distribution Analysis for Data

**Data Set Name: Great Lakes Smelting , Area: EEC D**

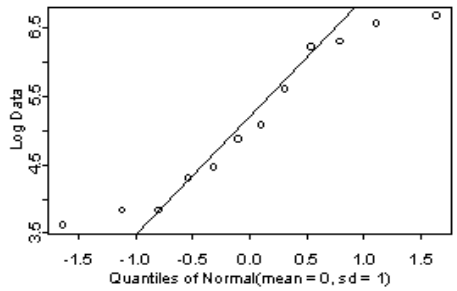
Histogram of Observed Data with Fitted Lognormal Distribution




Box Plot of Log Data Data




Normal Probability Plot of Log Data Data




Summary Statistics

| | |
|---|---|
| Sample Size: | 12 |
| Coefficient of Variation: | 0.2214088 |
| Coefficient of Skewness: | 0.122503 |

Results of Shapiro-Wilk GOF

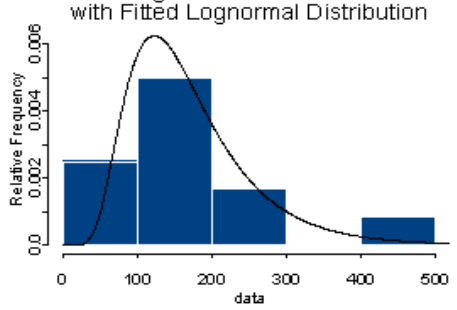
| | |
|---|---|
| Hypothesized Distribution: | Lognormal |
| Estimated Parameters: | meanlog = 5.106952<br>sdlog = 1.130724 |
| Test Statistic: | W = 0.9100934 |
| Test Statistic Parameter: | n = 12 |
| p-value: | 0.2139368 |

*Since p >= .05 conclude distribution is lognormal.*

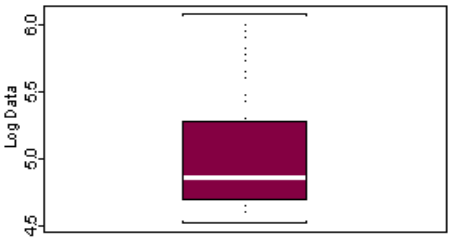
## Lognormal Distribution Analysis for Data

**Data Set Name: Great Lakes Smelting , Area: EEC U**

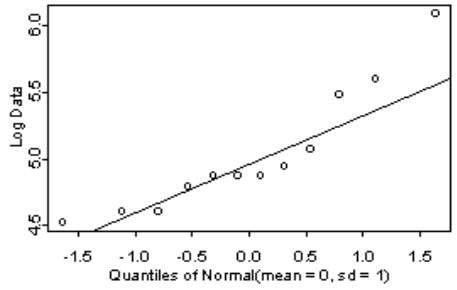
Histogram of Observed Data with Fitted Lognormal Distribution




Box Plot of Log Data Data




Normal Probability Plot of Log Data Data




Summary Statistics

| | |
|---|---|
| Sample Size: | 12 |
| Coefficient of Variation: | 0.0931368 |
| Coefficient of Skewness: | 1.25142 |

Results of Shapiro-Wilk GOF

| | |
|---|---|
| Hypothesized Distribution: | Lognormal |
| Estimated Parameters: | meanlog = 5.025406<br>sdlog = 0.4680502 |
| Test Statistic: | W = 0.8663555 |
| Test Statistic Parameter: | n = 12 |
| p-value: | 0.05876532 |

*Since p >= .05 conclude distribution is lognormal.*