

PARTNER



SAMPLING AND ANALYSIS/ WORK PLAN

500 WEST 5TH STREET (GMAC TOWERS)
601 WEST 4TH STREET (PARKING GARAGE/SURFACE PARKING)
Winston-Salem, North Carolina 27101

May 16, 2016
Partner Project Number 114-131345.5

Prepared For:

**NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL
QUALITY**
Brownfields Program



On Behalf of:
GRUBB PROPERTIES, INC.
c/o Mr. William Toole
Robinson Bradshaw and Hinson
101 North Tryon Street, Suite 1900
Charlotte, North Carolina 28202

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	Purpose.....	1
1.2	Project Contact Information.....	1
2.0	PROJECT BACKGROUND	1
2.1	Site Description.....	1
2.2	Project History.....	1
2.3	Schedule	3
3.0	FIELD SAMPLING PLAN.....	3
4.0	SAMPLE HANDLING AND CUSTODY REQUIREMENTS.....	7
4.1	Chain-of-Custody	7
5.0	DATA VALIDATION.....	8
6.0	REPORTING.....	9

Figures:	1	Site Vicinity Map
	2	Proposed Soil Boring/Monitoring Well Locations

1.0 INTRODUCTION

Partner Engineering North Carolina, PLLC (Partner) was retained by Grubb Properties, Inc., to prepare this Sampling and Analysis Plan Work Plan for the properties located at 500 West 5th Street and 601 West 4th Street in Winston-Salem, North Carolina (subject property) for submittal to the North Carolina Department of Environmental Quality (NCDEQ) Brownfields Program.

1.1 Purpose

The North Carolina Department of Environmental Quality (NCDEQ) Brownfields Program has requested additional investigation of the subject property in order to evaluate several areas of concern (AOCs). This scope of work has been designed to satisfy that request.

1.2 Project Contact Information

Please see Table 1 below for a summary of pertinent contact information for this project.

Table 1: Contact Information

Subject Property	Client	Consultant
500 West 5 th Street 601 West 4 th Street Winston-Salem, North Carolina	Grubb Properties, Inc. c/o Mr. William Toole Robinson Bradshaw and Hinson Charlotte, North Carolina Telephone: (704) 377-8360	Partner Engineering North Carolina, PLLC 8000 Corporate Center Drive, Suite 104 Charlotte, North Carolina Contact: Michael Chang Telephone: (704) 994-8423

2.0 PROJECT BACKGROUND

2.1 Site Description

The subject property is located on the east and west sides of Poplar Street Northwest, between West 5th street (to the north) and 4th Street Northwest (to the south) in a mixed commercial/retail/residential area of downtown Winston-Salem, North Carolina. The parcels on the east side of Poplar Street Northwest (500 West 5th Street) are currently developed with a vacant office building, the south tower of which was constructed in 1951 and the north tower of which was constructed in 1980. The parcels on the west side of Poplar Street Northwest are currently developed with a surface parking lot and the Fourth Street Parking Deck (601 4th Street Northwest), which was constructed in 1992.

2.2 Project History

Partner completed a Phase I Environmental Site Assessment Report (Phase I) for the 500 West 5th Street portion of the subject property, dated January 8, 2015, on behalf of Grubb Properties, Inc. As documented in the Phase I, the subject property was developed with residential dwellings as early as 1885; developed with residences and a church between 1885 and at least 1917; developed with residential and commercial structures from as early as 1917 to at least 1969, and developed with the current three structures in 1950, 1980, and 1999 for the South Tower, North Tower, and Emergency Generator Building, respectively. Tenants on the subject property have included a filling station (at least 1950 to at least 1957), Integon Insurance (at least 1987 to at least 2008) and GMAC Insurance (at least 2008 to 2013).

According to the Phase I, the subject property is equipped with one 2,000-gallon diesel fuel UST on its east side between the north and south tower. The 2,000-gallon UST was installed in 2005 and is constructed of steel-clad fiberglass reinforced plastic (FRP). The diesel UST provides fuel for the North Tower emergency generator. Based on the age of the tank and limited additional information regarding construction and potential leakage, the Phase I identified the diesel fuel UST as a recognized environmental condition (REC).

Historical Sanborn Fire Insurance Maps dated 1950 and 1957 depicted a filling station with four tanks located on the southwest corner of the subject property. There was no regulatory record of the filling station or any related environmental investigation. Further, information regarding a monitoring well located on the southwest portion of the subject property (in the area of the former fill station), associated with the adjoining western property groundwater investigation (Leaking Underground Storage Tank (LUST) Incident #8943), indicated naphthalene and bis(2-ethylhexyl)phthalate were detected in groundwater at the subject property. The historical use of the subject property as a gasoline filling station, and the potentially associated groundwater impacts previously identified on site were considered RECs that warranted further investigation.

The Phase I also identified a 2,000-gallon waste oil UST, designed to contain transformer oil in the event of a rupture of on-site transformers, that has been located on the east side of the subject property since approximately 1980. Since this tank is used solely for emergency purposes and is otherwise empty, the waste oil UST was considered a *de minimis* environmental concern. A 12,000-gallon diesel UST, which fuels the emergency generator for the South Tower, was observed in the south parking lot. This UST was the subject of recent inspections, which did not reveal any leaks, and therefore was not considered a REC.

Aside from the three current USTs, two former USTs were also identified. A former 10,000-gallon diesel UST has been closed in-place on the west side of the subject property, and a former 2,000-gallon diesel UST was removed when the current 2,000-gallon diesel UST replaced it on the east side of the subject property. Both of these USTs were the subjects of previous investigations that revealed soil impacts. The resultant UST Section incidents were closed with a Notice of Residual Petroleum, and were considered a controlled recognized environmental condition (CREC).

Partner conducted a Phase II Subsurface Investigation at the subject property in February, 2015 to investigate the potential impact of petroleum hydrocarbons as a consequence of a release or releases from the 2,000-gallon diesel UST and the former filling station. The scope of the Phase II Subsurface Investigation included UST tightness testing, a geophysical survey, and the advancement of four soil borings. Four soil samples were analyzed for TPH-GRO.

The 2,000-gallon diesel UST and associated subsurface product and return lines passed tightness testing, indicating that they had not leaked.

The geophysical survey did not identify the presence of USTs and/or excavations and/or anomalies in the former filling station area.

Field screening of soil borings did not indicate the presence of a petroleum or VOC release; further, THP-GRO was not detected in any of the soil borings.

Based on the results of the Subsurface Investigation, there was no evidence of a release from the 2,000-gallon diesel UST or from the former filling station, and Partner recommended no further investigation with respect to those features.

2.3 Schedule

Partner anticipates initiating field activities within two weeks of NCDEQ approval of the Sampling and Analysis Work Plan. Field activities are expected to take three to four days. The Phase II Subsurface Investigation Report documenting the field activities and findings will be submitted to the NCDEQ within thirty days after completion of the activities documented herein. Based on the anticipated time for NCDEQ review and approval of the Sampling and Analysis Work Plan, field activities are anticipated to be initiated in the first half of June 2016.

3.0 FIELD SAMPLING PLAN

The North Carolina Department of Environmental Quality (NCDEQ) Brownfields Section has requested additional investigation of the subject property, the 4th Street Parking Ramp adjacent to the west across Poplar Street Northwest, and the surface parking lot adjacent to the west across Poplar Street Northwest prior to redevelopment. Based on conversations with Sharon Eckard of Brownfields Section, this scope of work has been designed to satisfy that request.

The investigation scope will include a completion of a Brownfields Program Receptor Survey, completion of a Site-Specific Environmental Management Plan for the subject property, geophysical survey, the advancement of eight soil borings to facilitate the collection and analysis of soil gas samples, the advancement of 10 soil borings to facilitate the collection and analysis of soil samples, and the installation of nine temporary sub-slab vapor points to facilitate the collection of sub-slab soil gas samples. Sampling will address four areas of concern (AOCs): the north and south tower basements, the parking garage retail spaces, the north surface lot and the south surface lot.

Samples will be collected in each AOC as indicated in the following schedule:

Area of Concern	Number of Borings	Terminal Depth (ft bgs)	Matrix	Sample Depths (ft bgs)
North and South Tower Basements	4 – Vapor Points	Beneath slab	Sub-Slab Soil Gas	Beneath slab
4 th Street Parking Ramp Retail Space	5 – Vapor Points	Beneath slab	Sub-Slab Soil Gas	Beneath slab
North Surface Lot	4 – Soil	10 - Soil	Soil	1, 5, 10
	4 – Soil Gas	10 – Soil Gas	Soil Gas	1
South Surface Lot	6 – Soil	10 - Soil	Soil	1, 5, 10
	4 – Soil Gas	10 – Soil Gas	Soil Gas	1

Samples will be analyzed according to the following schedule:

Area of Concern	Samples for Analysis	Matrix	Constituent of Concern	Method of Analyses
North and South Tower Basements	4	Sub-Slab Soil Gas	VOCs	TO-15
4 th Street Parking Ramp Retail Space	1	Sub-Slab Soil Gas	VOCs	TO-15
North Surface Lot	12	Soil	VOCs	8260
			SVOCs	8270
			RCRA 8 Metals	6010/7471
	4	Soil Gas	VOCs	TO-15
South Surface Lot	18	Soil	VOCs	8260
			SVOCs	8270
			RCRA 8 Metals	6010/7471
	4	Soil Gas	VOCs	TO-15

3.1 Health and Safety Plan (HASP)

Partner will prepare a project-specific Health & Safety Plan (HASP). The purpose of the HASP is to minimize the likelihood of exposure of employees to hazardous concentrations of chemicals during field activities, minimize impacts to the environment, and provide guidelines for subcontractors. All field personnel will be required to complete the 40-hour Occupational Safety and Health Administration (OSHA) Hazardous Waste and Emergency Response (HAZWOPER) training prior to fieldwork. All personnel will maintain all safety standards as required for OSHA Level D (i.e., PPE to include hard hat, gloves, steel toe boots, and safety glasses) for the performance of the soil sampling fieldwork. Under circumstances where potential airborne exposure is possible, respiratory protective equipment may be required based on personal air monitoring results. Upgrades to Level C will be coordinated with the Site Safety and Health Officer (SSHO).

3.2 Utility Mark Out

Proposed soil boring locations will be marked, labeled, and flagged prior to drilling. Partner will contact the local and state utility clearance companies (NC811) at least 72 hours prior to initiating the drilling activities. Additionally, Partner will subcontract a private utility locating contractor to survey planned boring locations as an additional measure to protect subsurface features during drilling.

3.3 Sampling Activities

To evaluate soil likely to be disturbed during construction activities, Partner will contract with a North Carolina licensed drilling contractor to advance up to 18 borings to terminal depth of 10 feet bgs within the north and south surface lots. The proposed soil boring locations are indicated on the Proposed Sample Location Map included as Figure 1. These locations are approximate and final locations will be chosen in the field based on site conditions, utilities, etc.

3.3.1 Sample Designation

Soil samples will be designated as BX-XX. The first part of the designation (B) identifies the sample as a soil sample. The second part of the designation identifies the boring number. The third part of the designation identifies the depth bgs from which the sample was collected.

Soil gas samples will be designated SGX-XX. The first part of the designation (SG) identifies the sample as a soil gas sample. The second part of the designation identifies the boring number. The third part of the designation identifies the depth bgs from which the sample was collected.

Sub-slab soil gas samples will be designated SSX. The first part of the designation (SS) identifies the sample as a Sub-slab sample. The second part of the designation identifies the sample number.

3.3.2 Soil Sampling Equipment/Methodology

The soil samples will be installed using a direct-push drill rig to a terminal depth approximately ten feet bgs. Soil samples will be collected continuously to the terminal depth using a four-foot long by 2.25-inch diameter MacroCore sampler with a four-foot long polyvinyl chloride (PVC) liner, which will be advanced by the direct-push drill rig using four-foot long by 1.5-inch diameter drill rods. The sampler will be driven into the subsurface to allow undisturbed soil to enter the open MacroCore barrel and retrieved in four-foot intervals to recover the soil-filled liners.

A lengthwise section of each PVC liner will be removed with a splitting tool to expose the soil, which will be screened in the field for volatile organic vapor concentrations with a photoionization detector (PID) calibrated to isobutylene. In addition, soil samples will be logged in accordance with the Unified Soil Classification System (USCS). The field data will be used for the completion of soil boring logs. A sample will be collected from each boring at depths of one, five, and 10 feet bgs, although sampling depths may be modified based on PID readings or field observations.

Soil depths selected for laboratory analysis will be sampled directly from the liners using a disposable plastic syringe and retained in volatile organics analysis (VOA) vials in accordance with United States Environmental Protection Agency (EPA) Method 5035 sampling protocol, and in additional sample jars provided by the laboratory. The jars and VOA vials will be labeled for identification and stored in an iced cooler. The soil samples will be submitted under proper chain-of-custody protocol to a North Carolina licensed/accredited laboratory for analysis of VOCs by EPA Method 8260, SVOCs by EPA Method 8270, and RCRA 8 Metals by EPA Method 6010/7471.

Sampling equipment will be decontaminated prior to and between preparation of each soil boring. The equipment will be washed with a phosphate-free laboratory-grade detergent such as Alconox®, followed by a tap-water rinse after each sample is collected. Sampling equipment will be used immediately following decontamination procedures.

Following soil sampling activities, each of the borings will be backfilled in accordance with state regulations and finished with a concrete plug or asphalt patch, as necessary. It is not expected that significant amounts of derived waste are expected to be produced during this investigation.

3.3.3 Soil Gas Sampling Equipment/Methodology

Soil gas probes will be constructed at a depth of 10 feet bgs within selected boreholes upon completion of soil sampling. A dedicated stainless steel soil gas sampling tip will be installed at the base of the boreholes, and a new section of ¼-inch diameter teflon tubing will be inserted into the sampling tip. Sand will be poured into the boring annulus to form an approximately one-foot long sand pack around the sampling tip. Approximately one foot of dry, granular bentonite will be placed atop the sand pack and the remainder of the borehole will be backfilled with hydrated bentonite to the ground surface to form a seal. The sampling end of the tubing will be fitted with a stainless steel swagelock fitting.

Soil gas samples will be collected using 1.4-liter, stainless-steel, cylindrical SUMMA canisters subjected by the laboratory to a rigorous cleaning process using a combination of dilution, heat, and high vacuum. After cleaning, the canisters will be batch certified to be free of target contaminants to a specified reporting limit via gas chromatography/mass spectroscopy prior to delivery.

The unused SUMMA canisters will be evacuated to approximately 30 inches of mercury and fitted with stainless-steel flow controllers, calibrated to maintain constant flow (approximately 0.1 liter per minute) for approximately five to 10 minutes of sampling time.

Prior to sampling, the sample tubing will be purged of ambient air using a vacuum pump. Once the purge is complete, the swagelock on the tubing will be fitted to the sampling canister and the port valve opened, causing air to enter the sample container due to the pressure differential. Partner will close the valves after the canister is evacuated to approximately one to two inches of mercury, with pertinent data (e.g., time, canister vacuum) recorded at the start and end of sampling.

The soil gas samples will be submitted under proper chain-of-custody protocol to a North Carolina licensed/accredited laboratory for analysis of VOCs by EPA Method TO-15.

3.3.4 Sub-Slab Soil Gas Sampling Equipment/Methodology

Partner will install temporary Sub-slab soil vapor sampling points consisting of pre-fabricated stainless steel Vapor Pins equipped with a silicone sleeve, which will be manually inserted into a 5/8-inch diameter hole drilled through the concrete slab of the subject property building using a rotary hammer drill. A water dam will be constructed around the vapor point using VOC-free modeling clay, to ensure a tight seal between the silicone sleeve and concrete slab. Teflon tubing fitted with a stainless steel swagelock fitting will be attached to the Vapor Pins.

Sub-slab soil gas samples will be collected using 1.4-liter, stainless-steel, cylindrical SUMMA canisters subjected by the laboratory to a rigorous cleaning process using a combination of dilution, heat, and high vacuum. After cleaning, the canisters will be batch certified to be free of target contaminants to a specified reporting limit via gas chromatography/mass spectroscopy prior to delivery.

The unused SUMMA canisters will be evacuated to approximately 30 inches of mercury and fitted with stainless-steel flow controllers, calibrated to maintain constant flow (approximately 0.1 liter per minute) for approximately five to 10 minutes of sampling time.

Prior to sampling, the sample tubing will be purged of ambient air using a vacuum pump. Once the purge is complete, the swagelock on the tubing will be fitted to the sampling canister and the port valve opened, causing air to enter the sample container due to the pressure differential. Partner will close the valves after the canister is evacuated to approximately one to two inches of mercury, with pertinent data (e.g., time, canister vacuum) recorded at the start and end of sampling.

The sub-slab soil gas samples will be submitted under proper chain-of-custody protocol to a North Carolina licensed/accredited laboratory for analysis of VOCs by EPA Method TO-15.

4.0 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

Sample containers provided by the laboratory will be analyte free or demonstrated to not contain contaminants for the analytes being evaluated. All samples will be packaged so they do not leak, break, vaporize, or cause cross-contamination of other samples. Each individual sample will be properly labeled and identified as documented above. All samples will be transported in a cooler to the laboratory for analysis. The cooler will have a signed and dated chain-of-custody seal taped across the lid to allow the laboratory to verify that sample integrity was maintained during shipping. A chain-of-custody record will accompany each shipping container. Samples will be kept cool during the time between collection and final packaging. All samples will be clearly identified immediately upon collection. Each sample bottle label and chain-of-custody will include the following information:

- Client or project name, or unique identifier, if confidential
- A unique sample description (as documented above)
- Sample collection date and time
- Sampler's name or initials
- Indication of filtering or addition of preservative, if applicable
- Analyses to be performed

After collection and identification, the samples will be maintained under chain-of-custody procedures as described below.

4.1 Chain-of-Custody

A sample is considered to be under custody if it is in one's possession, view, or in a designated secure area. The chain-of-custody record will include, at a minimum, the following information:

Sampling and Analysis Work Plan
500 West 5th Street
601 4th Street Northwest
Winston-Salem, North Carolina 27101
Partner Project Number 14-131345.5
April 18, 2016
Page 7

- Client or project name, or unique identifier, if confidential
- Sample collector's name
- Partner's mailing address and telephone number
- Designated recipient of data (name and telephone number)
- Analytical laboratory's name and city
- Description of each sample (i.e., unique identifier and matrix)
- Date and time of collection
- Quantity of each sample or number of containers
- Type of analysis required

Additional information may include type of sample containers, shipping identification air bill numbers, etc. When transferring custody, both the individual(s) relinquishing custody of samples and the individual(s) receiving custody of samples will sign, date, and note the time on the form. If samples are to leave the collector's possession for shipment to the laboratory, the subsequent packaging procedures will be followed.

4.2 Sample Shipment

To prepare a cooler for shipment, the sample bottles will be inventoried and logged on the chain-of-custody form. At least one layer of protective material (e.g., bubble wrap, matting, plastic gridding, or similar material) will be placed in the bottom of the container to prevent samples from breaking. A heavy-duty plastic bag, if available, will be placed in the shipping container to act as an inner container. As each sample bottle is logged on the chain-of-custody form, it will be wrapped with protective material to prevent breakage. The protective material will be secured with tape. The sample will then be placed in a zip-lock type bag. Each sample bottle will be placed upright in the heavy-duty plastic bag inside the shipping container. Each sample bottle cap will be checked during wrapping and tightened, if needed. Additional packaging material should be spread throughout the voids between the sample bottles, if necessary.

Most samples require refrigeration as a minimum preservative. To ensure that samples are received by the laboratory within required temperature limits, ice cubes will be placed directly over packed samples, making sure that ice is present on all sides of each sample.

5.0 DATA VALIDATION

All sampling, analyses, and decontamination procedures will be performed in accordance with U.S. Environmental Protection Agency (EPA) and NCDEQ approved methodology.

Analytical data QA/QC review will be performed on all laboratory data to validate a high level of precision, accuracy, and completeness. The QA/QC review will include assessment of data according to the appropriate data validation techniques presented in the USEPA Contract Laboratory Program document National Functional Guidelines for Organic Data Review (US EPA, 2002) as they apply to the reported methodology.

The Laboratory QA activities will include all processes and procedures that have been designed to ensure that data generated by an analytical laboratory are of high quality, and that any problems in sample preparation or analysis that may occur in the laboratory are quickly identified and rectified. Partner will only be involved with laboratory QA through their collection of field QC samples that will be prepared and processed in the same manner as all field samples.

6.0 REPORTING

A summary of all field activities and analytical results will be summarized in a report which will include but not be limited to site maps, boring logs, photographic documentation, analytical data tables, and a summary of data validation and data quality.

Signatures of Environmental Professionals

Thank you for the opportunity to be of service. If you have any questions, please do not hesitate to contact Michael Chang at (704) 994-8423.

Sincerely,

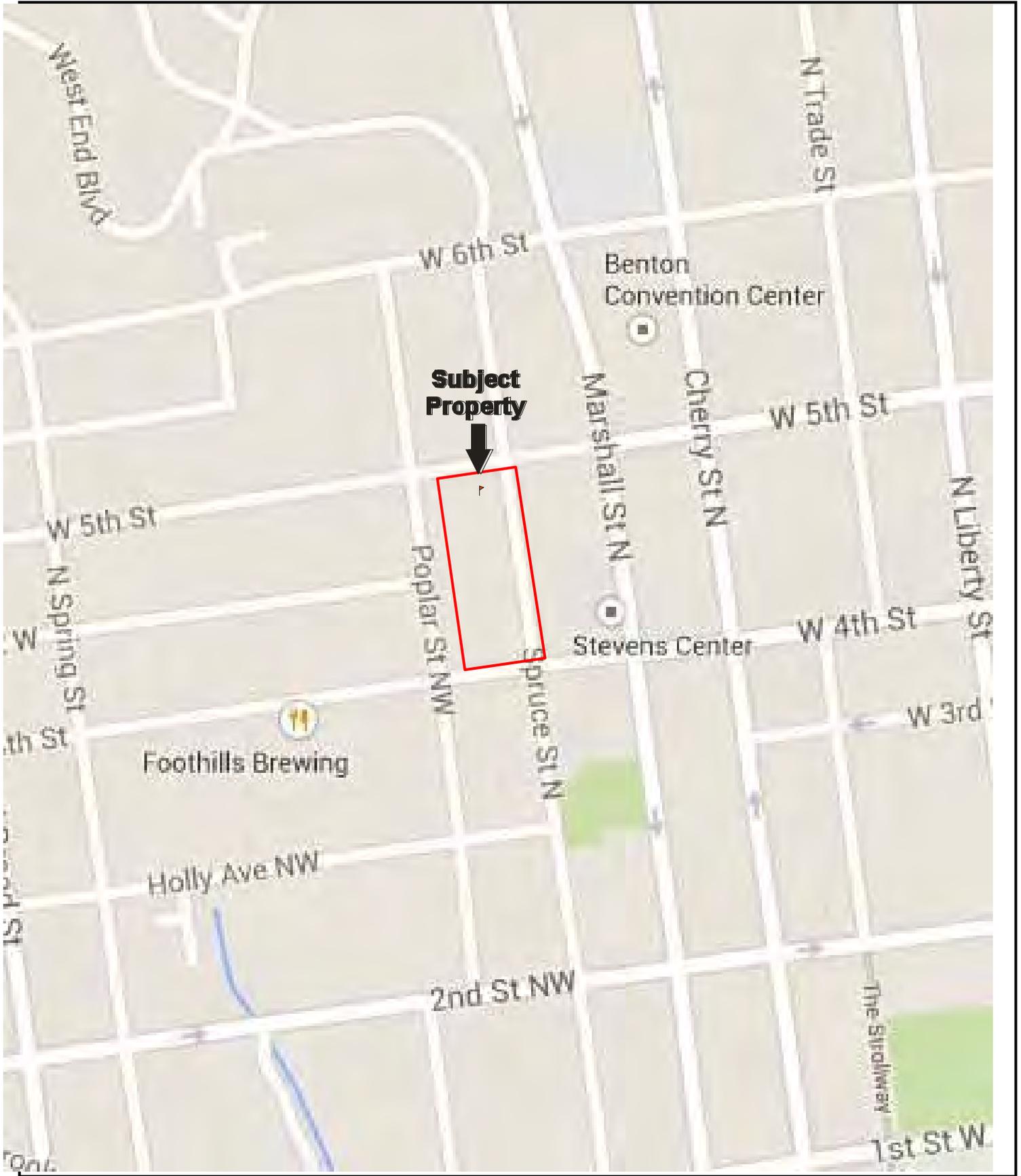


Michael McKenna
Project Manager



Michael T. Chang
Principal

Figures



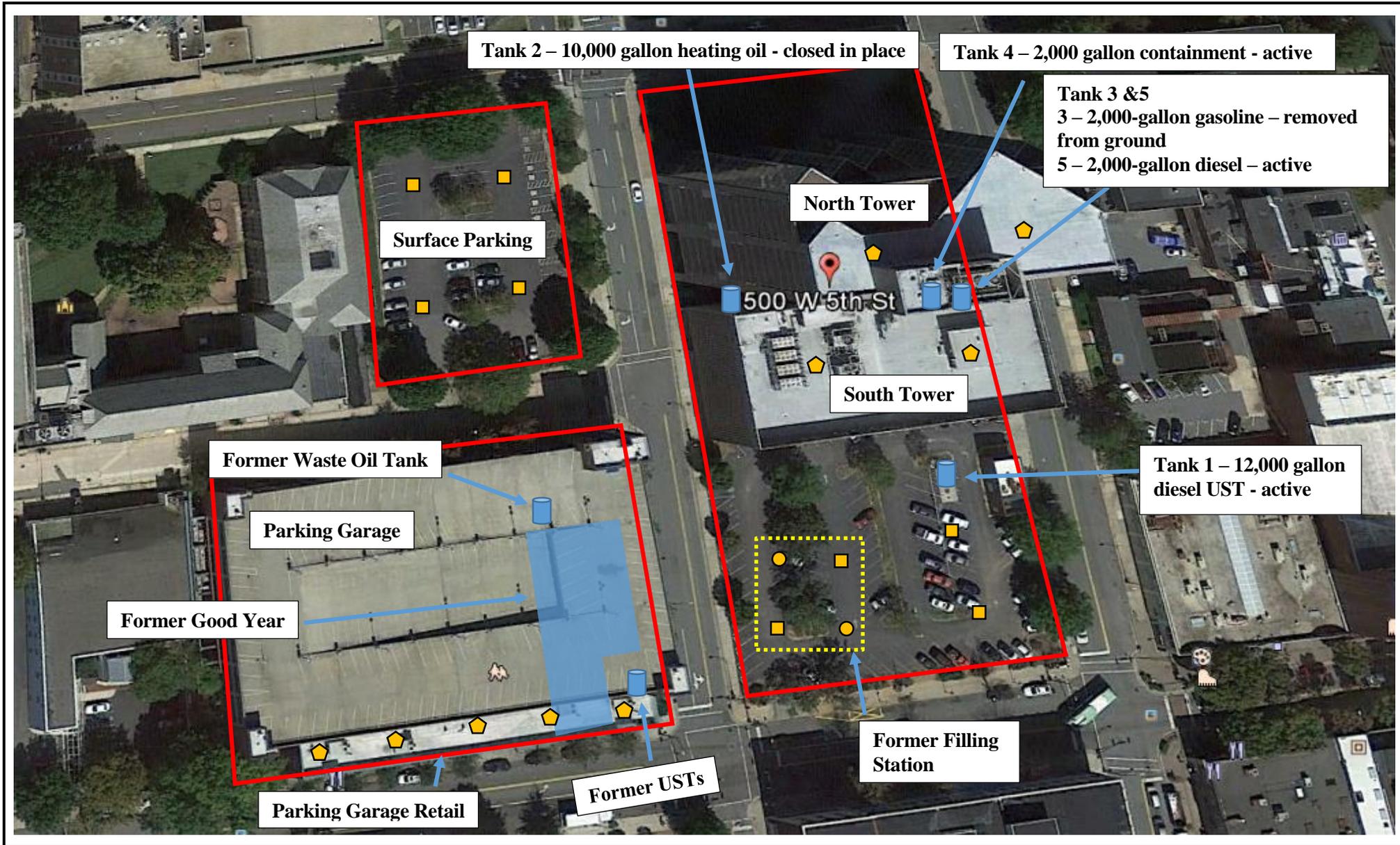
Subject Property



KEY:
Subject Site 

FIGURE 1: SITE LOCATION MAP
Project No. 14-131345.1





Soil Sample ●

Soil and Soil Gas Sample ■

Sub-slab Soil Gas Sample ⬠

KEY:

Subject Property ▭

FIGURE 2: PROPOSED SAMPLE LOCATIONS – BROWNFIELDS INVESTIGATION

Project No. 14-131345.5