

F. Soils and Groundwater

1. Existing Conditions

a. Soil

The United States Department of Agriculture (USDA) Soil Conservation Service information indicates that the soils on the subject property are classified as Urban Land, where the land surface is predominantly covered by roads, building footprints and other impervious surfaces, or for areas that are highly developed.

Soil borings previously advanced at the site in 1992 indicate the presence of between six inches to six feet of demolition debris beneath the paving and foundation structures reportedly remain intact. Soil samples collected from borings performed by others within the former building foot print area have documented the presence of total petroleum hydrocarbons.

b. Groundwater

There are no surface water features located on the subject property lots. The subject property is located within the Bronx River Drainage Basin, and is physically located approximately 2,400 feet to the east-southeast of the Bronx River. No other surface water features are in close proximity to the subject property. The Bronx River is not used as a source of drinking water.

Surficial aquifers are located in the Westchester County area; however, these aquifers are not currently used as a significant source of potable water. Potable drinking water is provided to the Village of Bronxville by United Water, which obtains potable water via an extensive reservoir and aqueduct system from upstate New York. A total of ten USGS wells are identified within a 1.0-mile radius of the subject property. No public water supply wells are indicated.

2. Potential Impacts

a. Soil

The analytical data confirms that the subject property has been impacted by contaminants that are consistent with the past use of the parcels (i.e., former gasoline service station, automotive repair and parking facility at the south parking lot; and a former heat, light and power plant at the central parking lot property). The nature of contaminants detected is not unusual for previously developed urban sites. The analytical data collected as part of this investigation indicates that the impacted soils do not meet the criteria for hazardous waste, and the area of groundwater impact appears to be isolated.

Historical laboratory analysis of soil and groundwater samples collected from the south end of the subject property (former Gramatan Garage) has demonstrated the presence of elevated petroleum constituents. Laboratory analysis of soil samples collected from the area of the former heat, light and power plant have shown the presence of elevated total petroleum hydrocarbons. Both these areas of the subject property have been assigned spill numbers by the New York State Department of Environmental Conservation (NYSDEC).

The soil laboratory analytical results were evaluated in accordance with the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum (TAGM) #4046 "Determination of Soil Cleanup Objectives and Cleanup Levels".

Soil samples SB-1, GSB-2, GSB-3 and GSB-9 were collected from accessible areas of the south parking lot. No VOCs appear to have impacted soils in this area; however, SVOCs above the NYSDEC RSCO have impacted this area of the subject property. Arsenic, barium, cadmium, chromium, lead and silver are present in this area at concentrations below the NYSDEC RSCO. No PCBs were detected in the locations and depths tested in the south parking lot.

Soil samples SBM-3, GSB-11 through GSB-17 were collected from accessible areas of the central parking lot. Varying concentrations of VOCs were detected in soil samples GS-11 and GSB-12. These two soil samples were collected from the southeast area of the central parking lot.

SVOCs above the NYSDEC RSCO were detected in all the soil samples collected from the central parking lot. Soils in the area of GSB-16 have exhibited a higher degree of SVOC impact versus the remaining areas.

Elevated Arsenic concentrations above the NYSDEC RSCO were detected in soils at locations SBM-3, GSB-11 and GSB-12. Cadmium and mercury concentrations above the NYSDEC RSCO were detected in soils at location GSB-14. Chromium concentrations above the NYSDEC RSCO were detected in soil at location GSB-15. Cadmium and lead concentrations above the NYSDEC RSCO were detected in soils at location GSB-16. Concentrations of arsenic, barium, cadmium, chromium, lead and mercury were also detected below the NYSDEC RSCO in soil samples collected from the central parking lot.

PCBs were detected at concentrations below the NYSDEC RSCO at the locations of soil borings SBM-3, GSB-13, GSB-16 and GSB-17. These soil samples were collected from depths ranging from approximately 4 to 8 feet below grade. The depth to bedrock documented as part of the

geotechnical soil borings performed at this area of the subject property ranges from approximately one foot to twenty-nine feet below grade. There is the potential for soils below 8 feet below grade to exhibit increased concentrations of PCBs.

It should also be noted that a dark tar like substance (possibly coal tar) was observed in soil samples obtained from both geoprobe and geotechnical soil borings performed at the central parking lot. Coal tar is a typical residual byproduct from coal gasification, which is a process that was commonly used to generate gas for power and heat in the mid 1800s up to the mid 1900s. Historical data from historic Sanborn Maps indicated that coal piles were maintained at the former power plant facility and the plant operated during the time frame that coal gasification was popular.

Contaminants typically associated with coal gasification include: acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, carbazole, chrysene, dibenzofuran, fluoranthene, fluorine, indeno(1,2,3-cd) pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and metals such as Arsenic, Cadmium, Chromium (hexavalent/total), Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc. Many of these contaminants were detected at concentrations above the NYSDEC RSCO in soil samples collected from the central parking lot.

Based on the elevated concentrations of contaminants detected at the subject property, Galli Engineering was concerned that some of the soils, primarily the central parking lot, could be characterized as hazardous for disposal purposes based on the available analytical data and historical use of the site. Therefore additional soil samples were collected for toxicity characteristic leaching procedure (TCLP) analysis to determine legal disposal options.

The TCLP test is one means used to characterize wastes as hazardous or non-hazardous. The TCLP is an extraction and analysis procedure that is designed to simulate the leaching potential of organic and inorganic contaminants present in soil. This methodology was used for a hazardous waste determination at the central portion of the subject property, and based on the analytical results from soil samples collected from the central parking lot (former power plant parcel), a full TCLP analysis of soil samples from this area of the subject property was performed. The TCLP analysis indicates that the soils at the locations and depths tested do not meet the criteria for hazardous waste.

Soils in the south parking lot area have impacts associated with concentrations of SVOC and arsenic above the Recommended Soil Cleanup

Objectives; however, the concentrations present do not appear to warrant disposal as a hazardous waste.

b. Groundwater

Groundwater samples were collected from the existing monitoring wells, which are located in the easement along Kensington Road and the south parking lot area (former gas station, garage and automotive repair facility). Some VOCs and metals were detected in the groundwater samples above the NYSDEC Ambient Water Quality Standards and Guidance Values. It should be noted that endeavors to install additional down gradient monitoring wells on the subject property were attempted, but attempted soil borings met refusal and groundwater was not encountered. Additionally, groundwater was not encountered in deep structural soil borings performed at the site as part of a geotechnical investigation.

The groundwater laboratory analytical results were evaluated in accordance with the New York State Department of Environmental Conservation (NYSDEC) Ambient Water Quality Standards and Guidance Values.

Laboratory analysis of groundwater sample MW-1 showed a mercury concentration higher than NYSDEC Ambient Water Quality Standards and Guidance Values, and concentrations of 1,2,4-Trimethylbenzene, arsenic, barium, chromium and lead below the NYSDEC Ambient Water Quality Standards and Guidance Values. Laboratory analysis of groundwater sample MW-2 showed elevated m,p-Xylene, arsenic, barium, cadmium, chromium, lead, mercury and silver concentrations above the NYSDEC Ambient Water Quality Standards and Guidance Values, and concentrations of ethylbenzene and bis(2-ethylhexyl)phthalate below the NYSDEC Ambient Water Quality Standards and Guidance Values.

These monitoring wells are located in the vicinity of the southeast portion of the south parking lot where there has been former USTs and automotive repair work performed. The groundwater in this area has been impacted by VOCs, SVOCs and metals.

3. Proposed Mitigation

a. Soil

Concentrations of SVOCs and some metals were detected above the NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives in the soil samples collected from the south parking lot property (former gas station, garage and automotive repair facility).

Concentrations of some VOCs, SVOCs and metals were detected above the NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives in

the soil samples collected from the central parking lot (former power plant parcel).

Soil laboratory analytical results are evaluated in accordance with NYSDEC TAGM 4046. The Recommended Soil Cleanup Objectives (RSCO) provided in TAGM #4046 are not regulatory standards and are not strict thresholds that dictate absolute cleanup levels; however, the TAGM #4046, in conjunction with the STARS Memo #1: Petroleum Contaminated Soil Guidance Policy, are the only current guidelines available for soils in the New York State, and as such are used to identify contaminated sites.

The proposed redevelopment of the subject property would require the demolition of existing structures and the removal of soil inundated with rocks and debris from past demolition activities to accommodate a subsurface parking garage. The impacted soil to be excavated for construction activities would require transport to an appropriate disposal or treatment facility. Subsurface construction and demolition debris should be separated from the impacted soils and taken to a recycling or disposal facility, as appropriate.

Most of the contaminated soil will be excavated and removed from the site; and a cap or barrier with a passive soil gas collection system that vents to the atmosphere can be implemented in conjunction with the construction of the subsurface parking garage. The subject property would be developed with or without engineering or physical controls, as appropriate, depending on residual contaminant levels. Galli Engineering anticipates that the NYSDEC will require additional assessment at the site in the form of a remedial investigation that addresses the feasibility of the remedial option or the submittal of a remedial action plan.

b. Groundwater

The groundwater in the subject property area is not a source of potable drinking water.

4. Brownfield Application and NYSDEC Regulations

The NYSDEC handbook entitled “Division of Environmental Remediation - Draft Brownfield Cleanup Program Guide” lists the requirements for the Brownfield Application and Agreement Process, Remedial Investigation Work Plan, Remedy Selection, Remedial Design and Remedial Action, General Provisions, Certificate of Completion and Citizen Participation. Based the findings, and discussions between Galli Engineering, NYSDEC and the Applicant it was determined that the proposed project site did not require an additional Remedial Investigation Plan (the Phase I and Phase II Environmental Assessment constituted the Remedial Investigation Plan) and therefore a Remedial Action Plan (RAP) was prepared in

conjunction with a Brownfield Application which was submitted on March 18, 2005.

The purpose of this RAP is to describe and document the technical approach, scope of work and remedial methodology to either eliminate the detected contamination or reduce it to an acceptable level deemed protective of public health and the environment.

The selected remedy for the subject property must eliminate or mitigate all significant threats to public health and/or the environment through the proper application of scientific and engineering principles. Specifically, the remediation goals for this site are to reduce or eliminate human exposure to contaminated soils on site by excavation and removal of soils; as well as installing an active venting system and capping the site. The items in the scope of work are further detailed in the following paragraphs.

a. Remediation Activities

The Applicant will begin the planned remediation by demolishing the current structures on site, excavating most of the contaminated soil to make room for a sub-grade parking garage; and leaving the rest of the contaminated soil in place to be capped with a geomembrane. Before capping, an active gas venting system will be installed to rid the remaining soils of petroleum odors. Two feet of clean fill material will be brought onto the property to serve as final cover in areas that will be landscaped in the final developed parcel.

b. Scope of Work

The following scope of work is an outline of the process and steps that are to be used in the cleanup of the Site. The NYSDEC and Westchester County Health Department (WCHD) will both be notified at least 48 hours in advance of the excavation date so that arrangements can be made, if desired, for their representatives to be present to witness the excavation and obtain samples.

Thirty days prior to the start of remediation, residents of the Village of Bronxville will be notified that the parking lots will be under construction. Contaminated soil is present on all of the lots. The development of the property is to include a subsurface parking garage; one level 2 feet below grade, and the second level 10 feet deeper than that. The goal of the scope of work is to remove or reduce the contamination in the soil as well as excavate enough of the soil from the site to accommodate the parking garage. The contaminated soil that is not excavated will remain in place, to be capped with a geomembrane, and an active soil venting system installed that would allow the contaminants to vent to the atmosphere.

The scope of work for environmental remediation is summarized as follows:

1. Excavate and stockpile contaminated soil on 6-mil plastic sheeting and cover with 6-mil plastic sheeting;
2. PID monitoring and dust control monitoring;
3. Collect one sample from every 500 yards of excavated soil;
4. Send soil samples to laboratory to perform full TCLP analysis and waste characterization;
5. Load, transport, and dispose of contaminated soil to appropriate facility;
6. Endpoint sampling of soil, with laboratory analysis;
7. Install active soil venting system;
8. Cap remaining contaminated soils in place with membrane;
9. Bring in clean fill materials for backfilling purposes as necessary;
10. Dust mitigation;
11. Health and safety meetings before the start of every day;
12. Record keeping.

Groundwater was not encountered in the deep structural soil borings done in previous site investigations. Given that the property is not in a flood prone zone; that the groundwater is not a source of potable drinking water; and that the groundwater contamination is minimal and is isolated, there is no need to remediate the groundwater on site.

c. Excavation and Removal Methodology

The excavation and stockpiling of the contaminated soil will consist of mobilization of equipment, layout of the stockpile area, excavation of the soil, erosion control, stockpiling of the soil, air monitoring, and laboratory testing of soil for waste characterization.

Soil excavation will proceed on a cell by cell basis starting on the southern portion of the site and working north. At each section of soil removal, the soil will be excavated and set aside. Excavated soil will be stockpiled in a designated area and placed between two layers of 6-mil plastic sheeting. The sides of the bottom sheet will be folded up, the top sheet will be placed to overlap the folds, and they will be secured to the ground to prevent the contaminated soil from spreading. Erosion control will be implemented using silt fences and hay bales primarily along the western portion of the site.

All of the soil will be removed in this manner until enough area is excavated to accommodate the parking garage structure. The following chart gives a breakdown of the estimated total amount of material needed to be excavated.

Soil samples will be collected from the stockpiles for laboratory analysis to determine characterization for disposal. The degree of contamination will be determined by a laboratory analysis of one sample from every 500 yards of excavated soil. The actual volume of excavated soil may vary based upon actual field conditions encountered. Depending on the laboratory findings, the contaminated soils will be transported to one or more facilities permitted to handle the appropriate level of contamination. If rock removal is necessary, no special disposal is needed for the excavated rock. The estimated total amount of rock to be removed is 12,828.9 cubic yards (17,319 tons).

The remaining contaminated soils that are left on site will have the contaminants actively vented out, and will be capped with a geomembrane. A two-foot thick layer of clean fill material will be brought on-site and placed over all areas that will ultimately be unpaved as well as encapsulate the existing on-site soils during construction of the condominiums.

d. Disposal of Contaminated Soil

The soil excavated from the areas of known contamination will be stockpiled, as necessary, on and under polyethylene sheeting. This will allow for soil disposal testing and more efficient loading for transport to the disposal site. The actual volume of stockpiled soil may vary based upon actual field conditions encountered.

The contaminated soil will be transported for disposal or treatment to an appropriately permitted facility. The final disposition of the contaminated materials will be in accordance with all applicable federal, state, and local regulations. Disposal facilities will be decided based on the results of laboratory analysis for disposal parameters, distances to facility and cost of disposal. Based on the known nature of the soil contamination, disposal facilities and options are readily available.

The NYSDEC will be notified in writing five (5) days prior to the removal any contaminated soils or groundwater with the names of the waste transporters and disposal facilities and their respective licenses and permits for its review.

e. Air Monitoring

Air monitoring will be conducted using dust monitors and a Photo Ionization Detector (PID) to ensure that flammable vapors are not present and that particulate matter is not migrating from the site. Air monitoring will take place in accordance with the New York State Department of Health (NYSDOH) guidance values. Monitoring for background levels will take place at the start of each workday. The monitors will then be moved to the downwind side of any ongoing work to monitor for

excessive levels of dust or flammable gases. Air monitoring results will be recorded on the appropriate log sheet.

Dust suppression activities will be implemented if conditions indicate that dust may become problematic. The PID will be used to monitor for explosive vapors. Detection of levels in excess of 5 ppm above background levels will result in a stoppage of work until the levels have dropped back to within 5 ppm of background.

f. Lab Analysis

Laboratory analysis of contaminated soil will be performed to satisfy disposal facility requirements. The degree of contamination will be characterized using the United States Environmental Protection Agency (US EPA) methods for volatile organic compounds (VOC's), semi-volatile organic compounds (SVOC's), total petroleum hydrocarbons (TPH), priority pollutant metals, polychlorinated biphenyls (PCB's), toxicity characteristics leaching procedure (TCLP) for metals, and RCRA characteristics (ignitability, corrosivity and reactivity).

All laboratory analysis will be performed by a NYSDOH Environmental Laboratory Approval Program (ELAP) certified lab. The laboratory will provide all sample containers. The laboratory will provide trip and lab blanks if requested.

g. Endpoint Samples

Endpoint samples will be taken when the final depth of excavation is reached, in the areas that have had the highest amount of contamination, to characterize the nature of the soils remaining after excavation. This will also provide a point of reference as far as determining the effectiveness of the soil venting system. The soil will be collected directly from the base of the excavated area. The samples will be analyzed for VOC's, SVOC's, PCB's and priority pollutant metals according to applicable methodologies. The contaminants remaining in the soils will then be actively vented out, as described below.

h. Venting System and Geomembrane

Soil venting is an in situ remediation technique, which is used to reduce the concentration of volatile constituents of petroleum products adsorbed by soils. A vacuum is applied to the contaminated soil through extraction wells, causing a negative pressure gradient that allows the contaminants to rise through the wells to the surface where the vapors are subsequently treated with carbon adsorption before being vented out into the atmosphere. The soil venting system will be installed above a layer of gravel, and within a layer of structural fill.

A capping system will be placed over the contaminated soil that remains after excavation. The total area to be capped is estimated at 14,545 square feet. Final placement of vent piping will be determined at the time of construction of such system.

i. Post Remediation Activities

Upon completion of remedial activities, a closure report will be sent to the NYSDEC within 30 days, seeking a no further action letter. The closure report will state the conclusions of the remediation on site, and will seek to have the DEC close the spill numbers.

Annual inspection of the venting system will be done to ensure its effectiveness as well as performance.

5. Health and Safety Plans (HASP)

Health and Safety Plans for site remediation will comply with OSHA and address community health and safety issues associated with completing the remedy. Galli Engineering has prepared a Health and Safety Plan on behalf of the Applicant. The HASP will be adhered to along with an on-site Health and Safety officer from Galli.

6. Operation Maintenance and Monitoring (OM&M)

A Draft OM&M Plan (an outline for extensive projects) will be submitted/included at the time of the draft Remedial Work Plan and will typically be finalized subsequent to the construction of the remedy.

7. Annual Certification

As required by ECL 27-1415 and the BCA for the site, the Applicant is required to submit to NYSDEC certification for any site where institutional and/or engineering controls are employed as part of the remedy on an annual basis, unless otherwise provided in writing by NYSDEC. This certification will be provided to NYSDEC.

8. Pre-Construction Citizen Participation

The Applicant will submit a draft Pre-Construction Notice to NYSDEC at least 20 days prior to the start of construction. Once the fact sheet is reviewed and ready for approval, the Applicant will:

- Transmit the notice to the parties on the Brownfield Site Contact List, at least 10 days prior to the start of construction; and
- Place a copy of the design document and notice in the document repository.

The Applicant will submit a certification of mailing to the NYSDEC within 10 days of the mailing.

9. Remedial Action Oversight

Remedial Action will be completed pursuant to the approved Remedial Work Plan. NYSDEC will observe construction to ensure that remedies are built and operated to the Remedial Work Plan or Remedial Design.

10. Remedial Action Report

Within 90 days after completion of construction, the Applicant will submit a Remedial Action Report (RAR). The RAR:

- Describes the remedial activities completed;
- Certifies that the data generated was useable and met the remedial requirements;
- Defines the boundaries of the site;
- Describes all of the institutional controls employed at the site;
- Certifies that any restrictions, Institutional Controls/Engineering Controls (IC/EC's), and/or any OM&M requirements are adequately provided in an environmental easement that has been created and recorded and that local governments have been notified;
- Certifies that the OM&M plan has been submitted and approved by the DEC; and where applicable; and
- Certifies that any financial assurance mechanisms required by DEC have been executed.

The RAR will include:

- Appropriate "as built" drawings, that include all changes made to the final design during construction;
- A copy of the environmental easement, if required; and
- The final OM&M Plan, if required for the site.

11. Remedial Action Report Review

Upon receipt of a draft Remedial Action Report and draft fact sheet, NYSDEC verifies that the technical requirements of the BCA and work plan(s) have been satisfied and approves, modifies or rejects the Remedial Action Report.

12. Post Construction Citizen Participation

The Applicant shall submit a proposed notice and fact sheet along with the Remedial Action Report. Once the fact sheet, which should describe the content of the report, is reviewed and ready for approval, the Applicant will:

- Mail the notice and fact sheet to the parties on the Brownfield Site Contact List prior to NYSDEC approval of the report; and,
- Provide a certification of mailing to NYSDEC within 10 days of the mailing to evidence compliance with the CP requirements.

If institutional or engineering controls are necessary at the site, within 10 days of issuance of the Certificate of Completion, a NYSDEC-approved fact sheet must be issued by the Applicant to the Brownfield Site Contact List.

13. Permits

The Applicant will not be required to obtain NYSDEC issued permits for BCP sites in good standing. A list of required permits, reviews, approvals and easements is included in Table I-1, Required Permits, Reviews and Approvals in Chapter I of this DEIS, Introduction and Executive Summary.

NYSDEC requires Applicants to obtain the necessary non-DEC State and local permits unless the Applicant can demonstrate that obtaining the permit will substantially delay the project or present a hardship. NYSDEC, at its discretion, then may exempt Applicants from having to obtain permits issued by New York State or local municipalities.

A Certificate of Completion is issued by the Commissioner once it is determined that the remediation requirements have been achieved or will be achieved under a Work Plan.