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November 2, 2016

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BY:_____

Mr. Doug Cieslak
Wisconsin Department of Natural Resources
141 NW Barstow St, Room 180
Waukesha, WI 53188

**Re: Soil Vapor Extraction Pilot Study Report**
**Martino's Master Dry Cleaners**
**7513 41st Avenue**
**Kenosha, Wisconsin 53142**
**BRRTS# 02-30-552188**

Dear Mr. Cieslak:

Environmental Forensic Investigations, Inc. (EnviroForensics) is pleased to submit this Soil Vapor Extraction Pilot Study Report for the Martino's Master Dry Cleaners (Martino's) site located at 7513 41st Avenue in Kenosha, Wisconsin. As we previously discussed, the remedial strategy for the site includes implementation of soil vapor extraction (SVE) to treat unsaturated soil in the source area. We expect to begin construction of the SVE system this month and begin operation early next year. Documentation of system construction will be submitted in accordance with Chapter NR 724.15

Sincerely,
**Environmental Forensic Investigations, Inc.**

Rob Hoverman, PG
*Senior Project Manager*

Brian Kappen, PG
*Project Manager*

enclosures

*Document: 6165-1148*
Environmental Forensic Investigations, Inc.
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# SOIL VAPOR EXTRACTION PILOT STUDY REPORT

**MARTINO'S MASTER DRY CLEANERS**
**7513 41st AVENUE**
**KENOSHA, WISCONSIN**
**WDNR BRRTS# 02-30-552188**

November 2, 2016

*Prepared For:*

Mr. Dan Martino, Sr.
Martino's Master Dry Cleaners
7513 41st Avenue
Kenosha, Wisconsin 53142

*Prepared By:*

Environmental Forensic Investigations, Inc.
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## APPENDICES

## EXECUTIVE SUMMARY

Environmental Forensic Investigations, Inc. (EnviroForensics) has prepared this *Soil Vapor Extraction Pilot Study Report* on behalf of Dan Martino, Sr., d/b/a Martino's Master Dry Cleaners, for the Martino's Master Dry Cleaners facility located at 7513 41st Avenue in Kenosha, Wisconsin (Site). The Site operates as a plant-on-premises dry cleaning facility.

A soil vapor extraction (SVE) pilot study has been performed to identify the feasibility of SVE for remediation of unsaturated soils impacted by dry cleaning solvents at the Site. The stated objectives upon implementation were to:

- Measure vacuum conditions in the shallow subsurface environment via monitoring points and existing groundwater monitoring wells while inducing a vacuum with one (1) pilot SVE extraction point;
- Assess the effectiveness of the pilot SVE system by monitoring changes in subsurface vacuum over the duration of the pilot test; and
- Determine a radius of influence for the SVE extraction point.

The pilot study included installation of one (1) SVE extraction point and four (4) vacuum monitoring points to facilitate pilot testing. A 24-hour SVE pilot test was performed, with applied vacuum incrementally increased during testing to gauge subsurface response to applied vacuum. Applied vacuums, subsurface vacuums, extraction flow rates, and extraction air contaminant concentrations were monitored during testing. Existing shallow groundwater monitoring wells were also monitored for vacuum response during testing.

The results indicate that SVE is a potentially viable remedial alternative for unsaturated soils at the Site. It may also provide additional benefit for mitigation of vapor intrusion at the Site building during implementation, and would require multiple SVE extraction points to achieve this goal.

## 1.0 INTRODUCTION

Environmental Forensic Investigations, Inc. (EnviroForensics) has prepared this *Soil Vapor Extraction Pilot Study Report* on behalf of Dan Martino, Sr., d/b/a Martino's Master Dry Cleaners (Martino's), for the Martino's facility located at 7513 41st Avenue in Kenosha, Wisconsin (Site). The general Site location is depicted on **Figure 1**.

The Site encompasses approximately 0.36 acres and contains a single slab-on-grade building which occupies 5,154 square feet. The Site building is situated at the south end of a "strip mall" and adjoins the building to the north. The remainder of the strip mall building is divided into separate properties with different owners. The general layout of the Site and surrounding area, including Site features, is depicted on **Figure 2**. Utilities noted during the Site reconnaissance include water, sewer, natural gas, telephone, and electrical lines. Asphalt driveway and parking areas surround the Site building, and maintained grass areas are present along 41st and 40th Avenues. The Site is bound by 41st Avenue to the west, 40th Avenue to the east, and commercial properties to the north and south. Land use surrounding the Site consists of mixed residential and commercial properties.

The lithological sequence encountered at the Site consists of clay and silt beneath surface fill materials to a depth of 6 to 7 feet below ground surface (bgs), followed by primarily fine-grained sand to a depth of 17 to 19 feet bgs. The water table is encountered at depths ranging from approximately 10 to 12 feet bgs at the Site. The direction of groundwater flow is toward the southeast.

The primary contaminants of concern at the Site are the dry cleaning solvent tetrachloroethene (PCE) and its daughter products including trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE) and vinyl chloride. Petroleum–related compounds including benzene, ethylbenzene, trimethylbenzenes, naphthalene, and xylenes are also present in the subsurface due to releases from a gasoline service station formerly located on the north adjacent property.

## 2.0 SVE PILOT STUDY ACTIVITIES

Pilot study activities performed include SVE well and monitoring point installation, SVE pilot testing, and analysis of the SVE pilot test data. This section provides a summary of the SVE field activities performed.

### 2.1 SVE Extraction Point Installation

In March of 2016 EnviroForensics mobilized to the Site and installed one (1) SVE pilot study extraction point (SVE-1) and two (2) double-nested vacuum monitoring points (MP-1s/d and MP-2s/d). The locations of the SVE extraction point and vacuum monitoring points are depicted on **Figure 2**. The points were installed using hollow-stem auger drilling methods in 8-inch diameter boreholes.

SVE-1 was constructed of 4-inch diameter, Schedule 40 PVC, with a 0.020-inch slotted Vee-Wire® screen from 4 to 9 feet bgs. A filter pack consisting of coarse sand was installed at SVE-1 from 4 to 9 feet bgs. Hydrated bentonite chips were installed from 3 to 4 feet bgs, and 2 feet of bentonite-cement grout was installed above the bentonite chips. The SVE extraction point was finished at grade with a flush-mount, steel vault set within a concrete pad.

The two (2) pairs of vacuum monitoring points (MP-1s/d and MP-2s/d) were installed at distances of 20 and 40 feet, respectively, from SVE-1 to gauge applied vacuum levels in the subsurface. Each monitoring point was constructed with 1-inch diameter, Schedule 40 PVC, 0.010-inch slotted well screen, and coarse sand filter pack. The screen for each shallow point (MP-1s and MP-2s) was installed at 3 to 6 feet bgs. The screen for each deep point (MP-1d and MP-2d) was installed at 7 to 10 feet bgs. The filter pack (spanning the screen interval) was installed at each monitoring point. Hydrated bentonite chips were installed from 6-7 feet bgs to seal the two screened intervals. Hydrated bentonite chips were also installed from 2 to 3 feet bgs, and bentonite-cement grout was installed from 1-2 feet bgs. The vacuum monitoring points were finished at grade with a flush-mounted steel vault set within a concrete pad.

A summary of construction information for the SVE extraction point and vacuum monitoring points, as well as other existing monitoring wells used during the pilot study, is provided in **Table 1**. Boring logs for the existing monitoring wells and soil borings within the SVE radius of influence (ROI) are provided in **Appendix A**.

In addition to the SVE-1 and MP points, existing groundwater monitoring wells MW-1 through MW-8 were utilized during the pilot test to gauge vacuum influence in the surrounding area and beneath the Site building. These consisted of 1 and 2-inch diameter PVC wells screened from approximately 6-16 feet bgs.

## 2.2 SVE Pilot Test Implementation

SVE testing was performed on March 22 and 23, 2016 using a mobile, claw-type vacuum pump capable of producing a flow rate of 180 actual cubic feet per minute (ACFM) at 20 inches of mercury (inHg). The vacuum system was piped to the SVE extraction point using 2-inch suction hose. A generalized process and instrumentation diagram for the extraction system is depicted on **Figures 3** and **4**.

Approximately 24 hours of continuous testing was performed over the course of three (3) testing steps (steps 1 through 3), with applied vacuum and flow rate varied for each step by adjusting the integrated dilution valve. System vacuum, as measured at the air-water separator, was adjusted during each step at 6, 14, and 20 inHg, which corresponded to applied vacuums at the SVE wellhead of 6, 11, and 17 inHg. A summary of each step and the recorded vacuum is included in **Table 2**.

During each step, volumetric flow rates, applied vacuums, recorded vacuums, and influent air total volatile organic compound (VOC) concentrations were monitored at fixed intervals. Influent flow rates were monitored using an anemometer. Subsurface vacuums were monitored using a magnehelic gauge at the SVE extraction point, and a hand-held digital manometer at the vacuum monitoring points and groundwater monitoring wells. Site groundwater levels were evaluated prior to testing to confirm that vacuum monitoring point screens were exposed above the water table, to ensure the vacuum measurements collected represented unsaturated soil conditions.

Influent air samples were field-screened using a photoionization detector (PID) for the presence of VOCs at a sampling port before the vacuum pump, located as indicated on **Figure 4**. Influent air samples were also collected from this port into laboratory-supplied Summa canisters, which were submitted to Envision Air Laboratories in Indianapolis, Indiana for analysis of VOCs using United States (U.S.) Environmental Protection Agency (EPA) Method TO-15. The TO-15 samples were collected two (2) hours following the start of steps 1 and 2, whereas the TO-15 sample for step 3 was collected approximately 16 hours after the start of that step.

## 3.0 PILOT STUDY RESULTS

Pilot study data was analyzed to determine the following parameters:

1. System flow rates
2. VOC mass removal rates
3. Subsurface vacuum response

Vacuum, flow rate, and PID data collected at the remediation system during testing are presented in **Table 3** and graphically depicted on **Chart 1**. Subsurface vacuum data is presented in **Table 4** and graphically depicted on **Chart 2**. No measurable subsurface moisture was collected during testing.

### 3.1 System Flow Rates

System flow rates varied from a minimum of 38 standard cubic feet per minute (SCFM) during Step 1 at an applied vacuum of 6 in Hg to a maximum of 62 SCFM during Step 3 at an applied vacuum of 20 inHg. A summary of the flow rates is presented in **Table 3** and graphically depicted in **Chart 1**.

### 3.2 VOC Mass Removal Rates

PCE concentrations ranged from 63 micrograms per cubic meter ($\mu g/m^3$) during Step 1 to 480 $\mu g/m^3$ during Step 2. TCE concentrations ranged from below laboratory detection limits to 74.2 $\mu g/m^3$. 1,2,4-Trimethylbenzene concentrations ranged from below laboratory detection limits to 267 $\mu g/m^3$. 1,3,5-Trimethylbenzene concentrations ranged from below laboratory detection limits to 139 $\mu g/m^3$. Isooctane concentrations ranged from below laboratory detection limits to 9,490 $\mu g/m^3$. Vinyl chloride concentrations ranged from below laboratory detection limits to 531 $\mu g/m^3$. A copy of the laboratory analytical report is provided in **Appendix B** and the results are summarized on **Table 5**.

Coupling effluent vapor concentrations with the effluent flow rates over the test duration for each period indicates that the VOC mass removal rate would be approximately 19.9 pounds per year per extraction well, during full scale system operation. The total VOC mass removed during testing was 0.038 pounds. The chlorinated VOC (cVOC) mass (i.e., the portion of the total mass attributed to PCE and its daughter products) removed during the pilot study was calculated to be approximately 0.002 pounds, which would be approximately 0.73 pounds per extraction well per

year of system operation. This result appears to be biased low due to the sub-optimal placement of the pilot test extraction well. Additional cVOC mass recovery would be expected during full-scale system implementation due to the placement of additional extraction wells in the source area soils. A summary of effluent concentrations and calculated mass removal rates is provided in **Table 5**.

### 3.3 Subsurface Vacuum Response

A maximum observed monitoring point influence of 4.795 inches of water (in-H2O) vacuum was detected during Step 3 at monitoring well MW-1, approximately 10 feet away from SVE-1. The observed vacuum responses in the monitoring points varied throughout the duration of the pilot study, most likely due to subsurface anomalies, heterogeneity of the subsurface lithology, and different construction methodology for the selected monitoring points. Monitoring wells and vacuum monitoring points that were determined to be non-standard with regard to vadose zone screen length, vadose zone soil type, and linear vacuum responses were not utilized during calculation of the estimated SVE ROI. Additionally, anomalous fluctuations were observed in the vacuums recorded at most test points during the pilot study, regardless of applied vacuums. In order to mitigate the large variances in this data set, the recorded vacuums were averaged for each point during each step. Subsurface vacuum response versus time for each monitoring point is graphically depicted in **Chart 2** and tabulated in **Table 4**.

A subset of the pilot study monitoring point network was utilized for the ROI calculations (MP-1s, MP-2s, MW-1, and MW-6). As previously discussed, these points exhibited the lithologic and construction criteria desired to best assess the SVE ROI in the upper silty soils. In order to evaluate the generalized SVE ROI for this Site, a best-fit statistical distribution was identified for Step 1, Step 2, and Step 3 to describe the attenuation of subsurface vacuum with respect to distance from SVE-1.

The vacuum versus distance data for Step 3 exhibited an exponential distribution and had the highest coefficient of determination ($R^2$) (0.88). This data indicated that step 3 provided the most linear, and therefore predictable, subsurface vacuum response. The minimum subsurface vacuum identified for determining an effective ROI for vapor capture is 0.1 in-$H_2O$. Using this minimum standard, the estimated vapor capture ROI for an applied vacuum of 20 inHg is approximately 32.5 feet. The data points and trend lines are presented in **Table 6** and **Chart 3a** through **3c**. The calculated ROI for each step of the pilot study are depicted in **Figure 2**.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

SVE is a viable remedial alternative for unsaturated soils at the Site and will likely promote reduction of the groundwater plume. It may also provide additional benefit for mitigation of vapor intrusion at the Site building during implementation, but would require multiple SVE extraction points to achieve this goal. EnviroForensics is preparing to implement SVE and will determine if additional groundwater treatment is required to facilitate Site regulatory closure. SVE design for remedial implementation at the property will consider the ROIs, flow rates, and other information identified in this report as well as Site-specific considerations such as local VOC concentrations, access limitations, lithologic heterogeneities, and subsurface utility corridors that may affect the vacuum propagation or influence the design criteria.

# TABLES

# TABLE 1

## Monitoring Point Construction Information

*Soil Vapor Extraction Pilot Study Report*

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

| Monitoring Point I.D. | Date Installed | Drilling Method | Well Diameter (inches) | Screened Interval (feet bgs) |
|---|---|---|---|---|
| SVE-1 | 3/17/2016 | Hollow Stem Auger | 4 | 4-9 |
| MP-1s | 3/17/2016 | Hollow Stem Auger | 1 | 3-6 |
| MP-1d | 3/17/2016 | Hollow Stem Auger | 1 | 7-10 |
| MP-2s | 3/17/2016 | Hollow Stem Auger | 1 | 3-6 |
| MP-2d | 3/17/2016 | Hollow Stem Auger | 1 | 7-10 |
| MW-1 | 9/1/2011 | Hollow Stem Auger | 2 | 7.1-17.1 |
| MW-2 | 9/1/2011 | Hollow Stem Auger | 2 | 7.3-17.3 |
| MW-3 | 9/1/2011 | Hollow Stem Auger | 2 | 6.2-16.2 |
| MW-5 | 9/1/2011 | Hollow Stem Auger | 2 | 6.8-16.8 |
| MW-6 | 9/1/2011 | Hollow Stem Auger | 2 | 5.6-15.6 |
| MW-7 | 9/1/2011 | Hollow Stem Auger | 2 | 6.9-16.9 |
| MW-8 | 12/2/2013 | Hollow Stem Auger | 2 | 8.1-18.1 |

bgs = below ground surface

# TABLE 2

## SVE Pilot Study Testing Regime

*Soil Vapor Extraction Pilot Study Report*

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

| Step | Time Start | Time Stop | Hour Start | Hour Stop | Step Duration (hours) | System Vacuum ($inH_g$) | Wellhead Vacuum ($inH_g$) |
|---|---|---|---|---|---|---|---|
| 1 | 3/22/2016 09:20 | 3/22/2016 14:04 | 0.0 | 4.7 | 4.7 | 6 | 6 |
| 2 | 3/22/2016 14:04 | 3/22/2016 16:50 | 4.7 | 7.5 | 2.8 | 14 | 11 |
| 3 | 3/22/2016 16:50 | 3/23/2016 09:00 | 7.5 | 23.7 | 16.2 | 20 | 17 |

# TABLE 3

**SVE Pilot Study System Data**

*Soil Vapor Extraction Pilot Study Report*

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

| Step | Date and Time | Test Hour | System Influent Vacuum (inHg) | System Influent Flow Rate (SCFM) | System Influent Temperature (°C) | System Influent VOC Concentration (ppm) |
|---|---|---|---|---|---|---|
| 1 | 3/22/16 9:50 | 0.5 | 6 | 42 | 51 | 2.0 |
| | 3/22/16 10:20 | 1.0 | 6 | 42 | 52 | 2.0 |
| | 3/22/16 10:50 | 1.5 | 6 | 42 | 53 | 2.1 |
| | 3/22/16 11:20 | 2.0 | 6 | 41 | 54 | 2.6 |
| | 3/22/16 12:20 | 3.0 | 6 | 39 | 56 | 3.3 |
| | 3/22/16 13:20 | 4.0 | 6 | 38 | 59 | 3.4 |
| 2 | 3/22/16 14:20 | 5.0 | 14 | 48 | 59 | 4.5 |
| | 3/22/16 14:50 | 5.5 | 14 | 48 | 59 | 5.4 |
| | 3/22/16 15:50 | 6.5 | 14 | 49 | 60 | 8.7 |
| | 3/22/16 16:50 | 7.5 | 14 | 49 | 61 | 10.5 |
| 3 | 3/23/16 7:30 | 22.2 | 20 | 59 | 47 | 23.0 |
| | 3/23/16 8:30 | 23.2 | 20 | 62 | 41 | 20.1 |
| | 3/23/16 9:00 | 23.7 | 20 | 62 | 41 | 15.7 |

inHg = vacuum in inches of mercury (measured at air-water separator)
CFM = cubic feet per minute
ppm = parts per million by volume
VOC = Volatile organic compound

# TABLE 4

## SVE Pilot Study Subsurface Data

*Soil Vapor Extraction Pilot Study Report*

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

| Step | Date and Time | Influent Flow Rate (cfm) | Test Hour | SVE-1 | MP-1s | MP-1d | MP-2s | MP-2d | MW-1 | MW-2 | MW-3 | MW-5 | MW-6 | MW-7 | MW-8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance from SVE-1 (ft)** | | | | **0** | **20** | **20** | **40** | **40** | **10** | **40** | **60** | **112** | **28** | **45** | **72** |
| 1 | 3/22/16 9:50 | 42 | 0.0 | 6 | 0.111 | 0.095 | 0.346 | 0.329 | 1.055 | 0.230 | 0.000 | 0.009 | 1.003 | 0.150 | 0.127 |
| | 3/22/16 10:20 | 42 | 0.5 | 6 | 0.047 | 0.126 | 0.018 | 0.017 | 1.072 | 0.855 | 0.802 | 0.031 | 0.010 | 0.741 | 0.307 |
| | 3/22/16 10:50 | 42 | 1.0 | 6 | 0.103 | 0.126 | 0.067 | 0.245 | 0.651 | 0.848 | 1.030 | 0.003 | 0.016 | 0.010 | 0.643 |
| | 3/22/16 11:20 | 41 | 1.5 | 6 | 0.166 | 0.330 | 0.024 | 0.014 | 1.172 | 0.003 | 0.015 | 0.102 | 0.001 | 0.009 | 0.787 |
| | 3/22/16 12:20 | 39 | 2.5 | 6 | 0.170 | 0.320 | 0.007 | 0.017 | 1.487 | 1.303 | 0.053 | 0.849 | 0.026 | 0.185 | 0.407 |
| | 3/22/16 13:20 | 38 | 3.5 | 6 | 0.157 | 0.288 | 0.008 | 0.014 | 0.850 | 0.021 | 0.010 | 0.533 | 0.013 | 0.007 | 0.039 |
| 2 | 3/22/16 14:20 | 48 | 4.5 | 11 | 0.429 | 0.901 | 0.010 | 0.011 | 1.530 | 0.483 | 0.043 | 0.069 | 0.063 | 0.203 | 0.314 |
| | 3/22/16 14:50 | 48 | 5.0 | 11 | 0.455 | 0.937 | 0.007 | 0.011 | 2.043 | 0.423 | 0.056 | 0.147 | 0.090 | 0.009 | 0.132 |
| | 3/22/16 15:50 | 49 | 6.0 | 11 | 0.292 | 0.774 | 0.021 | 0.010 | 1.826 | 0.644 | 0.397 | 0.013 | 0.067 | 0.114 | 0.020 |
| | 3/22/16 16:50 | 49 | 7.0 | 11 | 0.477 | 0.957 | 0.037 | 0.009 | 3.061 | 0.349 | 0.063 | 0.054 | 0.043 | 0.020 | 0.247 |
| 3 | 3/23/16 7:30 | 59 | 21.7 | 17 | 0.751 | 1.603 | 0.057 | 0.002 | 4.795 | 0.114 | 0.167 | 0.727 | 0.065 | 0.124 | 0.083 |
| | 3/23/16 8:30 | 62 | 22.7 | 17 | 0.784 | 1.588 | 0.058 | 0.003 | 2.984 | 0.122 | 0.191 | 0.484 | 0.078 | 0.071 | 0.061 |
| | 3/23/16 9:00 | 62 | 23.2 | 17 | 0.779 | 1.570 | 0.059 | 0.002 | 4.153 | 0.118 | 0.173 | 0.312 | 0.071 | 0.098 | 0.067 |
| **Maximum vacuum:** | | | | 17 | 0.784 | 1.603 | 0.346 | 0.329 | 4.795 | 1.303 | 1.030 | 0.849 | 1.003 | 0.741 | 0.787 |

All values are vacuum readings, in units of inches water column

# TABLE 5

**SVE Pilot Study Mass Removal Estimates**

*Soil Vapor Extraction Pilot Study Report*

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

| Step 1; Sample EF-1; Flow rate = 40.7 SCFM; Duration = 4.7 Hours | | | | | |
|---|---|---|---|---|---|
| **Analyte** | **Concentration ($\mu g/m^3$)** | **Removal Rate (lb/hour)** | **Removal Rate (lb/year)** | **Removal Rate (tons/year)** | **Mass Removed (lb)** |
| Tetrachloroethene | **63** | **0.00001** | **0.1** | **0.000** | **0.00005** |
| Trichloroethene | < 10.7 | < 0 | < 0 | < 0 | NA |
| cis-1,2-Dichloroethene | < 45.4 | < 0.00001 | < 0.1 | < 0.00005 | NA |
| trans-1,2-Dichloroethene | < 396 | < 0.00006 | < 0.5 | < 0.00025 | NA |
| 1,2,4-Trimethylbenzene | < 49.2 | < 0.00001 | < 0.09 | < 0.00005 | NA |
| 1,3,5-Trimethylbenzene | < 49.2 | < 0.00001 | < 0.09 | < 0.00005 | NA |
| Isooctane | < 4670 | < 0.00085 | < 7.45 | < 0.00373 | NA |
| Vinyl Chloride | < 12.8 | < 0.000002 | < 0.02 | < 0.00001 | NA |

| Step 2; Sample EF-2; Flow rate = 48.5 SCFM; Duration = 2.8 Hours | | | | | |
|---|---|---|---|---|---|
| **Analyte** | **Concentration ($\mu g/m^3$)** | **Removal Rate (lb/hour)** | **Removal Rate (lb/year)** | **Removal Rate (tons/year)** | **Mass Removed (lb)** |
| Tetrachloroethene | **480** | **0.00009** | **0.8** | **0.000** | **0.00024** |
| Trichloroethene | **14.0** | **0.00000** | **0.0** | **0.0000** | **0.00001** |
| cis-1,2-Dichloroethene | < 198 | < 0.00004 | < 0.4 | < 0.0002 | NA |
| trans-1,2-Dichloroethene | < 396 | < 0.00007 | < 0.6 | < 0.0003 | NA |
| 1,2,4-Trimethylbenzene | **267** | **0.00005** | **0** | **0.000** | **0.00013** |
| 1,3,5-Trimethylbenzene | **139** | **0.00003** | **0** | **0.000** | **0.00007** |
| Isooctane | < 4670 | < 0.00085 | < 7.45 | < 0.00373 | NA |
| Vinyl Chloride | **531** | **0.00010** | **1** | **0.000** | **0.00027** |

| Step:3; Sample EF-3; Flow rate = 61 SCFM; Duration = 16.2 Hours | | | | | |
|---|---|---|---|---|---|
| **Analyte** | **Concentration ($\mu g/m^3$)** | **Removal Rate (lb/hour)** | **Removal Rate (lb/year)** | **Removal Rate (tons/year)** | **Mass Removed (lb)** |
| Tetrachloroethene | **323** | **0.00007** | **0.6** | **0.000** | **0.00119** |
| Trichloroethene | **74.2** | **0.00002** | **0.1** | **0.0001** | **0.00027** |
| cis-1,2-Dichloroethene | < 198 | < 0.00005 | < 0.4 | < 0.0002 | NA |
| trans-1,2-Dichloroethene | < 396 | < 0.00009 | < 0.8 | < 0.0004 | NA |
| 1,2,4-Trimethylbenzene | < 49.2 | < 0.00001 | < 0.09 | < 0.00005 | NA |
| 1,3,5-Trimethylbenzene | < 49.2 | < 0.00001 | < 0.09 | < 0.00005 | NA |
| Isooctane | **9,490** | **0.00217** | **19.0** | **0.0095** | **0.03506** |
| Vinyl Chloride | **78.0** | **0.00002** | **0** | **0.000** | **0.00029** |

| | |
|---|---|
| **Total estimated mass removed (lb):** | **0.038** |
| **Total estimated cVOC mass removed (lb):** | **0.002** |

Notes:

Duration = Length of time applied to mass removal estimate

Removal Rate = concentration multiplied by duration

NA = Not Available

Mass Removed = Estimated mass removed through SVE system during representative pilot study periods

SCFM = Standard cubic feet per minute

µg = microgram

m = meter

lb = pound

# TABLE 6

## Radius of Influence Calculation Data

*Soil Vapor Extraction Pilot Study Report*

Martino's Master Dry Cleaners

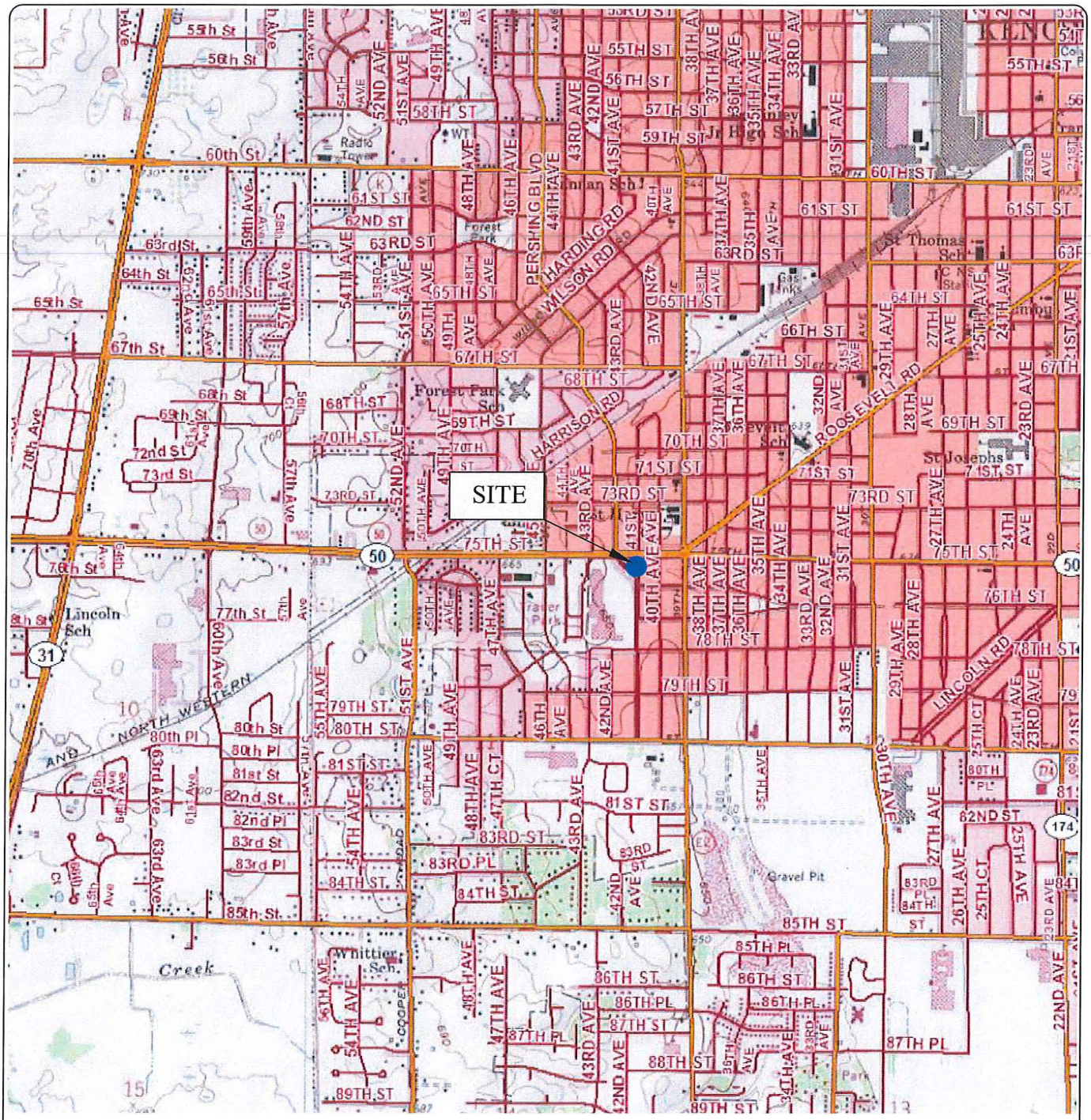
Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

| Monitoring Point I.D. | Distance from SVE-1 (feet) | Average Vacuum ($inH_2O$) | | |
|---|---|---|---|---|
| | | Step 1 | Step 2 | Step 3 |
| MP-1s | 20 | 0.129 | 0.413 | 0.771 |
| MP-2s | 40 | 0.025 | 0.019 | 0.058 |
| MW-1 | 10 | 1.046 | 2.115 | 3.977 |
| MW-6 | 28 | 0.013 | 0.066 | 0.071 |

- $inH_2O$ = inches of water column

# FIGURES




Scale 1:24,000

1 1/2 0 1 Mile

1000 0 1000 2000 3000 4000 5000 6000 7000 Feet

1 .5 0 1 Kilometer

N

Source: US Geological Survey, Kenosha, Wisconsin Quadrangle, 7.5 Minute Series, 1958

| No. | Date | Revision | Approved |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

ENVIRO forensics

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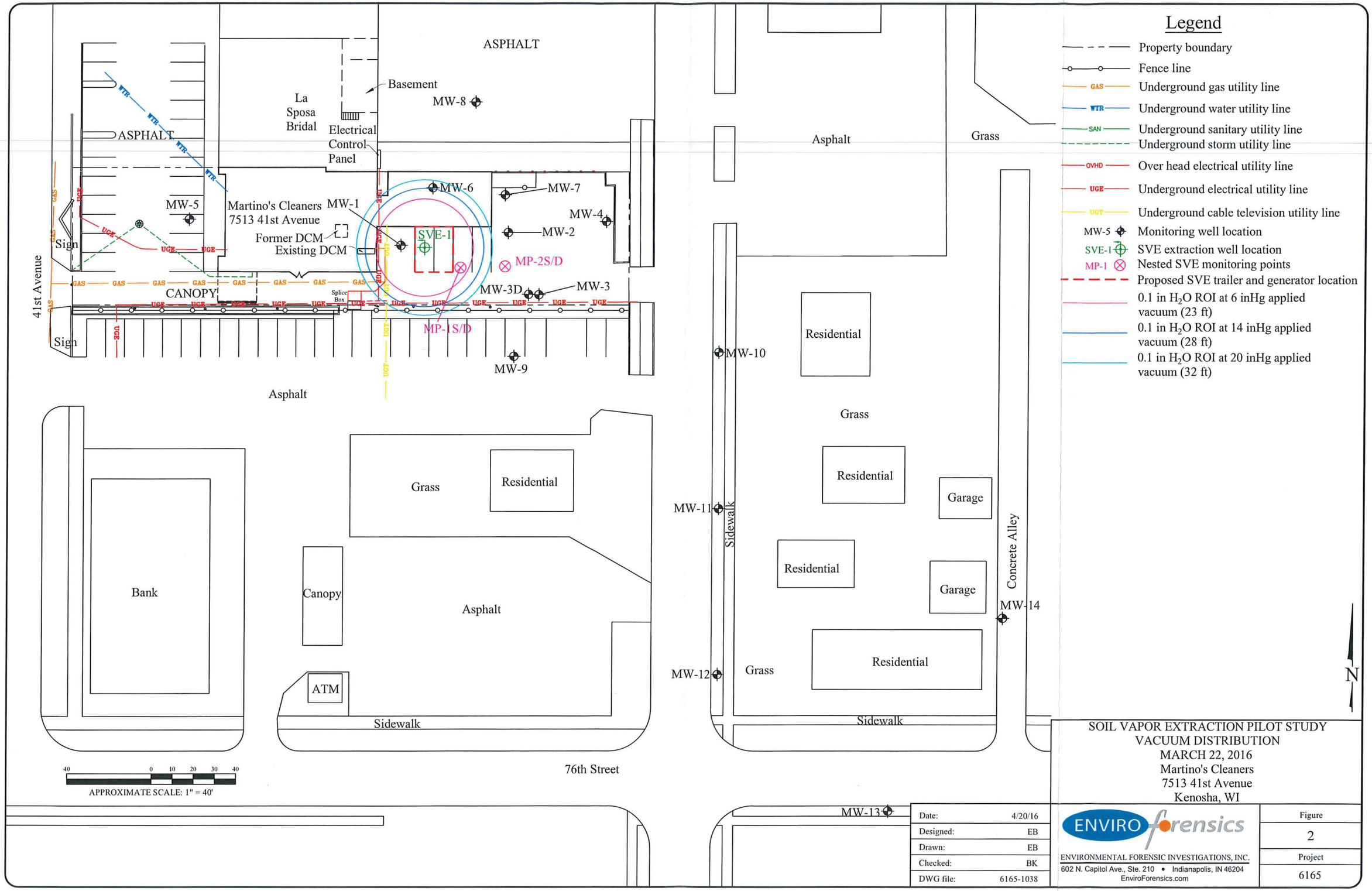
| | |
|---|---|
| Date: | 5/14/13 |
| Designed: | MMM |
| Drawn: | MMM |
| Checked: | WF |
| DWG file: | 71006-12 |

SITE LOCATION MAP

Martinos Cleaners
7513 41 Avenue
Kenosha, Wisconsin

| Figure |
|---|
| 1 |
| Project |
| 6272 |

K:\Drawings\6165 Martino's Cleaners 41st-WI\Drawings\71006-12.dwg




## Legend

- Property boundary
- Fence line
- GAS — Underground gas utility line
- WTR — Underground water utility line
- SAN — Underground sanitary utility line
- Underground storm utility line
- OVHD — Over head electrical utility line
- UGE — Underground electrical utility line
- UGT — Underground cable television utility line
- MW-5 — Monitoring well location
- SVE-1 — SVE extraction well location
- MP-1 — Nested SVE monitoring points
- Proposed SVE trailer and generator location
- 0.1 in $H_2O$ ROI at 6 inHg applied vacuum (23 ft)
- 0.1 in $H_2O$ ROI at 14 inHg applied vacuum (28 ft)
- 0.1 in $H_2O$ ROI at 20 inHg applied vacuum (32 ft)

SOIL VAPOR EXTRACTION PILOT STUDY
VACUUM DISTRIBUTION
MARCH 22, 2016
Martino's Cleaners
7513 41st Avenue
Kenosha, WI

| | |
|---|---|
| Date: | 4/20/16 |
| Designed: | EB |
| Drawn: | EB |
| Checked: | BK |
| DWG file: | 6165-1038 |

ENVIRO forensics
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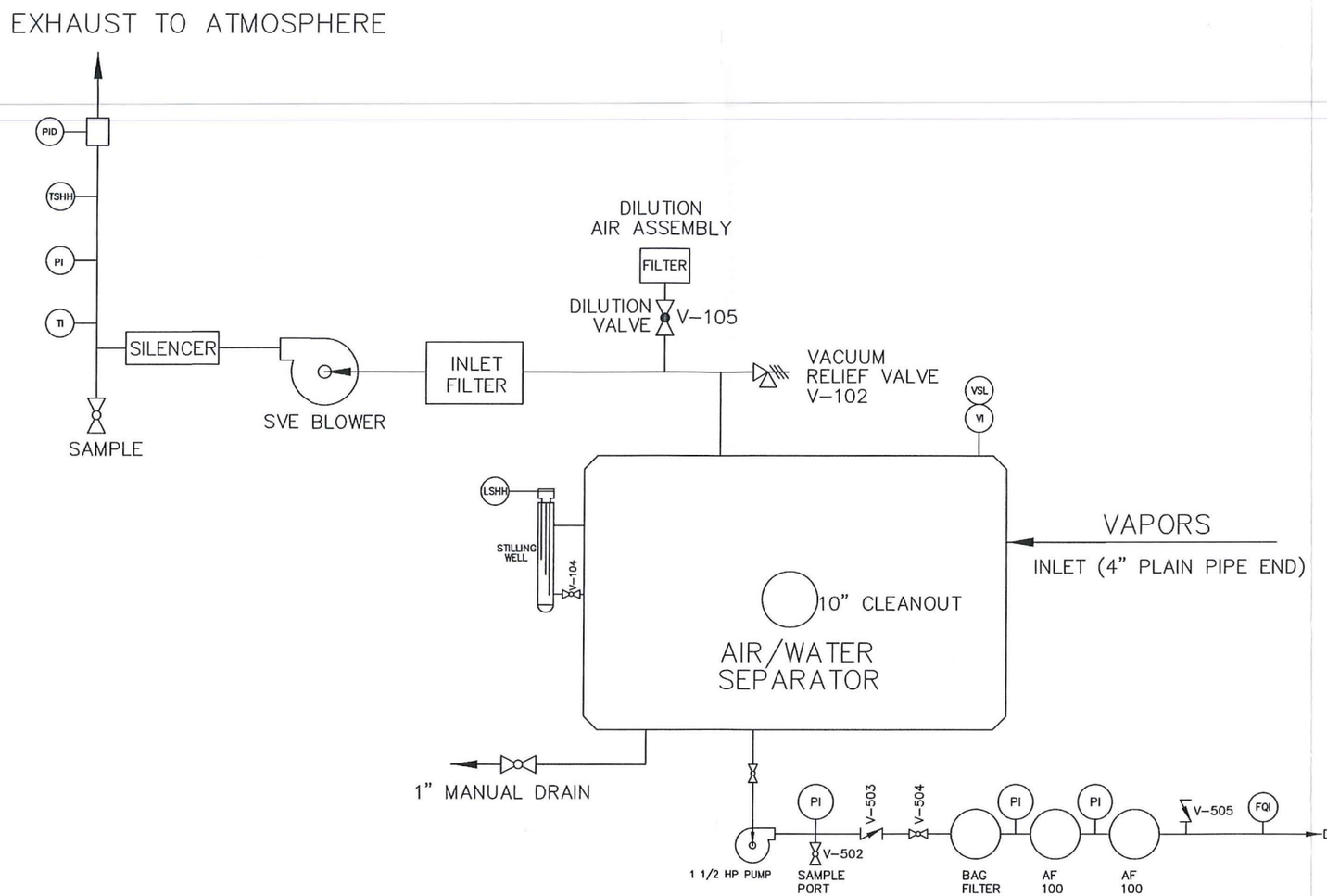
602 N. Capitol Ave., Ste. 210 • Indianapolis, IN 46204
EnviroForensics.com

| | |
|---|---|
| Figure | 2 |
| Project | 6165 |




| | | | |
|---|---|---|---|
| V | VACUUM | I | INDICATOR |
| P | PRESSURE | FQI | FLOW QTY IND. (TOTALIZER) |
| S | SWITCH | FRI | FLOW RATE INDICATOR |
| L | LIQUID LEVEL OR LOW | T | TEMPERATURE |

SVE PILOT SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM

Martino's Cleaners
7513 41st Avenue
Kenosha, WI

| | |
|---|---|
| Date: | 5/5/16 |
| Designed: | EB |
| Drawn: | EB |
| Checked: | CM |
| DWG file: | 6165-1040 |

ENVIRO forensics
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Figure 4

Project 6165

## VALVE AND PIPING SYMBOLS

- GATE VALVE
- SOLENOID VALVE
- CHECK VALVE
- BALL VALVE
- SAMPLING PORT
- EXHAUST TO ATMOSPHERE (INSIDE)
- EXHAUST TO ATMOSPHERE (OUTSIDE)
- PRESSURE RELIEF VALVE
- VACUUM GAUGE

## ABBREVIATIONS

| | |
|---|---|
| DP | DIFFERENTIAL PRESSURE |
| DO | DISSOLVED OXYGEN |
| FC | FAIL CLOSED |
| FI | FAIL INDETERMINATE |
| FL | FAIL LOCKED |
| FO | FAIL OPEN |
| FQ | FAIL QUANTIFIER |
| HOA | HAND-OFF-AUTOMATIC |
| HS | HAND SWITCH |
| IL | INDICATOR LIGHT |
| I/I | CURRENT-TO-CURRENT |
| I/P | CURRENT-TO-PNEUMATIC |
| KC | PROGRAM CONTROLLER |
| LC | LEVEL CONTROLLER |
| LEL | LOWER EXPLOSIVE LIMIT |
| LR | LOCAL-REMOTE |
| LS | LEVEL SWITCH |
| LSHH, LSL, LSH | LIQUID SWITCH HIGH / LOW |
| M | MOTOR |
| NO | NORMALLY OPEN |
| NC | NORMALLY CLOSED |
| P | PRESSURE |
| PI | PRESSURE INDICATOR |
| PS | PRESSURE SWITCH |
| PT | PRESSURE TRANSMITTER |
| PRV | PRESSURE RELIEF VALVE |
| PSH | PRESSURE SWITCH - HIGH |
| SG | SIGHT GLASS |
| SP | SAMPLING PORT |
| UA | UNIVERSAL ALARM |
| FMT | FLOW METER TOTALIZER |
| AFM | AIR FLOW METER |

## EQUIPMENT SYMBOLS

- PUMP
- BLOWER

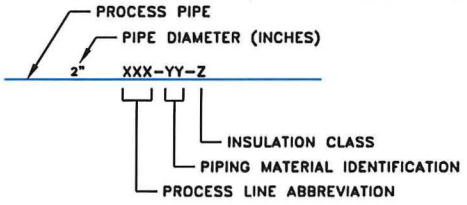
## LINE SYMBOLS

- PROCESS PIPES OR CHANNELS
- ELECTRIC SIGNAL
- COMPRESSED AIR LINE

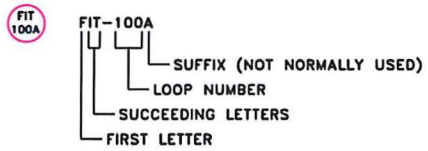
## GENERAL INSTRUMENT SYMBOLS

- LOCALLY MOUNTED
- PANEL MOUNTED
- REAR-OF-PANEL MOUNTED
- INTERLOCK (I)
- PURGE (P)

## PROCESS PIPING IDENTIFICATION




## INSTRUMENT IDENTIFICATION




| No. | Date | Revision | Approved |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

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602 N Capitol Ave., Ste 210 • Indianapolis, IN 46204
EnviroForensics.com

| | |
|---|---|
| Date: | 5/5/16 |
| Designed: | EB |
| Drawn: | EB |
| Checked: | CM |
| DWG file: | 6165-1041 |

PROCESS AND INSTRUMENTATION LEGEND
Martino's Cleaners
7513 41st Avenue
Kenosha, WI

| | |
|---|---|
| Figure | 3 |
| Project | 6165 |

ENVIRO forensics

# CHARTS

**CHART 1**

**Extraction Regime and Organic Vapor Conentrations**

*Soil Vapor Extraction Pilot Study Report*

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

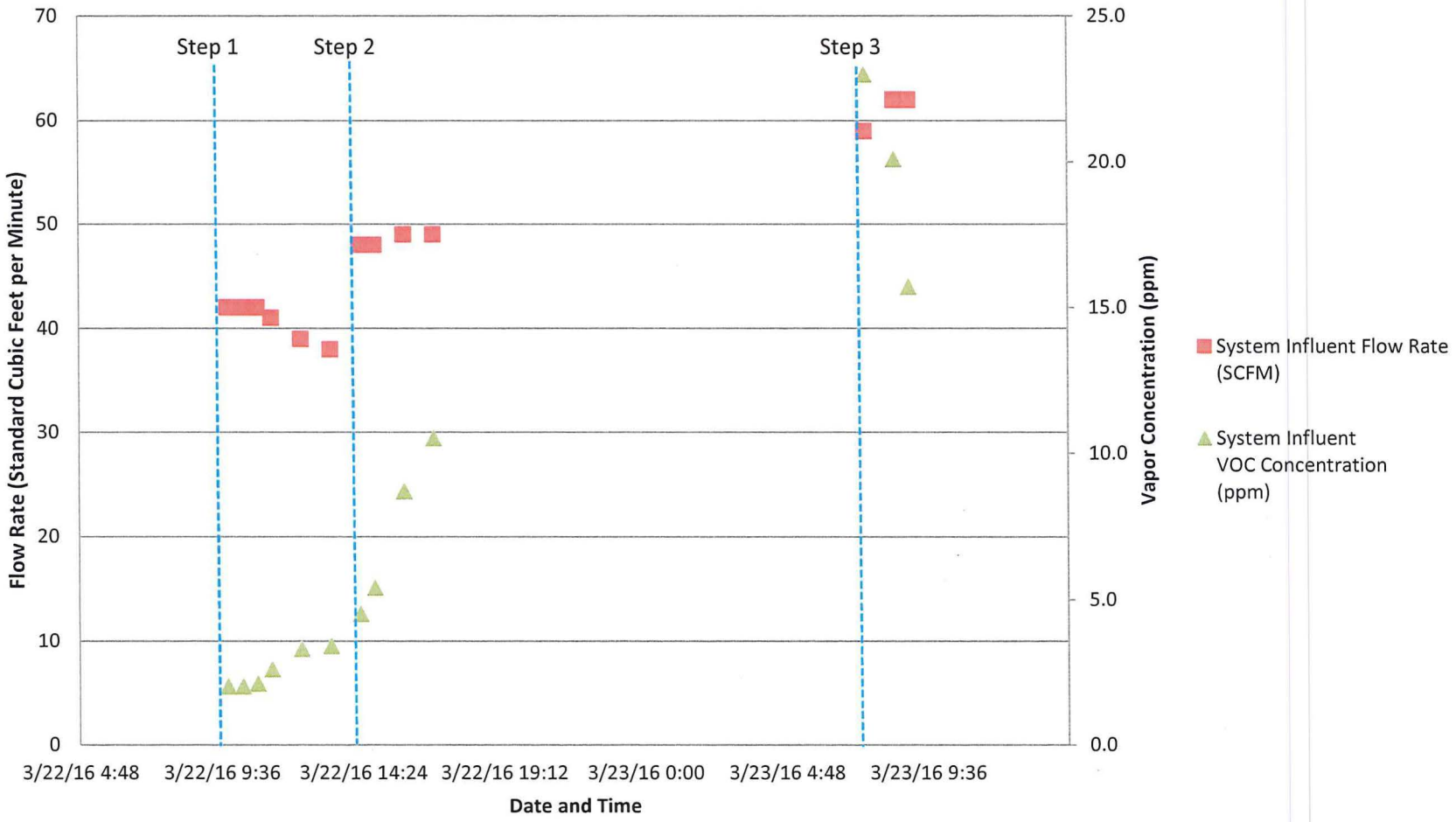


**CHART 2**

**Subsurface Vacuum Data**

*Soil Vapor Extraction Pilot Study Report*

Martino's Master Dry Cleaners

Kenosha, Wisconsin

WDNR BRRTS No. 02-30-552188

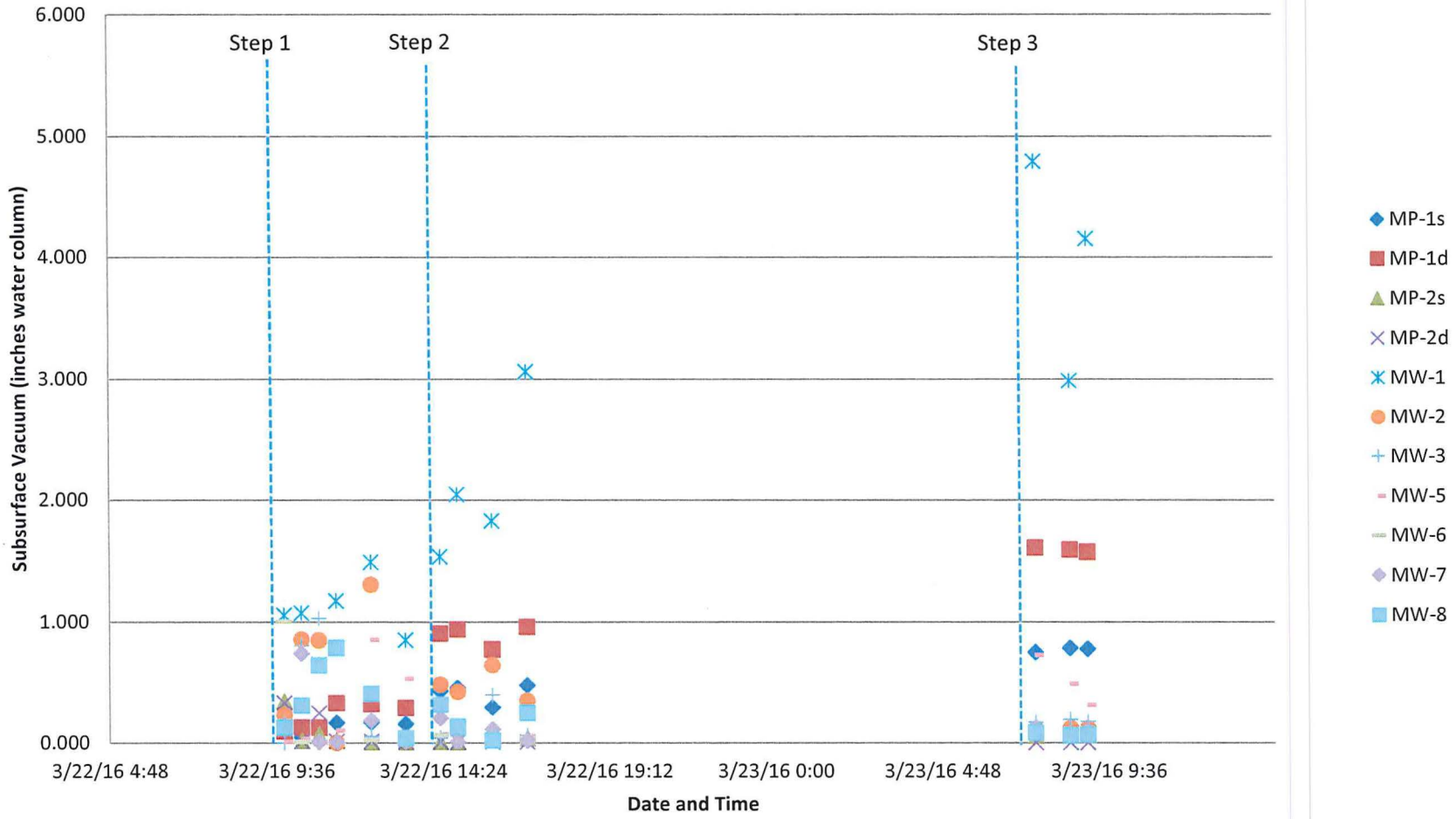


**CHART 3a**
**Radius of Influence**
**Applied Vacuum 6 in-Hg**
*Soil Vapor Extraction Pilot Study Report*
Martino's Master Dry Cleaners
Kenosha, Wisconsin
WDNR BRRTS No. 02-30-552188

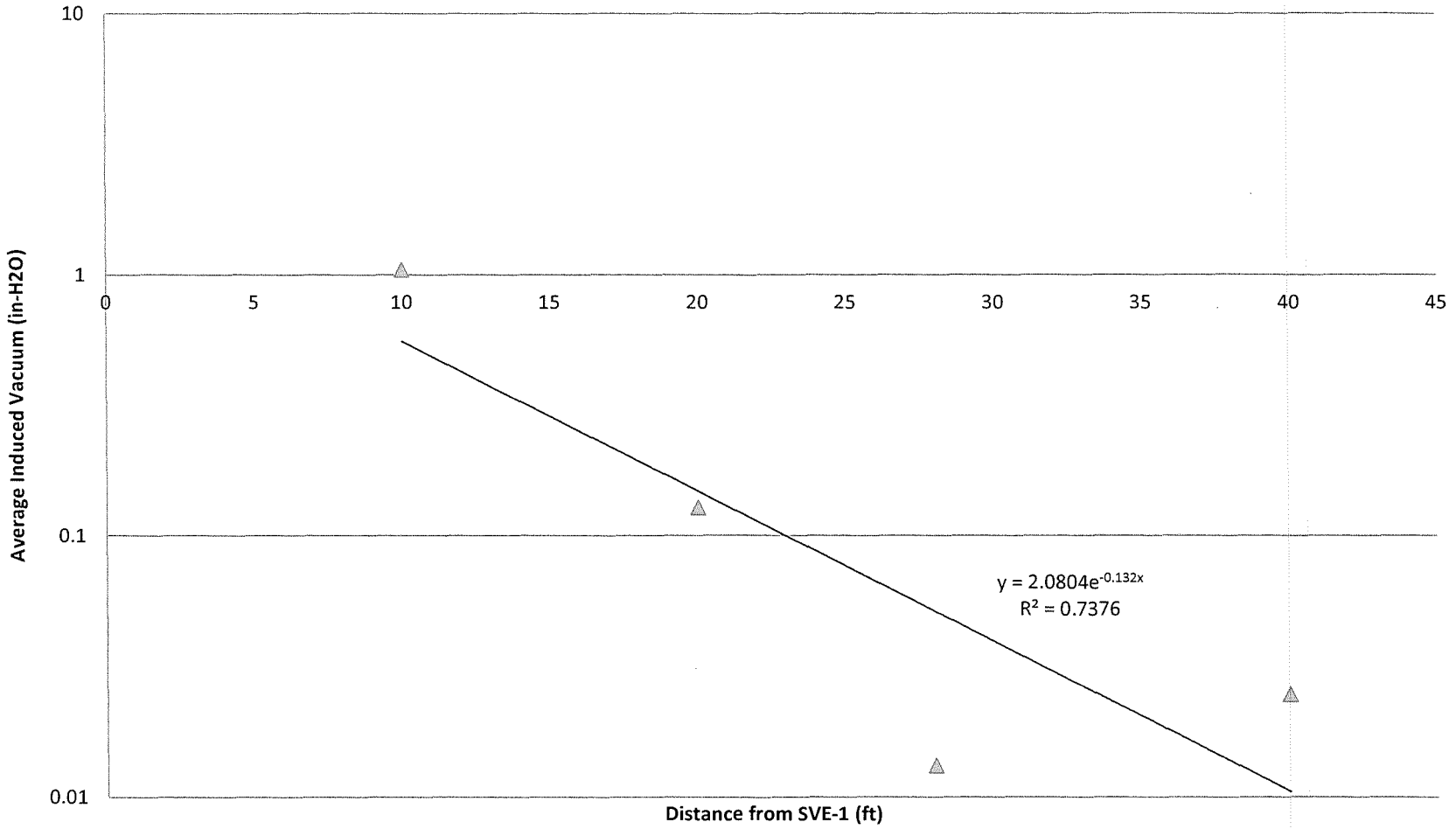


**CHART 3b**
**Radius of Influence**
**Applied Vacuum 14 in-Hg**
*Soil Vapor Extraction Pilot Study Report*
Martino's Master Dry Cleaners
Kenosha, Wisconsin
WDNR BRRTS No. 02-30-552188

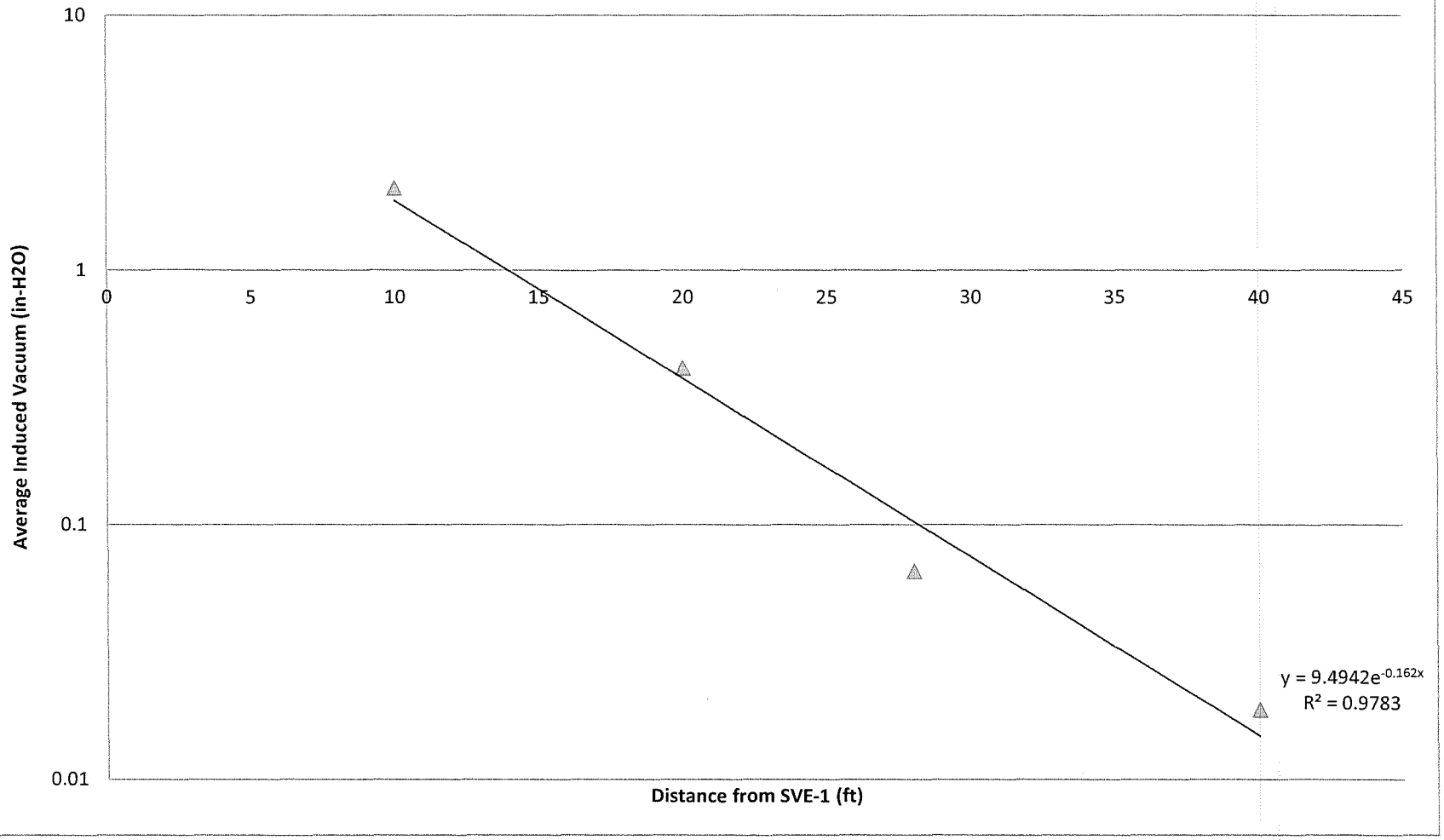
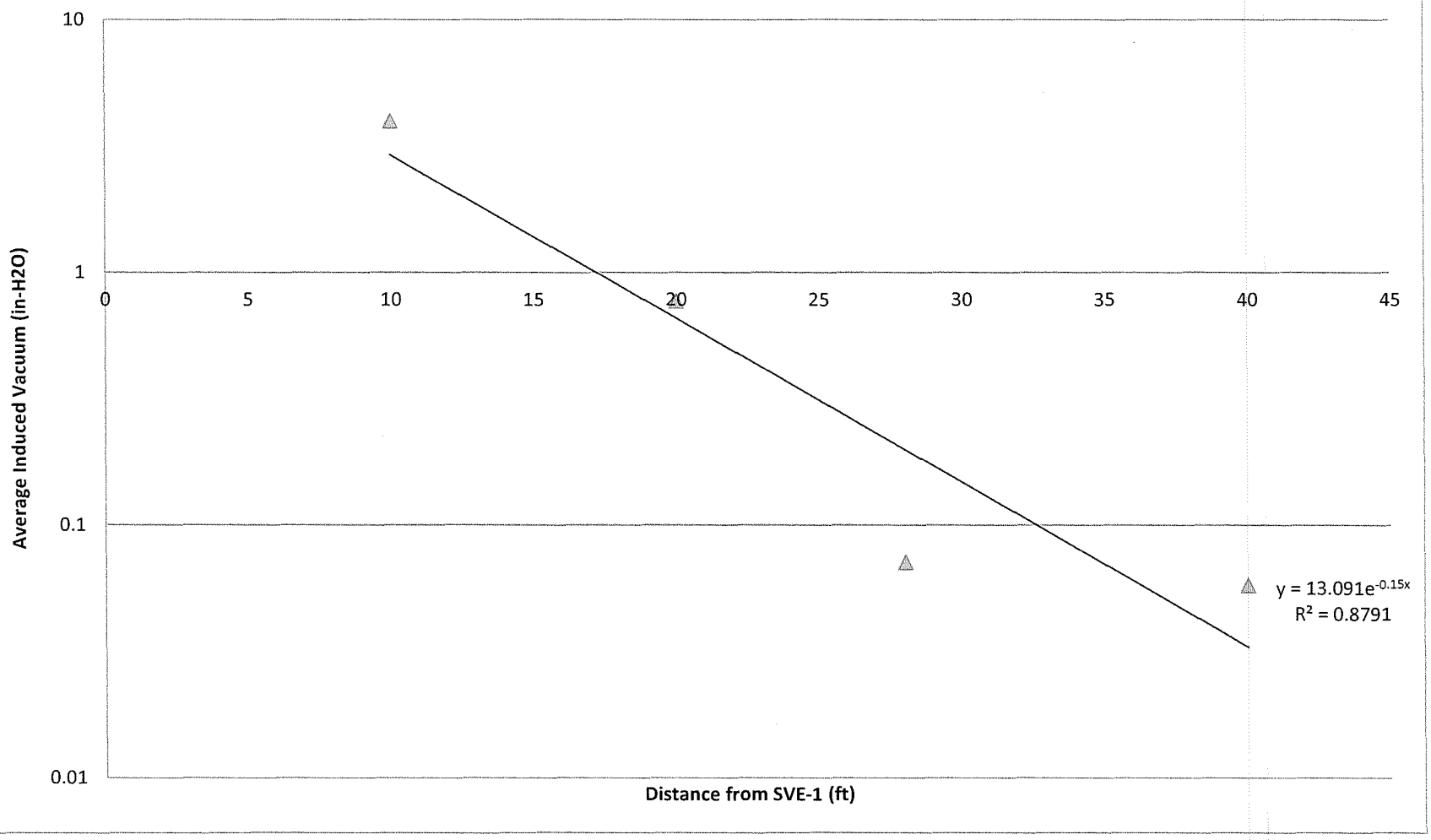


**CHART 3c**
**Radius of Influence**
**Applied Vacuum 20 in-Hg**
*Soil Vapor Extraction Pilot Study Report*
Martino's Master Dry Cleaners
Kenosha, Wisconsin
WDNR BRRTS No. 02-30-552188



# APPENDIX A

## Boring Logs

State of Wisconsin
Department of Natural Resources

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____



| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| Martinos 41st-Kenosha | | SB-4 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| First Name: Mark Last Name: Firm: Enviro-Dynamics | 2/ 6/ 011 | 2/ 6/ 011 | Macro Core |

| WI Unique Well No. | DNR Well ID No. | Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| | | MW-2 | _____ Feet MSL | _____ Feet MSL | 2.5 inches |

Local Grid Origin ☐ (estimated: [x]) or Boring Location [x]
State Plane _____ N, _____ E
_____ 1/4 of _____ 1/4 of Section _____, T _____ N, R _____

Lat 42° 33' 56.38"
Long 87° 51' 26.0"

Local Grid Location
[x] N ☐ E
_____ Feet ☐ S _____ Feet [x] W

| Facility ID | County | County Code | Civil Town/City/ or Village |
|---|---|---|---|
| 6165 | KENOSHA | 30 | Kenosha City |

| Sample Number and Type | Length Att. & Recovered (in) | Blow Counts | Depth in Feet (Below ground surface) | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil 2-4 | | | 0 | 0.0 - 1.0 (0'-1') ASPHALT(AS): Asphalt Gravel Roadbase. | AS | | | | | | | | | |
| Soil 8-10 | | | 1 | 1.0 - 12.0 (1'-12') SILT(ML): Black to brown, Silt, trace of fine Sand, trace of clay after 5', medium stiff, slightly plastic, uniform, moist. | ML | | | 1.3 | | | | | | |
| | | | 2 | | | | | | | | | | | |
| | | | 3 | | | | | | | | | | | |
| | | | 4 | | | | | | | | | | | |
| | | | 5 | | | | | | | | | | | |
| | | | 6 | | | | | | | | | | | |
| | | | 7 | | | | | | | | | | | |
| | | | 8 | | | | | | | | | | | |
| | | | 9 | | | | | | | | | | | |
| | | | 10 | | | | | | | | | | | |
| | | | 11 | | | | | | | | | | | |
| | | | 12 | | | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

| Signature | Firm |
|---|---|
| | |

State of Wisconsin
Department of Natural Resources

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____



| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| Martinos 41st-Kenosha | | SB-6 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| First Name: Mark Last Name: | 2/ 6/ 011 | 2/ 6/ 011 | Macro Core |
| Firm: Enviro-Dynamics | | | |

| WI Unique Well No. | DNR Well ID No. | Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| | | MW-1 | _____ Feet MSL | _____ Feet MSL | 2.5 inches |

Local Grid Origin ☐ (estimated: [x] ) or Boring Location [x]
State Plane _____ N, _____ E
_____ 1/4 of _____ 1/4 of Section _____, T _____ N, R _____

Lat 42° 33' 56.38"
Long 87° 51' 26.0"

Local Grid Location
[x] N ☐ E
_____ Feet ☐ S _____ Feet [x] W

| Facility ID | County | County Code | Civil Town/City/ or Village |
|---|---|---|---|
| 6165 | KENOSHA | 30 | Kenosha City |

| Sample Number and Type | Length Att. & Recovered (in) | Blow Counts | Depth in Feet (Below ground surface) | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil 2-4 | | | | 0.0 - 1.0 (0'-1') ASPHALT(AS): Asphalt Gravel Roadbase. | AS | | | | | | | | | |
| Soil 8-10 | | | 1 | 1.0 - 12.0 (1'-12') SILT(ML): Blackish brown, Silt, little fine Sand, color change after 5' to light brown and an increase of Sand was present, medium stiff to dense, slightly plastic to non plastic, uniform, moist. | ML | | | 1.2 | | | | | | |
| | | | 2 | | | | | | | | | | | |
| | | | 3 | | | | | | | | | | | |
| | | | 4 | | | | | | | | | | | |
| | | | 5 | | | | | | | | | | | |
| | | | 6 | | | | | | | | | | | |
| | | | 7 | | | | | | | | | | | |
| | | | 8 | | | | | | | | | | | |
| | | | 9 | | | | | | | | | | | |
| | | | 10 | | | | | | | | | | | |
| | | | 11 | | | | | | | | | | | |
| | | | 12 | | | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

| Signature | Firm |
|---|---|
| | |

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

**SOIL BORING LOG INFORMATION**
Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☐ Other ☐ _____

Page 1 of 1

| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| #6165-Martino's Master Dry Cleaners-41st | | SB-7 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| First Name: Rob Last Name: Mores<br>Firm: Envirodynamics | 9/ /2 /11 (m m / d d / y y y y) | 9/ /2 /11 (m m / d d / y y y y) | Direct Push |

| WI Unique Well No. | DNR Well ID No. | Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| _ _ _ _ _ _ | _ _ _ | MW-6 | _____ Feet MSL | _____ Feet MSL | 2.25 inches |

Local Grid Origin ☐ (estimated: ☒ ) or Boring Location ☒
State Plane _____ N, _____ E
_____ 1/4 of _____ 1/4 of Section _____, T _____ N, R _____

Lat 42° 0 ' 0.0 "
Long 87° 0 ' 0.0 "

Local Grid Location
_____ Feet ☐ N ☐ S _____ Feet ☐ E ☐ W

| Facility ID | County | County Code | Civil Town/City/ or Village |
|---|---|---|---|
| | KENOSHA | 30 | Kenosha |

| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth in Feet (Below ground surface) | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | 0.0 - 0.66 (0-.66') CONCRETE (CO): CONCRETE road base. | CO | | | | | | | | | |
| | | | 2 | 0.66 - 1.5 (0.66-1.5') FILL (Fl): Sand and Gravel FILL material. | Fl | | | 10.0 | | | | | | |
| | | | 4 | 1.5 - 5.0 (1.5-5') CLAY (CL): Reddish black CLAY with Sand and some Pebbles and trace wood fragments. Medium stiff and dry. | CL | | | 13.9 | | | | | | |
| | | | 6 | 5.0 - 15.0 (5-15') SILT (ML): Black SILT with some fine Sand and some Clay and trace wood fragments. Soft and dry. Color becomes reddish brown @ 9' with an addition of fine Gravel. Saturated @ 11.5'. Color becomes grayish brown @ 13'. | ML | | | 9.8 | | | | | | |
| SOIL 6-8' | | | 8 | | | | | 309 | | | | | | |
| SOIL 10-12' | | | 10 | | | | | 276 | | | | | | |
| | | | 12 | | | | | 232 | | | | | | |
| | | | 14 | | | | | 179 | | | | | | |
| | | | 16 | 15.0 - 16.0 (15-16') CLAY (CL): Gray CLAY. Very stiff and dry @ 15.5'. | CL | | | 63.6 | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

| Signature | Firm |
|---|---|
| | |

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☐ Other ☐ _____



| | | | |
|---|---|---|---|
| Facility/Project Name: #6165-Martino's Master Dry Cleaners-41st | License/Permit/Monitoring Number | Boring Number: SB-8 | |
| Boring Drilled By: Name of crew chief (first, last) and Firm — First Name: Rob Last Name: Mores — Firm: Envirodynamics | Date Drilling Started: 9/ /2 /11 | Date Drilling Completed: 9/ /2 /11 | Drilling Method: Direct Push |
| WI Unique Well No. | DNR Well ID No. | Well Name: MW-7 | Final Static Water Level: _____ Feet MSL |
| Surface Elevation: _____ Feet MSL | Borehole Diameter: _____ inches | | |
| Local Grid Origin ☐ (estimated: ☒ ) or Boring Location ☒ — State Plane _____ N, _____ E — _____ 1/4 of _____ 1/4 of Section _____, T _____ N, R _____ | Lat 42° 33' 0.0" — Long 87° 51' 0.0" | Local Grid Location: _____ Feet ☐ N ☐ S _____ Feet ☐ E ☐ W | |
| Facility ID | County: KENOSHA | County Code: 30 | Civil Town/City/ or Village: Kenosha |

| Sample Number and Type | Length Att. & Recovered (in) | Blow Counts | Depth in Feet (Below ground surface) | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | 0.0 - 3.0 (0-3) FILL (FI): Asphalt and Gravel FILL material. | FI | | | 1.4 | | | | | | |
| | | | 2 | | | | | 2.6 | | | | | | |
| | | | 4 | 3.0 - 7.0 (3-7') SILT (ML): Black SILT with some Sand. Soft, non-plastic and dry. Brick @ 3.5'. | ML | | | 3.5 | | | | | | |
| | | | 6 | | | | | 3.0 | | | | | | |
| SOIL 8-10 | | | 8 | 7.0 - 17.0 (7-17') SAND (SW): Dark brown Silty SAND with little Clay. Well graded, fine to coarse grained, loose and dry. Color becomes reddish orange @ 8.5'. Color becomes black @ 10'. Petroleum odor and saturated @ 12' (sludge consistancy). | SW | | | 4.5 | | | | | | |
| SOIL 10-12 | | | 10 | | | | | 15,000 | | | | | | |
| | | | 12 | | | | | 15,000 | | | | | | |
| | | | 14 | | | | | 60.3 | | | | | | |
| | | | 16 | | | | | 5.8 | | | | | | |
| | | | 18 | 17.0 - 20.0 (17-20') CLAY (CL): Gray CLAY. Very stiff and plastic, dry. | CL | | | 4.1 | | | | | | |
| | | | 20 | | | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm _____

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

**SOIL BORING LOG INFORMATION**
Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☐ Other ☐ _____

Page 1 of _____

| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| #6165-Martino's Master Dry Cleaners-41st | | SB-9 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| First Name: Rob Last Name: Mores<br>Firm: Envirodynamics | 10 / 12 / 2011 (m m d d y y y y) | 10 / 12 / 2011 (m m d d y y y y) | Direct Push |

| WI Unique Well No. | DNR Well ID No. | Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| _ _ _ _ _ _ | _ _ _ _ | MW-4 | _____ Feet MSL | _____ Feet MSL | _____ inches |

Local Grid Origin ☐ (estimated: ☒ ) or Boring Location ☒
State Plane _____ N, _____ E
_____ 1/4 of _____ 1/4 of Section _____, T _____ N, R _____

Lat 42° 0 ' 0.0 "
Long 87° 0 ' 0.0 "

Local Grid Location
_____ Feet ☐ N ☐ S _____ Feet ☐ E ☐ W

| Facility ID | County | County Code | Civil Town/City/ or Village |
|---|---|---|---|
| | KENOSHA | 30 | Kenosha |

| Sample Number and Type | Length Att. & Recovered (in) | Blow Counts | Depth in Feet (Below ground surface) | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | 0.0 - 2.0 (0-2') FILL (FI): Asphalt and Gravel FILL material. | FI | | | 4.2 | | | | | | |
| | | | 2 | 2.0 - 6.0 (2-6') SILT (ML): Brown SILT with some Gravel and Clay. Slightly stiff and moist. | ML | | | 0.0 | | | | | | |
| | | | 4 | | | | | | | | | | | |
| | | | 6 | 6.0 - 11.0 (6-11') SAND (SP): Brown fine SAND. Poorly graded. Slightly moist and slightly dense. | SP | | | 5.7 | | | | | | |
| SOIL 6-8' | | | 8 | | | | | 70.4 | | | | | | |
| | | | 10 | | | | | 23.1 | | | | | | |
| SOIL 10-12 | | | 11 | 11.0 - 19.0 (11-19') SAND (SW): Brownish Gray fine to coarse grained SAND with little Clay and Gravel. Well graded and loose. Saturated @ 12.5'. | SW | | | 120 | | | | | | |
| | | | 12 | | | | | 26.7 | | | | | | |
| | | | 14 | | | | | 79.4 | | | | | | |
| | | | 16 | | | | | 54.2 | | | | | | |
| | | | 18 | | | | | | | | | | | |
| | | | 19 | 19.0 - 20.0 (19-20') CLAY (CL): Gray CLAY. Very stiff, plastic and dry. | CL | | | 9.0 | | | | | | |
| | | | 20 | | | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

| Signature | Firm |
|---|---|
| | |

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

**SOIL BORING LOG INFORMATION**
Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☒ Other ☐



| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| 6165 Martinos 41st Ave. | 02-30-552188 | SB-10 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| Rob Mores<br>Envirodynamics | 9/2/2011 | 9/2/2011 | Direct Push |

| WI Unique Well No. | DNR Well ID No. | Common Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| | | MW-3/ MW-3D | 629.4 Feet MSL | 640.6 Feet MSL | 2.3 inches |

Local Grid Origin ☐ (estimated: ☐ ) or Boring Location ☒
State Plane 213,565 N, 2,577,411 E S/C/N
1/4 of 1/4 of Section , T N, R
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

| Facility ID | County | County Code | Civil Town/City/ or Village |
|---|---|---|---|
| 230067090 | Kenosha | 30 | Kenosha |

| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth In Feet | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CS | 60 | | 1 | **(0'-2') FILL(Fill):** FILL Asphalt road base and Gravel FILL material. | fill | | | 1.7 | | | | | | |
| | | | 2 | **(2'-16') SILT(ML):** Black to brown SILT, with Sand, some Gravel, Cobbles, trace Clay, soft, slightly plastic, dry. Saturacted @ 10'. Color becomes reddish brown @ 11'. | | | | 0.7 | | | | | | |
| | | | 3 | | | | | | | | | | | |
| | | | 4 | | | | | | | | | | | |
| CS | 60 | | 5 | | ML | | | 1.9 | | | | | | |
| | | | 6 | | | | | | | | | | | |
| | | | 7 | | | | | | | | | | | |
| | | | 8 | | | | | 1.1 | | | | | | |
| | | | 9 | | | | | | | | | | | |
| CS | 60 | | 10 | | | | | 6.9 | | | | | | |
| | | | 11 | | | | ▼ | | | | | | | |
| | | | 12 | | | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

| Signature | Firm | Tel: / Fax: |
|---|---|---|
| | EnviroForensics | |

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

**SOIL BORING LOG INFORMATION SUPPLEMENT**
Form 4400-122A

Boring Number SB-10 Use only as an attachment to Form 4400-122. 

| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth In Feet | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 13 | **(2'-16') SILT(ML):**Black to brown SILT, with Sand, some Gravel, Cobbles, trace Clay, soft, slightly plastic, dry. Saturacted @ 10'. Color becomes reddish brown @ 11'. *(continued)* | ML | | | 59.0 | | | | | | |
| | | | 14 | | | | | | | | | | | |
| CS | 60 | | 15 | | | | | 40.1 | | | | | | |
| | | | 16 | **(16'-19.5') SAND(SW):**Brown, fine to medium grained, SAND. Well graded and loose. Addition of some clay @ 19'. | SW | | | | | | | | | |
| | | | 17 | | | | | | | | | | | |
| | | | 18 | | | | | 2.0 | | | | | | |
| | | | 19 | | | | | | | | | | | |
| | | | 20 | **(19.5'-28') CLAY(CL):**Gray CLAY. Very stiff, hightly plastic, and moist. 3" Greyish green Sand layer, fine to coarse grained, wet. | CL | | | | | | | | | |
| CS | 60 | | 21 | | | | | | | | | | | |
| | | | 22 | | | | | | | | | | | |
| | | | 23 | | | | | | | | | | | |
| | | | 24 | | | | | | | | | | | |
| CS | 60 | | 25 | | | | | | | | | | | |
| | | | 26 | | | | | | | | | | | |
| | | | 27 | | | | | | | | | | | |
| | | | 28 | **(28'-33') SAND(SP):**Grayish green, fine to medium grained, SAND. Well graded, very dense, some Silt, and trace fine to medium grained gravel. | SP | | | | | | | | | |
| | | | 29 | | | | | | | | | | | |
| CS | 60 | | 30 | | | | | | | | | | | |
| | | | 31 | | | | | | | | | | | |
| | | | 32 | | | | | | | | | | | |

State of Wisconsin
Department of Natural Resources

**SOIL BORING LOG INFORMATION SUPPLEMENT**
Form 4400-122A

Boring Number SB-10 Use only as an attachment to Form 4400-122. 

| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth In Feet | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Soil Properties: Moisture Content | Soil Properties: Liquid Limit | Soil Properties: Plasticity Index | Soil Properties: P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 33 | | SP | | | | | | | | | |
| | | | 33 | **(33'-43') SILT and CLAY(CL-ML):** Grayish green SILT and CLAY with fine to coarse grained Sand, some Gravel. Very dense, moist, slightly plastic. | | | | | | | | | | |
| CS | 60 | | 34 35 36 37 38 39 40 | | CL-ML | | | | | | | | | |
| CS | 36 | | | | | | | | | | | | | |
| | | | | EOB @ 43'bgs | | | | | | | | | | |

State of Wisconsin
Department of Natural Resources

**SOIL BORING LOG INFORMATION**
Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☒ Other ☐



| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| 6165 Martinos 41st Ave. | 02-30-552188 | MW-8 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| Tony Kapugi<br>On-Site Environmental | 12/2/2013 | 12/2/2013 | Direct Push |

| WI Unique Well No. | DNR Well ID No. | Common Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| | | MW-8 | 629.4 Feet MSL | 639.4 Feet MSL | 2.3 inches |

Local Grid Origin ☐ (estimated: ☐ ) or Boring Location ☒
State Plane 213,655 N, 2,577,378 E S/C/N
1/4 of 1/4 of Section , T N, R
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

| Facility ID | County | County Code | Civil Town/City/ or Village |
|---|---|---|---|
| 230067090 | Kenosha | 30 | Kenosha |

| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth In Feet | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CS | 60 | | 1 | **(0'-0.5') ASPHALT:**ASPHALT cover. | AS | | | 18.1 | | | | | | |
| | | | 2 | **(0.25'-3') FILL:**FILL material, including Gravel and Sand. | Fill | | | 38.7 | | | | | | |
| | | | 3 | **(3'-4.5') SANDY SILT:**Black SILT with SAND, soft plastic, moist. | ML | | | | | | | | | |
| | | | 4 | | | | | 99.6 | | | | | | |
| | | | 5 | **(4.5'-4.7') COBBLE:** COBBLE layer, white, loose. | GP | | | | | | | | | |
| CS | 60 | | 6 | **(4.7'-7.5') SAND:**Light Brown SAND, fine to medium grained, poorly graded, some Silt, moist, dense. | SP | | | 100.0 | | | | | | |
| | | | 7 | | | | | | | | | | | |
| | | | 8 | **(7.5'-12') SAND:**Dark gray SAND, fine to coarse grained, well graded, dense, moist, petroleum odor at 7.5. | | | | 497.3 | | | | | | |
| | | | 9 | | | | | | | | | | | |
| | | | 10 | | SW | | ▼ | | | | | | | |
| CS | 60 | | 11 | | | | | 340.8 | | | | | | |
| | | | 12 | | | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

| Signature | Firm | Tel: |
|---|---|---|
| | EnviroForensics | Fax: |

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State of Wisconsin
Department of Natural Resources

**SOIL BORING LOG INFORMATION SUPPLEMENT**
Form 4400-122A

Boring Number MW-8 Use only as an attachment to Form 4400-122. 

| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth In Feet | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 13 | **(12'-18') SAND:**Light Brown SAND, fine to medium grained, poorly graded, some Silt, dense, saturated. | | | | 128.0 | | | | | | |
| | | | 14 | | | | | 114.6 | | | | | | |
| CS | 60 | | 15 | | SP | | | | | | | | | |
| | | | 16 | | | | | 17.1 | | | | | | |
| | | | 17 | | | | | | | | | | | |
| | | | 18 | **(18'-20') SILTY CLAY:**Brown CLAY with SILT, stiff, slightly moist, slightly plastic. | | | | 3.6 | | | | | | |
| | | | 19 | | CL | | | | | | | | | |
| | | | 20 | | | | | | | | | | | |

# APPENDIX B

## Laboratory Report

**EnvisionAir**
1441 Sadlier Circle West Drive
Indianapolis, IN 46239
Ph: 317-351-0885
Fax: 317-351-0882
www.envision-air.com

Mr. Oran Day
Enviroforensics
602 N. Capitol Ave.
Suite 210
Indianapolis, IN 46204

April 8, 2016

EnvisionAir Project Number: 2016-264
Client Project Name: 6165 – Martino's 41st Ave

Dear Mr. Day,

Please find the attached analytical report for the samples received March 28, 2016. All test methods performed were fully compliant with local, state, and federal EPA methods unless otherwise noted. The project was analyzed as requested on the enclosed chain of custody record. Please review the comments section for additional information about your results or Quality Control data.

Feel free to contact me if you have any questions or comments regarding your analytical report or service.

Thank you for your business. EnvisionAir looks forward to working with you on your next project.

Yours Sincerely,

Stanley A. Hunnicutt

Stan Hunnicutt

Project Manager
EnvisionAir, LLC

**EnvisionAir**
1441 Sadlier Circle West Drive
Indianapolis, IN 46239
Ph: 317-351-0885
Fax: 317-351-0882
www.envision-air.com

**Client Name:** ENVIROFORENSICS

**Project ID:** 6165 / MARTINO'S 41ST AVE

**Client Project Manager:** ORAN DAY

**EnvisionAir Project Number:** 2016-264

## Sample Summary

*Canister Pressure / Vacuum*

| Laboratory Sample Number: | Sample Description: | Matrix: | START Date Collected: | START Time Collected: | End Date Collected: | End Time Collected: | Date Received: | Time Received | Initial Field (in. Hg) | Final Field (in. Hg) | Lab Received (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16-966 | 6165-EF-1 | A | 3/22/16 | 12:05 | 3/22/16 | 12:06 | 3/28/16 | 11:50 | -27.5 | -5 | -5 |
| 16-967 | 6165-EF-2 | A | 3/22/16 | 15:57 | 3/22/16 | 15:58 | 3/28/16 | 11:50 | -27 | -5 | -5 |
| 16-968 | 6165-EF-3 | A | 3/23/16 | 8:27 | 3/23/16 | 8:28 | 3/28/16 | 11:50 | -27 | -5 | -5 |

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**Client Name:** ENVIROFORENSICS

**Project ID:** 6165 / MARTINO'S 41ST AVE

**Client Project Manager:** ORAN DAY

**EnvisionAir Project Number:** 2016-264

**Analytical Method:** TO-15
**Analytical Batch:** 040216AIR

**Client Sample ID:** 6165-EF-1
**Envision Sample Number:** 16-966
**Sample Matrix:** AIR

**Sample Collection START Date/Time:** 3/22/16 12:05
**Sample Collection END Date/Time:** 3/22/16 12:06
**Sample Received Date/Time:** 3/28/16 11:50

| Compounds | Sample Results ug/m³ | Reporting Limit ug/m³ | Flag |
|---|---|---|---|
| 4-Ethyltoluene | < 4920 | 4920 | 2 |
| 4-Methyl-2-pentanone (MIBK) | < 20500 | 20500 | 2 |
| 1,1,1-Trichloroethane | < 5460 | 5460 | 2 |
| 1,1,2,2-Tetrachloroethane | < 3.36 | 3.36 | 1,2 |
| 1,1,2-Trichloroethane | < 2.10 | 2.10 | 1,2 |
| 1,1-Dichloroethane | < 40.5 | 40.5 | 2 |
| 1,1-Dichloroethene | < 1980 | 1980 | 2 |
| 1,2,4-Trichlorobenzene | < 7.42 | 7.42 | 2 |
| 1,2,4-Trimethylbenzene | < 49.2 | 49.2 | 2 |
| 1,2-dibromoethane (EDB) | < 0.32 | 0.32 | 1,2 |
| 1,2-Dichlorobenzene | < 601 | 601 | 2 |
| 1,2-Dichloroethane | < 4.05 | 4.05 | 2 |
| 1,2-Dichloropropane | < 4.62 | 4.62 | 2 |
| 1,3,5-Trimethylbenzene | < 49.2 | 49.2 | 2 |
| 1,3-Butadiene | < 2.21 | 2.21 | 2 |
| 1,3-Dichlorobenzene | < 601 | 601 | 2 |
| 1,4-Dichlorobenzene | < 6.01 | 6.01 | 2 |
| 1,4-Dioxane | < 18.0 | 18.0 | 2 |
| 2-Butanone (MEK) | < 29500 | 29500 | 2 |
| 2-Hexanone | < 205 | 205 | 2 |
| Acetone | < 23800 | 23800 | 2 |
| Benzene | < 16.0 | 16.0 | 2 |
| Benzyl Chloride | < 4.14 | 4.14 | 1,2 |
| Bromodichloromethane | < 5.36 | 5.36 | 1,2 |
| Bromoform | < 103 | 103 | 2 |
| Bromomethane | < 38.8 | 38.8 | 2 |
| Carbon Disulfide | < 3110 | 3110 | 2 |
| Carbon Tetrachloride | < 6.29 | 6.29 | 2 |
| Chlorobenzene | < 230 | 230 | 2 |
| Chloroethane | < 132 | 132 | 2 |

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www.envision-air.com

| Compounds | Sample Results ug/m³ | Reporting Limit ug/m³ | Flag |
|---|---|---|---|
| Chloroform | < 8.30 | 8.30 | 2 |
| Chloromethane | < 206 | 206 | 2 |
| cis-1,2-Dichloroethene | < 198 | 198 | 2 |
| cis-1,3-Dichloropropene | < 45.4 | 45.4 | 2 |
| Cyclohexane | < 55100 | 55100 | 2 |
| Dibromochloromethane | < 8.52 | 8.52 | 2 |
| Dichlorodifluoromethane | < 495 | 495 | 2 |
| Ethyl Acetate | < 18000 | 18000 | 2 |
| Ethylbenzene | < 86.8 | 86.8 | 2 |
| Hexachloro-1,3-butadiene | < 10.7 | 10.7 | 2 |
| Isooctane | < 4670 | 4670 | 2 |
| m,p-Xylene | < 434 | 434 | 2 |
| Methylene Chloride | < 417 | 417 | 2 |
| Methyl-tert-butyl ether | < 361 | 361 | 2 |
| N-Heptane | < 4100 | 4100 | 2 |
| N-Hexane | < 1760 | 1760 | 2 |
| o-Xylene | < 434 | 434 | 2 |
| Propylene | < 1720 | 1720 | 2 |
| Styrene | < 4260 | 4260 | 2 |
| Tetrachloroethene | **63.1** | 31.9 | 2 |
| Tetrahydrofuran | < 2950 | 2950 | 2 |
| Toluene | < 37700 | 37700 | 2 |
| trans-1,2-Dichloroethene | < 396 | 396 | 2 |
| trans-1,3-Dichloropropene | < 45.4 | 45.4 | 2 |
| Trichlorethene | < 10.7 | 10.7 | 2 |
| Trichlorofluoromethane | < 5620 | 5620 | 2 |
| Vinyl Acetate | < 1760 | 1760 | 2 |
| Vinyl Bromide | < 4.37 | 4.37 | 2 |
| Vinyl Chloride | < 12.8 | 12.8 | 2 |
| 4-bromofluorobenzene (surrogate) | 111% | | |
| Analysis Date/Time: | 4-2-16/19:09 | | |
| Analyst Initials | tjg | | |

**EnvisionAir**
1441 Sadlier Circle West Drive
Indianapolis, IN 46239
Ph: 317-351-0885
Fax: 317-351-0882
www.envision-air.com

**Client Name:** ENVIROFORENSICS

**Project ID:** 6165 / MARTINO'S 41ST AVE

**Client Project Manager:** ORAN DAY

**EnvisionAir Project Number:** 2016-264

**Analytical Method:** TO-15
**Analytical Batch:** 040216AIR

**Client Sample ID:** 6165-EF-2
**Envision Sample Number:** 16-967
**Sample Matrix:** AIR

**Sample Collection START Date/Time:** 3/22/16 15:57
**Sample Collection END Date/Time:** 3/22/16 15:58
**Sample Received Date/Time:** 3/28/16 11:50

| Compounds | Sample Results ug/m³ | Reporting Limit ug/m³ | Flag |
|---|---|---|---|
| 4-Ethyltoluene | < 4920 | 4920 | 2 |
| 4-Methyl-2-pentanone (MIBK) | < 20500 | 20500 | 2 |
| 1,1,1-Trichloroethane | < 5460 | 5460 | 2 |
| 1,1,2,2-Tetrachloroethane | < 3.36 | 3.36 | 1,2 |
| 1,1,2-Trichloroethane | < 2.10 | 2.10 | 1,2 |
| 1,1-Dichloroethane | < 40.5 | 40.5 | 2 |
| 1,1-Dichloroethene | < 1980 | 1980 | 2 |
| 1,2,4-Trichlorobenzene | < 7.42 | 7.42 | 2 |
| 1,2,4-Trimethylbenzene | **267** | 49.2 | 2 |
| 1,2-dibromoethane (EDB) | < 0.32 | 0.32 | 1,2 |
| 1,2-Dichlorobenzene | < 601 | 601 | 2 |
| 1,2-Dichloroethane | < 4.05 | 4.05 | 2 |
| 1,2-Dichloropropane | < 4.62 | 4.62 | 2 |
| 1,3,5-Trimethylbenzene | **139** | 49.2 | 2 |
| 1,3-Butadiene | < 2.21 | 2.21 | 2 |
| 1,3-Dichlorobenzene | < 601 | 601 | 2 |
| 1,4-Dichlorobenzene | < 6.01 | 6.01 | 2 |
| 1,4-Dioxane | < 18.0 | 18.0 | 2 |
| 2-Butanone (MEK) | < 29500 | 29500 | 2 |
| 2-Hexanone | < 205 | 205 | 2 |
| Acetone | < 23800 | 23800 | 2 |
| Benzene | < 16.0 | 16.0 | 2 |
| Benzyl Chloride | < 4.14 | 4.14 | 1,2 |
| Bromodichloromethane | < 5.36 | 5.36 | 1,2 |
| Bromoform | < 103 | 103 | 2 |
| Bromomethane | < 38.8 | 38.8 | 2 |
| Carbon Disulfide | < 3110 | 3110 | 2 |
| Carbon Tetrachloride | < 6.29 | 6.29 | 2 |
| Chlorobenzene | < 230 | 230 | 2 |
| Chloroethane | < 132 | 132 | 2 |

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| Compounds | Sample Results ug/m³ | Reporting Limit ug/m³ | Flag |
|---|---|---|---|
| Chloroform | < 8.30 | 8.30 | 2 |
| Chloromethane | < 206 | 206 | 2 |
| cis-1,2-Dichloroethene | < 198 | 198 | 2 |
| cis-1,3-Dichloropropene | < 45.4 | 45.4 | 2 |
| Cyclohexane | < 55100 | 55100 | 2 |
| Dibromochloromethane | < 8.52 | 8.52 | 2 |
| Dichlorodifluoromethane | < 495 | 495 | 2 |
| Ethyl Acetate | < 18000 | 18000 | 2 |
| Ethylbenzene | < 86.8 | 86.8 | 2 |
| Hexachloro-1,3-butadiene | < 10.7 | 10.7 | 2 |
| Isooctane | < 4670 | 4670 | 2 |
| m,p-Xylene | < 434 | 434 | 2 |
| Methylene Chloride | < 417 | 417 | 2 |
| Methyl-tert-butyl ether | < 361 | 361 | 2 |
| N-Heptane | < 4100 | 4100 | 2 |
| N-Hexane | < 1760 | 1760 | 2 |
| o-Xylene | < 434 | 434 | 2 |
| Propylene | < 1720 | 1720 | 2 |
| Styrene | < 4260 | 4260 | 2 |
| Tetrachloroethene | **480** | 31.9 | 2 |
| Tetrahydrofuran | < 2950 | 2950 | 2 |
| Toluene | < 37700 | 37700 | 2 |
| trans-1,2-Dichloroethene | < 396 | 396 | 2 |
| trans-1,3-Dichloropropene | < 45.4 | 45.4 | 2 |
| Trichlorethene | **14.0** | 10.7 | 2 |
| Trichlorofluoromethane | < 5620 | 5620 | 2 |
| Vinyl Acetate | < 1760 | 1760 | 2 |
| Vinyl Bromide | < 4.37 | 4.37 | 2 |
| Vinyl Chloride | **531** | 51.1 | 3 |
| 4-bromofluorobenzene (surrogate) | 105% | | |
| Analysis Date/Time: | 4-2-16/19:47 | | |
| Analyst Initials | tjg | | |

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**Client Name:** ENVIROFORENSICS

**Project ID:** 6165 / MARTINO'S 41ST AVE

**Client Project Manager:** ORAN DAY

**EnvisionAir Project Number:** 2016-264

**Analytical Method:** TO-15
**Analytical Batch:** 040416CAIR

**Client Sample ID:** 6165-EF-3
**Envision Sample Number:** 16-968
**Sample Matrix:** AIR

**Sample Collection START Date/Time:** 3/23/16 8:27
**Sample Collection END Date/Time:** 3/23/16 8:28
**Sample Received Date/Time:** 3/28/16 11:50

| Compounds | Sample Results ug/m³ | Reporting Limit ug/m³ | Flag |
|---|---|---|---|
| 4-Ethyltoluene | < 4920 | 4920 | 2 |
| 4-Methyl-2-pentanone (MIBK) | < 20500 | 20500 | 2 |
| 1,1,1-Trichloroethane | < 5460 | 5460 | 2 |
| 1,1,2,2-Tetrachloroethane | < 3.36 | 3.36 | 1,2 |
| 1,1,2-Trichloroethane | < 2.10 | 2.10 | 1,2 |
| 1,1-Dichloroethane | < 40.5 | 40.5 | 2 |
| 1,1-Dichloroethene | < 1980 | 1980 | 2 |
| 1,2,4-Trichlorobenzene | < 7.42 | 7.42 | 2 |
| 1,2,4-Trimethylbenzene | < 49.2 | 49.2 | 2 |
| 1,2-dibromoethane (EDB) | < 0.32 | 0.32 | 1,2 |
| 1,2-Dichlorobenzene | < 601 | 601 | 2 |
| 1,2-Dichloroethane | < 4.05 | 4.05 | 2 |
| 1,2-Dichloropropane | < 4.62 | 4.62 | 2 |
| 1,3,5-Trimethylbenzene | < 49.2 | 49.2 | 2 |
| 1,3-Butadiene | < 2.21 | 2.21 | 2 |
| 1,3-Dichlorobenzene | < 601 | 601 | 2 |
| 1,4-Dichlorobenzene | < 6.01 | 6.01 | 2 |
| 1,4-Dioxane | < 18.0 | 18.0 | 2 |
| 2-Butanone (MEK) | < 29500 | 29500 | 2 |
| 2-Hexanone | < 205 | 205 | 2 |
| Acetone | < 23800 | 23800 | 2 |
| Benzene | < 16.0 | 16.0 | 2 |
| Benzyl Chloride | < 4.14 | 4.14 | 1,2 |
| Bromodichloromethane | < 5.36 | 5.36 | 1,2 |
| Bromoform | < 103 | 103 | 2 |
| Bromomethane | < 38.8 | 38.8 | 2 |
| Carbon Disulfide | < 3110 | 3110 | 2 |
| Carbon Tetrachloride | < 6.29 | 6.29 | 2 |
| Chlorobenzene | < 230 | 230 | 2 |
| Chloroethane | < 132 | 132 | 2 |

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| Compounds | Sample Results ug/m³ | Reporting Limit ug/m³ | Flag |
|---|---|---|---|
| Chloroform | < 8.30 | 8.30 | 2 |
| Chloromethane | < 206 | 206 | 2 |
| cis-1,2-Dichloroethene | < 198 | 198 | 2 |
| cis-1,3-Dichloropropene | < 45.4 | 45.4 | 2 |
| Cyclohexane | < 55100 | 55100 | 2 |
| Dibromochloromethane | < 8.52 | 8.52 | 2 |
| Dichlorodifluoromethane | < 495 | 495 | 2 |
| Ethyl Acetate | < 18000 | 18000 | 2 |
| Ethylbenzene | < 86.8 | 86.8 | 2 |
| Hexachloro-1,3-butadiene | < 10.7 | 10.7 | 2 |
| Isooctane | **9,490** | 187000 | 4,5 |
| m,p-Xylene | < 434 | 434 | 2 |
| Methylene Chloride | < 417 | 417 | 2 |
| Methyl-tert-butyl ether | < 361 | 361 | 2 |
| N-Heptane | < 4100 | 4100 | 2 |
| N-Hexane | < 1760 | 1760 | 2 |
| o-Xylene | < 434 | 434 | 2 |
| Propylene | < 1720 | 1720 | 2 |
| Styrene | < 4260 | 4260 | 2 |
| Tetrachloroethene | **323** | 31.9 | 2 |
| Tetrahydrofuran | < 2950 | 2950 | 2 |
| Toluene | < 37700 | 37700 | 2 |
| trans-1,2-Dichloroethene | < 396 | 396 | 2 |
| trans-1,3-Dichloropropene | < 45.4 | 45.4 | 2 |
| Trichlorethene | **74.2** | 10.7 | 2 |
| Trichlorofluoromethane | < 5620 | 5620 | 2 |
| Vinyl Acetate | < 1760 | 1760 | 2 |
| Vinyl Bromide | < 4.37 | 4.37 | 2 |
| Vinyl Chloride | **78.0** | 12.8 | 2 |
| 4-bromofluorobenzene (surrogate) | 97% | | |
| Analysis Date/Time: | 4-5-16/13:49 | | |
| Analyst Initials | tjg | | |

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*Analytical Report*

## TO-15 Quality Control Data

**EnvisionAir Batch Number:** 040216AIR

| Method Blank (MB): | MB Results (ppbv) | Reporting Limit (ppbv) | Flags |
|---|---|---|---|
| 4-Ethyltoluene | < 100 | 100 | |
| 4-Methyl-2-pentanone (MIBK) | < 500 | 500 | |
| 1,1,1-Trichloroethane | < 100 | 100 | |
| 1,1,2,2-Tetrachloroethane | < 0.049 | 0.049 | 1 |
| 1,1,2-Trichloroethane | < 0.038 | 0.038 | 1 |
| 1,1-Dichloroethane | < 1 | 1 | |
| 1,1-Dichloroethene | < 50 | 50 | |
| 1,2,4-Trichlorobenzene | < 0.1 | 0.1 | |
| 1,2,4-Trimethylbenzene | < 1 | 1 | |
| 1,2-dibromoethane (EDB) | < 0.0041 | 0.0041 | 1 |
| 1,2-Dichlorobenzene | < 10 | 10 | |
| 1,2-Dichloroethane | < 0.1 | 0.1 | |
| 1,2-Dichloropropane | < 0.1 | 0.1 | |
| 1,3,5-Trimethylbenzene | < 1 | 1 | |
| 1,3-Butadiene | < 0.1 | 0.1 | |
| 1,3-Dichlorobenzene | < 10 | 10 | |
| 1,4-Dichlorobenzene | < 0.1 | 0.1 | |
| 1,4-Dioxane | < 0.5 | 0.5 | |
| 2-Butanone (MEK) | < 1000 | 1000 | |
| 2-Hexanone | < 5 | 5 | |
| Acetone | < 1000 | 1000 | |
| Benzene | < 0.5 | 0.5 | |
| Benzyl Chloride | < 0.08 | 0.08 | 1 |
| Bromodichloromethane | < 0.08 | 0.08 | 1 |
| Bromoform | < 1 | 1 | |
| Bromomethane | < 1 | 1 | |
| Carbon Disulfide | < 100 | 100 | |
| Carbon Tetrachloride | < 0.1 | 0.1 | |
| Chlorobenzene | < 5 | 5 | |
| Chloroethane | < 5 | 5 | |
| Chloroform | < 0.17 | 0.17 | |
| Chloromethane | < 10 | 10 | |
| cis-1,2-Dichloroethene | < 5 | 5 | |
| cis-1,3-Dichloropropene | < 1 | 1 | |
| Cyclohexane | < 1600 | 1600 | |
| Dibromochloromethane | < 0.1 | 0.1 | |
| Dichlorodifluoromethane | < 10 | 10 | |
| Ethyl Acetate | < 500 | 500 | |
| Ethylbenzene | < 2 | 2 | |
| Hexachloro-1,3-butadiene | < 0.1 | 0.1 | |
| Isooctane | < 100 | 100 | |
| m,p-Xylene | < 10 | 10 | |
| Methylene Chloride | < 12 | 12 | |
| Methyl-tert-butyl ether | < 10 | 10 | |
| N-Heptane | < 100 | 100 | |
| N-Hexane | < 50 | 50 | |
| o-Xylene | < 10 | 10 | |
| Propylene | < 100 | 100 | |
| Styrene | < 100 | 100 | |
| Tetrachloroethene | < 0.47 | 0.47 | |
| Tetrahydrofuran | < 100 | 100 | |

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*Analytical Report*

| Method Blank (MB): | MB Results (ppbv) | Reporting Limit (ppbv) | Flags |
|---|---|---|---|
| Toluene | < 1000 | 1000 | |
| trans-1,2-Dichloroethene | < 10 | 10 | |
| trans-1,3-Dichloropropene | < 1 | 1 | |
| Trichlorethene | < 0.2 | 0.2 | |
| Trichlorofluoromethane | < 100 | 100 | |
| Vinyl Acetate | < 50 | 50 | |
| Vinyl Bromide | < 0.1 | 0.1 | |
| Vinyl Chloride | < 0.5 | 0.5 | |
| 4-bromofluorobenzene (surrogate) | 92% | | |
| Analysis Date/Time: | 4-2-16/12:50 | | |
| Analyst Initials | tjg | | |

| LCS/LCSD | LCS Results (ppbv) | LCSD Results (ppbv) | LCS/D Conc(ppbv) | LCS Rec. | LCSD Rec. | RPD | Flag |
|---|---|---|---|---|---|---|---|
| Propylene | 9.13 | 9.71 | 10 | 91% | 97% | 6.2% | |
| Dichlorodifluoromethane | 9.88 | 8.44 | 10 | 99% | 84% | 15.7% | |
| Chloromethane | 9.42 | 11.1 | 10 | 94% | 111% | 16.4% | |
| Vinyl Chloride | 10.5 | 9.41 | 10 | 105% | 94% | 10.9% | |
| 1,3-Butadiene | 9.67 | 10.1 | 10 | 97% | 101% | 4.4% | |
| Bromomethane | 11.5 | 9.52 | 10 | 115% | 95% | 18.8% | |
| Chloroethane | 11.1 | 10.2 | 10 | 111% | 102% | 8.5% | |
| Vinyl Bromide | 10.4 | 9.85 | 10 | 104% | 99% | 5.4% | |
| Trichlorofluoromethane | 10.6 | 8.89 | 10 | 106% | 89% | 17.5% | |
| Acetone | 10.2 | 8.8 | 10 | 102% | 88% | 14.7% | |
| 1,1-Dichloroethene | 10.4 | 8.55 | 10 | 104% | 86% | 19.5% | |
| Methylene Chloride | 9.71 | 7.9 | 10 | 97% | 79% | 20.6% | 6 |
| Carbon Disulfide | 9.97 | 8.34 | 10 | 100% | 83% | 17.8% | |
| trans-1,2-Dichloroethene | 11.3 | 9.24 | 10 | 113% | 92% | 20.1% | 6 |
| Methyl-tert-butyl ether | 10.5 | 9.95 | 10 | 105% | 100% | 5.4% | |
| 1,1-Dichloroethane | 9.72 | 8 | 10 | 97% | 80% | 19.4% | |
| Vinyl Acetate | 9.17 | 7.47 | 10 | 92% | 75% | 20.4% | 6 |
| N-Hexane | 8.53 | 7.04 | 10 | 85% | 70% | 19.1% | |
| 2-Butanone (MEK) | 9.48 | 7.78 | 10 | 95% | 78% | 19.7% | |
| cis-1,2-Dichloroethene | 10 | 8.19 | 10 | 100% | 82% | 19.9% | |
| Ethyl Acetate | 8.77 | 8.7 | 10 | 88% | 87% | 0.8% | |
| Chloroform | 10.3 | 8.48 | 10 | 103% | 85% | 19.4% | |
| Tetrahydrofuran | 9.72 | 9.24 | 10 | 97% | 92% | 5.1% | |
| 1,2-Dichloroethane | 10.2 | 11.4 | 10 | 102% | 114% | 11.1% | |
| 1,1,1-Trichloroethane | 11.9 | 11.2 | 10 | 119% | 112% | 6.1% | |
| Carbon Tetrachloride | 11.8 | 11.3 | 10 | 118% | 113% | 4.3% | |
| Benzene | 9.84 | 9.41 | 10 | 98% | 94% | 4.5% | |
| Cyclohexane | 9.03 | 8.69 | 10 | 90% | 87% | 3.8% | |
| 1,2-Dichloropropane | 9.48 | 9.06 | 10 | 95% | 91% | 4.5% | |
| Trichlorethene | 10.8 | 10.3 | 10 | 108% | 103% | 4.7% | |
| Bromodichloromethane | 11.4 | 10.9 | 10 | 114% | 109% | 4.5% | |
| 1,4-Dioxane | 11.8 | 11.1 | 10 | 118% | 111% | 6.1% | |
| Isooctane | 10 | 9.5 | 10 | 100% | 95% | 5.1% | |
| N-Heptane | 8.87 | 8.4 | 10 | 89% | 84% | 5.4% | |
| cis-1,3-Dichloropropene | 10.8 | 10.2 | 10 | 108% | 102% | 5.7% | |
| 4-Methyl-2-pentanone (MIBK) | 9.27 | 8.81 | 10 | 93% | 88% | 5.1% | |
| trans-1,3-Dichloropropene | 11.8 | 11 | 10 | 118% | 110% | 7.0% | |
| 1,1,2-Trichloroethane | 10.3 | 9.84 | 10 | 103% | 98% | 4.6% | |
| Toluene | 9.88 | 9.49 | 10 | 99% | 95% | 4.0% | |
| 2-Hexanone | 9.67 | 9.36 | 10 | 97% | 94% | 3.3% | |
| Dibromochloromethane | 11.9 | 10.7 | 10 | 119% | 107% | 10.6% | |
| 1,2-dibromoethane (EDB) | 11 | 9.9 | 10 | 110% | 99% | 10.5% | |
| Tetrachloroethene | 11.5 | 10.5 | 10 | 115% | 105% | 9.1% | |
| Chlorobenzene | 10.1 | 9.2 | 10 | 101% | 92% | 9.3% | |
| Ethylbenzene | 9.68 | 8.88 | 10 | 97% | 89% | 8.6% | |
| m,p-Xylene | 19.1 | 17.7 | 20 | 96% | 89% | 7.6% | |
| Bromoform | 10.5 | 10.9 | 10 | 105% | 109% | 3.7% | |

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*Analytical Report*

| LCS/LCSD | LCS Results (ppbv) | LCSD Results (ppbv) | LCS/D Conc(ppbv) | LCS Rec. | LCSD Rec. | RPD | Flag |
|---|---|---|---|---|---|---|---|
| Styrene | 10.8 | 9.72 | 10 | 108% | 97% | 10.5% | |
| 1,1,2,2-Tetrachloroethane | 8.5 | 10.4 | 10 | 85% | 104% | 20.1% | 6 |
| o-Xylene | 10.6 | 9.56 | 10 | 106% | 96% | 10.3% | |
| 4-Ethyltoluene | 9.76 | 8.99 | 10 | 98% | 90% | 8.2% | |
| 1,3,5-Trimethylbenzene | 9.12 | 8.39 | 10 | 91% | 84% | 8.3% | |
| 1,2,4-Trimethylbenzene | 9.82 | 8.93 | 10 | 98% | 89% | 9.5% | |
| 1,3-Dichlorobenzene | 10.7 | 9.52 | 10 | 107% | 95% | 11.7% | |
| Benzyl Chloride | 10.1 | 11.2 | 10 | 101% | 112% | 10.3% | |
| 1,4-Dichlorobenzene | 11.6 | 10.5 | 10 | 116% | 105% | 10.0% | |
| 1,2-Dichlorobenzene | 10.6 | 9.63 | 10 | 106% | 96% | 9.6% | |
| 1,2,4-Trichlorobenzene | 11.2 | 10.2 | 10 | 112% | 102% | 9.3% | |
| Hexachloro-1,3-butadiene | 8.51 | 8.3 | 10 | 85% | 83% | 2.5% | |
| 4-bromofluorobenzene (surrogate) | 93% | 104% | | | | | |
| Analysis Date/Time: | 4-2-16/13:56 | 4-2-16/14:38 | | | | | |
| Analyst Initials | tjg | tjg | | | | | |

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*Analytical Report*

## TO-15 Quality Control Data

**EnvisionAir Batch Number:** 040416CAIR

| Method Blank (MB): | MB Results (ppbv) | Reporting Limit (ppbv) | Flags |
|---|---|---|---|
| 4-Ethyltoluene | < 100 | 100 | |
| 4-Methyl-2-pentanone (MIBK) | < 500 | 500 | |
| 1,1,1-Trichloroethane | < 100 | 100 | |
| 1,1,2,2-Tetrachloroethane | < 0.049 | 0.049 | 1 |
| 1,1,2-Trichloroethane | < 0.038 | 0.038 | 1 |
| 1,1-Dichloroethane | < 1 | 1 | |
| 1,1-Dichloroethene | < 50 | 50 | |
| 1,2,4-Trichlorobenzene | < 0.1 | 0.1 | |
| 1,2,4-Trimethylbenzene | < 1 | 1 | |
| 1,2-dibromoethane (EDB) | < 0.0041 | 0.0041 | 1 |
| 1,2-Dichlorobenzene | < 10 | 10 | |
| 1,2-Dichloroethane | < 0.1 | 0.1 | |
| 1,2-Dichloropropane | < 0.1 | 0.1 | |
| 1,3,5-Trimethylbenzene | < 1 | 1 | |
| 1,3-Butadiene | < 0.1 | 0.1 | |
| 1,3-Dichlorobenzene | < 10 | 10 | |
| 1,4-Dichlorobenzene | < 0.1 | 0.1 | |
| 1,4-Dioxane | < 0.5 | 0.5 | |
| 2-Butanone (MEK) | < 1000 | 1000 | |
| 2-Hexanone | < 5 | 5 | |
| Acetone | < 1000 | 1000 | |
| Benzene | < 0.5 | 0.5 | |
| Benzyl Chloride | < 0.08 | 0.08 | 1 |
| Bromodichloromethane | < 0.08 | 0.08 | 1 |
| Bromoform | < 1 | 1 | |
| Bromomethane | < 1 | 1 | |
| Carbon Disulfide | < 100 | 100 | |
| Carbon Tetrachloride | < 0.1 | 0.1 | |
| Chlorobenzene | < 5 | 5 | |
| Chloroethane | < 5 | 5 | |
| Chloroform | < 0.17 | 0.17 | |
| Chloromethane | < 10 | 10 | |
| cis-1,2-Dichloroethene | < 5 | 5 | |
| cis-1,3-Dichloropropene | < 1 | 1 | |
| Cyclohexane | < 1600 | 1600 | |
| Dibromochloromethane | < 0.1 | 0.1 | |
| Dichlorodifluoromethane | < 10 | 10 | |
| Ethyl Acetate | < 500 | 500 | |
| Ethylbenzene | < 2 | 2 | |
| Hexachloro-1,3-butadiene | < 0.1 | 0.1 | |
| Isooctane | < 100 | 100 | |
| m,p-Xylene | < 10 | 10 | |
| Methylene Chloride | < 12 | 12 | |
| Methyl-tert-butyl ether | < 10 | 10 | |
| N-Heptane | < 100 | 100 | |
| N-Hexane | < 50 | 50 | |
| o-Xylene | < 10 | 10 | |
| Propylene | < 100 | 100 | |
| Styrene | < 100 | 100 | |
| Tetrachloroethene | < 0.47 | 0.47 | |
| Tetrahydrofuran | < 100 | 100 | |

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*Analytical Report*

| Method Blank (MB): | MB Results (ppbv) | Reporting Limit (ppbv) | Flags |
|---|---|---|---|
| Toluene | < 1000 | 1000 | |
| trans-1,2-Dichloroethene | < 10 | 10 | |
| trans-1,3-Dichloropropene | < 1 | 1 | |
| Trichlorethene | < 0.2 | 0.2 | |
| Trichlorofluoromethane | < 100 | 100 | |
| Vinyl Acetate | < 50 | 50 | |
| Vinyl Bromide | < 0.1 | 0.1 | |
| Vinyl Chloride | < 0.5 | 0.5 | |
| 4-bromofluorobenzene (surrogate) | 103% | | |
| Analysis Date/Time: | 4-4-16/21:50 | | |
| Analyst Initials | tjg | | |

| LCS/LCSD | LCS Results (ppbv) | LCSD Results (ppbv) | LCS/D Conc(ppbv) | LCS Rec. | LCSD Rec. | RPD | Flag |
|---|---|---|---|---|---|---|---|
| Propylene | 10.5 | 8.95 | 10 | 105% | 90% | 15.9% | |
| Dichlorodifluoromethane | 8.98 | 10.1 | 10 | 90% | 101% | 11.7% | |
| Chloromethane | 9.73 | 8.93 | 10 | 97% | 89% | 8.6% | |
| Vinyl Chloride | 9.23 | 8.57 | 10 | 92% | 86% | 7.4% | |
| 1,3-Butadiene | 9.54 | 9.22 | 10 | 95% | 92% | 3.4% | |
| Bromomethane | 9.73 | 10.8 | 10 | 97% | 108% | 10.4% | |
| Chloroethane | 10.1 | 9.96 | 10 | 101% | 100% | 1.4% | |
| Vinyl Bromide | 9.45 | 11.4 | 10 | 95% | 114% | 18.7% | |
| Trichlorofluoromethane | 11.1 | 11.5 | 10 | 111% | 115% | 3.5% | |
| Acetone | 9.34 | 10.5 | 10 | 93% | 105% | 11.7% | |
| 1,1-Dichloroethene | 8.88 | 11.4 | 10 | 89% | 114% | 24.9% | 6 |
| Methylene Chloride | 8.82 | 10.7 | 10 | 88% | 107% | 19.3% | |
| Carbon Disulfide | 8.84 | 9.62 | 10 | 88% | 96% | 8.5% | |
| trans-1,2-Dichloroethene | 9.95 | 10 | 10 | 100% | 100% | 0.5% | |
| Methyl-tert-butyl ether | 9.92 | 9.89 | 10 | 99% | 99% | 0.3% | |
| 1,1-Dichloroethane | 9.13 | 8.56 | 10 | 91% | 86% | 6.4% | |
| Vinyl Acetate | 10.6 | 8.91 | 10 | 106% | 89% | 17.3% | |
| N-Hexane | 8.46 | 8.86 | 10 | 85% | 89% | 4.6% | |
| 2-Butanone (MEK) | 9.77 | 8.37 | 10 | 98% | 84% | 15.4% | |
| cis-1,2-Dichloroethene | 8.95 | 8.69 | 10 | 90% | 87% | 2.9% | |
| Ethyl Acetate | 8.92 | 8.81 | 10 | 89% | 88% | 1.2% | |
| Chloroform | 9.87 | 11 | 10 | 99% | 110% | 10.8% | |
| Tetrahydrofuran | 10.2 | 9.4 | 10 | 102% | 94% | 8.2% | |
| 1,2-Dichloroethane | 9.83 | 11.5 | 10 | 98% | 115% | 15.7% | |
| 1,1,1-Trichloroethane | 9.85 | 11.4 | 10 | 99% | 114% | 14.6% | |
| Carbon Tetrachloride | 10.1 | 11.6 | 10 | 101% | 116% | 13.8% | |
| Benzene | 9.03 | 8.61 | 10 | 90% | 86% | 4.8% | |
| Cyclohexane | 8.99 | 10.3 | 10 | 90% | 103% | 13.6% | |
| 1,2-Dichloropropane | 9.24 | 8.39 | 10 | 92% | 84% | 9.6% | |
| Trichlorethene | 9.45 | 9.88 | 10 | 95% | 99% | 4.4% | |
| Bromodichloromethane | 9.73 | 10.6 | 10 | 97% | 106% | 8.6% | |
| 1,4-Dioxane | 9.77 | 8.3 | 10 | 98% | 83% | 16.3% | |
| Isooctane | 8.42 | 9.35 | 10 | 84% | 94% | 10.5% | |
| N-Heptane | 8.6 | 9.23 | 10 | 86% | 92% | 7.1% | |
| cis-1,3-Dichloropropene | 9.66 | 9.58 | 10 | 97% | 96% | 0.8% | |
| 4-Methyl-2-pentanone (MIBK) | 8.66 | 8.47 | 10 | 87% | 85% | 2.2% | |
| trans-1,3-Dichloropropene | 10.2 | 10.7 | 10 | 102% | 107% | 4.8% | |
| 1,1,2-Trichloroethane | 9.65 | 9.15 | 10 | 97% | 92% | 5.3% | |
| Toluene | 8.98 | 9.33 | 10 | 90% | 93% | 3.8% | |
| 2-Hexanone | 8.92 | 8.65 | 10 | 89% | 87% | 3.1% | |
| Dibromochloromethane | 10.4 | 11.3 | 10 | 104% | 113% | 8.3% | |
| 1,2-dibromoethane (EDB) | 9.78 | 10.2 | 10 | 98% | 102% | 4.2% | |
| Tetrachloroethene | 10.2 | 11.3 | 10 | 102% | 113% | 10.2% | |
| Chlorobenzene | 9.36 | 10.2 | 10 | 94% | 102% | 8.6% | |
| Ethylbenzene | 9.78 | 10.4 | 10 | 98% | 104% | 6.1% | |
| m,p-Xylene | 19 | 20.7 | 20 | 95% | 104% | 8.6% | |
| Bromoform | 10.4 | 11.5 | 10 | 104% | 115% | 10.0% | |

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*Analytical Report*

| LCS/LCSD | LCS Results (ppbv) | LCSD Results (ppbv) | LCS/D Conc(ppbv) | LCS Rec. | LCSD Rec. | RPD | Flag |
|---|---|---|---|---|---|---|---|
| Styrene | 9.76 | 10.3 | 10 | 98% | 103% | 5.4% | |
| 1,1,2,2-Tetrachloroethane | 8.6 | 8.35 | 10 | 86% | 84% | 2.9% | |
| o-Xylene | 9.39 | 9.99 | 10 | 94% | 100% | 6.2% | |
| 4-Ethyltoluene | 9.07 | 9.94 | 10 | 91% | 99% | 9.2% | |
| 1,3,5-Trimethylbenzene | 9.01 | 9.93 | 10 | 90% | 99% | 9.7% | |
| 1,2,4-Trimethylbenzene | 9.17 | 10.1 | 10 | 92% | 101% | 9.7% | |
| 1,3-Dichlorobenzene | 10.5 | 11.4 | 10 | 105% | 114% | 8.2% | |
| Benzyl Chloride | 11.3 | 11.9 | 10 | 113% | 119% | 5.2% | |
| 1,4-Dichlorobenzene | 10.7 | 11.4 | 10 | 107% | 114% | 6.3% | |
| 1,2-Dichlorobenzene | 10.3 | 11.5 | 10 | 103% | 115% | 11.0% | |
| 1,2,4-Trichlorobenzene | 8.88 | 8.79 | 10 | 89% | 88% | 1.0% | |
| Hexachloro-1,3-butadiene | 10.2 | 10.2 | 10 | 102% | 102% | 0.0% | |
| 4-bromofluorobenzene (surrogate) | 102% | 100% | | | | | |
| Analysis Date/Time: | 4-4-16/19:53 | 4-5-16/05:58 | | | | | |
| Analyst Initials | tjg | tjg | | | | | |

**EnvisionAir**
1441 Sadlier Circle West Drive
Indianapolis, IN 46239
Ph: 317-351-0885
Fax: 317-351-0882
www.envision-air.com

| Flag Number | Comments |
|---|---|
| 1 | Reporting limit is supported by MDL. TJG |
| 2 | Reported value is from a 10x dilution. TJG 4-8-16 |
| 3 | Reported value is from a 40x dilution. TJG 4-8-16 |
| 4 | Reported value is from a 400x dilution. TJG 4-8-16 |
| 5 | Reported value is below the reporting limit, but above the MDL. 4-8-16 |
| 6 | RPD is biased high but recoveries are within control. TJG 4-8-16 |

EnvisionAir Proj#: 2016-264 Page 1 of 1 BJK

# CHAIN OF CUSTODY RECORD

EnvisionAir | 1441 Sadlier Circle West Drive | Indianapolis, IN 46239 | Phone: (317) 351-0885 | Fax: (317) 351-0882

| | |
|---|---|
| Client: EnviroForensics | P.O. Number: 2016276 |
| Report Address: 602 N Capitol Ave Ste 210 Indianapolis IN | Project Name or Number: 16165 Martinsville 41st Ave |
| Report To: B. Day | Sampled by: M. Stettnisch |
| Phone: 317-972-7670 | QA/QC Required: (circle if applicable) Level III Level IV |
| Invoice Address: Same | Reporting Units needed: (circle) ug/m³ mg/m³ PPBV PPMV |
| Desired TAT: (Please Circle One) 1 day 2 days 3 days Std (5 bus. days) | Media type: 1LC = 1 Liter Canister; 6LC = 6 Liter Canister; TB = Tedlar Bag; TD = Thermal Desorption Tube |

**REQUESTED PARAMETERS**

TO-15 Full List / TO-15 Short List

ENVISIONAIR

www.envision-air.com

Sampling Type:
Soil-Gas: X
Sub-Slab: ☐
Indoor-Air: ☐
effluent ✓

*Canister Pressure / Vacuum*

| Air Sample ID | Media Type (see code above) | Coll. Date (Grab/Comp Start) | Coll. Time (Grab/Comp Start) | Coll. Date (Comp. End) | Coll. Time (Comp. End) | TO-15 Full List | TO-15 Short List | | | Canister Serial # | Flow Controller Serial # | Initial Field (in. Hg) | Final Field (in. Hg) | Lab Received (in. Hg) | EnvisionAir Sample Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16165-EF-1 | 1LC | 3/22 | 1205 | 3/22 | 1206 | X | | | | 84051 | — | -27.5 | -5 | -5 | 16-966 |
| 16165-EF-2 | 1LC | 3/22 | 1557 | 3/22 | 1558 | X | | | | 83736 | — | -27 | -5 | -5 | 16-967 |
| 16165-EF-3 | 1LC | 3/23 | 0827 | 3/23 | 0828 | X | | | | 83737 | — | -27 | -5 | -5 | 16-968 |
| ~~16165-EF-4~~ MS | ~~1LC~~ | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | |

Comments:

| Relinquished by: | Date | Time | Received by: | Date | Time |
|---|---|---|---|---|---|
| Megan Stettnisch | 3/25/16 | 0810 | FedEx | | |
| | | | Stanley A. Runnicetto | 3/28/16 | 1150 |

# Production Work Order Form

Project/Phase: 6165.23a Due Date: 11/3/2016

Originator: B. Kapper

Hours Budgeted: 1

Date/Time In:
Date/Time Out:

Description of Work: ☐ - Draft ☒ - Final
☐ Word Process Job ☐Photocopying Job ☒ Report Production Job ☐ Electronic Filing Only

Finishing: ☐ 3-Ring Binder ☐ Clipped ☐CD Appendix Tabs ☐ Yes ☒ No

EnviroForensics Color Cover Page: ☐ Yes ☒ No Spine: ☒ Yes ☐ No
Back Page: ☐ Yes ☒ No comb-bind

Other Instructions: Match pagesize and color. Some 11x17.

Number of: Hard Copies 1 CD Copies _____ File Copy _____

Single-Sided: Double-Sided: ____ (___Entire Report ___Appendices _____)

↳ Text, tables, figures, charts. ↳ Appendies A+B

SUBMITTAL INSTRUCTIONS

Fax/Email To: _____ Fax Number: _____
_____ Email: _____
_____

Regular Mail: X

Federal Express: ☐ First Overnight (by 8:00 am)
☐ Priority Overnight (by 10:00 am)
☐ Standard Overnight (between 8:00 to 3:30 pm)

Special Shipping Instruction: _____

Mail to: Chue Yee Yang How many copies: 1
Wisconsin Dept. of Natural Resources
cc: 2300 N Martin Luther King Jr. Drive How many copies: _____
Milwaukee, WI 53212 How many copies: _____
_____ How many copies: _____

**To Be Completed by Technical Administrative Assistant Only:**

**Signed "Deliverable Review Form" attached:** ☐
**Final Document Review/Check (to Styles Guide):** ☐
**Letter of Transmittal Completed (if required):** ☐
**Document Tracking Log Updated:** ☐
**Save Final document and "Deliverable Review Form" electronically, and delete all drafts** ☐