

**HIGHLAND PLAZA  
BROWNFIELD SITE # C915293**

**215 to 237 HIGHLAND PARKWAY  
TONAWANDA, NEW YORK**

**REMEDIAL INVESTIGATION**

**FINAL REPORT**

**PREPARED FOR:**

**NYSDEC REGION 9  
&  
NYSDOH**

**PREPARED BY:**

**HIGHLAND PLAZA  
&  
ENVIRONMENTAL & GEOLOGIC MANAGERMENTS SERVICES, LLC**

**May, 2017**

Revision 2

<b>EXECUTIVE SUMMARY</b>	<b>6</b>
<b>INTRODUCTION</b>	<b>10</b>
<b>SITE DESCRIPTION</b>	<b>10</b>
<b>PREVIOUS SITE USE</b>	<b>11</b>
<b>PUBLIC &amp; PRIVATE INFORMATION ON PREVIOUS SITE INVESTIGATIONS</b>	<b>11</b>
<b>PRELIMINARY PHASE II INVESTIGATION</b>	<b>11</b>
Preliminary Phase II Investigation Results	<b>11</b>
Soil Vapor Study	<b>12</b>
Additional Air & Soil Sampling in the Service Alley	<b>12</b>
Preliminary Phase II Investigation Conclusions	<b>12</b>
<b>BROWNFIELD PROGRAM</b>	<b>13</b>
<b>REMEDIAL INVESTIGATION SCOPE OF WORK</b>	<b>13</b>
Health & Safety	<b>13</b>
RI Soil Characterization	<b>14</b>
RI Soil Sampling & Analysis	<b>15</b>
RI Groundwater Quality Characterization	<b>16</b>
Groundwater Monitoring Well Development	<b>16</b>
Groundwater Sampling & Analysis	<b>17</b>
Determination of Groundwater Flow Direction	<b>17</b>
<b>INTERIM REMEDIAL MEASURE</b>	<b>17</b>
Confirmation Indoor Air Sampling	<b>19</b>
Pressure Testing	<b>19</b>
<b>SOIL VAPOR INTRUSION INVESTIGATION 2016</b>	<b>19</b>
Sampling Locations	<b>20</b>
Pre-sampling Building Inspection & Preparation	<b>20</b>
Product Inventory	<b>20</b>
Sub-slab Vapor Sampling	<b>21</b>
Indoor Air Sampling	<b>21</b>
Outdoor Air Sampling	<b>22</b>
Air & Vapor Analytical Methods	<b>22</b>
<b>SOIL VAPOR INTRUSION INVESTIGATION 2017</b>	<b>22</b>
Pre-sampling Building Inspection & Preparation	<b>23</b>
Product Inventory	<b>23</b>
Sub-slab Vapor Sampling	<b>23</b>
Indoor Air Sampling	<b>24</b>

Outdoor Air Sampling	25
Air & Vapor Analytical Methods	25
<b>QUALITY ASSURANCE/QUALITY CONTROL</b>	<b>25</b>
<b>RESULTS OF REMEDIAL INVESTIGATION</b>	<b>25</b>
RI Soil Results	26
RI Soil Quality	26
RI Groundwater Results	27
RI Groundwater Quality	28
<b>COMBINED RESULTS OF THE PRELIMINARY PHASE II AND REMEDIAL INVESTIGATIONS</b>	<b>28</b>
Soils	28
Geospatial Distribution of Compounds Detected in On Site Soils	29
Geospatial Distribution of Compounds Detected in Off Site Soils	30
Comparison of Soil Quality Results to NYSDEC Guidance in On Site Soils	30
Comparison of Soil Quality Results to NYSDEC Guidance in Off Site Soils	31
Groundwater Results	32
Geospatial Distribution of Compounds Detected in Groundwater	32
Comparison of Groundwater Quality Results to NYSDEC Guidance	33
<b>RESULTS OF 2016 SOIL VAPOR INTRUSION INVESTIGATION</b>	<b>34</b>
Comparison of Results to NYSDOH Guidance	35
<b>RESULTS OF 2017 SOIL VAPOR INTRUSION INVESTIGATION</b>	<b>36</b>
Comparison of Results to NYSDOH Guidance	37
<b>RESULTS OF THE SUB-SLAB DEPRESSURIZATION SYSTEM EFFECTIVENESS TESTING</b>	<b>37</b>
Results of Confirmation Indoor Air Sampling at the Former Dry Cleaner Tenant Space	37
Comparison of Confirmation Indoor Air Sampling Results to NYSDOH Guidance	38
Results of Pressure Testing of the Sub-Slab Depressurization System at the Former Dry Cleaner tenant Space	38
<b>DATA USABILITY</b>	<b>38</b>
<b>REMEDIAL INVESTIGATION CONCLUSIONS</b>	<b>38</b>
Soil	38
Groundwater	38
Soil Vapor & Air	39

<b>RECOMMENDATIONS</b>	<b>39</b>
Soil	<b>39</b>
Groundwater	<b>39</b>
Soil Vapor & Air	<b>39</b>

<b>DEVIATIONS FROM APPROVED WORK PLANS</b>	<b>39</b>
Remedial Investigation	<b>39</b>
Soil Vapor Intrusion Investigation 2016	<b>40</b>
Soil Vapor Intrusion Investigation 2017	<b>40</b>
Interim Remedial Measure	<b>40</b>

## **FIGURES**

Figure 1:	Site Location Map
Figure 2:	Detailed Site Map with RI Soil and Groundwater Sampling Locations
Figure 3:	Preliminary Phase II Investigation Soil Boring Location Map
Figure 4:	Remedial Investigation Water Table Map
Figure 5:	Remedial Investigation & Interim Remedial Measure Soil Vapor Intrusion Investigation Air & Vapor Sampling Locations

## **TABLES**

Table 1:	Summary of Soil Boring Depth, Sampling Intervals and Monitoring Well Construction Details
Table 2:	Summary of Surface Soil Samples
Table 3:	Summary of Groundwater Monitoring Well Water Elevations
Table 4:	Summary of Groundwater Monitoring Well Development
Table 5:	Sample Location Survey Summary
Table 6A:	On Site Remedial Investigation Subsurface and Surface Soil Analytical Results - Volatile Organic Compounds (Detected)
Table 6B:	Off Site Remedial Investigation Subsurface and Surface Soil Analytical Results - Volatile Organic Compounds (Detected)
Table 7A:	On Site Remedial Investigation Subsurface and Surface Soil Analytical Results – Semi-volatile Organic Compounds (Detected)
Table 7B:	Off Site Remedial Investigation Subsurface and Surface Soil Analytical Results – Semi-volatile Organic Compounds (Detected)
Table 8A:	On Site Remedial Investigation Subsurface and Surface Soil Analytical Results – Metals (Detected)
Table 8B:	Off Site Remedial Investigation Subsurface and Surface Soil Analytical Results – Metals (Detected)
Table 9A:	On Site Remedial Investigation Subsurface and Surface Soil Analytical Results – Pesticides & PCBs (Detected)

Table 9B:	Off Site Remedial Investigation Subsurface and Surface Soil Analytical Results – Pesticides & PCBs (Detected)
Table 10A:	On Site Remedial Investigation Groundwater Analytical Results – Volatile Organic Compounds (Detected)
Table 10B:	Off Site Remedial Investigation Groundwater Analytical Results – Volatile Organic Compounds (Detected)
Table 11A:	Phase II Soil Vapor Intrusion Study Summary (2014) - Volatile Organic Compounds Detected in Site Air
Table 11B:	Remedial Investigation Soil Vapor Intrusion Study Summary (2016) - Volatile Organic Compounds Detected in Site Air
Table 11C	Remedial Investigation Soil Vapor Intrusion Study Summary (2017) – Volatile Organic Compounds Detected in Site Air
Table 12	Summary of Sub-slab Depressurization Pressure Point Tests

## **PHOTOS**

Photo 1	Soil Boring SB - 16
Photo 2	Soil Boring SB - 24
Photo 3	Soil Boring SB - 27
Photo 4	Surface Soil Sample AWSS - 6
Photo 5	Surface Soil Sample AWSS - 7
Photo 6	Surface Soil Sample AWSS - 8
Photo 8	Surface Soil Sample AWSS - 9
Photo 9	Surface Soil Sample AWSS - 10
Photo 10	Surface Soil Sample AWSS - 11

## **APPENDICES**

Appendix A:	Preliminary Phase II Investigation Report
Appendix B:	Brownfield Acceptance Letter
Appendix C:	Remedial Investigation Soil Boring Logs
Appendix D:	Remedial Investigation Groundwater Monitoring Well Construction Diagrams
Appendix E:	Groundwater Monitoring Well Sampling Sheets
Appendix F:	Soil Vapor Intrusion Investigation Pre-Sampling Questionnaires
Appendix G:	Test America Soil Analytical Results Data Package
Appendix H:	Test America Groundwater Analytical Results Data Package
Appendix I:	Centek Labs Vapor and Air Sampling Results Data Package (2016)
Appendix J:	Soil Data Usability Summary Report
Appendix K:	Groundwater Data Usability Summary Report
Appendix L:	Air and Vapor Data Usability Summary Report
Appendix M:	Centek Labs Vapor and Sampling Results Data Packages (2017)

## EXECUTIVE SUMMARY

The Highland Plaza Site is located in Tonawanda, New York on the southeast corner of the Colvin Avenue and Highland Parkway intersection in a mixed commercial and residential neighborhood. The Site is approximately 300 feet in length (east – west) and approximately 100 feet wide in the north – south direction. Approximately 50% of the Site is occupied by a one story strip plaza building, which is 297 feet in length and 49 feet wide. This is a slab on grade cinder block building that is situated 2.95 feet from the southern property boundary to the back of the parcel. The northern half of the Site is an asphalt parking lot. The strip plaza consists of three attached buildings that are separated by a common firewall, a foundation break and different roof lines. The buildings are subdivided into eight commercial businesses. The eastern one-third of the strip plaza was formerly occupied by a dry cleaner that ceased operations in 2010.

Sanborn Maps show that the property was undeveloped in 1928, but by 1950 had been developed into the present plaza. There was no indication from available public information that the property was used for industrial or manufacturing purposes.

### *Preliminary Phase II Investigation*

A Preliminary Phase II Investigation and Soil Vapor Intrusion Study were completed at the Site in 2014 consisting of 12 soil borings ranging in depths from 8 to 12 feet below ground surface. Groundwater was encountered in one soil boring during this investigation (SB-2) and was sampled. Eleven subsurface soil samples were collected for laboratory analysis from the on site soil borings; and, one shallow surface soil sample was collected on-site. In addition, three shallow surface soil samples were collected off site in the adjacent service alleyway directly south of the site for a total of 15 soil samples collected as part of the Preliminary Phase II Investigation. A soil vapor intrusion investigation in the former dry cleaner tenant space consisting of the collection and analysis of one indoor air sample, three sub-slab vapor samples and two outdoor air samples.

The Preliminary Phase II Investigation and SVI Study concluded that there were no apparent environmental impacts from the former Getty Station based on the soil and groundwater samples collected. Low levels of soil contamination were identified on Site under the floor of the building where the former dry cleaner was located. Soil contamination is also present off site in the service alley directly south of the former dry cleaner from spills or disposal of cleaning solvents from the former dry cleaner. The concentrations of these compounds are below the NYSDEC's Commercial soil cleanup objectives (SCOs), but are above the Restricted Residential SCO for tetrachloroethene.

Volatile organic compounds (VOCs) associated with the former dry cleaning operation were also detected in the soil vapor under the concrete slab and have impacted indoor air quality in the eastern end of the building. Impacts to groundwater from the dry cleaner operations could not be evaluated since groundwater was not encountered at the eastern end of the Site.

Additional investigative work was recommended to determine the nature and extent of the soil contamination from the former dry cleaner and to characterize impacts to groundwater. Remediation of indoor air was also recommended.

### *Brownfield Program*

In January of 2015, Highland Plaza applied to New York State to have the site placed in the New York State Brownfield program. The site was accepted into the program on April 1, 2015 as site number C915293.

### *Remedial Investigation*

In October, 2015 a Remedial Investigation (RI) started at the Site which consisted of the completion of 14 soil borings with the collection of soil samples for laboratory analysis; installation of five groundwater monitoring wells (three onsite and two off site); collection of five groundwater samples for laboratory analysis; collection of six shallow surface soil samples for analysis; and, the completion of a soil vapor intrusion (SVI) investigation in February, 2016 consisting of the collection and analysis of two sub-slab vapor samples, two indoor air samples in the two tenant spaces west to the former dry cleaner, and the collection of one outdoor background air sample. In March, 2017, a second SVI investigation was completed in the other four tenant spaces in the strip plaza.

### *Combined Results of the Preliminary Phase Investigation and Remedial Investigation*

Twenty-six soil borings were completed as part of the Preliminary Phase II Investigation and the Remedial Investigation. A total of 52 soil samples were collected as part of these studies. Forty-two soil samples were collected and analyzed from these on site and off site soil borings. Ten surface soil samples were also collected and analyzed as part of these investigations.

A total of 21 on-site soil samples were collected and analyzed as part of the two investigations. Thirty-one soil samples were collected off-site as part of the two investigations. The 52 soil samples were analyzed for VOCs: 14 of the soil samples were analyzed for semi-volatile organic compounds (SVOCs); and 12 of the soil samples were analyzed for total metals, pesticides, poly-chlorinated biphenyls (PCBs) and herbicides.

Groundwater samples were collected on-site from four different locations (SB-2 as part of the Preliminary Phase II Investigation) and off-site from two different locations. Groundwater samples were analyzed for VOCs with SVOCs at one location on-site (SB-2). Slow groundwater recharge in the groundwater monitoring wells that were installed as part of the RI did not allow for the collection of enough water to analyze the groundwater samples for the full Target Compound List/Target Analyte List of parameters.

### *On-Site Impacts to Soil and Groundwater*

There were no impacts to soil and groundwater noted along the west side of the Site from the former Getty Service station.

Volatile organic compounds are present in soil from the former dry cleaner at the eastern end of the Site. These compounds are present under the floor of the eastern end of the former dry cleaner, and in shallow soils in the parking lot north of the building at soil boring SB – 19. Benzene, cis-1,2-dichloroethene, Tetrachloroethene and Trichloroethene were detected at concentrations below their respective NYSDEC Part 375 Commercial Soil Cleanup Objectives (SCOs), but were above the NYSDEC Part 375 Protection of Groundwater SCO.

Groundwater quality has been slightly impacted by former dry cleaning operations at the easternmost end of the Site. The VOC Cis-1,2-dichloroethene was detected at a concentration slightly above its guidance value per NYSDEC Technical and Operational Series 1.1.1 – Ambient Water Quality Standards and Guidance. There were no other VOCs detected in on-site groundwater.

#### *Off-Site Impacts to Soil and Groundwater*

Volatile organic compounds and SVOCs were detected at elevated concentrations in the soil samples from the service alley directly south of the Site. The VOCs detected are commonly associated with dry cleaning operations, and are prevalent in the shallow soils and deep soils encountered in soil borings SB – 23, SB – 24, SB – 25, SB – 27 and SB – 29 on the easternmost end of the service alley adjacent to the former dry cleaner. The concentration of tetrachloroethene exceeded the Part 375 Commercial SCO in soil borings SB -24 and SB – 25, and Part 375 Protection of Groundwater SCO in soil borings SB – 23, SB – 27 and SB – 29; and shallow soil samples AWSS – 1, AWSS – 2 and AWSS – 3. The concentration of Trichloroethene exceeded the Part 375 Protection of Groundwater SCO in soil borings SB – 23, SB – 24, SB – 27 and SB – 29. The concentration of cis – 1,2-Dichloroethene exceeded the Part 375 Protection of Groundwater SCO in soil borings SB – 24, SB – 25 and SB – 29. The concentration of Acetone (a common laboratory contaminant) exceeded the Part 375 Protection of Groundwater SCO in soil boring SB – 21.

The SVOCs Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene were detected in the shallow surface soil samples from the service alleyway at concentrations above of their respective Commercial SCOs. The SVOCs Benzo(k)fluoranthene and Chrysene were detected above their respective Residential SCOs. The occurrence of these SVOCs is likely related to the presence of millings that have been placed on the alley way services road.

Off site impacts to groundwater from the former dry cleaner were noted in the two off site groundwater monitoring wells that were installed as part of the RI investigation (MW – 4 and MW – 5). The concentrations of Cis-1,2-dichloroethene, Tetrachloroethene and Trichloroethene were detected in MW – 4 at concentrations significantly above their respective TOGS 1.1.1 guidance values. The concentrations of these compounds were also significantly above their respective TOGS 1.1.1 guidance values in MW – 5.



### *Interim Remedial Measure*

A sub-slab depressurization system (SSDS) was constructed in early 2016 in the plaza area formerly occupied by the dry cleaner (235 to 237 Highland Parkway) and has been operational since late April of 2016. The results of confirmation indoor air sampling in February 2017 within the tenant space confirmed no VOCs were present above NYSDOH guidance. The results of differential pressure testing of the sub-slab pressure in April confirmed that negative pressure is being maintained under the concrete slab by the SSDS.

### *Soil Vapor Intrusion Studies*

A soil vapor intrusion study was completed in February of 2016 in the tenant spaces immediately west of the former dry cleaner (227 and 231 Highland Parkway). The results showed no VOCs were present above the NYSDOH Guidance Values in the two indoor air samples collected. However, tetrachloroethene and trichloroethene were detected at elevated concentrations in the sub-slab vapor sample collected at 231 Highland Parkway.

A second soil vapor intrusion study was completed in March of 2017 in the last four tenant spaces in the western half of the strip plaza (215, 217, 221 and 225 Highland Parkway). The results showed no VOCs were present above the NYSDOH Guidance Values in the four indoor air samples collected.

### *Recommendations*

Installation of a second SSDS is recommended for the tenant space located at 231 Highland Parkway to intercept VOCs that are present under the concrete slab at this location.

## **INTRODUCTION**

This Remedial Investigation (RI) Summary Report provides the results of investigative activities that were completed at the Highland Plaza located at 215 Highland Parkway in Tonawanda, New York. Highland Plaza (Site) is designated as Brownfield Site C915293. The work was completed in accordance with New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) approved work plan which was designed to satisfy the investigative requirements outlined by the NYSDEC as set forth under DER – 10 Technical Guidance for Site Investigations and Remediation (DER – 10).

## **SITE DESCRIPTION**

The Highland Plaza Site is located in Tonawanda, New York on the southeast corner of the Colvin Avenue and Highland Parkway intersection in a mixed commercial and residential neighborhood (Figure 1). The property boundary is the same as the Brownfield Cleanup Program (BCP) site boundary. The site is approximately 300 feet in length (east – west) and approximately 100 feet wide in the north – south direction. The Site gently slopes northward toward Highland Parkway. Approximately 50% of the Site is occupied by a one story strip plaza building, which is 297 feet in length and 49 feet wide. This is a slab on grade cinder block building that is situated 2.95 feet from the southern property boundary to the back of the parcel. The northern half of the Site is an asphalt parking lot (Figure 2).

The strip plaza consists of three attached buildings that are separated by a common firewall, a foundation break and different roof lines. The eastern half of the plaza was a former dry cleaner that ceased operation in 2010. The buildings are subdivided into eight commercial businesses located in a mixed residential and commercial area (Figure 2):

- 215 Highland Parkway - Mama Mia's Pizza with approximately 16 feet of frontage;
- 217 Highland Parkway - Fit House with approximately 31 feet of frontage (now vacant);
- 221 Highland Parkway – Louis Anthony Salon with approximately 46 feet of frontage;
- 225 Highland Parkway - Paisley Peacock Boutique with approximately 16 feet of frontage (now vacant);
- 227 Highland Parkway – Franklin Telecom with approximately 31 feet of frontage (now vacant);
- 231 Highland Parkway – National Hearing Aid Services with approximately 30 feet of frontage;
- 235 Highland Parkway – Buffalo O. T. Therapy with approximately 30 feet of frontage; and
- 237 Highland Parkway – open (former dry cleaner) with approximately 98 feet of frontage.

To the north is Highland Parkway, then commercial properties. To the west is a former Getty Service Station followed by Colvin Boulevard and commercial properties. To the south is a

service alleyway approximately 25 feet wide, then residences with their back yards to the service alleyway. The service alleyway is not part of the BCP site. To the east is the Tonawanda Community Federal Credit Union (Figure 1).

## **PREVIOUS SITE USE**

Sanborn Maps show that the property was undeveloped in 1928, but by 1950 had been developed into the present plaza. There was no indication from available public information that the property was used for industrial or manufacturing purposes.

## **PUBLIC AND PRIVATE INFORMATION ON PREVIOUS SITE INVESTIGATIONS**

Review of publicly available records for the former onsite dry cleaner showed there is no information on spills or environmental investigations for the former dry cleaner. There is also no record of previous site investigations other than the Preliminary Phase II Site Investigation that was completed by Environmental & Geologic Management Services, LLC (EGMS) in 2014. This investigation will be discussed in another section of this report.

The site is bounded to the west by a former Getty Service Station. Review of NYSDEC environmental records for the former Getty Service Station indicates it has undergone two subsurface investigations/remedial actions: one in 1999 (Spill #889-75108) and a second in 2008 (Spill #06-06779). NYSDEC concluded from the results of the investigations that “No Further Action” was required at this location.

## **PRELIMINARY PHASE II INVESTIGATION**

A Preliminary Phase II Investigation and Soil Vapor Intrusion Study were completed at the Site in 2014. A copy of this report is included as Appendix A. Twelve soil borings ranging in depths from 8 to 12 feet below ground surface (BGS) were completed as part of the Preliminary Phase II Investigation. Groundwater sampling points (12 feet BGS) were planned at three of the soil boring locations; however, groundwater was only encountered at one location. In addition, one shallow surface soil sample (SS-12) was collected on Site and three shallow surface soils were collected from the service alleyway for a total of 15 soil samples (12 on site subsurface soil samples, one on site surface soil sample and three off site surface soil samples. These locations are shown on Figures 2 and 3.

Fifteen soil samples and one groundwater sample were analyzed for Method 8260 target compound list (TCL) volatile organic compounds (VOCs); two soil samples were analyzed for Method 8270 TCL semi-volatile organic compounds (SVOCs); and two soil samples were analyzed for polychlorinated biphenyls (PCBs).

### **Preliminary Phase II Investigation Results**

The Site is underlain by a thin veneer of fill material one to 1.5 feet in thickness, which is then underlain by native, dense red-brown clay with minor amounts of silt, sand and gravel. The soil samples collected were dry to generally damp (deep).

Soil screening and sample analytical results from soil boring SB-2 located along the western property line between the Getty Station and the Site (located to evaluate potential impacts from the former service station) did not show impacts from the former service station.

Laboratory analytical results of soil samples from under the concrete floor of the former dry cleaner detected three VOCs (cis-1,2-dichloroethene, tetrachloroethene, and trichloroethene) above their respective detection limits (Table 6A). The soil sample collected outside of the back door (SS – 12) also showed impacts from tetrachloroethene and trichloroethene. No SVOCs or PCBs were detected in the respective soil samples analyzed. There were no VOCs detected in the groundwater sample that was analyzed from SB-2.

### **Soil Vapor Intrusion Study**

A soil vapor intrusion (SVI) study was also completed at the former dry cleaner as part of the Phase II Preliminary Phase II Investigation. Three sub-slab vapor samples were collected near boring locations with the highest PID readings. One indoor air and one outdoor air sample were also collected. Samples were analyzed for USEPA Method TO – 15 for VOCs. Sampling locations are shown on Figure 3.

Analytical results from the SVI study showed that cis-1,2-dichloroethene, tetrachloroethene and trichloroethene were detected at elevated concentrations in the sub-slab, indoor air and outdoor air samples that were collected (Table 11A).

### **Additional Air & Soil Sampling in the Service Alley**

VOCs were detected in the outdoor air sample that was placed on the ground off site in the service alley; thus additional air and soil samples were collected in this area. The second outdoor air sample was collected four feet above the ground surface. In addition, three shallow soil samples were also collected off Site in the service alley at approximately 20 foot intervals centered on the location of Outdoor Air Sample #2 using a steel shovel and analyzed for TCL VOCs (Figure 3).

Analytical results for Outdoor Air Sample #2 collected four feet above the ground surface showed a significant decrease in the concentrations of cis-1,2-dichloroethene, tetrachloroethene and trichloroethene (Table 11A). Analytical results for the three soil samples (AWSS-1 through AWSS-3) detected the VOC tetrachloroethene at elevated concentrations in all three soil samples (Table 6B).

### **Preliminary Phase II Investigation Conclusions**

Twelve on site subsurface soil samples, one on site surface soil samples and one groundwater sample were collected on site and analyzed for VOCs, SVOCs and PCBs. In addition, three shallow soil samples were collected off site and analyzed for VOCs. Five air and vapor samples were also collected on Site as part of the Preliminary Phase II Investigation.

The Preliminary Phase II Investigation and SVI Study concluded that there were no apparent environmental impacts from the former Getty Station based on the soil and groundwater samples collected.

Low levels of soil contamination are present on Site under the floor of the building where the former dry cleaner was located. Soil contamination is also present in the service alley directly south of the former dry cleaner from spills or disposal of cleaning solvents from the former dry cleaner. The concentration of these compounds is below the NYSDEC's commercial SCOs, but are above the restricted residential SCO for tetrachloroethene.

VOCs associated with the former dry cleaner are present in the soil vapor under the concrete slab and have impacted indoor air quality in the eastern end of the building.

The level of impacts to groundwater from the former dry cleaner were unknown at the time of the completion of the Preliminary Phase II Investigation since groundwater was not encountered at the eastern end of the Site.

Additional investigative work was recommended to determine the nature and extent of the soil contamination from the former dry cleaner and to characterize impacts to groundwater.

Remediation of indoor air was also recommended, by installing a sub-slab depressurization system (SSDS) in the area of the building where the former dry cleaner was located.

The Preliminary Phase II Investigation Report is included as Appendix A

## **BROWNFIELD PROGRAM**

In January of 2015, Highland Plaza applied to New York State to have the site placed in the New York State Brownfield program. The site was accepted into the program on April 1, 2015 as site number C915293. The New York State Brownfield Acceptance letter is included as Appendix B.

## **REMEDIAL INVESTIGATION SCOPE OF WORK**

Based on the findings of the Preliminary Phase II Investigation, and discussions with the NYSDEC, a Remedial Investigation (RI) Work Plan was submitted to the NYSDEC and the NYSDOH for the Site. The RI Work Plan was approved in August, 2015 and field work started in October of 2015. The objectives of the RI were to further characterize soil and groundwater conditions on site as well as at adjacent off site properties.

### **Health and Safety**

The field work was completed in accordance with the NYSDEC/NYSDOH approved Work Plan, Health & Safety Plan (HASP), Community Air Monitoring Plan (CAMP) and Quality Assurance Project Plan (QAPP) that were approved for this project.

## RI Soil Characterization

Soil quality was previously characterized on Site in the parking lot north of the strip plaza and within the building where the former dry cleaner was located as part of the Preliminary Phase II Investigation. Soil quality within the 2.95 feet wide strip of soil behind the building was not fully characterized due to the presence of underground utilities.(Appendix A).

The RI focused on characterization of site soils outside of the building in the parking lot north of the building and off site on the adjoining properties to the east and south. Between October 14<sup>th</sup> through October 18<sup>th</sup>, 2015, soil samples were collected at 20 locations (14 soil borings and six surface sampling locations) as follows:

- Four soil sampling locations on Site in the parking lot north of the site building using a Geoprobe (SB-16, SB-17, SB-18 and SB-19);
- Three soil sampling locations off site at the Town of Tonawanda Federal Credit Union immediately east of the site building using a Geoprobe (SB-20, SB-21 and SB-22);
- Seven soil sampling locations off site at the south part of the Service Alley Road located directly south of the Site using a Geoprobe (SB-23, SB-24, SB-25, SB-26, SB-27, SB-28 and SB-29);
- Five shallow soil sampling locations immediately adjacent to the 2.95 feet strip of land directly behind the building using hand collection methods (AWSS – 6, AWSS – 7, AWSS – 8, AWSS – 9 & AWSS – 10); and
- One shallow soil sampling location at the southwest part of the Service Alley located directly behind the Site using hand collection methods (AWSS – 11).

A total of 36 soil samples were collected during completion of the RI: 30 subsurface soil samples and six surface soil samples. The soil sampling locations are shown on Figure 2.

### *RI Geoprobe Sampling Locations Completed on Pavement and in the Service Alley*

On October 14<sup>th</sup> through October 16<sup>th</sup>, 2015, soil borings were advanced in the parking lot north of the building, on the Credit Union property and in the Service Alley behind the building using a direct push drill rig (Geoprobe 6620T) and macro-core sampler with clean acetate liners. A total of 14 soil borings were completed using a Geoprobe drill rig: nine were completed to 8 feet below ground surface (BGS) using this method; and five were advanced to 24 feet BGS for the installation of groundwater monitoring wells. Table 1 provides a summary of these activities, and also includes the depths of the subsurface soil samples collected during completion of the RI.

Soil samples were screened in the field for the presence of VOCs with a photo-ionization detector (PID) equipped with an 11.7eV lamp. Background and elevated PID readings were noted and placed on a soil boring log for each sampling interval and soil boring location (Table 1). Soil boring logs are attached to this report as Appendix C

In areas where pavement was present, a sample of the sub-base fill material or native material directly under the pavement was collected at each soil boring location for laboratory analysis along with discrete soil samples from any interval that exhibited staining or elevated PID readings. One discrete interval shallow soil sample was collected for laboratory analysis at each location. Samples were placed in clean sample jars provided by the contract laboratory including Terra Core sampling kits for VOCs. Samples were placed on ice at 4 degrees centigrade for delivery to the contract laboratory.

In the Service Alley, a shallow soil sample was collected at each soil boring location for laboratory analysis along with discrete soil samples from any interval that exhibited staining or elevated PID readings. A minimum of one discrete interval shallow soil sample was collected for laboratory analysis at each location.

A second soil sample was collected at depth in each of the Geoprobe soil borings at intervals where staining or elevated PID readings were encountered. If staining or elevated PID readings were not encountered at depth, then the second sample in each respective soil boring was collected at or near the bottom of the soil boring since no groundwater was encountered during drilling activities. The soil samples collected at depth were analyzed for VOCs with the exception of one location where the soil sample was analyzed for a full suite of analytical parameters (VOCs, SVOCs, metals, pesticides and PCBs). The selection of one location where the additional at depth soil sample received full suite analyses was based on subsurface conditions encountered during the investigation.

#### *RI Hand Sampling Locations*

A total of six shallow soil samples were collected on Sunday morning October 18<sup>th</sup>, 2015 when the building was not occupied. These samples were collected off site immediately adjacent to the narrow strip of soil on the Site directly behind the building and from the Service Alley and are designated as shallow surface soil sample AWSS – 6 through AWSS – 11 (Figure 2). One discrete soil sample was collected at each location by hand from approximately 0 to 4 inches in depth using dedicated sampling spoons. Soil samples were screened in the field for the presence of VOCs with a PID equipped with an 11.7 eV lamp. Background and elevated PID readings were noted for each sampling location. Samples were placed in clean sample jars provided by the contract laboratory which included Terra-Core sampling kits for VOCs. Once collected, samples were placed on ice for delivery to the contract laboratory.

#### **RI Soil Sampling & Analysis**

A total of 36 soil samples were delivered to Test America Labs, an ELAP certified laboratory for analysis as part of the RI. All 36 samples were analyzed for VOCs. In addition, 12 soil samples from the following locations were analyzed for a full suite of analytes:

- Shallow Geoprobe soil boring samples SB-16 (6 inches – 12 inches); SB-17 (6 inches - 12 inches); SB-19 (6 inches - 18 inches); SB-28 (10 inches - 22 inches); SB-24 (6 inches - 14 inches); SB-27 (0 inches - 14 inches);

- Deep Geoprobe soil samples SB-17 (23 feet - 24 feet); SB-24 (23 feet - 24 feet); and
- Shallow hand samples AWSS-6 (0 inches – 4 inches); AWSS-7 (0 inches - 4 inches); AWSS-9 (0 inches - 4 inches) and AWSS11 (0 inches – 4 inches).

These samples were analyzed using the following USEPA analytical methods:

- Method 8260C Target Compound List (TCL) volatile organic compounds (VOCs);
- Method 8270 TCL semi-volatile organic compounds (SVOCs);
- Method 6010C and 7471B Target Analyte List (TAL) Metals;
- Method 8082 PCBs;
- Method 8081B Pesticides; and
- Method 8061 Herbicides.

The other 24 soil samples were only analyzed for 375 Method 8260C VOCs. Soil for VOCs analyses were collected using dedicated Terra-Core sampling kits. Soils for all other analyses were collected in certified clean glassware provided by the contract laboratory.

Matrix spike, matrix spike duplicates (MS/MSDs), field duplicates and trip blanks were collected for quality assurance/quality control (QA/QC) purposes. The analytical results were provided as an ASP Deliverable for data validation purposes and completion of the data usability summary report (DUSR) that is required as per DER - 10.

### **RI Groundwater Quality Characterization**

A total of five groundwater monitoring wells were installed between October 14<sup>th</sup> and October 16<sup>th</sup>, 2015 to characterize groundwater quality and flow direction (Figure 2). The well borings were advanced using a direct push drill rig and a macro-core sampler. Three of the soil borings that were advanced in the Site parking lot north of the building (SB-16, SB-17 and SB-19) were further advanced to 24 feet BGS and converted to groundwater monitoring wells. Two of the soil borings that were advanced in the Service Alley south of the former dry cleaner (SB-24 and SB-28) were also further advanced to a depth of 24 feet BGS and converted to groundwater monitoring wells as follows:

- SB-16 was converted to on Site monitoring well 1 (MW-1);
- SB-17 was converted to on Site MW-2;
- SB-19 was converted to on Site MW-3;
- SB-24 was converted to off site MW-4; and
- SB-27 was converted to off site MW-5.

The groundwater monitoring wells were finished as one inch PVC groundwater monitoring wells with 10 foot long, 10 slot screens and flush surface mount casings (Figure 2). The groundwater monitoring well installation diagrams are included in Appendix D.



## **Groundwater Monitoring Well Development**

No groundwater was encountered during installation of the Site groundwater monitoring wells, so the five groundwater monitoring wells were left to reach groundwater equilibrium conditions until December 4<sup>th</sup>, 2015 when a round of water levels was collected. Groundwater level information is summarized in Table 3. On December 18<sup>th</sup> 2015, the five groundwater monitoring wells were developed using dedicated Teflon bailers to be sampled once the soil analytical results had been received and reviewed from the laboratory. Site groundwater monitoring well development is summarized in Table 4.

## **Groundwater Sampling & Analysis**

Prior to collection of the groundwater samples, the water level was measured in each groundwater monitoring well. These water levels are shown on Table 3. Groundwater samples were then collected using a low flow sampling pump with dedicated Teflon tubing for each well. Each well was to be purged with a low flow sampling pump until field parameters (temperature, pH and conductivity) stabilized; however, there was not enough volume of standing water in the wells or sufficient groundwater recharge into the wells to allow both purging until stabilization of field parameters, and collection of enough groundwater to allow for the analysis of a full suite of analytical parameters as originally approved. NYSDEC was contacted for guidance, and instructed field personnel to collect enough groundwater from the respective wells for VOC analysis (only) given groundwater recharge conditions. Groundwater sampling data sheets are included in Appendix E.

Once collected, the groundwater samples were placed in clean, laboratory supplied glassware, and stored on ice for transport to the contract laboratory. Matrix spike, and matrix spike duplicates (MS/MSDs) were also collected. Analytical results were provided as an ASP B Deliverable for data validation purposes and completion of the data usability summary report (DUSR) that is required as per DER - 10.

## **Determination of Groundwater Flow Direction**

The water level information collected during the initial water level collection event on December 4<sup>th</sup>, 2015 was used to construct a potentiometric surface map of the water table to determine groundwater flow direction (Figure 4). Groundwater flow direction was determined to be toward the north and east.

## **INTERIM REMEDIAL MEASURE**

Highland Plaza received approval in February of 2016 from the NYSDEC and NYSDOH to construct and operate an interim remedial measure (IRM) consisting of a Sub-Slab Depressurization System (SSDS). Implementation of the IRM started in March and was completed the third week of April, 2016. The SSDS was constructed in the easternmost building of the strip plaza (235 and 237 Highland Parkway) in the tenant space formerly occupied by the dry cleaner. The SSDS is designed to depressurize the entire concrete slab of the easternmost plaza building where the former dry cleaner was located. Detailed drawings

and specifications for the SSDS can be found in the Site Final Engineering Report. The IRM consisted of the following work elements:

- Removal of the concrete floor where it was covered with a wooden lattice (approximately 80% of the tenant space);
- Placement of a crushed stone substrate in the area where the concrete was removed;
- Placement of four inch perforated horizontal PVC pipe vapor collection runs within the crushed stone for the SSDS that connected to solid vertical PVC piping to the blower units mounted on the roof of the building;
- Placement of a plastic membrane over the crushed stone substrate and pipe runs; and
- Placement of new concrete in the area of the tenant spaces where the old concrete was removed.

Approximately 32 feet by 50 feet of existing concrete floor was left in place in the easternmost part of this tenant space (237 Highland Parkway). In order to install the SSDS in this area, the existing concrete floor was saw-cut. The soils were excavated out of the saw-cut area to a depth of approximately 18 inches. Four inch perforated PVC vapor collection pipe was placed in the trench and covered with crushed stone in the saw cut and associated excavation. The perforated pipe was then attached to the solid vertical PVC pipe to connect to the roof top mounted blower.

The SSDS consists of three blowers and four sub-slab vapor collection pipe runs. The three blowers are located on the roof of the building and are designated as follows:

- The easternmost blower is designated as BL-1;
- The central blower is designated as BL-2; and
- The westernmost blower is designated as BL-3.

The sub-slab vapor collection points for this area are as follows:

- Approximately 25 feet from the front of the building and approximately 25 feet from the back of the building;
- The easternmost vapor collection pipe run (designated as EP-1) is located approximately 25 feet west of the east building wall and is approximately 5 feet 9 inches in length east-west;
- The east central vapor collection point (designated as EP-2) is located approximately 50 west of the east building wall and is approximately 10 feet in length east-west;
- The west central vapor collection point (designated as EP-3) is located approximately 45 feet east of the west building wall and is approximately 15 feet in length east-west; and
- The westernmost vapor collection point (designated as EP-4) is located approximately 25 feet east of the west building wall and is approximately 25 feet 6 inches in length east-west..

All sub-slab piping for the SSDS consist of schedule 40 perforated PVC pipe and was wrapped with a permeable sleeve to prevent small rock chips from entering the piping.

Piping was placed in a trench approximately 18 inches wide and 6 inches below the concrete floor. Once the vapor collection piping was placed in the trench, the trench was backfilled with crushed stone.

Solid PVC piping runs vertically from the concrete floor through the drop ceiling and roof to roof mounted blowers. Tjernlund R5HF (R-Series Radon Mitigation Fans) are mounted on the roof for vapor extraction. The Tjernlund R5HF is a moderate to high flow blower used for commercial areas (up to 2500 square feet). It has a maximum flow rate of 353 cubic feet per minute.

The SSDS became operational the last week of April, 2016. The three fans were installed one at a time, tested and put into operation. This process took approximately one week to complete. The SSDS has been in continuous operation since that time.

### **Confirmation Indoor Air Sampling**

Highland Plaza evaluated the effectiveness of the existing sub-slab depressurization system (SSDS) system by collecting a confirmation indoor air sample in the former dry cleaner tenant space on February 16, 2017. Since the former dry cleaner tenant space has been subdivided into two tenant spaces, the confirmation indoor air sample was collected in the tenant space that is presently occupied (Buffalo Ergonomics at 235 Highland Parkway). The indoor air sample was collected using the same sample collection methods described in the 2006 NYSDH guidance document. Sampling interval was 24 hours and the air sample was analyzed for USEPA method TO-15 VOCs.

A product inventory of this tenant space was also provided by the existing tenant (Buffalo Ergonomics) and is provided in Appendix F.

### **Pressure Testing**

In April, 2017, pressure differential between the indoor air and sub-slab space was measured to confirm the presence of negative pressure under the concrete floor slab and the effectiveness of the SSDS to intercept and control soil vapors from entering the tenant space. An Omniguard 4 Differential Pressure Monitor was used to measure pressure in the tenant space and the sub-slab space. Six small diameter holes (1/2 inch in diameter) were drilled through the concrete floor slab at a distance of 18 inches to three feet from the north and south exterior walls of the building to measure the pressure differential between the sub-slab and indoor air.

### **SOIL VAPOR INTRUSION INVESTIGATION 2016**

A soil vapor intrusion (SVI) investigation was completed on March 14<sup>th</sup> and 15<sup>th</sup>, 2016 in tenant spaces located at 227 Highland Parkway (Franklin Telecom Supply) and 231 Highland Parkway (National hearing Aid) to evaluate sub-slab vapor and indoor air quality in Building 2 of the strip plaza adjacent to the former dry cleaner.

The strip plaza consists of three buildings: Building 1 is the former dry cleaner on the east

end of the strip plaza (235 and 237 Highland Parkway); Building 2 is the central building with four tenant spaces (221, 225, 227 and 2312 Highland Parkway); and, Building 3 is the western building with two tenant space (215 and 217 Highland Parkway). This is apparent by the presence of a change in the roof line and/or a break in the brick work. In addition, a concrete block wall and a foundation break were observed at the west end of the former dry cleaner during the build out of the former dry cleaner and construction of the interim remedial measure sub-slab depressurization system (SSDS).

### **Sampling Locations**

The first two tenant spaces west of the former dry cleaner were selected as sampling locations for the 2016 SVI Investigation and are noted on Figure 5 as Franklin Telecom Supply and Service at 227 Highland Parkway (Sampling Area #1) and National Hearing Aid Services at 231 Highland Parkway (Sampling Area #2). Sub-slab and indoor air samples were collected 30 feet west of the former dry cleaner (Sampling Area #2) and 60 feet west of the former dry cleaner (Sampling Area #1).

### **Pre-sampling Building Inspection & Preparation**

A pre-sampling inspection was completed in each tenant space prior to the sampling event to identify and minimize conditions that would interfere with the proposed testing. The information collected on potential sources of indoor air contamination is identified on a building inventory form for each tenant space (Appendix F). The tenant spaces are separated by firewalls rated for one hour as per building codes in the Town Tonawanda. A determination was made that the two tenant spaces did not share air handling (HVAC) systems, drop ceilings or shared crawl spaces.

When samples were collected, the HVAC in each tenant space was operating in a manner consistent with normal operating conditions. To avoid potential interferences and dilution effects, reasonable efforts were made to avoid the following for 24 hours prior to sampling: opening any windows; operating ventilation fans; smoking in the building; painting; using auxiliary heating equipment (e.g., kerosene heater); cleaning, waxing or polishing furniture, floors or other woodwork with petroleum- or oil-based products; using air fresheners, scented candles or odor eliminators; using cosmetics including hairspray, nail polish, nail polish removers, perfume/cologne, etc.; and bringing freshly dry-cleaned clothing or furnishings into the building.

The interim remedial measure sub-slab depressurization system that was under construction in the former dry cleaner area was not yet operational during completion of the 2016 soil vapor intrusion investigation.

### **Product Inventory**

A product inventory of each tenant space that was sampled was made to characterize the occurrence and use of chemicals within each tenant space sampled to help formulate an indoor environment profile (Appendix F).

## **Sub-slab Vapor Sampling**

The tenant spaces that were sampled are slab on grade. One sub-slab vapor sample was collected from each of the two tenant spaces. Sub-slab vapor samples were collected from the soil or aggregate immediately below the concrete floor slab.

Prior to installation of the sub-slab vapor probe, the building floor was inspected and any penetrations (cracks, floor drains, utility perforations, sumps, etc.) were noted.

Temporary sub-slab vapor probe installations were drilled through the concrete floor slab using an impact drill to drill a ½ inch hole. Temporary probes were constructed with inert tubing (e.g., polyethylene) 1/4 inch in diameter. The tubing did not extend further than two inches into the sub-slab material. The temporary probe was then sealed to the surface with non-VOC-containing and non-shrinking putty. The sub-slab vapor samples were collected in the following manner:

- One volume (i.e., the volume of the sample probe and tube) was purged prior to collecting the samples to ensure samples collected were representative;
- Flow rates for both purging and collecting did not exceed 0.2 liters per minute to minimize ambient air infiltration during sampling;
- Samples were collected using a summa type canister and regulator that were certified clean by the contract laboratory; and
- Sub-slab vapor samples were collected over the same period of time as the indoor and outdoor air samples (8 hours).

A sample log sheet was also maintained summarizing sample identification numbers with date and time of sample collection; sampling methods and devices; vacuum of canisters before and after samples collected; and, chain of custody records used to track samples.

Helium tracer gas, a shroud and portable monitoring device were used as a QA/QC control measure to verify the integrity of the soil vapor probe seal prior to sample collection.

## **Indoor Air Sampling**

Two indoor samples (one in each tenant space) were collected at the same time as the sub-slab vapor and outdoor air sample. Since this is a commercial building, the indoor air samples were collected at a height approximately three feet above the floor to represent the height at which occupants normally are seated. These locations are also shown on Figure 4.

The heating system was in operation for at least 24 hours prior to and during the collection of samples. The indoor air samples were collected for eight hours using a summa type canister and regulator that were certified clean by the contract laboratory. The conditions within the tenant space were documented as outlined for the sub-slab sampling locations. A field sampling log was also maintained for the indoor air samples.

## **Outdoor Air Sampling**

An outdoor air sample was collected upwind at the western end of the building simultaneously with the sub-slab vapor and indoor air samples using the same sampling method and sample period. The sampling device was placed at a height of approximately five feet above the ground to represent the breathing zone (Figure 4).

## **Air & Vapor Analytical Methods**

The samples collected as part of this investigation were analyzed by USEPA Method TO-15 for VOCs by Centek Laboratories in Syracuse, New York.

Data Usability Summary Reports (DUSRs) were prepared for soils, groundwater and air to assure the data was usable and the project specific criteria for data quality and data use were met (Appendices J, K and L).

## **SOIL VAPOR INTRUSION INVESTIGATION 2017**

A second soil vapor intrusion was completed on March 9<sup>th</sup> and 10<sup>th</sup> 2017 using the same protocols, collection methods, laboratory analytical methods and QA/QC protocols that were used to complete the 2016 soil vapor intrusion investigation. Sampling locations were as follows:

- IA – 215 Indoor air sample (IA) at 215 Highland Parkway;
- IA – 217 and SS – 217 IA and sub-slab vapor sample (SS) at 217 Highland Parkway;
- IA – 221 and SS – 221 IA and SS samples at 221 Highland Parkway;
- IA – 225 IA air sample at 225 Highland Parkway; and
- Outdoor Air Sample 1 collected upgradient at the western end of Building 3.

## **Pre-sampling Building Inspection and Preparation**

A pre-sampling inspection was completed on March 6, 2017 in the four tenant spaces where sampling would take place as per methods outlined in the 2006 NYSDOH guidance. The tenant spaces are separated by firewalls rated for one hour as per building codes in the Town Tonawanda. A determination was made that the four tenant spaces did not share air handling (HVAC) systems, drop ceilings or shared crawl spaces. When samples were collected, the HVAC system in each tenant space was operating in a manner consistent with normal operating conditions when the building is occupied. To avoid potential interferences and dilution effects, tenants were notified (in advance of the sampling event) that reasonable efforts must be made to avoid the following for 24 hours prior to sampling:

- Opening any windows;
- Operating ventilation fans unless special arrangements are made;
- Smoking in the building;
- Painting;

- Using auxiliary heating equipment (e.g., kerosene heater);
- Cleaning, waxing or polishing furniture, floors or other woodwork with petroleum- or oil-based products;
- Using air fresheners, scented candles or odor eliminators;
- Using cosmetics including hairspray, nail polish, nail polish removers, perfume/cologne, etc.; and
- Bringing freshly dry-cleaned clothing or furnishings into the building.

Since one of the tenant spaces was a hair and nail salon (Louie Salon), it was not possible to avoid the use of cosmetics, hairspray, nail polish and nail polish remover from the premises since these products are used daily as part of normal business activities

### **Product Inventory**

A product inventory of each tenant space that was being sampled was provided by each tenant to characterize the occurrence and use of chemicals within that tenant space to help formulate an indoor environment profile. This information is provided in Appendix F.

### **Sub-slab Vapor Sampling**

Sub-slab vapor sampling was completed at two locations:

- At Louis Salon (221 Highland Parkway) in building 2; and
- At Fitness House (now vacant) at 217 Highland Plaza in building 3.

Sub-slab vapor samples were collected from the soil or aggregate immediately below the concrete floor slab which is slab-on-grade.

#### *Sub-slab Vapor Sampling Protocols*

The building floor in each tenant space was inspected and any penetrations (cracks, floor drains, utility perforations, sumps, etc.) were noted and recorded. The probe holes were installed on March 8<sup>th</sup>, 2017 at locations where the potential for ambient air infiltration via floor penetrations was minimal. The probe holes were constructed through the concrete floor slab using an impact drill to drill a ½ inch hole. Inert tubing of the appropriate size was inserted in the hole but did not extend further than 2 inches into the sub-slab material. The temporary probe hole was sealed to the surface with non-VOC-containing and non-shrinking clay. The sub-slab vapor samples were collected in the following manner:

- One to three volumes (i.e., the volume of the sample probe and tube) were purged prior to collecting the samples to ensure samples collected were representative;
- Flow rates for both purging and collecting did not exceed 0.2 liters per minute to minimize ambient air infiltration during sampling;
- Samples were collected, using a summa type canister and regulator that were

certified clean by the contract laboratory; and

- Sub-slab vapor samples were collected over the same period of time as the indoor and outdoor air samples (24 hours).

Historic and current storage and uses of volatile chemicals were identified. The use of heating or air conditioning systems during sampling were ~~not~~. Any pertinent observations, such as spills, floor stains, and odors were noted.

A sample log sheet was maintained summarizing the following information:

- a. Sample identification number with date and time of sample collection,
- b. Sampling depth,
- c. Identity of samplers,
- d. Sampling methods and devices,
- e. Soil vapor purge volumes,
- f. Volume of soil vapor extracted,
- g. Vacuum of canisters before and after samples collected,
- h. Apparent moisture content (dry, moist, saturated, etc.) of the sampling zone, and
- i. Chain of custody protocols and records used to track samples.

### Tracer Gas

A tracer gas (helium) and shroud was used on March 8<sup>th</sup>, 2017 as a QA/QC control measure to verify the integrity of the soil vapor probe seal as per guidance that is provided by NYSDOH.

### **Indoor Air Sampling**

Indoor air samples were collected at the following locations in the second and third buildings:

- Paisley (now vacant) located at 225 Highland Parkway (Building 2);
- Louis Salon located at 221 Highland Parkway (Building 2);
- Fit House (now vacant) located at 217 Highland Parkway (Building 3); and
- Mama Mia Pizza (Building 2) located at 215 Highland Parkway.

The indoor air samples were collected at the same time as the sub-slab vapor and outdoor air samples at a height approximately three feet above the floor to represent a height at which occupants normally are seated.

### Indoor Air Sampling Protocols

The indoor air samples were collected in the following manner:



- Flow rates for both purging and collecting did not exceed 0.2 liters per minute to minimize ambient air infiltration during sampling;
- Samples were collected using a summa type canister and regulator that are certified clean by the contract laboratory; and
- Indoor air samples were collected over the same period of time as the sub-slab and outdoor air samples (24 hours).

The conditions within the tenant space were documented following the same approach as outlined for the sub-slab sampling locations. A field sampling log was also maintained for the indoor air samples and contains information similar to the logs for the sub-slab vapor samples.

### **Outdoor Air Sampling**

An outdoor air sample was collected outside of building upwind at the western end of the building (Figure 5). The sampling device was placed at a height above the ground to represent breathing zones approximately 3 to 5 feet above the ground surface.

#### *Outdoor Air Sampling Protocols*

One outdoor air sample was collected simultaneously with the sub-slab vapor and indoor air samples. The same sampling method and sample period was used to collect the outdoor air sample.

### **Air and Vapor Analytical Methods**

The samples collected as part of this investigation were analyzed using USEPA Method TO-15 for volatile organic compounds (VOCs).

### **QUALITY ASSURANCE QUALITY CONTROL (QA/QC)**

QA/QC procedures were followed during all sampling events. Samples met sample holding times and were delivered to the analytical laboratory as soon as possible after collection. In addition, laboratory accession procedures were followed; including field documentation (sample collection information and locations), chain of custody, collection of field duplicates; matrix spike and matrix spike duplicate (MS/MSD).

### **RESULTS OF THE REMEDIAL INVESTIGATION**

A total of 14 soil borings were completed as part of the RI. Thirty subsurface soil samples were collected and analyzed from the RI soil borings, along with the collection six surface soil samples for a total of 36 soil samples. Five of the soil borings were converted into one-inch groundwater monitoring wells.

The following number of samples were collected on site and off site as part of the RI:

- 30 subsurface soil samples;
- Six surface soil samples;
- Three on site groundwater samples and two off site groundwater samples;
- Seven on site indoor air samples;
- Seven on site sub-slab vapor samples; and
- Two outdoor air samples.

The data collected as part of the RI shows varying impacts to soil and groundwater from the former dry cleaner, at the Site and off site properties.

### **RI Soil Results**

Soils encountered during completion of the RI consisted of both fill materials and native soils (Photos 1 through 9).

#### *RI Fill*

Soil borings completed on site north of the building in the parking lot (SB-16 through SB-19) showed the presence of approximately six inches of asphalt underlain by six to twelve inches of crushed stone or brown-black stained sand, which is underlain by native silty clay soils.

Soil borings completed east of the Site in the Credit Union parking lot (SB-20 through SB-22) showed the presence of approximately eight inches of asphalt/crushed stone underlain by dark brown stained clay. These materials were underlain by native silty clay soils.

Soil borings advanced in the service alley behind the building encountered varying amounts of dark grey to black topsoil (0 to 8 inches) underlain by angular medium grey gravel (crushed stone) and sand. At some locations, crushed stone and sand were present at the surface. These materials were underlain by native silty clay soils (Photos 4 through 9).

#### *RI Native Soils*

The native soils that underlie the Site consist of a very dense reddish brown silty clay that is greater than 24 feet in thickness (Photos 1, 2 and 3). There were no other soil types encountered in the soil borings that were advanced on the Site or adjacent properties. Silt and sand lenses were generally lacking in the native soil samples that were observed; however, minor amounts of sand and gravel occurred as matrix material within this silty clay unit. No groundwater was encountered during the advancement of the soil borings or installation of the groundwater monitoring wells.

### **RI Soil Quality**

All 36 RI soil samples were analyzed for VOCs. In addition, 12 of these soil samples were analyzed for SVOCs, metals, pesticides, PCBs and herbicides. The soil quality analytical

package from Test America is attached as Appendix G. The following provides a summary of that information.

#### *RI Volatile Organic Compounds*

VOCs were detected in 35 of the 36 soil samples that were analyzed for these compounds. Fourteen VOCs were detected in total. Most of these compounds were detected at estimated or very low concentrations; however, cis-1,2-Dichloroethene and trichloroethene were detected at concentrations slightly above their method detection limits (MDLs). Tetrachloroethene was detected at three locations (SB – 24, SB – 25 and SB - 27) at significantly elevated concentrations. This information is summarized on Tables 6A and 6B.

#### *RI Semi-volatile Organic Compounds*

SVOCs were detected in 7 of the 12 soil samples that were analyzed for these compounds. Eighteen SVOCs were detected in total. There were no SVOCs detected in the following five soil samples: SB-16 (6"-12"); SB-17 (6"-12"); SB-17 (23'-24'); SB-19 (6"-18"); and SB-24 (23'-24'). This information is summarized on Table 7A and 7B.

#### *RI Metals*

Metals were detected in the 12 soil samples that were analyzed for these analytes (Table 8A and 8B). Twelve metals were detected in total. The concentrations of metals varied between sample locations and between the various metals as is common in soils.

#### *RI Pesticides & Polychlorinated Biphenyls*

Pesticides were detected in 10 of the 12 soil samples that were analyzed for these compounds. Eleven pesticides were detected in total. These compounds were present at very low estimated (J) concentrations in the soil samples analyzed. There were no PCBs detected in the 12 soil samples that were analyzed for these compounds (Table 9A and 9B).

#### *RI Herbicides*

There were no herbicides detected in the 12 soil samples that were analyzed for these compounds.

### **RI Groundwater Results**

Groundwater was not encountered during the completion of the soil borings that were part of the RI. Soil samples were usually damp to a depth of approximately 15 feet BGS. From 15 feet to 24 feet BGS, the silty clay soils were slightly moist to moist and less dense. In several instances, the clay soils from 20 to 24 feet BGS were moist and pliable. On December 4, 2015, groundwater levels were measured in the five groundwater monitoring wells and were found to range from 2.8 feet to 5.4 feet below the top of the well risers.

Groundwater samples were collected and analyzed from the three on-site monitoring wells and the two off-site monitoring wells. Groundwater samples were only analyzed for VOCs. Slow groundwater recharge in the groundwater monitoring wells did not allow for the collection of enough water to analyze the groundwater samples for the full Target Compound List/Target Analyte List of parameters.

### **RI Groundwater Quality**

The groundwater quality analytical results package from Test America is attached as Appendix H. The following provides a summary of that information. Tables 10A and 10B provide a tabular summary of this information.

Six VOCs were detected in four of the five groundwater monitoring wells that were installed as part of this investigation.

## **COMBINED RESULTS OF THE PRELIMINARY PHASE II AND REMEDIAL INVESTIGATIONS**

### **Soils**

Twenty-six soil borings were completed as part of the Preliminary Phase II Investigation and the Remedial Investigation. A total of 52 soil samples were collected as part of these studies. Forty-two subsurface soil samples were collected and analyzed from the on site and off site soil borings. Ten surface soil samples were also collected and analyzed as part of these investigations

A total of 21 on-site soil samples were collected and analyzed as part of the two investigations. In addition, 31 soil samples were collected and analyzed off-site as part of the two investigations. The 52 soil samples were analyzed for VOCs: 14 of the soil samples were analyzed for semi-volatile organic compounds (SVOCs); and 12 of the soil samples were analyzed for total metals, pesticides, poly-chlorinated biphenyls (PCBs) and herbicides.

#### *On-Site Impacts to Soil*

There were no impacts to soil and groundwater noted along the west side of the Site from the former Getty Service station.

Volatile organic compounds are present in soil from the former dry cleaner at the eastern end of the Site. These compounds are present under the floor of the eastern end of the former dry cleaner, and in shallow soils in the parking lot north of the building at soil boring SB – 19. Benzene, cis-1,2-dichloroethene, Tetrachloroethene and Trichloroethene were detected at concentrations below their respective NYSDEC Part 375 Commercial Soil Cleanup Objectives (SCOs). The concentrations of benzene, tetrachloroethene and trichloroethene were above the NYSDEC Part 375 Protection of Groundwater SCO is soil boring SB – 19.

### *Off-Site Impacts to Soil*

Volatile organic compounds and SVOCs were detected at elevated concentrations in the soil samples from the service alley directly south of the Site. The VOCs detected are commonly associated with dry cleaning operations, and are prevalent in the shallow soils and deep soils encountered in soil borings SB – 23, SB – 24, SB – 25, SB – 27 and SB – 29 on the easternmost end of the service alley adjacent to the former dry cleaner.

The concentration of tetrachloroethene exceeded the Part 375 Commercial SCO in soil borings SB -24 and SB – 25, and Part 375 Protection of Groundwater SCO in soil borings SB – 23, SB – 27 and SB – 29; and shallow soil samples AWSS – 1, AWSS – 2 and AWSS – 3.

The concentration of Trichloroethene exceeded the Part 375 Protection of Groundwater SCO in soil borings SB – 23, SB – 24, SB – 27 and SB – 29.

The concentration of cis – 1,2-Dichloroethene exceeded the Part 375 Protection of Groundwater SCO in soil borings SB – 24, SB – 25 and SB – 29.

The concentration of Acetone (a common laboratory contaminant) exceeded the Part 375 Protection of Groundwater SCO in soil boring SB – 21.

The SVOCs Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene were detected in the shallow surface soil samples from the service alleyway at concentrations above of their respective Commercial SCOs. The occurrence of these SVOCs is likely related to the presence of millings that have been placed on the alley way services road.

### **Geospatial Distribution of Compounds Detected in On Site Soils**

There were no impacts to soil noted along the west side of the Site from the former Getty Service station.

Seven VOCs were present in soil from the former dry cleaner at the eastern end of the Site (Table 6A). These compounds are present under the floor of the eastern end of the former dry cleaner, and in shallow soils in the parking lot north of the building at soil boring SB – 19.

There were no SVOCs detected in the on site soil samples analyzed as part of the RI (Table 7A).

Ten metals typically found in soils were present in the on site soil samples that were analyzed for metals (Table 8A).

There were no pesticides detected above their respective method detection limits in the on-site soil samples analyzed as part of the RI (Table 9A).

There were no PCBs detected in the on site soil samples analyzed as part of the RI (Table 9A).

### **Geospatial Distribution of Compounds Detected in Off Site Soils**

Volatile organic compounds and SVOCs were detected at elevated concentrations in the soil samples from the service alley directly south of the Site. The VOCs detected are commonly associated with dry cleaning operations, and are prevalent in the shallow soils and deep soils encountered in soil borings SB – 23, SB – 24, SB – 25, SB – 27 and SB – 29 on the easternmost end of the service alley adjacent to the former dry cleaner.

There were 14 VOCs detected in the off site soil samples analyzed as part of the RI (Table 6B). Most of these compounds were detected at low concentrations (J values or estimated); however, tetrachloroethene and trichloroethene were detected at elevated concentrations in shallow and deep soil samples collected in SB-24 and SB-25. These VOCs are commonly associated with dry cleaning operations, and are prevalent off site in the shallow soils and some deep soils on the easternmost end of the service alley way adjacent to the former dry cleaner.

There were 18 SVOCs detected in the soil boring soil samples and surface soil off site soil samples analyzed as part of the RI (Table 7B). These compounds are likely associated with the millings that have been placed on the service alley way through time.

Twelve metals typically found in soils were found in the off site soil samples that were analyzed for metals (Table 8B).

There were no pesticides detected above their respective method detection limits in the off site soil samples analyzed as part of the RI (Table 9B).

There were no PCBs detected in the off site soil samples analyzed as part of the RI (Table 9B).

There were no herbicides detected in the off site soil samples.

### **Comparison of Soil Quality Results to NYSDEC Guidance in On Site Soils**

#### *Volatile Organic Compounds in On Site Soils*

There were no VOCs detected at or above their respective NYSDEC Part 375 Commercial Soil Cleanup Objectives (SCOs) in on site soils (Table 6A).

The VOC benzene was detected at one on site location (SB-19) above the Part 375 Protection of Groundwater SCO; and the VOCs tetrachloroethene and trichloroethene were detected at three on site locations above the Part 375 Protection of Groundwater SCO (Table 6A). SB –

5 and SB – 7 are located in the eastern end of the building in the area of the former dry cleaner; and SB – 19 is located at the easternmost end of the parking lot (Figures 2 and 3).

*Semi-volatile Organic Compounds in On Site Soils*

There were no SVOCs detected in on site soils at or above their respective NYSDEC Part 375 Commercial SCOs (Table 7A).

*Metals in On Site Soils*

There were no metals detected in on site soils at or above their respective NYSDEC Part 375 Commercial SCOs (Table 8A).

*Pesticides and PCBs in On Site Soils*

There were no pesticides or PCBs detected in on site soils at or above their respective NYSDEC Part 375 Commercial SCOs (Table 8A).

**Comparison of Soil Quality Results to NYSDEC Guidance in Off Site Soils**

VOCs and SVOCs were detected in off site soils at elevated concentrations in the service alley way directly south of the Site.

*Volatile Organic Compounds in Off Site Soils*

The VOCs detected are commonly associated with dry cleaning operations, and are present in the shallow soils and some deep soils on the easternmost end of the service alley adjacent to the former dry cleaner.

The concentration of tetrachloroethene exceeded the NYSDEC Part 375 SCO in off site soil borings SB -24 and SB – 25, and the NYSDEC Part 375 Protection of Groundwater SCO in off site soil borings SB – 23, SB – 27 and SB – 29; and in off site shallow soil samples AWSS – 1, AWSS – 2 and AWSS – 3 (Table 6B).

The concentration of Trichloroethene exceeded the Part 375 Protection of Groundwater SCO in off site soil borings SB – 23, SB – 24, SB – 27 and SB – 29 (Table 6B).

The concentration of cis – 1,2-Dichloroethene exceeded the Part 375 Protection of Groundwater SCO in off site soil borings SB – 24, SB – 25 and SB – 29 (Table 6B).

The concentration of Acetone (a common laboratory contaminant) exceeded the Part 375 Protection of Groundwater SCO in off site oil boring SB – 21 (Table 6B).

*Semi-volatile Organic Compounds in Off Site Soils*

The SVOCs Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene were detected in shallow soils in the

service alley way at concentrations above their respective Commercial SCOs. Benzo(a)anthracene was detected above its Commercial SCO in surface soil samples AWSS-7 and AWSS-9.

Benzo(a)pyrene was detected above its Commercial SCO in off site soil samples SB-28 (10 inches-22 inches), AWSS-6, AWSS-7 and AWSS-9 and AWSS-11.

Benzo(b)fluoranthene was detected above its Commercial SCO in off site surface soil samples AWSS-7 and AWSS-9.

Indeno(1,2,3-cd)pyrene was detected above its Commercial SCO in off site surface soil samples AWSS-7 and AWSS-9.

The occurrence of these SVOCs is most likely related to the presence of millings that have been placed on the alley way service road.

#### *Metals in Off Site Soils*

There were no metals detected above their respective Commercial SCOs in off site soils.

#### *Pesticides and PCBs in Off Site Soils*

There were no pesticides detected above their respective Commercial SCOs; and, there were no PCBs detected in the 12 off site samples that were analyzed for these compounds.

### **Groundwater Results**

Groundwater was sampled at six different locations as part of these investigations: on site from four different locations (SB-2 as part of the Preliminary Phase II Investigation) and off-site from two different locations. The six groundwater samples were analyzed for VOCs and for SVOCs at one location on-site (SB-2). Slow groundwater recharge in the groundwater monitoring did not allow for the collection of enough water to analyze the groundwater samples for the full Target Compound List/Target Analyte List of parameters.

### **Geospatial Distribution of Compounds Detected in Groundwater**

There were no VOCs detected in the groundwater sample collected from SB-2. Six VOCs were detected in four of the five groundwater monitoring wells that were installed as part of this investigation. The following compounds were detected in the other four groundwater monitoring wells.

#### *Groundwater Monitoring Well MW-1 (On Site)*

Acetone (a common laboratory contaminant) was detected in MW-1 at a concentration of 5.4 micrograms per liter (ug/L). No other VOCs were detected in this groundwater sample above their respective method detection limits (MDLs) (Table 10A).



*Groundwater Monitoring Well MW-2 (On Site)*

There were no VOCs detected in the groundwater sample collected from MW-2 (Table 10A).

*Groundwater Monitoring Well MW-3 (On Site)*

Cis-1,2-Dichloroethene was detected at a concentration of 24.0 ug/L in the groundwater sample collected from this monitoring well (Table 10A).

*Groundwater Monitoring Well MW-4 (Off Site)*

Four VOCs were detected in the groundwater sample collected from this groundwater monitoring well. 1,1-Dichloroethene, cis-1,2-Dichloroethene, Tetrachloroethene and Trichloroethene were all detected in the groundwater sample collected from this well (Table 10B).

*Groundwater Monitoring Well MW-5(Off Site)*

Four VOCs were detected in the groundwater sample collected from this groundwater monitoring well. Cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Tetrachloroethene and Trichloroethene were detected in the groundwater sample collected from this well (Table 10B).

**Comparison of Groundwater Quality Results to NYSDEC Guidance**

The groundwater results were compared to guidance provided in the document NYSDEC Technical & Operational Guidance Series 1.1.1 – Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS 1.1.1). A comparison of the groundwater analytical results by well to the TOGS 1.1.1 standards by compound is provided in Table 10 A & 10 B.

*On Site Groundwater Quality*

Groundwater quality has been slightly impacted by former dry cleaning operations at the easternmost end of the Site.

Acetone was detected in one onsite well (MW-1) at a concentration of 5.4J micrograms/liter (ug/l) (estimated value) well below the TOGs 1.1.1 guidance value of 50 ug/l.

Cis-1,2-Dichloroethene was detected in one on site well (MW-3) at a concentration of 24.0 ug/l, which is above the TOGs 1.1.1 guidance value of 5 ug/l (Table 10A).

Trichloroethene was detected in MW-3 at a concentration of 0.85 J (estimated) well below the TOGs 1.1.1 guidance value of 5 ug/L

### *Off Site Groundwater Quality*

Off site impacts to groundwater from the former dry cleaner were noted in the two off site groundwater monitoring wells that were installed as part of the RI investigation (MW – 4 and MW – 5).

Five VOCs were detected in the two off site wells (Table 10B). 1,1-Dichloroethene was detected in MW-4 at a concentration 10.0J ug/l, slightly above the TOGs guidance value of 5 ug/l.

Cis-1,2-Dichloroethene was detected in both MW-4 and MW-5 at concentrations of 900.0 ug/l and 1100.0 ug/l respectively, well above the TOGs 1.1.1 guidance value of 5 ug/l.

Trans-1,2-Dichloroethene was detected in MW-5 at a concentration of 34.0 ug/l, above the TOGs 1.1.1 guidance value of 6 ug/l.

Tetrachloroethene was detected in both MW-4 and MW-5 at concentrations of 58,000.0 ug/l and 3,200.0 ug/l respectively, significantly above the TOGs 1.1.1 guidance value of 5 ug/l.

Trichloroethene was detected in both off site groundwater monitoring wells MW-4 and MW-5 at concentrations of 740.0 ug/l and 1,700.0 ug/l respectively, significantly above the TOGs 1.1.1 guidance value of 5 ug/l.

### **RESULTS OF 2016 SOIL VAPOR INTRUSION INVESTIGATION**

The air and vapor quality analytical package from Centek Laboratories is attached as Appendix I. The analytical results are tabulated as Table 11B. Sampling locations are shown on Figure 5. Thirty-three VOCs were detected in the vapor and air samples collected as part of this investigation. These compounds consisted primarily of petroleum compounds, solvents and refrigerants (Table 11B). Fourteen compounds were detected at concentrations at or above 10 micrograms per cubic meter (ug/m<sup>3</sup>):

- Acetone was detected in both sub-slab samples, both indoor air samples and the outdoor air sample;
- Cis-1,2 Dichloroethene was detected in the Sub-slab #2 sample;
- Cyclohexane was detected in the Sub-slab #2 sample;
- Heptane was detected in the Sub-slab #2 sample;
- Hexane was detected in the Sub-slab #2 sample;
- Isopropyl Alcohol was detected in the Indoor Air #1 sample;
- m&p Xylene was detected in both sub-slab samples;

- Methyl Ethyl Ketone was detected in the Indoor Air #1 sample and Sub-slab #1 sample;
- Methylene chloride was detected in the Sub-slab #1 sample;
- Tetrachloroethylene (tetrachloroethene) was detected in both sub-slab samples;
- Tetrahydrofuran was detected in the Indoor Air #2 sample;
- Toluene was detected in both sub-slab samples and the Indoor Air #1 sample;
- Trans 1,2 Dichloroethene was detected in the Sub-slab #2 sample; and
- Trichloroethene was detected in the Sub-slab #2 sample.

### **Comparison of Soil Vapor Intrusion Investigation to NYSDOH Guidance**

NYSDOH provides guidance values for three of these compounds: Methylene chloride; Tetrachloroethylene also known tetrachloroethene or perchloroethene; and Trichloroethene.

Methylene chloride was detected in all three air samples at a concentration of 0.94 ug/m<sup>3</sup> in Indoor Air #2 sample (231 Highland Parkway); at a concentration of 1.9 ug/m<sup>3</sup> in Indoor Air Sample #1 (227 Highland Parkway), and at a concentration of 1.9 ug/m<sup>3</sup> in Outdoor Air Sample #1 all well below the NYSDOH guidance value of 60 ug/m<sup>3</sup>.

Tetrachloroethene was detected in all three air samples at a concentration of 7.3 ug/m<sup>3</sup> in Indoor Air #2 sample (231 Highland Parkway); at a concentration of 5.5 ug/m<sup>3</sup> in Indoor Air Sample # 1 (227 Highland Parkway); and at a concentration of 5.4 in Outdoor Air Sample #1 all well below the NYSDOH guidance value of 30 ug/m<sup>3</sup> Tetrachloroethene was detected at a concentration of 23.0 ug/m<sup>3</sup> in Sub-slab Sample #1; and, at an elevated concentration of 150.0 ug/m<sup>3</sup> in Sub-slab Sample #2 (231 Highland Parkway).

Trichloroethene was detected in all three air samples at estimated (J) values at a concentration of 0.48 J ug/m<sup>3</sup> in both indoor air samples and at an estimated concentration of 0.27 J in Outdoor Air Sample #1 all well below the NYSDOH guidance value of 2 ug/m<sup>3</sup>.

The results were compared to NYSDOH Guidance provided in their 2006 Soil Vapor Intrusion Guidance Document. Comparison of results for tetrachloroethene in the IA #1 and SS #1 indoor air and sub-slab vapor sample from 227 Highland Plaza to the NYSDOH Soil Vapor/Indoor Air Matrix Table 2 Guidance shows the tenant space at 227 Highland Plaza (formerly Franklin Telecom) falls into Category 2: *Take reasonable and practical actions to identify source(s) and reduce exposure*. Comparison of the results for tetrachloroethene in the IA #2 and SS #2 samples from 231 Highland Plaza (National Hearing Aid) shows this tenant space falls into Category 6: *Monitor/Mitigate*.

Comparison of results for trichloroethene in the IA #1 and SS #1 indoor air and sub-slab vapor sample from 227 Highland Plaza to the NYSDOH Soil Vapor/Indoor Air Matrix 1

Guidance Table shows the tenant space at 227 Highland Plaza (formerly Franklin Telecom) falls into Category 3: *Take reasonable and practical actions to identify source(s) and reduce exposure*. Comparison of the results for trichloroethene in the IA #2 and SS #2 samples from 231 Highland Plaza (National Hearing Aid) falls into Category 10 on Matrix 1: *Monitor/Mitigate*.

## **RESULTS OF 2017 SOIL VAPOR INTRUSION INVESTIGATION**

The air and vapor quality analytical package from Centek Laboratories is attached as Appendix M. The analytical results are tabulated as Table 11C. Sampling locations are shown on Figure 5. Thirty VOCs were detected in the vapor and air samples collected as part of this investigation. These compounds consisted primarily of petroleum compounds, solvents and refrigerants (Table 11C). Eleven compounds were detected at concentrations at or above 10 micrograms per cubic meter (ug/m<sup>3</sup>):

- Acetone was detected in all four indoor air samples, the MS/MSD, both sub-slab samples, and the outdoor air sample above 10 ug/m<sup>3</sup> with the highest concentrations in the indoor air sample at 221 Highland Parkway occupies by Louis Salon (36,000.0 ug/m<sup>3</sup>) and the sub-slab sample at Louis Salon (430.0 ug/m<sup>3</sup>);
- Ethyl Acetate was detected in the indoor air sample at 221 Highland Parkway (Louis Salon) at a concentration of 99.0 ug/m<sup>3</sup>;
- Heptane was detected in the Sub-slab sample at 221 Highland Parkway (Louis Salon) at a concentration of 28.0 ug/m<sup>3</sup>; and at a concentration of 18.0 at 217 Highland Parkway
- Hexane was detected in the Sub-slab sample at 221 Highland Parkway (Louis Salon) at a concentration of 12.0 ug/m<sup>3</sup>;
- Isopropyl Alcohol was detected in the indoor air sample at 221 Highland Parkway (Louis Salon) at a concentration of 2900.0 ug/m<sup>3</sup>, and in the sub-slab sample at a concentration of 19.0 ug/m<sup>3</sup>;
- m&p Xylene was detected in both sub-slab sample at 217 Highland Parkway (former Fitness House) at a concentration of 12.0 ug/m<sup>3</sup>; and the sub-slab sample at 221 Highland Parkway (Louis Salon) at a concentration of 15.0 ug/m<sup>3</sup>;
- Methyl Ethyl Ketone was detected in the Indoor Air at 221 Highland Parkway (Louis Salon) at a concentration of 64.0 ug/m<sup>3</sup>; and in both sub-slab samples at a concentration of 340.0 ug/m<sup>3</sup> (Louis Salon) and a concentration of 270.0 at 217 Highland Parkway (former Fitness House);
- Methylene chloride was detected in the Sub-slab at 221 Highland Parkway (Louis Salon) at a concentration of 18.0 ug/m<sup>3</sup>;
- Tetrachloroethylene (tetrachloroethene) was detected at a concentration of 13.0

ug/m3 in the sub-slab sample at 217 Highland Parkway (former Fitness House);

- Tetrahydrofuran was detected in the sub-slab sample 221 Highland Parkway (Louis Salon) at a concentration of 16.0 ug/m3; and
- Toluene was detected in both sub-slab samples at a concentration of 46.0 ug/m3 at 217 Highland Parkway (former Fitness House), and at a concentration of 70.0 ug/m3 at 221 Highland Parkway (Louis Salon).

### **Comparison of Soil Vapor Intrusion Investigation to NYSDOH Guidance**

Methylene chloride was detected in all five air samples at concentrations ranging from a low concentration of 0.73 ug/m3 in the Indoor Air #1 sample, to a high concentration of 1.7 ug/m3 in Indoor Air Sample 221 from Louis Salon all well below the NYSDOH guidance value of 60 ug/m3.

Tetrachloroethene was detected in all four indoor air samples and the outdoor air sample at a concentration of less than 1.0 ug/m3 well below the NYSDOH Guidance Value of 30.0 ug/m3.

Trichloroethene was detected in all four indoor air samples and the outdoor air sample at a concentration of less than 0.21 ug/m3 well below the NYSDOH Guidance Value of 2.0 ug/m3.

Comparison of results for tetrachloroethene in the indoor air and sub-slab vapor samples for all tenant spaces to the NYSDOH Indoor/Indoor Air Matrix Table 2 Guidance shows the four tenant spaces fall into Category 1: *No further action*.

Comparison of results for trichloroethene in the indoor air and sub-slab vapor sample for these four tenant spaces to the NYSDOH Indoor/Indoor Air Matrix Table 2 Guidance shows the four tenant spaces fall into Category 1: *No further action*.

### **RESULTS OF THE SUB-SLAB DEPRESSURIZATION SYSTEM EFFECTIVENESS TESTING**

#### **Results of Confirmation Indoor Air Sampling at the Former Dry Cleaner Tenant Space**

The air and vapor quality analytical package from Centek Laboratories is attached as Appendix M. Seventeen VOCs were detected in the confirmation indoor air sample collected on February 16, 2017. These compounds consisted primarily of petroleum compounds, solvents and refrigerants (Table 11C). Only two compounds were detected at concentrations at or above 10 micrograms per cubic meter (ug/m3):

- Acetone was detected at a concentration of 30ug/m3; and
- Isopropyl Alcohol was detected at a concentration of 83.0 ug/m3.

The sampling location is shown on Figure 5.

## **Comparison of Confirmation Indoor Air Sampling at the Former Dry Cleaner to NYSDOH Guidance**

There were no VOCs detected at concentrations above applicable NYSDOH guidance values in the indoor air sample collected to confirm the effectiveness of the SSDS to capture vapors emanating from soils under the building (Table 11C).

## **Results of Pressure Testing of the Sub-slab Depressurization System at the Former Dry Cleaner Tenant Space**

Differential pressure testing of the SSDS was completed during April of 2017. The locations of the test points are shown on Figure 5. The results of pressure testing from six locations of the former dry cleaner tenant space show the presence of negative pressures under the concrete floor slab ranging from -0.004 inches of water at test point TP-2 in the southwest corner of the former dry cleaner tenant space (now Buffalo Ergonomics) to -0.018 inches of water at test point TP-6 in the southeast corner of the former dry cleaner in unoccupied space (Table 12). These results confirm that the SSDS is maintaining negative pressure under the concrete slab where the former dry cleaner was located.

## **DATA USABILITY**

Vali-Data, a qualified data validation company reviewed the soil, groundwater and air analytical results to determine data usability and determined that all data was considered usable (Appendices J,K and L).

## **REMEDIAL INVESTIGATION CONCLUSIONS**

### **Soil**

Impacts to Site soil are present on site and off site from VOCs likely related to the former dry cleaner that was located in the strip plaza at 235 through 237 Highland Parkway. The soil contamination on site is confined to the easternmost end of the Site. Soil contamination was found under the floor at 237 Highland Parkway (former dry cleaner) during completion of the Preliminary Phase II Investigation in 2014, and in the northeast corner of the Site at soil boring SB – 19 during completion of the RI. Impacts to soil from VOCs are mostly present off site in the service alley way directly south of the Site. There were no impacts to soil observed at the adjacent property to the east (Tonawanda Federal Credit Union).

### **Groundwater**

Impacts to groundwater quality were observed on the eastern end of the Site in groundwater monitoring well MW-3 and in the two off site groundwater monitoring wells located along the eastern end of the service alleyway directly behind the former dry cleaner that was located at 235 through 237 Highland Parkway. The most significant impact to groundwater is VOCs in groundwater monitoring wells MW – 4 and MW – 5 located along the eastern end of the service alley way.

## **Soil Vapor & Air**

Petroleum compounds, solvents and refrigerants were detected in the sub-slab and indoor air samples collected in 2016 from the two tenant spaces immediately west of the former dry cleaner. Most of these compounds were present at very low concentrations. However, Tetrachloroethene and Trichloroethene were detected at elevated concentrations in the Sub-slab #2 sample (231 Highland Parkway), which is the tenant space located closest to the former dry cleaner. The concentration of Trichloroethene in the Sub-slab #2 sample was above the NYSDOH immediate action level of 20 ug/m<sup>3</sup>. The occurrence of these compounds is most likely associated with the former dry cleaning operation.

Petroleum compounds, solvents and refrigerants were detected at varying concentrations in the sub-slab and indoor air samples collected in 2017 from the four tenant spaces further west of the dry cleaner in Buildings 2 and 3. VOC concentrations were well below their respective NYSDOH Guidance Values in these tenant spaces.

The results of confirmation indoor air sampling in the area of the former dry cleaner show that VOCs historically associated with dry cleaning operations were not present in the tenant space at 235 Highland Parkway. In addition, the pressure testing that was completed in the area of the former dry cleaner confirmed that the SSDS is creating a pressure differential under the concrete and is therefore preventing migration of soil vapors into the tenant space.

## **RECOMMENDATIONS**

### **Soil**

No additional work is recommended regarding the collection, analysis or removal of soil at the site.

### **Groundwater**

No additional work is recommended regarding the collection, analysis or removal of groundwater at the site.

### **Soil Vapor and Air**

Installation of a second SSDS is recommended at the tenant space occupied by National Hearing Aid Services at 231 Highland Parkway (Sampling Area #2).

## **DEVIATIONS FROM APPROVED WORK PLANS**

### **Remedial Investigation**

The RI approved work plan called for the collection and analysis of two at depth soil samples for a full suite of analytical parameters. Only one at depth soil sample was analyzed for a

full suite of analytical parameters since there were no visual or olfactory indications of soil contamination in the deep subsurface soil samples other than VOCs.

The approved RI work plan called for the collection of soil samples ASWW-6 through AWSS-11 from 0 to 2 inches depth. The sampling interval was actually 0 to 4 inches depth due to the presence of sod or crushed stone from 0 to 2 inches at these locations.

The approved RI work plan called for the collection of soil samples AWSS-6 through AWSS-11 on site within the narrow strip of soil behind the strip plaza. These samples were collected immediately adjacent to the site due to the presence of significant brush and debris located on the narrow strip of on-site soil behind the strip plaza building.

The RI scope of work called for the analysis of a full suite TCL/TAL analytical parameters from the groundwater samples collected from the five groundwater monitoring wells installed as part of the RI. Only VOC analysis was completed due to the lack of groundwater recharge; this deviation from the scope of work was approved in the field during the time of sample collection by NYSDEC personnel.

#### **Soil Vapor Intrusion Investigation 2016**

There were no deviations from the approved 2016 soil vapor intrusion investigation work plan.

#### **Soil Vapor Intrusion Investigation 2017**

There were no deviations from the approved 2017 soil vapor intrusion investigation work plan.

#### **Interim Remedial Measure**

There were two deviations from the approved IRM Work Plan:

- The concrete floor was removed from approximately  $\frac{3}{4}$  of the former dry cleaner tenant space where the combination concrete/wooden floor was located, and was replaced with crushed stone, a plastic covering and new concrete; and
- The fans for the extraction systems were placed directly on the roof vertically above the respective vapor collection points.

Both changes in work scope were discussed with NYSDEC prior to implementation and were approved.





**Legend**

- Roadway
- Streets
- JURISDICTION
- Ashtut
- Buffalo
- City of Tonawanda
- Eric County
- Eric County-Buffal
- Kenmore
- NYSTA
- New York
- Park
- Plains
- Tonawanda
- Tonawanda - Buffalo
- Unimproved
- World Boundary
- World Imagery
- Low Resolution 30m Imagery
- High Resolution 60m Imagery
- High Resolution 30m Imagery

**215 Highland Parkway  
Town of Tonawanda, NY**

0 10 20 40 Feet

Prepared by Technical Support Dept.  
January 2015



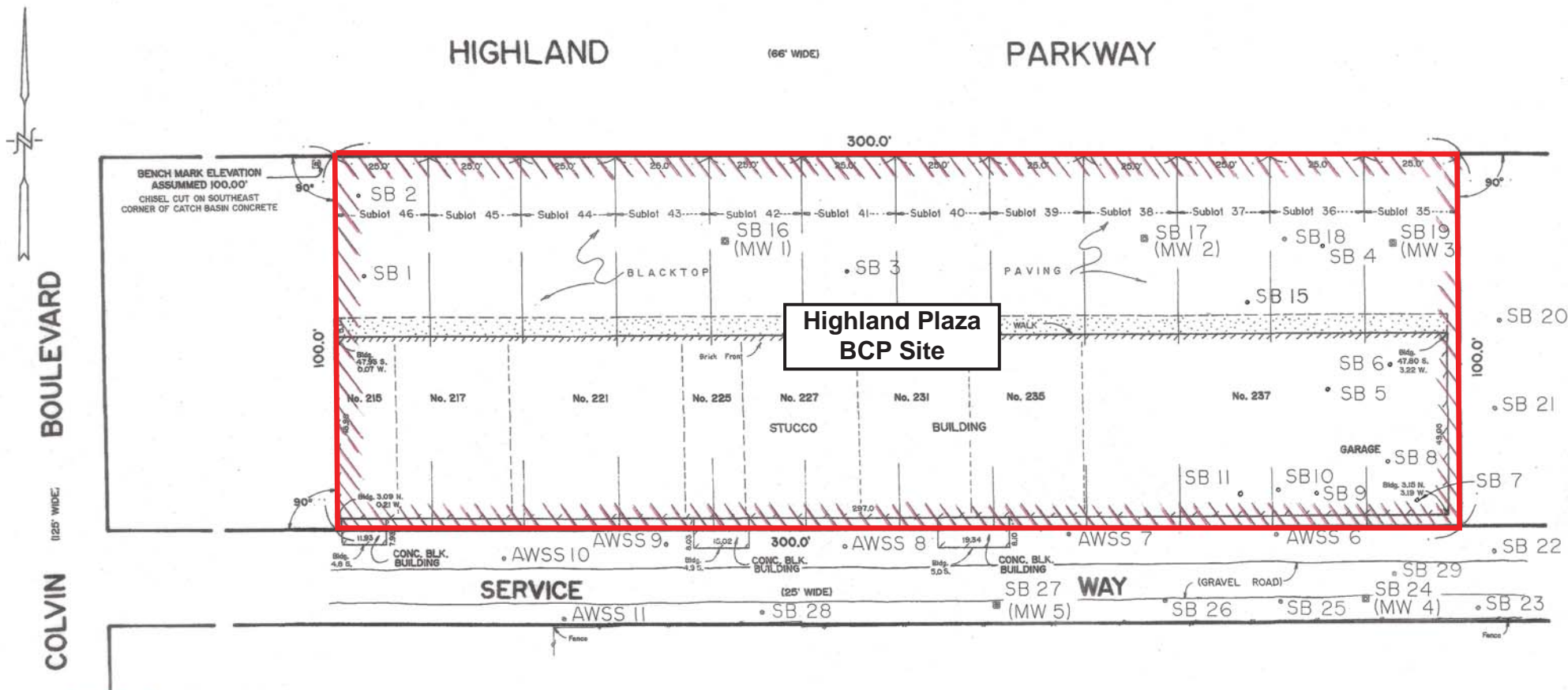
**FIGURE 1: SITE LOCATION MAP  
REMEDIAL INVESTIGATION  
HIGHLAND PLAZA IN TONAWANDA, NEW YORK**

Prepared by Technical Support Dept.  
January 2015



REPRODUCTION

HIGHLAND PARKWAY (66' WIDE)



Highland Plaza  
BCP Site

NOTE:  
DELINEATES BROWNFIELD AREA BOUNDARY

NOTE:  
Tenant spaces/Addresses are as shown on EGMS Drawing  
FIGURE 4: RI VAPOR INTRUSIONSAMPLE LOCATIONS  
SOIL VAPOR INTRUSION INVESTIGATION  
HIGHLAND PLAZA IN TONAWANDA, N.Y.  
Dated May 2016

NOTE:  
SOIL BORING SB 1 WAS NOT SAMPLED

NOTE:  
THE ADDITIONAL SOIL BORING LOCATIONS AND  
REVISED SOIL BORING LOCATIONS ARE SHOWN  
ACCORDING TO DIMENSIONS PROVIDED TO OUR  
FIRM IN A LETTER FROM ENVIRONMENTAL &  
GEOLOGICAL MANAGEMENT SERVICES, LLC  
Dated May 15, 2017

NOTE:  
SONNENBERGER LAND SURVEYING ACCEPTS NO  
RESPONSIBILITY FOR THE ACCURACY OF  
ADDITIONAL AND REVISED SOIL BORING LOCATIONS.

Point Description	Distance East of Northwest Property Corner	Distance South of Northwest Property Corner	Elevation (PVC Pipe)
SB 16 (MW 1)	104.45	22.36	100.51
SB 17 (MW 2)	216.22	22.43	100.18
SB 19 (MW 3)	282.43	24.29	100.08
SB 24 (MW 4)	274.59	119.19	101.45
SB 27 (MW 5)	176.13	120.15	102.06
SB 18	253.63	22.88	
SB 20	310.68	44.85	
SB 21	309.38	68.53	
SB 22	309.20	106.52	
SB 23	304.75	121.78	
SB 25	251.83	119.34	
SB 26	221.32	118.93	
SB 28	113.74	121.41	
SB 29	282.23	112.08	
AWSS 6	251.01	101.56	
AWSS 7	195.55	101.02	
AWSS 8	136.09	104.20	
AWSS 9	88.35	102.98	
AWSS 10	45.14	106.68	
AWSS 11	61.17	122.98	

Point Description	Distance East of Northwest Property Corner	Distance South of Northwest Property Corner
SB 1	8'	32.5'
SB 2	6.5'	10'
SB 3	136'	31'
SB 15	242'	39.5'
SB 4	262'	24'

SOIL BORING LOCATIONS ARE APPROXIMATE

Point Description	Distance West of Northeast Building Corner	Distance South of Northeast Building Corner
SB 5	32'	15'
SB 6	15'	8'
SB 7	8'	44'
SB 8	16'	34'
SB 9	35'	43'
SB 10	45'	42'
SB 11	55'	43'

SOIL BORING LOCATIONS ARE ESTIMATED

FIGURE 2 : SITE BASE MAP  
HIGHLAND PLAZA  
TONAWANDA, NEW YORK

SUBLOTS 35 to 46 INCLUSIVE  
MAP COVER I400  
PART OF LOT 33, TOWNSHIP 12, RANGE 8  
TOWN OF TONAWANDA  
ERIE COUNTY, NEW YORK



SONNENBERGER LAND SURVEYING  
60 NIAGARA STREET  
BUFFALO, NEW YORK 14202  
(716) 854-0159  
SonnenbergerLandSurveying.com

SCALE: 1" = 20' DATE: NOV. 10, 2015

SHEET: 69621 No. 15-221 ATS-1  
REVISED 9/20/16 REVISED 9/18/17



This map void unless EMBOSSED with  
New York State Licensed Land  
Surveyor's Seal No. 049989

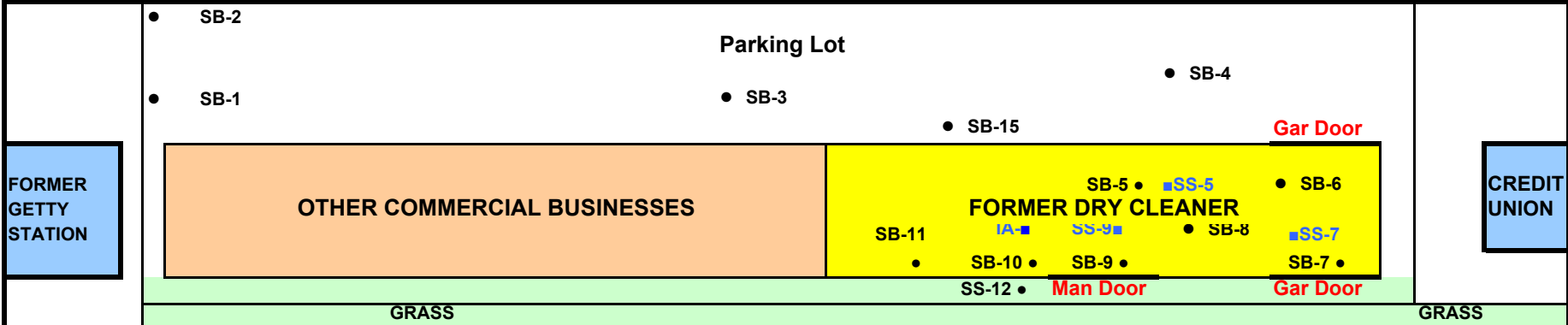
Altering any item on this map is in violation of  
the law, excepting as provided in Section 7205,  
Part 2 of the New York State Education Law.

This Survey was prepared without the benefit of a current  
full abstract of title and is subject to any state of facts  
that may be revealed by an examination of same

COPYRIGHT 2015 SONNENBERGER LAND SURVEYING

# COMMERCIAL PROPERTIES

Highland Parkway



ALLEY WAY (Pavement)

Background Air Samples 1 & 2

Sign pole



FENCE

Fence

AWSS-2

AWSS-1

AWSS-3

Fence

# RESIDENTIAL PROPERTIES (BACK YARDS)

- Soil Sampling Location
- IA - Indoor Air Sampling Location
- SS - Subslab Sampling Location
- Background Air Samples 1 & 2

FIGURE 3 SAMPLING LOCATION MAP  
 PRELIMINARY PAHSE II INVESTIGATION (2014)  
 HIGHLAND PLAZA IN TONAWANDA, NY

May, 2016

Not to Scale

HIGHLAND

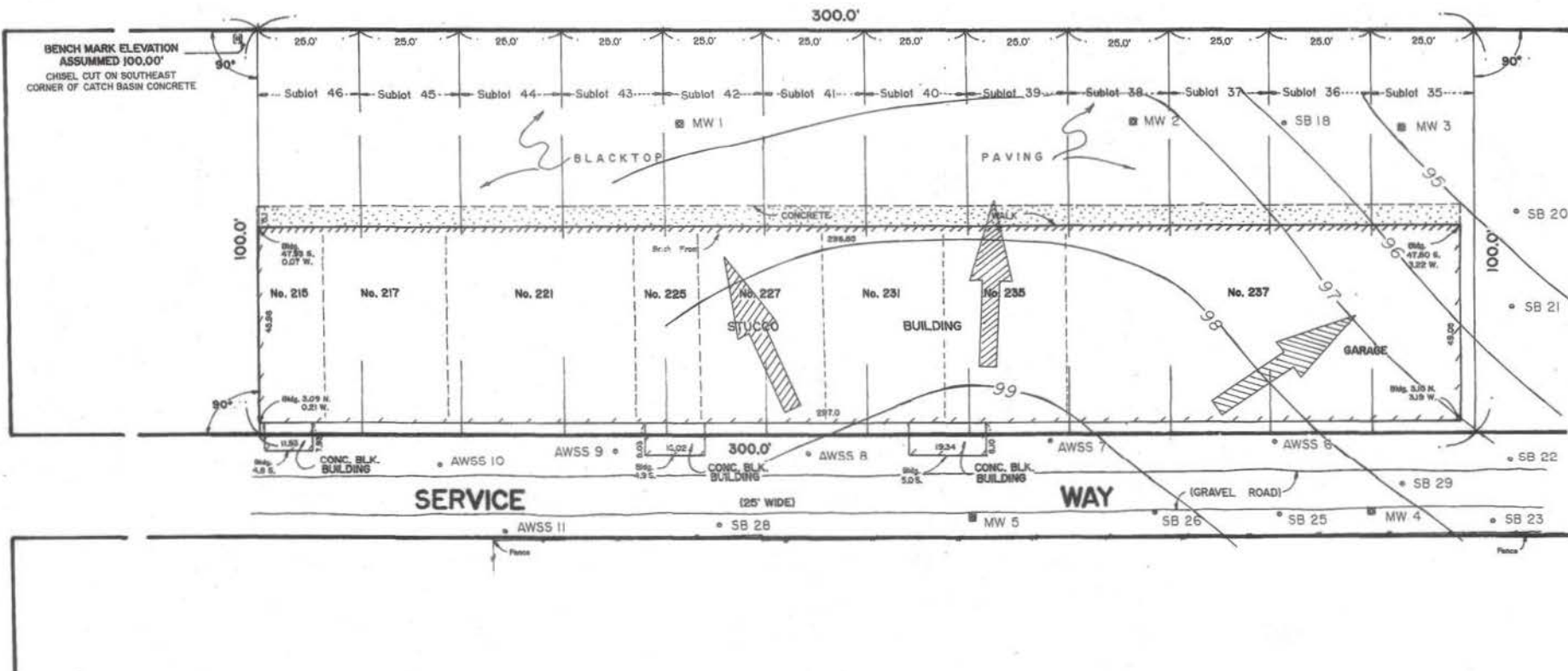
(66' WIDE)

PARKWAY

BOULEVARD

(125' WIDE)

COLVIN



NOTE:

The groundwater contour lines were provided to Sonnenberger Land Surveying by Environmental & Geological Management Services, LLC based on measurements shown on:

TABLE 3: REMEDIAL INVESTIGATION GROUNDWATER ELEVATIONS HIGHLAND PLAZA IN TONAWANDA, N.Y.

Dated December 4, 2015

Sonnenberger Land Surveying accepts no responsibility for the accuracy or completeness of the contour lines shown.



This map void unless EMBOSSED with New York State Licensed Land Surveyor's Seal No. 049989

Altering any item on this map is in violation of the law, excepting as provided in Section 7206, Part 2 of the New York State Education Law.

This survey was prepared without the benefit of a current full abstract of title and is subject to any state of facts that may be revealed by an examination of same.

COPYRIGHT 2015 SONNENBERGER LAND SURVEYING

Point Description	Distance East of Northwest Property Corner	Distance South of Northwest Property Corner	Elevation (PVC Pipe)	Groundwater Elevation as supplied by Environmental & Geological Management Services, LLC Table 3 Dated 12/4/15
MW 1	104.45	22.36	100.51	96.71
MW 2	216.22	22.43	100.18	97.38
MW 3	282.43	24.29	100.08	94.68
MW 4	274.59	119.19	101.45	98.35
MW 5	176.13	120.15	102.06	99.26
SB 18	253.63	22.88		
SB 20	310.68	44.85		
SB 21	309.58	68.53		
SB 22	309.20	106.52		
SB 23	304.75	121.78		
SB 25	251.83	119.34		
SB 26	221.32	118.93		
SB 28	113.74	121.41		
SB 29	282.23	112.08		
AWSS 6	251.01	101.56		
AWSS 7	195.55	101.02		
AWSS 8	136.09	104.20		
AWSS 9	88.35	102.98		
AWSS 10	45.14	106.68		
AWSS 11	61.17	122.98		

FIGURE 4 : WATER TABLE MAP HIGHLAND PLAZA TONAWANDA, NEW YORK

SUBLOTS 35 to 46 INCLUSIVE MAP COVER 1400 PART OF LOT 33, TOWNSHIP 12, RANGE 8 TOWN OF TONAWANDA ERIE COUNTY, NEW YORK



SONNENBERGER LAND SURVEYING  
60 NIAGARA STREET  
BUFFALO, NEW YORK 14202  
(716) 854-0159  
SonnenbergerLandSurveying.com

SCALE: 1" = 20' DATE: NOV. 10, 2015

SHEET: 69621 No. 15-221 GW-1  
REVISED 9/20/16 REVISED 5/18/17

C O L V I N

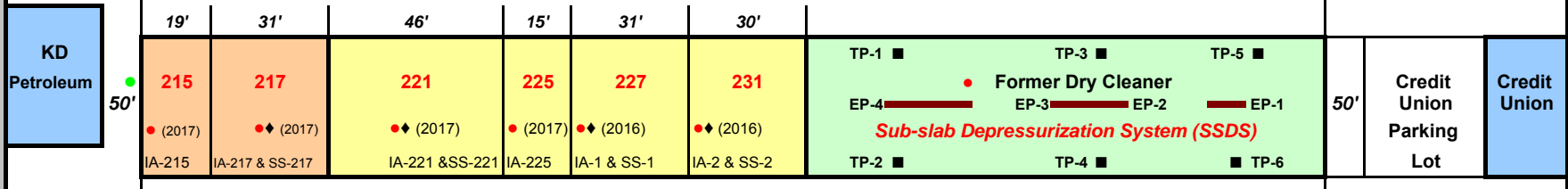


PARKING LOT

HIGHLAND PARKWAY

PARKING LOT  
**HIGHLAND PLAZA**

128'



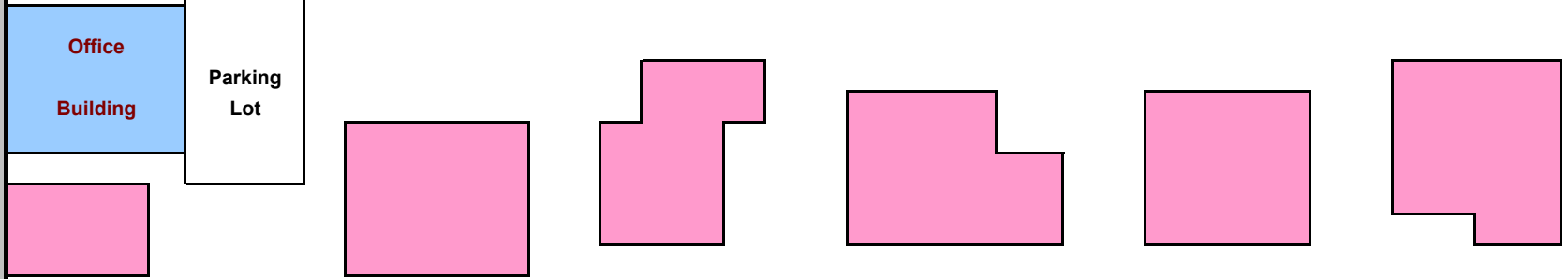
ALLEY WAY

Fence

Fence

Fence

B O U L E V A R D



- Building 1
- Building 2
- Building 3
- Residence
- Commercial Building
- Outdoor Air Sample Location (Estimated)
- Indoor Air Sampling Locations
- Sub-slab Sampling Locations
- Background Air Sampling Location
- Pressure Test Point
- SSDS with separate blowers

215, 217.....231 Tenant Space Address

Figure 5. Air and Vapor Sampling Points  
2016 & 2017 SVI Investigations  
Highland Plaza  
Tonawanda, New York  
Not to Scale