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# **130 Liberty Street Building New York, New York**

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## **Sampling and Analysis Plan for Asbestos Building Inspection, WTC Dust Characterization, and Visual Mold Inspection Study**

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Prepared for:

**Lower Manhattan Development Corporation**

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## 1.0 INTRODUCTION

The Louis Berger Group, Inc. (Berger), under contract with the Lower Manhattan Development Corporation (LMDC) and in its role as an Environmental Consultant for the World Trade Center Memorial and Redevelopment Plan (WTC Rebuilding Plan), was authorized to conduct an Asbestos Building Inspection, World Trade Center (WTC) Dust Characterization, and Visual Mold Inspection Study (the Study) at the building located at 130 Liberty Street, New York, NY (the Building). The Study was conducted to determine the presence of Asbestos Containing Materials (ACM) and/or other contaminants of potential concern associated with settled WTC dust and/or visible mold prior to the scheduled deconstruction of the Building. The scope of the Study was similar to an environmental site assessment/investigation that is performed by lending institutions and/or parties to property transactions after their initial due diligence review. As such, the overall intent and objective of the Study was to identify any building materials that would be classified as ACM as well as to determine whether particular contaminants (Contaminants of Potential Concern, or COPCs) that the U.S. Environmental Protection Agency (U.S. EPA) determined were released on September 11, 2001, were present in the Building as surface dust.

Following the WTC Event, the U.S. EPA established a committee to evaluate COPCs found in WTC dust. The COPC Committee of the World Trade Center Indoor Air Task Force Working Group prepared the *World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks* (May 2003), which identified the compounds of concern for Lower Manhattan cleanup efforts. The WTC Dust Characterization for COPCs, as defined by the U.S. EPA's COPC Committee, are Silica, Polycyclic Aromatic Hydrocarbons (PAHs), Dioxin, Polychlorinated Biphenyls (PCBs), Heavy Metals (Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, and Zinc), and Mercury.

This Sampling and Analysis Plan (SAP), which was developed to support the objectives of the Study, provides the approach and protocols for sampling and laboratory analysis, including sample collection methods, sample media and equipment, equipment decontamination, quality assurance and quality control (QA/QC) procedures, and laboratory analytical methods. This SAP will be used in conjunction with the Site-Specific Health and Safety Plan (HASP) and the Quality Assurance Project Plan (QAPP), which were developed pursuant to all applicable federal, state, and local regulations. This work is being performed under Contract Number F40951.



## 1.1 Site History

The events of September 11, 2001, causing the destruction of the World Trade Center (WTC) Towers, physically destroyed significant portions of the interior and exterior of the Building, a 42 story, approximately 1.5 million square foot office building. The massive debris generated from the collapse of the South Tower broke approximately 1,500 windows and opened a gash (“Gash Area”) in the Building’s exterior exposing portions of the interior of the north side of the Building between the 7th through 24th Floors. The debris demolished the plaza in front of the Building, exposing the basement and sub-basement (Basement A and Basement B) areas and ruptured a diesel fuel tank in the basement, the contents of which burned. As a result of these events, a combination of soot, dust, dirt, debris, and contaminants settled in and on the Building. The Gash Area and broken windows exposed the interior of the Building to the elements, which may have caused some further impacts even after the initial exposures and events on September 11, 2001. Subsequent to September 11, 2001, cleaning operations have been undertaken to clear debris from the plaza, lobby and interior spaces in the Gash Area. The immediate Gash Area was remediated in accordance with New York City Department of Environmental Protection (NYCDEP) and New York City Department of Health (NYCDOH) protocols to permit the construction of columns, beams and floor decks in the Gash Area to stabilize the situation; which was followed by the hanging of a porous geosynthetic mesh or “netting” on the outside of the gashed side of the building for further protection and safety. Once the initial cleaning and stabilization measures were in place, office furniture, equipment and other non-attached items in the building were removed and disposed. During this time, several study activities were also undertaken to assist the building owner and their insurance representatives in understanding the extent and impacts of the WTC dust-related contamination.

The WTC Rebuilding Plan also was initiated during this period. The first stage of the WTC Rebuilding Plan has been identified as including the deconstruction of the building at 130 Liberty Street down to the top of the foundation walls. This deconstruction will include the removal of interior walls, stairs, ceilings, floor coverings, Mechanical, Electrical and Plumbing (MEP) items, exterior skin, superstructure concrete and structural steel. The building will be deconstructed piece by piece as a safety precaution, and will not include the use of explosion/implosion devices as is typically the case with conventional building demolition.

## 1.2 Scope and Objectives

An Asbestos Building Inspection is required to facilitate the proposed deconstruction of the Building and to comply with: (1) the New York City Department of Buildings permitting requirements, and (2) the pre-demolition requirements promulgated by the New York City Department of Environmental Protection (NYCDEP), Section I-53; the New York State



Department of Labor (NYSDOL) Industrial Code, Rule 56: Asbestos Regulation, Title 15, Sections 56-1.4 and 56-1.9(e); and the U.S. EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP) for asbestos-containing materials (ACM).

In addition to the Asbestos Building Inspection, a WTC Dust Characterization and Mold Inspection will be performed to determine whether or not the aforementioned COPCs and mold are present in the Building. The results of the Study will be used to obtain permits and to aid in developing procedures for the deconstruction process, including: (1) worker health and safety; (2) the implementation of engineering controls and precautionary work practices to ensure public health and safety; (3) remediation and disposal procedures that properly address all identified contaminants; and (4) compliance with applicable Federal, State and local regulations throughout the deconstruction process. To meet these objectives, the following scope of work has been developed:

- TASK 1 Plans and Preparation
- TASK 2 Asbestos Inspection and Material Survey
- TASK 3 WTC Dust Characterization for Asbestos
- TASK 4 WTC Dust Characterization for Silica, PAHs, Dioxin, PCBs, Heavy Metals, and Mercury
- TASK 5 Visual Inspection for Mold
- TASK 6 Communication and Report Preparation

The remainder of this report is divided into seven sections, which will address Tasks 2 through 5 of the Study. Section 2.0 of this SAP describes procedures for site inspection, and for the collection and analysis of samples of building materials that contain asbestos, WTC Dust that contains asbestos, and WTC dust that contains COPCs, and the visual inspection of mold. Sections 3.0 through 8.0 discuss equipment decontamination, QA/QC procedures, sample identification and labeling, field log books, chain of custody, and sample shipment.



## 2.0 SAMPLING PROCEDURES

This section of the SAP provides sampling and analysis information for conducting the asbestos inspection and sampling of Building materials, sampling of WTC Dust for COPCs, and for the visual inspection of mold. Table 1 shows a summary of sampling collection and analysis information for each analyte. Additional sample collection information is provided in Table 2, which shows the sample matrix, sample preservation, holding time, and sample container requirements for each of the COPCs other than asbestos.

### 2.1 Asbestos Building Materials

It should be noted that before proceeding with the sampling effort in each area, each Task Leader will make sure that there is a clear understanding of the sampling approach based on a site inspection and available as-built drawings. In large areas with many sampling zones, a sketch will be drawn on the Sample Log Sheet (or Floor Plans) to document the planned sampling locations prior to sampling. The sample locations will be identified by a unique number that will permit the cross-referencing of sample information throughout the report. Outer gloves will be changed between each sample collected. Sample summary tables are provided in Tables 3 and 4.

#### 2.1.1 Asbestos Inspection and Bulk Sampling Procedures

The asbestos inspection and bulk sampling procedures to be implemented are based on the guidelines established by the U.S. EPA in the *Guidance for Controlling Asbestos Containing Materials in Buildings*, Office of Pesticides and Toxic Substances, DOC #560/5-85-024 and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA). Field information is organized according to the AHERA concept of Homogeneous Area (HA). A HA is defined as a suspect material of similar age, appearance, function, and texture. Each material will be grouped together as a specific HA, sampled, and then assessed for condition.

The AHERA guidelines represent the most up-to-date inspection and sampling protocol available and as such will be utilized during the inspection and sampling. For the purposes of this inspection, suspect ACM has been placed in three (3) material categories: thermal systems insulation (TSI), surfacing materials, and miscellaneous materials. The locations within the Building will be inspected physically, functional space-by-functional space, and homogeneous area-by-homogeneous area, to determine the presence of ACM.

Core samples of friable and non-friable suspect materials will be collected by penetration of the suspect material to its substrate. Friable ACM is material that may be crumbled, pulverized, powdered, crushed, or exposed, or material that is capable of being released into the air by hand pressure. The bulk samples collected will be placed in sealed containers and labeled with an



identifying code. Representative samples of each sampling area will then be submitted to the laboratory to be analyzed for asbestos content. The inspection involves the following tasks:

1. Visual determination as to the extent of visible and accessible suspect materials and conditions of the material;
2. Collection and analysis of suspect building materials for asbestos content;
3. A physical "Hand Pressure" test for determining friability and condition of suspect materials;
4. An assessment of suspect friable and non-friable materials and locations;
5. Quantification of the amount of suspect friable and non-friable materials in their respective locations;
6. Identification of all suspect materials sampled on the appropriate building floor plan diagram with the sample number; and
7. Preparation of a Chain of Custody record that will accompany the samples to the laboratory.

### **2.1.2 Physical Inspection Procedures**

Every area and space of the Building, including the Roof, shall be physically inspected functional space-by-functional space (room-by-room) and homogeneous area-by-homogeneous area to determine the presence or absence of ACM. All suspect material in each functional space, including above the suspended ceiling, shall be categorized by homogeneous area prior to bulk sampling. Random sampling shall be conducted according to the protocol described in this Sampling and Analysis Plan. All sampling information shall be documented on the Asbestos Field Survey Data Sheet. Inspection activities shall include, but are not necessarily limited to, the following:

1. Conducting a thorough on-site visual inspection of the Building, including the area above the suspended ceiling. Inspections shall be scheduled and coordinated with the Building Representative and conform to the approved work schedule. During the inspection, Berger shall identify and document the condition of the suspected material, the activity level, the potential for disturbance based on functional area usage, and other factors deemed appropriate;
2. Indicating all areas of homogeneous material, without regard to the results of subsequent laboratory bulk analysis, either on a set of building floor plans, on schematic drawings, or in tabular form;
3. Identifying the functional spaces on the drawings; and



4. Completing the Field Survey Data Sheet (FSDS) for each homogeneous material, listing all functional spaces where similar ACM are present. Where suspect ACM have been identified through review of building documentation, and are suspected to be present but are not sampled, this information must also be present on the FSDS.

### 2.1.3 Bulk Sampling

Berger shall conduct bulk sampling of all friable and non-friable suspected ACM in compliance with the requirements of AHERA for bulk sampling (40 CFR 763.86) and consistent with this SAP and QAPP. A minimum of one side-by-side quality control sample shall be collected for each of the 20 samples. All sample locations shall be clearly identified on copies of the Building schematic diagrams (drawings or floor plans) and marked with an identification number corresponding to the respective sample number. Each sample shall be listed on the Chain of Custody record, which will accompany the samples to the laboratory.

Bulk Sampling shall be conducted in the following manner:

1. Berger shall collect representative bulk samples of all materials suspected to contain asbestos. Sample locations will be determined using the U.S. EPA's simplified random sampling method (EPA 560/5-85-030a). All sample locations are to be indicated on the drawings or floor plans, and each sample location is to be identified by a unique number, which will permit the cross-referencing of sample information throughout the report. The documentation should be sufficient to locate and ascertain the quantity and extent of all suspect ACM in the Building surveyed.
2. Bulk samples shall be collected from materials in each HA to determine the asbestos content and to identify the complete content matrix of the material. Homogeneity shall be based on, but not necessarily limited to, the following criteria:
  - a. Visual appearance;
  - b. Texture; and
  - c. Use (including but not limited to: ceilings, floors, walls, boilers, tanks, furnaces, other mechanical equipment, ceiling tiles, floor tiles, pipe wrapping, elbow materials, valve material, on structural members, decks, beams, duct work, in fire doors, stage curtains, insulated protective clothing, and laboratory apparatus and equipment).
3. With two exceptions, at least three samples of a suspect material must be collected and analyzed before concluding that there is no asbestos in the suspect material. A single sample of thermal system insulation, including patching or miscellaneous material, will be acceptable if Berger's Project Inspector deems it is sufficiently representative of the



material and it meets the following size restrictions. The thermal system insulation is of less than six (6) linear or square feet and the miscellaneous material is less than 160 square feet or 260 linear feet in total quantity. Otherwise, the numbers of samples to be collected for each homogeneous area are as follows:

- a. Surfacing Material on ceilings, walls, and structural members:
  - i. Less than 1,000 square feet = at least three (3) samples
  - ii. Between 1,000 square feet and 5,000 square feet = at least five (5) samples.
  - iii. Greater than 5,000 square feet = at least seven (7) samples
  - iv. At least one additional sample for each additional 10,000 square feet up to a total of nine (9) samples.
  - v. At least one (1) sample for each patched area.
- b. Thermal System Insulation such as pipe work, valves, elbows, and ductwork:
  - i. Collect at least one (1) bulk sample from each homogeneous area of patched thermal system insulation if the patched section is less than six (6) linear or six (6) square feet.
  - ii. Collect at least three (3) bulk samples from each homogeneous area of thermal system insulation equal to or greater than six (6) linear or square feet.
  - iii. Collect at least one (1) sample of valve material, hanger, and elbow mud for each insulated line of varying diameter and visible appearance.
- c. Miscellaneous Materials:
  - i. Miscellaneous materials include ceiling and floor tiles, linoleum or vinyl floor coverings, baseboards and similar material, and their adhesives. Collect at least one (1) sample for an area containing up to 160 square feet or 260 linear feet of suspect material. Collect at least three (3) samples for an area of 260 - 5,000 square feet or between 160 - 1000 linear feet of suspect material. Collect at least one (1) additional sample for each 5,000 square feet or 1000 linear feet or part thereof of material to a total of nine (9) samples.
  - ii. Roofing: Built-up roof (BUR) systems as well as other types of suspected asbestos-containing roof material shall be sampled. Sampling must include roofing felts or tar papers, as well as shingles, where present. Collect three (3) samples of each layer for a homogeneous roof area up to



10,000 square feet and one (1) additional sample for each additional 10,000 square feet or part thereof to a total of nine (9) samples.

4. Quality Assurance/ Quality Control (QA/QC) Samples: Collect one (1) random split sample for every twenty (20) samples collected and submitted for analysis.

#### **2.1.4 Bulk Sample Submission and Retention**

Berger shall be responsible for transporting the samples to the laboratory and for assuring that the laboratory analyzes each sample, identifying the type and amount of asbestos and other components present, in accordance with the QAPP. The Laboratory Director shall maintain the Chain of Custody documentation.

1. Berger shall submit the bulk samples to a Laboratory that is accredited by National Voluntary Laboratory Accreditation Program (NVLAP) under the National Institute of Standards & Technology and the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP).
2. The samples shall be submitted to the laboratory for analysis promptly upon completion of the survey. Berger shall prepare and retain documentation that accurately reflect all changes in the Chain of Custody and location of each sample. Documentation shall indicate all persons who take custody of samples and the period of time in each person's custody, as well as to whom the samples were relinquished. There shall be no unaccounted period of time with regard to each sample.
3. Berger shall have the laboratory analyze each sample and identify the type and amount of asbestos present, as well as other components, in accordance with the QAPP.
4. Bulk samples shall be retained by the laboratory with the Chain of Custody documentation.
5. Quality assurance shall be used to monitor the performance of the analytical laboratory. A QA sample shall be collected for every twentieth bulk sample collected in the Building. The QA sample shall be taken or collected immediately adjacent to the related bulk sample, and it shall be labeled and numbered independently in such a manner that the laboratory personnel, if the same laboratory is used for QA analysis, cannot discern the QA sample(s) from other samples being analyzed.
6. Samples shall be shipped or hand delivered to the analytical laboratory in an appropriate and suitable manner. All packaging and labels shall comply with Federal Department of Transportation regulations, as provided in 49 CFR 171-178.



### 2.1.5 Laboratory Analytical Procedures and Methodologies

Berger shall submit the bulk samples to a Laboratory that is accredited by NVLAP under the National Institute of Standards & Technology and the NYSDOH ELAP. The samples of the suspect materials shall be analyzed according to the following methods:

#### Polarized Light Microscopy (PLM) for Friable Materials

Samples will be analyzed by PLM with dispersion staining according to the method specified in the U.S. EPA *Interim Method of the Determination of Asbestos in Bulk Insulation Samples*, Appendix A, Subpart F, 40 CFR Part 763 and the NYSDOH ELAP Method 198.1. This is a standard of analysis in optical mineralogy and the currently accepted method for the determination of asbestos in friable bulk samples. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light; the resulting characteristic color display enables mineral identification.

#### Transmission Electron Microscopy (TEM) for Non-Friable Organically Bound Materials

Detection of asbestos fibers used in non-friable organically bound materials (NOBs) such as floor tile, mastics, roofing materials, and window caulking/glazing, is often extremely difficult because of the small fibers used during manufacture, their subsequent mixing and coating with an organic matrix (vinyl, asphalt, etc.), and potential combination during sample preparation. To address this problem, specialized sample preparation (gravimetric reduction per Chatfield 1991) and analysis by TEM is required.

The use of TEM addresses the principle that the limit of an optical microscope's ability to detect objects is affected by the wavelength of light, which is the source for PLM analysis. The electron microscope used in TEM analysis is inherently superior to the optical microscope for detecting very small fibers. The TEM's extremely short wavelength, coupled with simple image presentation, yields resolvable images of even the smallest asbestos fibers. Furthermore, identification of chrysotile or amphibole crystalline structure can be consistently produced via the electron diffraction capabilities of modern TEMs. Accordingly, the TEM's resolution of up to 20,000 magnification provides the most reliable method for detecting and quantitating asbestos fibers in NOBs and is considered the only method that can be used to report true negative results from PLM analysis of NOB samples.

#### Positive Stop Procedures for PLM and TEM Analysis

In accordance with U.S. EPA guidelines, samples are categorized into "homogeneous groups" by material type. The number of samples to be taken for each group is dictated by the type and quantity of the material. All samples within the homogeneous group must be less than 1%



asbestos in order to classify the material as “non-asbestos.” Conversely, the positive result of any one (1) sample dictates that the Homogeneous Group be classified as ACM. Thus, when the individual samples of each homogeneous group are analyzed, the laboratory will discontinue analysis when asbestos has been identified in one (1) of the samples. These subsequent samples, which have not yet been analyzed, are reported as NA/PS (“Not Analyzed/Positive Stop”) and the homogeneous material is classified as an ACM. Positive Stop procedures are economically beneficial by reducing analytical cost for repetitive analysis.

## **2.2 WTC Dust Sampling for Asbestos**

Berger shall collect representative bulk samples of settled dust to determine the asbestos content, if any, from random locations under the suspended ceiling, which will be treated as separate functional areas. Sample locations will be determined using the U.S. EPA simplified random sampling method (EPA 560/5-85-030a). All sample locations will be documented on the drawings or floor plans. Each sample location is to be identified by a unique number, which will permit the cross-referencing of sample information throughout the report. The documentation (consisting of Field Survey Data Sheets, Chain of Custody documentation, and Floor Plans) is anticipated to be sufficient to locate and ascertain the extent of asbestos-containing dust throughout the Building.

All functional spaces will be investigated. Each floor will be divided into a grid with nine (9) sections; the sections will be numbered starting from section number one in the south west corner, number two the next section east, number three in the south east corner and number four in the west central area; counting east from the west wall in each section. The ninth section will be in the north east corner. The areas will be numbered using the floor number followed by the section number. Area 1 will be the Southeast section of the floor. For example, the area in the southeast corner of the first floor will be called Area 01-01. The areas 01-01 through 42-09 will include every section of the Building. Samples collected above and under the suspended ceiling shall be labeled separately to identify where the samples were collected.

Samples will be analyzed by PLM with dispersion staining according to the method specified in the U.S. EPA *Interim Method of the Determination of Asbestos in Bulk Insulation Samples*, Appendix A, Subpart F, 40 CFR Part 763 and the NYSDOH ELAP Method 198.1. This is a standard of analysis in optical mineralogy and the currently accepted method for the determination of asbestos in friable bulk samples. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The resulting characteristic color display enables mineral identification.

For areas with significant dust accumulation, the dust will be wetted, scraped and placed into a sample container. For areas with minimal dust accumulation, the same procedure will be



followed, except the sample area will be larger. Sample locations in each section of the Building will be determined by the inspector in the field. Samples will be collected from any horizontal surface in a section and from areas that contain visible dust. Dust samples shall also be collected from the following locations and tested for asbestos content:

- Filters at fresh air intakes and other possible locations within the HVAC system, the number of which will be determined based on field inspection and review of “as-built” drawings; and
- Exterior construction curtain netting used to contain the damage and debris caused by the collapse of the WTC, the number of which will be determined following review of safety requirements.

All sampling will be performed by a New York State Department of Labor Asbestos Inspector and/or a New York City Certified Asbestos Investigator. The sampling schedule shall comply with the requirements of the AHERA Guidelines as explained previously in this document and shall consist of the following:

1. A thorough on-site visual inspection of the Building. Inspections will be scheduled and coordinated with the Building Representative and conform to the approved work schedule. During the inspection Berger shall identify areas of high/low dust accumulation on available as-built drawing or floor plans.
2. Subdividing each floor into nine sampling areas, one sample will be collected from each of the nine areas on each floor. Samples will be taken from non-porous floors, porous floors, furniture, above ceilings, and on mechanical equipment based on the amount of dust found on each for each sample area. In areas where there is no discernable difference in accumulation samples will be collected from the lowest level where dust can be sampled.
3. Identification of functional spaces within the sampling areas (number two above) will be shown on the available as-built drawings or floor plans.
4. Identification of any locations where the dust could not be sampled, accompanied by the reason it cannot be sampled. Areas where access is impossible shall be indicated on the drawings with a notation as to why the areas could not be accessed.
5. Dust samples collected above the suspended ceiling will be treated as separate homogeneous material from the dust under the suspended ceiling.
6. Berger shall conduct sampling of all dust suspected to be asbestos-containing in compliance with the requirements of U.S. EPA AHERA for bulk sampling (40 CFR 763.86). A minimum of one (1) side-by-side quality control sample will be collected for



each 20 samples. All sample locations will be clearly identified on copies of the building schematic diagrams (drawings or floor plans) and marked with an identification number corresponding to the respective sample number.

7. Each sample shall be listed on the Chain of Custody record, which will accompany the samples to the laboratory.

### **2.3 WTC Dust Sampling for Contaminants of Potential Concern (COPCs)**

Wipe/vacuum sampling for non-asbestos analytes, e.g., metals, PAHs, dioxins, etc., within surface dust on identified surfaces will be performed. During the initial site walk-through, five general sampling zones were identified based on previous sampling results and the amount of visible dust present (See Table 3).

Zone 1 includes those mechanical areas on the 5<sup>th</sup> and 40<sup>th</sup> floors, Zone 2 includes general carpeted/uncarpeted office space at and below the 24<sup>th</sup> floor (including the basement and vault areas), Zone 3 includes general carpeted/uncarpeted office space above the 24<sup>th</sup> floor, Zone 4 includes the remediated “gash” area located on the north side of the building between the 7<sup>th</sup> and 24<sup>th</sup> floors, and Zone 5 is the roof area. For Zones 1 and 2, it is anticipated that seventy-two (72) sample locations will be identified; for Zone 3, thirty-three (33) sample locations will be identified; for Zone 4, seven (7) sample locations will be identified; and for Zone 5, four (4) sample locations will be identified. In each case, sample locations will be chosen based upon the extent of visible dust and/or representation of the area. Sample locations will be divided by zone such that approximately ¼ will be collected from floor surfaces, ¼ will be collected from ledge (horizontal surfaces), ¼ will be collected from HVAC interior ductwork, and ¼ will be collected from above the ceiling, i.e., the plenum. This equates to approximately twenty-nine (29) samples for each of the previously described locations. It is anticipated that destructive techniques will need to be utilized for spaces within HVAC ductwork. Furthermore, as floor space varies between carpeted and uncarpeted, depending on the building floor, sample collection methods may vary (i.e., vacuum sample for carpeting, wipe sample for tile/wood) for all COPCs accordingly. Zone 5 includes the roof area where one wipe sample from a horizontal surface will be collected from each of four quadrants. Table 4 shows a floor-by-floor summary of samples scheduled to be collected for each of the analyte groups.

The following dust sample collection methods will be employed at the Site:

#### **Micro-Vacuum Sampling Methods**

A micro-vacuuming method may be employed to collect silica and the other COPCs from within the zones described above for certain sampling substrates, (e.g., carpeting). A pre-weighed PVC cassette (for silica) will be connected to a three foot length run of Tygon tubing (with a 45° angle



cut into the sample intake portion) on the sampling side and a pump set at a flow rate of 10.0 liters per minute on the intake side. Using a template, samples will be collected within a ten centimeter-by-ten centimeter area for a period of approximately two (2) minutes. Appropriate PPE, including coveralls, gloves, boots, and a HEPA filtered respirator will be worn by sampling technicians at all times. Samples will be placed in a sealed bag and kept cold during collection and holding/submittal to the approved analytical laboratory.

#### Bulk Dust Sampling Methods

Bulk sampling methods shall be used to collect dust for a determination of percentages of various silica species, i.e., crystalline versus amorphous. A clean laboratory scoop will be utilized to collect representative samples from non-porous surfaces where extensive dust is present. Appropriate PPE, including coveralls, gloves, boots, and a HEPA filtered respirator will be worn by sampling technicians at all times. It is anticipated that at least two such samples will be collected from each zone. Samples will be placed in a sealed bag and kept cold during collection and holding/submittal to the approved analytical laboratory.

#### Bulk Carpeting Sampling Methods

Bulk carpet sampling methods will also be employed to collect dioxin samples. A clean cutting tool will be utilized to remove a ten centimeter-by-ten centimeter area using a pre-cut template. Sample locations will be determined utilizing the protocol described above. Appropriate PPE, including coveralls, gloves, boots, and a HEPA filtered respirator will be worn by sampling technicians at all times. Samples will be placed in a sealed bag and kept cold during collection and holding/submittal to the approved analytical laboratory.

#### Wipe Sampling Methods

A wipe sampling method will be employed to collect PCBs, PAHs, and metals (including mercury) within the aforementioned zones. Wipe sampling will be the default sampling method in locations where no carpeting is present. Individual samples (per suitable wipe/matrix/container) for these parameters will be collected within a ten centimeter-by-ten centimeter templated area. PCBs and PAHs will be collected on sterile gauze pad treated with a 4:1 acetone/hexane mixture, while metals will be collected on a sterile gauze pad treated with deionized water. Appropriate PPE, including coveralls, gloves, boots, and a HEPA filtered respirator will be worn by sampling technicians at all times. Samples will be placed in a sealed bag and kept cold during collection and holding/submittal to the approved analytical laboratory.



## 2.4 **Visual Inspection for Mold**

Berger shall conduct a comprehensive visual site inspection of all areas within the Building to determine the presence of mold and or water infiltration. All suspect surfaces shall be identified and located on building floor plans. Berger shall accomplish all tasks necessary to identify any mold contamination present, which shall include, but is not necessarily limited to, the following:

1. Conducting a thorough onsite visual inspection of the accessible locations within the Building. Inspections shall be scheduled and coordinated and shall identify and document the condition of the suspected mold surfaces, the activity level and potential for disturbance based on usage, and other factors deemed appropriate; and
2. Indicating all areas either on a set of floor plans or schematic drawings or in tabular form.

Generally the locations within a building that require thorough visual inspection include the following: Air Conditioned Spaces, Areas of Concealed Condensation, Thermal Bridges, and Window Systems.

## 3.0 **EQUIPMENT DECONTAMINATION**

Given that primarily disposable tools/media shall be utilized during the sampling process, only limited equipment decontamination procedures will be necessary. Berger will ensure that dedicated (as opposed to re-usable) sample collection media will be utilized for each wipe/dust sample. The sampling pump to be utilized during micro-vacuum procedures will be kept in a toolbox and will not be handled. Extension cords, although present in the general sampling area, will not come in contact with the surfaces to be sampled. As a safety precaution, the outer case holding the sampling pump and the extension cord(s) shall be washed using sterile towelettes.



## 4.0 QUALITY ASSURANCE/ QUALITY CONTROL

All wipe/dust samples will be immediately placed in dedicated glass sample jars prior to being recorded on chain-of-custody forms and placed in chilled coolers. Samples will be preserved according to the specific method requirements and delivered to the laboratory within 24 hours of collection. The QA/QC samples proposed for the sampling program are presented in Table 1. Comprehensive details on QA/QC requirements for sampling collection and analytical methods are provided in the Quality Assurance Project Plan (QAPP).

## 5.0 SAMPLE IDENTIFICATION AND LABELING

In order to provide LMDC with easy reference information, a standardized sample and label identification program was established, using unique identification (ID) numbers. For Tasks 2 and 3, sample IDs should consist of the following:

- YY-S-H  
YY = Floor No.  
S = Sample No.  
H = Homogeneous Material ID Number

The sample container shall be labeled with the sample number and the Asbestos Field Survey Data Sheet shall be completed.

For Task 4, sample IDs should consist of the following:

- WXYYSZZV  
W = Analyte Group; A = Asbestos, C = Chemical  
X = Sampler #  
YY = Floor #  
S = Sample (constant)  
ZZ = Sample number  
V = Sampling event, e.g., A = 1st time, B = 2nd time (Used to distinguish between sampling events should a floor need to be re-visited to collect additional samples.)

The sample container shall be labeled with the sample number/ID, data collected, and the sampler's initials. The Sample Log Sheets should then be completed.



The information necessary to relate sample locations for reporting purposes should be documented on a Sampling Log Sheet-attached to the SAP. This log sheet must be completed for each sample collected. The information on this sheet is essential for proper completion of a sample results report and includes:

- Client and Facility information;
- Sample ID-assigned as above;
- Date/time sampled;
- Sampler;
- Room/area where sample came from- use client identifiers where possible;
- Equipment/area number if applicable-use client/facility numbers;
- Description of areas/items sampled; and
- Sketch of sample locations-for large areas, stacks of bins, or areas where definition of multiple swipe/swab locations is warranted.

A copy of the sample log sheet for each sample must be provided with the samples to the testing laboratory. Originals should be forwarded to the Task Manager and QC Manager for inclusion in the project file.

## **6.0 FIELD LOG BOOKS**

A bound Field Log Book is required to document all sampling and other information. The log book will be completed in indelible ink, will have bound numbered pages, and will be signed and initialed by all users on the inside front cover. Corrections to log entries, when required, will be made by a single-line cross out and dated and initialed by the person making the correction. Entries made into this logbook should include:

- Date of sampling event;
- Sample ID and reference to drawing;
- Time of Sample;
- Description of sample type/location;
- Any unusual information pertinent to the sample; and
- Initials of sampler.



## **7.0 CHAIN OF CUSTODY**

All samples must be transferred without exception to the appropriate analysis station under chain of custody. Standard Chain of Custody must be used for this purpose.

## **8.0 SAMPLE SHIPMENT**

Samples are to be treated in an appropriate and suitable manner for delivery to the analytical laboratory. All packaging and labels shall comply with Federal Department of Transportation regulations as provided in 49 CFR 171-178. Specific requirements for sample shipment are outlined in the QAPP.

# TABLES

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**Table 1**  
**Proposed Sample Collection and Analysis Parameters**

<b>Analytical Parameter</b>	<b>Number of Samples</b>	<b>Analytical Method</b>	<b>Sampling Media</b>	<b>Number of QC Samples</b>	<b>Total Number of Samples</b>
Asbestos, Friable	912	PLM	Bulk	46	958
Asbestos, NOB	620	PLM	Bulk	31	651
Asbestos, NOB	450	TEM	Bulk	N/A	450
Asbestos in Dust	772	PLM	Bulk	40	812
Silica in Dust	116	XRD	Bulk	16	132
Dioxin	116	8290	Wipe/Bulk	16	132
PAHs	116	8270C	Wipe/Bulk	16	132
PCBs	116	8082	Wipe/Bulk	16	132
Metals	116	6010B	Wipe/Bulk	16	132
Mercury	116	7471A	Wipe/Bulk	16	132
Notes:					
Polarized Light microscopy (PLM) as per NYSDOH ELAP 198.1					
Transmission Electron Microscopy (TEM) as per NYSDOH ELAP 198.4					
XRD per Modified NIOSH 7500					



**Table 2  
Proposed Sample Collection Requirements**

<b>Field Sample Matrix</b>	<b>Analytical Parameter</b>	<b>No. of Samples*</b>	<b>U.S. EPA Analytical Method</b>	<b>Sample Preservation</b>	<b>Holding Time (days)</b>	<b>Sample Container</b>
Gauze w/hexane	PAHs	132	8270	Refrigerate / keep dark	14/40	Glass Jar
Gauze w/hexane	PCBs	132	8082	Refrigerate	14/40	Glass Jar
Bulk or vacuum (PW PVC)	Silica	132	NIOSH 7500 Modified	None	N/A	Glass Jar
Gauze w/deionized water	Metals	132	6010B	None	180	Glass Jar
Gauze w/deionized water	Mercury	132	7471A	Refrigerate	28	Glass Jar
Gauze	Dioxin	132	8290	Refrigerate / keep dark	14/40	Glass Jar
*Includes QA samples.						
<b>SAFETY NOTE:</b> Electrically energized equipment shall be shut down, locked-out and tagged prior to sampling.						



**Table 3**  
**Proposed Sample Summary – COPC by Zone**

<b>BUILDING ZONE</b>	<b>NUMBER OF SAMPLES</b>
<b>ZONE 1 – Mechanical Rooms</b>	--
5 <sup>th</sup> Floor	14
41 <sup>st</sup> Floor	13
<b>Zone Total</b>	27
<b>ZONE 2 – Office Space Below 24<sup>th</sup> Floor</b>	--
18 <sup>th</sup> Floor	8
14 <sup>th</sup> Floor	6
12 <sup>th</sup> Floor	5
10 <sup>th</sup> Floor	4
6 <sup>th</sup> Floor	6
4 <sup>th</sup> Floor	7
2 <sup>nd</sup> Floor	6
Basement	2
Vault Area	1
<b>Zone Total</b>	45
<b>ZONE 3 – Office Space Above 24<sup>th</sup> Floor</b>	--
25 <sup>th</sup> Floor	4
27 <sup>th</sup> Floor	2
31 <sup>st</sup> Floor	4
35 <sup>th</sup> Floor	2
39 <sup>th</sup> Floor	7
40 <sup>th</sup> Floor	7
41 <sup>st</sup> Floor	7
<b>Zone Total</b>	33
<b>ZONE 4 – Remediated Gash Area</b>	--
7 <sup>th</sup> Floor	1
10 <sup>th</sup> Floor	1
12 <sup>th</sup> Floor	1
15 <sup>th</sup> Floor	1
17 <sup>th</sup> Floor	1
22 <sup>nd</sup> Floor	1
24 <sup>th</sup> Floor	1
<b>Zone Total</b>	7
<b>ZONE 5 – Roof</b>	--
Fresh Air Intakes	2
Exterior Curtain	2
<b>Zone Total</b>	4
<b>QA SAMPLES</b>	12
<b>TOTAL</b>	<b>132</b>



**Table 4  
Proposed Sample Summary by Floor**

Floor No.	No. of Bulk Asbestos Samples – Friable	No. of Bulk Asbestos Samples – Non-Friable Organically Bound	No. of Bulk Dust – Asbestos	No. of Bulk Dust - COPC
Vault				1
Basement	22	15	9	2
1	22	15	18	
2	22	15	18	6
3	22	15	18	
4	22	15	18	7
5	22	15	18	14
6	22	15	18	6
7	22	15	18	(1)*
8	22	15	18	
9	22	15	18	
10	22	15	18	4 (1)*
11	22	15	18	
12	22	15	18	5 (1)*
14	22	15	18	6
15	22	15	18	(1)*
16	22	15	18	
17	22	15	18	(1)*
18	22	15	18	8
19	22	15	18	
20	22	15	18	
21	22	15	18	
22	22	15	18	(1)*
23	22	15	18	
24	22	15	18	(1)*
25	22	15	18	4
26	22	15	18	
27	22	15	18	2
28	22	15	18	
29	22	15	18	
30	22	15	18	
31	22	15	18	4
32	22	15	18	
33	22	15	18	
34	22	15	18	
35	22	15	18	2
36	22	15	18	
37	22	15	18	
38	22	15	18	
39	22	15	18	7
40	22	15	18	7
41	22	15	18	20
Roof	10	5	18	4
TBD	0	0	14	12

COPC\*\* includes Dioxin, PAHs, PCBs, Metals, Mercury, and Silica  
 (1)\* - One set of COPC dust samples collected in Gash Area