BROWNFIELD CLEANUP PROGRAM

REMEDIAL INVESTIGATION WORK PLAN

FOR

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Remedial Bureau C
Division of Environmental Remediation

HNJ REALTY LLC.
FOR
SCHMUKLERS CLEANERS
358 - 364 North Avenue, New Rochelle, New York
Site No.: C360088
Index No.: A3-0542-0306

PREPARED FOR
NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
625 BROADWAY
ALBANY, NEW YORK 12233-7016

PREPARED BY

BERNINGER ENVIRONMENTAL, INC.

BEi

MARCH 2007

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1.0 INTRODUCTION

This Remedial Investigation Work Plan (Work Plan) has been developed pursuant to the requirements of an executed Brownfield Cleanup Agreement (dated February 27, 2006), between the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER)and HNJ Realty, LLC, the Volunteer. The Site is a commercial property located at 358 through 364 North Avenue, New Rochelle, New York (see Figures 1-3), fully described as Section 4 - Block 1206 - Lot 19 of the tax maps of City of New Rochelle. A metes and bounds description of Section 4 - Block 1206 - Lot 19 is included in Appendix A.

A Remedial Investigation Work Plan is required when available data collected by previous investigations demonstrates, and the NYSDEC concludes, that contamination is present at the Site.

1.1 Purpose

The purpose of a Remedial Investigation is to:

- Determine the nature and delineate the areal and vertical extent of contamination in all media for each area of potential environmental concern or that emanating from the Site;
- Delineate the surface and subsurface environmental media, including topography and depth to groundwater;
- Identify the source(s) of contamination, migration paths and actual or potential receptors of contamination on or through air, soil, sediment, groundwater, surface water, utilities and structures at the Site without regard to property boundaries;
- Collect and evaluate all necessary data to evaluate the actual and potential impact to public health and the environment;
- Evaluation of historical and known locations of Above and Underground Storage Tanks (ASTs and USTs);
- Collect data to facilitate selection and design of remedial action alternatives; and
- Identify collected data needed for monitoring natural attenuation, potential feasible cleanup technologies and presumptive remedies.

2.0 SITE HISTORY

2.1 Physical Site Description

Site Name: Schmukler's Dry Cleaners
358 through 364 North Avenue, New Rochelle, New York

Owner: HNJ Realty, LLC

Location: 358 through 364 North Avenue, New Rochelle, New York

Latitude -73.784480", Longitude "40.914176"

Brownfield Cleanup Agreement: Site No.: C360088
Index No.: A3-0542-0306

2.2 Site Description, History of Ownership and Land Use

The subject property consists of a partial two-story/part one-story commercial building on a 0.21 acre parcel identified as the street addresses 358 through 364 North Avenue, New Rochelle, New York. The subject parcel is located in the City of New Rochelle, County of Westchester. The property is assessed as 0.21 acres in size and improved with a commercial building constructed in 1914. The owner of record of the subject property is HNJ Realty, LLC[1].

According to the 2005 tax roll information, the prior owner of record was listed as Gerald Colomb.[2] His address is listed as 3260 South Shore Drive Apt. 63C, Punta Gorda, Florida 33955. The property was acquired by Mr. Colomb on December 26, 1979 and sold to current owner on August 23, 2005. Mr. Colomb has no relationship with the volunteer. Prior to Mr. Colomb's ownership, Mr. James McGoey and Sons, Inc.(address-unknown) acquired the property on August 1, 1967. This prior owner also has no relationship with the volunteer. Prior to McGoey, Ms. Eva Schmukler (address unknown); acquired the property on August 1, 1921; she also had no relationship with the volunteer.

The building on the Site is and has been operated by Schmukler's Cleaners since 1914. The current co-owners of Schmukler's Cleaners (business) are Patrick Korbel and Tom Briter. This business has

[1] According to the information provided by the client.

[2] The on-line records have not been updated to reflect the recent change of ownership with the current owner being HNJ Realty, LLC.

historically operated on the first floor and in the basement of the building. Currently, All Sports Athletic Wear (single tenant) is also located on the first floor. On the second floor of the building are attorneys' offices, tourism offices and other professional businesses. These types of services also made up the past uses of the second floor of the building.

Historical Development and Use

According to review of the City of New Rochelle records, as well as a review of historical Sanborn Fire Insurance Maps, the subject property was developed as early as 1891 with two residential-use buildings. The property was subsequently redeveloped with a multi-tenant two-story commercial building. The first floor and basement of the building have been utilized by Schmukler's Dry Cleaners since around 1914. An addition was made to the western portion of the building circa 1937. An addition was also made to the southwestern portion of the building sometime prior to 1987. A final addition was made to the northwestern portion of the building (which includes the steam boiler) in 1987.

In order to confirm the historical pattern of development, Environmental Data Resources, Inc. (EDR) performed a search of historic Sanborn fire insurance maps at the subject property. Based upon this request, Sanborn provided maps from the years 1896, 1903, 1911, 1931, 1942, 1951 and 1990 through 1996 (see Phase I ESA in BCP application package) whose areal extent encompassed the subject Site.

1896: The subject property is developed with two detached residential dwellings. The immediate surrounding area is somewhat heavily developed with a mixture of residential and commercial uses, including a grocery and printing shop adjacent to the south along North Avenue.

1903: The subject property remains generally unchanged. A laundry facility is depicted further to the south of the property along North Avenue.

1911: The subject property remains generally unchanged. A 5,000 gallon water tank is depicted on

the roof of the laundry facility located to the south of the property along North Avenue.

1931: The subject property has been redeveloped with a two-story multi-tenant commercial building and detached residential dwelling. Commercial development has increased along North Avenue.

1942: The subject property remains unchanged and is listed as occupied by the New Rochelle Realty Co. The immediate surrounding property remains generally unchanged.

1951: The subject property and immediate surrounding area remain generally unchanged.

1990: The subject property is depicted as occupied by a dry-cleaning operation. The northern portion of the subject building is depicted as occupied by a publicly-operated facility. The former laundry building located to the south of the property is also depicted as occupied by a publicly-operated facility.

1991 to 1996: The subject property and immediate surrounding area remain generally unchanged.

Current Use (Year 2005 Site Inspection)

As part of due diligence, the property was inspected on October 5, 2005 by BEI representatives William Schlageter, Jill Haimson, CGWP, PG and Walter Berninger. The property was investigated as to use, surrounding area, Site topography, general evidence of dumping and/or filling, storage of hazardous materials, Site maintenance and/or other indications of potential contamination. It should be noted that the Site inspection was limited to the basement, first floor and exterior portions of the property. Access was not provided to second floor commercial tenant space. Details discussed below are depicted in photographic log provided in Appendix B.

The subject property was observed to be currently occupied by a part two-story/part one-story multi-tenant commercial building with an address of 358 through 364 North Avenue. The first floor tenant space of 358 North Avenue was noted to be currently occupied by All American Sports Wear, an

embroidery and silk screening facility for sporting apparel. Interior features within this tenants' unit noted during the inspection included silk screening equipment, one gallon containers of clothing dye/ink, one gallon containers of mineral spirits, a slop sink, a mercury exposure machine (which utilizes a mercury ultra violet process and generates no mercury waste other than the bulb), containers of emulsifiers and clothing stock. The slop sink was noted to be heavily stained with clothing dyes and inks, however, same was confirmed via record research to discharge to the municipal sewer system since building construction.

The remainder of the first floor of the subject property and the entire basement of the building is occupied by Schmukler's Cleaners, a dry-cleaning operation for clothing, carpet and upholstery. The basement of the building is only located beneath the eastern original portion of the subject building. The southern portion of the basement contained a clothing rack conveyor system which consists of a continuous motorized loop between the basement and the first floor of the cleaners.

The basement was observed to contain an air compressor located along the western central wall beneath a stair case, utilized in the dry-cleaning operations. No staining or evidence of the release of compressor oil or hydraulic fluid was observed in the vicinity of the compressor. What appeared to be spent or old equipment filters were observed within a closed window well adjacent to the compressor. The source of these filters is unknown, however same may have been utilized in dry cleaning operations.

To the south of the compressor and along the interior western wall of the basement two out-of-service copper lines were noted that entered the western wall of the building. The two copper lines were observed by BEI to be indicative of those associated with a No. 2 fuel oil tank. Based upon the line direction, this tank would have been potentially located adjacent to the original western wall of the building. To the south of the copper lines was a small area of raised ceramic tiled floor that appeared to have been associated with a former bathroom (demolished and removed) within the basement.

A boiler room located at the southeastern corner of the basement contained documentation indicating that same had once contained an oil-fired boiler system. The boiler currently present within this boiler room was confirmed by BEI to be a natural gas-fired system. A boiler blow-down

pit was identified at the western portion of the boiler room. The pit contained a sump pump atop of the exposed ground surface within the pit. No evidence of release of petroleum products was observed within the pit, however the pit is considered to be a Class V injection well and is subject to regulations set forth in the United States Environmental Protection Agency (USEPA) Underground Injection Control (UIC) Program). No discharge records are available for blow-down pit discharges.

The entire floor of the basement was noted to be an uneven concrete surface with numerous depressed areas, adjacent to what appeared to be former concrete footings. An approximate 5 feet wide by 7 feet long area of water-stained concrete floor was observed at the south central portion of the basement. A one-inch diameter hole was observed within the central portion of the stained concrete, likely installed for drainage purposes. The northern portion of the basement contained a limited amount of miscellaneous items associated with building maintenance, (working quantities of lubricants, grease, ice melt, etc.). Significant portions of steam piping within the basement were observed to be wrapped in suspect friable asbestos-containing pipe insulation. Much of this insulation was noted to be in poor condition.

Two floor drains were noted within the floor at the northeastern corner of the basement. The discharge points of these drains are unknown, however if these drains discharge in-situ, they would be subject to regulations set forth by the USEPA UIC program. A large concrete bottom sump pit was located to the north of the two floor drains.

The building's natural gas service enters the building along the eastern basement wall, to the south of the floor drains. Adjacent to the north of the natural gas service meter, is a rectangular-shaped discoloration of the concrete floor potentially indicating the former location of an aboveground storage tank (AST). Four out-of-service fuel oil fill ports were observed adjacent to the exterior (North Avenue) western wall of the building.

The first floor of the Schmukler's Cleaners facility consists of typical features associated with a dry-cleaning operation. The eastern portion of the cleaners contained the customer counter and waiting areas, storage, employees' lunchroom, hand ironing area, tailoring area and the terminus of the clothing conveyor system. The western (one-story) portion of the dry cleaners' facility contained the

mechanical operations. The northwestern portions of the building contained the steam boiler room and steam presses. The steam boiler room, situated at the northwest corner of the building contains a large steam boiler and associated support equipment. A blow-down pit is located within the steam boiler room, the discharge point of the blow-down pit is unknown, however due to proximity, this pit may be directed to the sub-grade drywell previously identified by BEI to be situated within the grass-covered area, at the northwestern portion of the property. No discharge records are available for the blow-down pit discharges.

A steam vent pipe was observed to exit the western wall of the steam boiler room. The steam vent pipe leads to a pipe which extends vertically downward into the ground surface of an adjoining vegetable planter. This downward pipe has the potential to discharge steam condensate to the ground surface in this area. Adjacent, to the southeast of the steam boiler room, is the steam press area. Several steam presses fed via the steam boiler were observed within this area. Several containers of starch and spot remover were observed within the steam press area.

To the south of the steam press area is a small rectangular room which contains several commercial clothes washing and dryer machines. Numerous five gallon containers of laundry detergent were observed stored atop of the wood and concrete floor of the building. The discharge point of one of the commercial washing machines was noted to be to a slop sink along the northern wall of the room. The sink was noted to be stained during the Site inspection. A bathroom is located at the western portion of this room. No discharge records are available for any slop sinks.

This room is reported to have formerly housed dry-cleaning equipment. As detailed in Section 3.0, *Summary of Past Investigation*, soil borings were installed within this room as part of BEI's due diligence activities. Soil samples collected from beneath the floor of this room exhibited both field and/or laboratory evidence of impacts from dry-cleaning activities. More specifically, the dry-cleaning chemical PCE was detected in two of the soil samples at actionable concentrations.
To the south of the former dry-cleaning equipment room is the current dry-cleaning equipment room. This room contains a RealStar RS 640 dry-cleaning machine. Several containers of dry-cleaning chemicals and PCE usage logs, operations notes, etc. were observed within the room. The dry-cleaning equipment was noted to be contained within a secondary containment unit. An evaporator

and still unit is located along the southern wall of the dry-cleaning equipment room. Several small containers of dry-cleaning chemicals were observed within the equipment room.

A one-inch diameter out-of-service pipe was noted protruding from the exterior southern wall of the equipment room. The purpose of this pipe is unknown, and as the interior walls of the equipment room have been resurfaced since this pipe was in-service, the prior use of this pipe could not be ascertained.

The southwestern corner of the dry cleaning equipment room is separately utilized for the storage of spent dry-cleaning chemicals, which is classified as hazardous waste. Several containers of waste were observed within the storage room. The floors within the hazardous waste storage room were observed to be coated poured concrete, with concrete-block walls. The floors were observed in fair condition, with some minor cracks. No floor drains were observed. Limited evidence of spills or leakage was noted within the storage room.

The rear western exterior portions of the subject property consist of concrete-paved and landscaped areas. A small diameter storm drain is located within the concrete-paved walkway, adjacent to a rear exit door, off the central western wall of the building. Piping was observed to enter the eastern side of the drain from an unknown interior location. An additional pipe was observed to exit the storm drain to the northwest toward a sub-grade drywell, shown in Site plans maintained by the City of New Rochelle Building Department as located beneath the grass-covered area. Soil samples collected from the small drain were determined to contain PCE at actionable concentrations.

2.3 Adjacent Property Land Use

North: Vacant commercial building, Lockwood Avenue, Gothic Cabinet and several commercial buildings and Getty Gasoline Service Station along North Avenue.

West: A residential apartment building, a printing facility and additional residential

development.

East: North Avenue, Beautiful Queen Nail Salon, Olga's Beauty Salon and additional commercial uses.

South: Several commercial facilities including Love Music, Touba Upholstery & Decorators and Fenway Floor Coverings.

2.4 Geographic Setting

The City of New Rochelle is located along the north shore of the Long Island Sound. According to the Surficial Geology Map of New York Lower Hudson Sheet produced by the University of the State of New York; State Education Department, 1989, the subject property is located in one of five physiographic provinces, known as the Hudson-Mohawk Lowlands. The Hudson-Mohawk Lowlands is the predominant, if not dominant, physiographic province of the eastern part of the State. This physiographic province consists of the valleys of the Hudson and Mohawk Rivers, from the Lake George/Lake Champlain area in the north and the St. Johnsville area in the west, south to the vicinity of Harriman in Orange County.

Surficial geologic deposits distributed throughout the Hudson Valley consist of almost all of the types of glacial deposits that are associated with continental glaciation. The ice deposited a thick sequence of till over much of the area in the form of ground moraine (lodgement till), drumlins and later, ablation till. The Hudson-Mohawk Lowlands experienced all of this glaciation. It then became the host area for a large glacial lake, Lake Albany, and its various related stages, which extended north from an ice dam located in the vicinity of Bear Mountain in the Lower Hudson Valley to the receding ice front. Lake Albany expanded as the ice receded and eventually covered the land north to the Lake George/Lake Champlain area and west up the Mohawk Valley to the vicinity of

Rotterdam. Tens of feet of silt and clay were deposited in this lake, which, at its maximum size, reached an approximate elevation of 350 to 360 feet amsl in the Albany area. Beneath the Hudson -Mohawk Lowlands are beds of Ordovician shale, sandstone and limestone.

2.5 Hydrogeology and Surface Water

According to the Surficial Geology Map of New York Lower Hudson Sheet produced by the University of the State of New York; State Education Department, 1989, the subject property is located within an area of New York where the surficial geology is defined as glacial till. The till is described as variable texture (e.g., clay, silt-clay, boulder clay), usually poorly sorted, which was deposited beneath glacial ice. The till is generally characterized by mixtures of relatively impermeable loamy matrix-to-sandy in areas underlain by gneiss or sandstone. The thickness of the till varies between one and 50 meters.

During recent Phase II Environmental Site Assessment (ESA) activities, refusal was encountered in soil borings at depths of 11.5 feet bgs. This refusal was the result of bedrock present beneath the surface. Rock fragments (weathered bedrock) were retrieved from the sampling core at the refusal depths. Based upon field observations of these rock chips, the underlying bedrock was metamorphic in nature and was consistent with a gneiss.

The subject property is located in the eastern portion of the City of New Rochelle and groundwater flow direction could not be determined from published information. As groundwater is not used as a potable water source in the Site vicinity, current groundwater quality data are very limited. No water table elevation maps are available for the City of New Rochelle. However, given both the surface and bedrock topography in the area (which generally slopes down toward the Long Island Sound), groundwater flow in unconsolidated deposits and/or upper weathered bedrock is likely easterly-southeasterly, toward the Long Island Sound.

Due to the variable geology of the Site vicinity (till and glacial sediments atop of bedrock) the specific depth to groundwater cannot be determined from available information. No Site specific groundwater data has been established for the subject property to date. Due to the heavily developed

nature of the immediate surrounding area, groundwater quality is expected to be regionally degraded.

No surface water bodies are located on, adjoining or proximate to the subject property. Ferris Creek and The Long Island Sound are located approximately 3,250 feet to the east/southeast of the subject property. Soil borings conducted by BEI in the Spring of 2005 encountered refusal at 11.5 feet below

grade surface (bgs), due to the presence of bedrock. Groundwater was not encountered at any of the borings indicating that groundwater is not present in the unconsolidated deposits underlying the subject property. Therefore, groundwater is likely present deeper, within fractured or weathered bedrock zone, at an unknown distance beneath the land surface.

In October 2005, BEI did observe several groundwater monitoring wells within the sidewalk adjacent to an out-of-service gasoline service station, located approximately 1/4-mile to the north of the subject property, along North Avenue. Standing groundwater was encountered within the well at approximately 10 feet bgs. The bottom of the well was measured at approximately 15 feet bgs.

According to Freshwater Wetland, National Wetland Inventory, Westchester Wetlands and Tidal Wetlands data available on the Westchester County GIS System, there are no regulated wetlands on or adjoining the subject property.

2.6 Topography

The subject property is located at an elevation of approximately 80 feet above mean sea level according to review of USGS Topographic Map, Mount Vernon Quadrangle (Figure 1).

2.7 Water Supply Wells

Public water is provided to the subject property by United Water New Rochelle. No on-Site potable or dry cleaning or washing make-up supply wells, active or inactive, were observed during the inspection. According to information provided by United Water, the supply source is surface water that is purchased from the New York City Department of Environmental Protection (NYCDEP). The three sources of New York City supply that is utilized includes the Croton, Catskill and Delaware Aqueducts. The Central Avenue and little Catskill pump stations supply the day to day demands to the system.

2.8 Drainage Pattern

The subject property is located in the eastern portion of the City of New Rochelle and groundwater and/or surface water flow direction could not be determined from published information. However, given both the surface and bedrock topography in the area (which generally slopes down toward the

Long Island Sound), overland surface water flow within the study area is likely easterly-southeasterly, toward the Long Island Sound. At the subject property, stormwater runoff discharges to the ground surface and to one or more stormwater drywells located exterior of the building. Some or all of the stormwater drains in-situ via the drainage structures. The disposition of any municipally-controlled stormwater runoff (e.g., into catch basins, street drainage, etc.) is not known at this time. At the subject property, sanitary wastewater disposal is currently to a separate municipal system.

2.9 Soils

According to the Surficial Geology Map of New York Lower Hudson Sheet produced by the University of the State of New York; State Education Department, 1989, the surficial soils at the subject property are comprised of glacial till. The till varies in thickness from 1-50 meters, is relatively impermeable loamy matrix and can cause potential land instability on steep slopes.

2.10 Infrastructure

As the subject property is located within the City of New Rochelle, Westchester County, BEI contacted the City of New Rochelle Building Department, Fire Department, Department of Public Works and Tax Assessor, along with the Westchester County Department of Health to establish as complete as possible construction, development and infrastructure history for the subject property. These records are summarized as follows and were previously provided in the Phase I ESA included with the BCP application.

Permit No. 637 was issued on July 23, 1913 for the construction of a two-story brick building for use as offices and stores. The building card indicates that the building was completed in 1914. Permit No. 17167 was issued on March 18, 1937 for an addition to the building. Permit No. 21827 was issued on November 15, 1947 for alterations to the existing building. Physical records for the three aforementioned permits were not maintained by the Building Department.

Permit No. 42059 was issued on July 2, 1987 for a 1,029 square foot addition to the existing dry-

cleaning facility. According to plans dated August 12, 1987 and maintained within the Building Department records, the proposed addition was to be located at the northwestern portion of the property and would include the steam boiler room. The plans indicated that the one-story addition, which currently houses the hazardous waste storage room and current dry-cleaning equipment room, existed as of the date of the plan. The aforementioned plans indicate that the storm drain located within the concrete-paved area exterior to the rear (western) wall of the building, discharges to a sub-grade drywell located within the grass-covered area at the northwestern portion of the property. The plan also depicts drainage from the steam boiler room directed to the drywell. The type of discharge from the steam boiler area is anticipated to be from boiler blow-down and condensate. Basement plans indicated that boilers were located within the northeastern and southeastern portions of the basement. A large square feature was depicted at the south/central portion of the basement, the purpose of which is unknown.

Permit No. 44488 was issued on March 11, 1991 to legalize the existing one-story addition to the southwestern portion of the building. Photographs attached to the plans indicated that the areas adjacent to the hazardous waste storage rooms and along the exterior western wall of the building were exposed soil areas.

The permit indicated that dry cleaning equipment within the facility was a Multimatic Shop Star 500. A Fire Department Permit was included within the permit package indicating that the facility is permitted for use as a dry-cleaning establishment.

No plumbing or heating plans were included within the building department files. Records maintained by the Department of Public Works were provided for review on October 5, 2005. Records indicated that two sewer connections are on file for the property. The first connection is listed as having occurred in 1891 and is assumed to have been associated with the residential use of the subject property prior to the existing commercial building. The second connection is listed as having occurred in 1913 and is assumed to be associated with the construction of the existing

commercial building. The property is located within the C-2 Zoning district and is assessed as having municipal sewer tax applied.

Due to the on-site activities (dry cleaning and silk screening), hazardous waste is inherently stored and handled on-site. Waste and virgin dry-cleaning chemicals are stored within the hazardous material storage room at the southwestern portion of the building.

The facility is listed on the USEPA RCRA database as a small quantity hazardous waste generator, generating between 100 and 1,000 kilograms of hazardous waste monthly. Waste listed on the database registry included tetrachloroethene and associated break down products, lead and chromium. (The source of the lead and chromium are unknown). Several violations were identified to have historically been issued to the property, however, all have apparently been satisfied.

The portion of the subject building which was reported to have been constructed circa 1937 is reported to have at one time housed a PCE storage tank, however, no records confirming the presence of this tank have been provided. Sanitary wastewater disposal is currently to the municipal sewer system. Stormwater runoff discharges to the ground surface and to a stormwater drywell located exterior to the western wall of the building.

3.0 SUMMARY OF PAST INVESTIGATIONS

A Phase II Site Investigation was conducted prior to Phase I Environmental Site Assessment as the Phase II was performed for due diligence purposes while the Phase I was specifically prepared for the BCP application process.

Phase II Environmental Site Investigation, April and May 2005

Due Diligence activities were conducted by BEI in April and May of 2005 (previously provided as an attachment to the BCP application). These activities included the installation of nine soil borings (GP-1 through GP-9) utilizing GeoProbe® drilling technology, as well as hand boring equipment. Soil samples were collected on a nominal continuous basis, field screened for the visual or olfactory presence of contaminants, as well as for volatile organic compounds (VOCs) utilizing a Photoionization Detector (PID)[3] and containerized for submission for laboratory analysis.

Soil borings were installed within the current dry-cleaning equipment room (GP-1 and GP-2), within the reported former dry-cleaning equipment room (GP-3, GP-7 and GP-8), within the basement of the original building (GP-5 and GP-6), within a storm drain located within a concrete walkway exterior to a rear door (GP-4) and within a grass-covered area at the western portion of the property (GP-9).

Results of the testing program confirmed that the dry-cleaning chemical tetrachloroethene (PCE) was present within shallow soil samples (0 to 4 ft bgs) collected from GP-3, GP-4 and GP-7 at concentrations exceeding applicable New York State Department of Environmental Conservation (NYSDEC) Recommended Soil Clean-up Objectives (RSCOs) set forth in the *NYSDEC Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels* revised in 1995 and updated in 2001. The VOC 1,2,3-trichloropropane (a solvent) was also detected in the GP-5 sample at a concentration also in exceedance of its NYSDEC RSCO.

During the May 19, 2005 investigation activities, elevated PID readings (at limit of instrumentation) were noted in soil samples collected from GeoProbe® borings GP-3 and GP-7, at depths between 6 and 11 feet bgs. These type of PID responses are typically indicative of a significant impact to

[3]A PID is a portable field instrument capable of detecting a wide range of VOCs.

soils.

Soil borings were installed to a depth of eleven feet bgs at which depth refusal was encountered as a result of bedrock present beneath the surface. Rock fragments were present within the sampling core. Groundwater was not present at any of the soil borings.

Based upon the above investigation, NYSDEC Spill No. 05-05438 was assigned to the subject property on August 3, 2005. Subsequent to the issuance of a spill, the subject property was accepted into the NYSDEC Brownfield Clean-up Program (BCP).

Historic building plans depict the storm drain sampled by BEI discharges to a sub-grade drywell located within the grass-covered area at the northwestern portion of the property. The plan also depicts drainage from the steam boiler room, directed to the drywell.

Phase I Environmental Site Assessment (ESA) - October 2005

BEI performed a Phase I ESA of the 358 to 364 North Avenue, New Rochelle, New York property as part of due diligence. The Phase I ESA revealed evidence of recognized environmental conditions and potential environmental concerns as follows:

- Prior sampling and analysis of soil samples from the subject property confirmed impacts with actionable PCE concentrations. Specifically, soils within the exterior (at grade) storm drain were determined to be impacted with PCE. NYSDEC Spill No. 05-05438 was issued to the property. Furthermore, Site plans indicate that this storm drain is likely connected to a subgrade drywell located within the grass-covered area at the northwestern portion of the property. The plans also indicate that a discharge emanating from the steam boiler room is also directed to the subgrade drywell;
- Although groundwater was not encountered before refusal by bedrock, if soil conditions are not addressed, there is the potential for groundwater to become impacted from historic dry-cleaning activities;
- Based upon Site inspection, the potential exists that a UST may have been present at the Site (new dry cleaning equipment room) prior to 1987. Should a fuel oil UST have been present

within this location, prior to the construction of this portion of the building, the soils and/or groundwater in the immediate vicinity of the potential UST could have been impacted with fuel oil;

- A knowledgeable party indicated that a UST had been abandoned in-place at the subject property. No documentation has been provided regarding the location or abandonment of this UST;

- Several depressed areas and holes were observed within the poured concrete slab floor of the basement. Soils underlying the basement slab have the potential to have been impacted from historic dry-cleaning activities;

- Spent or old filters were observed within a window well adjacent to the compressor in the basement. Therefore, soils within the window well have the potential to have been impacted from any discharges associated with these filters;

- Two floor drains and a sump pit are present within the northeastern portion of the basement. The discharge points of these drains are unknown, however, should the drains discharge in-situ, the potential exists that bottom sediments within same are impacted with dry-cleaning chemicals;

- The boiler blow down pit located within the boiler room at the southeastern corner of the basement was observed to discharge in-situ, which makes the structure regulated by the USEPA UIC program. The potential exists that blow down from the boiler has impacted bottom sediments within the pit;

- A vent for the steam boiler may give rise to condensate and inadvertent discharges into a vegetable planter (in use) at the subject property;

- According to plans maintained within the building department, the area adjacent to the hazardous waste storage room had previously been exposed soil, prior to the construction of the existing planters. The potential exists that these formerly exposed soils may have been impacted from inadvertent releases from dry-cleaning chemicals stored proximate to these areas;

- Due to the age of the building, the presence of lead-based paint is likely. However, painted surfaces were noted in good condition with no peeling or flaking evident; and

- Suspect asbestos-containing, pipe and pipe joint insulation, ceiling and floor tiles were noted within the building. Due to the age of the structure, the presence of asbestos-containing materials in roofing and construction materials is likely.

4.0 EXPOSURE ASSESSMENT

To perform a qualitative exposure assessment, Site conditions are characterized to evaluate whether a property poses an existing or potential hazard to the exposed or potentially exposed population. Site characterization involves a review of sampling data for exposed media and an evaluation of the physical conditions of the contaminant sources or physical hazards near the Site which may pose an additional health risk to the community.

The reported concentrations of volatile organic compounds such as tetrachloroethene and its degradation products at the Site were evaluated in a three-step process. First, an analysis was conducted to identify potential exposure pathways. Second, concentrations of the chemicals of concern were assigned to the exposure points for each pathway based on the Site data. Third, the exposure point concentrations were compared to acceptable levels to determine if those concentrations could pose an unacceptable risk to human health. If the original source is unknown, the environmental media (soil, air, water, etc.) is evaluated at its point of exposure.

According to limited available Site data, elevated concentrations of dry-cleaning related VOCs were present in shallow soils in a small drywell exterior to the rear door. This drywell likely overflows to an additional subgrade structure. Additional suspect soils impacts by VOCs are present under the dry cleaning equipment room; same were identified by field screening of soils during due diligence. The soils were at depths between 2 and 11 feet bgs (depth of bedrock).

The historic data were evaluated in a three-step process in the performance of a qualitative exposure assessment. The first step in this analysis was the identification of potential exposure pathways. Second, concentrations of the chemicals of concern were assigned to the exposure points for each pathway based on the Site data. Third, if applicable, the exposure point concentrations were compared to acceptable levels to determine if those concentrations could pose an unacceptable risk to human health.

4.1 Exposure Pathways Analysis

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a Site. An exposure pathway has five elements: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and (5) a receptor population.

An exposure pathway is complete when all five elements of an exposure pathway are documented; a potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway is not documented. Any exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present and will never exist in the future. Potential exposure pathways for volatile organic compounds in the soils and groundwater can include: 1) soil contact via ingestion or dermal; 2) ingestion of groundwater; and 3) discharge of groundwater to surface water with subsequent exposures.

At this time, the known Site media containing contaminants is the presence of VOCs in the shallow subsurface soils between 2 and 11 feet bgs. No groundwater was encountered in the unconsolidated soils at the Site and bedrock appeared to be a relatively impermeable gneiss. Therefore it is unknown if groundwater impacts have occurred and/or the distribution of same. However, potential exposure pathways for the chlorinated solvents such as those associated with dry cleaning operations can include: 1) inhalation of indoor or outdoor air containing VOCs that volatilized from underlying soils and/or groundwater; 2) direct soil contact; 3) ingestion of groundwater; and 4) discharge of groundwater to surface water with subsequent exposures. Potential receptors for each of these exposure pathways are identified below.

4.1.1 *Soil Contact Exposure Pathway*

The previous investigations identified actionable concentrations of the PCE in the shallow subsurface soils in drains or under concrete. Ultimately Site remediation will be performed that will include any required health and safety protection for remedial workers and will serve to mitigate this

issue. Therefore, no completed soil contact exposure pathways are projected relative to drainage structures, even during the remediation process. Remediation will include on-Site and community air monitoring with the utilization of proper engineering controls or personal protection to mitigate any potential exposure pathways.

At this time, other known soil impacts are under concrete surfaces. This concrete covering provides mitigation of the soil contact pathway at the subject property until remedial measures can be implemented. No degree of significant contact with the shallow or subsurface Site soils can occur under current conditions. Therefore, this exposure pathway is currently not considered to be a completed pathway.

As the BCP remedial investigation is performed and completed, other more direct soil contact pathways (such as the planter boxes) may become apparent after data validation. If this exposure pathway is determined to be complete or possess a high likelihood of potential impacts to human health, an immediate recommendation will be set forth for the implementation of some form of protective barrier as an interim remedial measure until the final remedial selections made for the subject Site are completed.

As a remedial program may require a deed restriction relative to the restricted use, it is anticipated that no alterations will be allowable relative to the building or infrastructure that would enable an exposure to any subgrade remaining impacted soils. Any remaining potential exposure pathways will be evaluated at that time as part of the justification for the remedy selection.

The transport mechanism of contaminants through soil is gravity drainage near the release source until contact with groundwater. Contaminant transport by advection and diffusion in groundwater or surface water can respectively cause additional soil or sediment contamination on- and off-site. This is limited however, to a zone of soil/sediment in contact with groundwater/surface water. At this time, the depth of soil contamination has not been fully delineated nor has saturated unconsolidated soils been identified. Therefore, no groundwater contamination has been identified

at the subject property, so this exposure pathway is not considered a completed pathway at this time. A scope of work to further evaluate soil and groundwater (if encountered) has been set forth in the remedial investigation work plan to evaluate these potential exposure pathways.

Unless construction excavation to groundwater occurs, the soil contact exposure will not be a completed exposure pathway relative to this issue. Therefore, the only potential exposure pathway associated with the previously identified organic compounds in shallow subgrade soils is via the inhalation migration pathway.

4.1.2 *Inhalation Exposure Pathways*

For inhalation exposures, potential receptors under current and future conditions would include workers and customers at the Site as well as possible occupants of proximate commercial businesses and residential homes.

The potential exposure pathway at the Site itself is the inhalation of indoor and outdoor air by Site workers, tenants and business customers. The building foundation itself was observed to be in good condition and a portion of the property (front and side) is concrete or asphalt-paved. The rear of the property is grassed and vegetated; however, this area is accessible on a limited basis only for workers, tenant or the occupants of the rear residence. Inhalation of outdoor air will be further evaluated under the remedial investigation. The potential exposure pathway of the inhalation of indoor air will also be further evaluated under the remedial investigation. As the building is constructed as a partial basement; the basement is unoccupied. However, as the revolving clothes rack is present in the basement, and the basement is partially open to the first floor, the basement level will also require evaluation relative to this potential exposure pathway.

The nearest potential receptors are occupants of the residence to the rear of the building (west) as well as the surrounding proximate commercial businesses to the north and south. The rear of the property is a vegetated land surface (lawn). The land surface areas at the commercial properties are generally impervious materials such as concrete or asphalt pavement. The remedial investigation

provides a scope to further evaluate exposure pathways for proximate receptors. If groundwater contamination is identified migrating from the subject property, this exposure pathway may require supplemental evaluation, dependent upon the results of the complete set of media testing data.

4.1.3 *Groundwater Ingestion Pathway*

Previous research of the study area determined that potable water is supplied to the area by the United Water New Rochelle. No on-site potable or dry cleaning or washing make-up supply wells, active or inactive, were observed during the inspection.

According to information provided by United Water, the supply source is surface water from the New York City supply: the Croton, Catskill and Delaware Aqueducts. Based upon this factor, there is no potential that any discharges into groundwater at the subject property will affect a local public water supply. Furthermore, groundwater has not been encountered yet at depth (only bedrock). Therefore, a preliminary evaluation of the potential for groundwater impacts from the study property indicates a negligible likelihood for impacts to public potable water supply. Furthermore, the subject property is situated in a long-term urbanized setting that historically results in some degree of degraded water quality. Based upon the aforementioned, the potential for groundwater ingestion is not considered to be a completed exposure pathway. This pathway will be further evaluated under the investigation process, relative to any private wells that may be identified in the future.

4.1.3 *Discharge of Groundwater to Surface Water Pathway*

At this time, the presence of a distinct aquifer or sufficient groundwater at the subject property has not been identified. However, given both the surface and bedrock topography in the area, any groundwater flow will most likely be toward the Long Island Sound. This distance is more than 3,200 feet away, therefore, discharge of groundwater to surface water pathway is not considered a completed exposure pathway at this time.

4.2 Exposure Assessment Summary

A qualitative exposure assessment has been performed that has not identified any completed

potential exposure pathways. The potential exposure pathways that have been identified will be re-evaluated at the completion of the remedial investigation. Any conclusions made regarding exposure pathways will be made only after the validated RI data is received.

5.0 WORK PLAN OBJECTIVES

The objective and scope of this work plan is two-fold: 1) delineation of the nature and extent of dry-cleaning related contamination to the satisfaction of the NYS-DEC. In addition, the investigation focus will include continued efforts to identify actual or potential impacts to sensitive receptors or complete exposure pathways.

5.1 Potential Environmental Concerns

The subject property has been historically sewered by the municipality (circa 1913) and connected to public potable water supply. Local groundwater is not used as a potable water source in the Site vicinity. Based on prior studies, soils at the subject property are known to be impacted with actionable PCE concentrations. Therefore, the major issues of public concern have been identified to include the following:

- Soils (bottom sediments) within the storm drainage structure(s) are impacted; this indicates the potential for migration or discharge of impacted stormwater on-site and possibly off-site to adjoining properties and/or into the municipal system.

- On-site soils underlying the building at the subject property are likely impacted by historic dry cleaning operations. Although groundwater has not been identified in the unconsolidated zone, these soils must be addressed in order to reduce the potential for vapor migration and groundwater (expected to be present within weathered or fractured bedrock) impacts.

- The potential exists for condensate from a boiler blow-down vent pipe to have impacted soils in proximate ornamental and vegetable planters; and

- The potential exists that a UST had been present in a portion of the building, the soils and/or groundwater in the immediate vicinity of the potential UST could have been impacted with fuel oil.

Therefore, the focus of the remedial investigation specified in this work plan is the required investigation of on-site conditions and off-site, as necessary. As part of the proposed future remedial action selection process, a Track 2 Restricted Commercial Use Soil Cleanup is proposed for this Site. This track utilizes, as far as practicable, the generic restricted commercial soil cleanup objectives for Volatile Organic Compounds (VOCs) for the protection of human health set forth in Brownfield Cleanup Program, 6 NYCRR Remedial Program Subpart 375-3.8(e)(2) (see Table 1 (a) below).

Table 1(a)

Pertinent Contaminant Text 375-3.8(b)	Restricted Commercial - Track 2 (*ug*/kg)	Protection Of Groundwater - Track 2 (mg/L)
1,1-Dichloroethane	240	0.27
1,1-Dichloroethene	500 (b)	0.33
1,2-Dichloroethane	30	0.01
1,2-Dichloroethene (cis)	500	0.25
1,2-Dichloroethene (trans)	500 (b)	0.19
Tetrachloroethene	25	1.3
Trichloroethene	200	0.47
Vinyl Chloride	13	0.02

5.2 Scope of Work

BEI has defined the scope of the work efforts into specific tasks. The sampling program proposed

under the BCP remedial investigation is summarized in Table 1 which provides the analytical samples, the number of samples by matrix, the type of analysis and associated QA/QC samples. The remedial investigation tasks are outlined as follows:

TASK 1 - SUB SLAB, SOIL GAS, INDOOR AND OUTDOOR AIR INVESTIGATION

Purpose: The main objective for determining concentrations of volatile organic compounds in soil gas is to assist in an evaluation of the potential for migration of vapors into on-property and off-site locations (See Figures 4 - 6). The soil gas data allows for the evaluation for the potential for soil vapor intrusion into building structures other than the dry cleaners.

As requested by NYSDEC, the proposed soil gas sample locations were aligned with the two storefronts located along North Ave. Proposed basement indoor air samples were co-located with the proposed sub-slab soil vapor points. Combining the sampling locations in this manner ensures that both storefront spaces will have a complete round of data to allow for the evaluation of the potential for soil vapor intrusion. No indoor air sampling of the first floor (dry cleaners) is proposed . This is because the dry cleaner unit itself currently uses PCE in its operations, therefore, the presence of PCE is expected. Therefore, any indoor air sampling data for the first floor (dry cleaners) would not be meaningful. Additionally, as this area is occupied by workers, indoor air occupational exposures are protected under the OSHA regulations. Furthermore, workers generally understand the workplace regulations that are already in place for their protection (e.g., hazard communication and monitoring plans).

All indoor, ambient and sub slab samples will be collected via dedicated decontaminated summa canisters. Specifically, one sub-slab soil gas samples (SSV - one each) will be collected below the poured concrete floor in the basement area of the of the dry cleaners and the basement of the All American Sports Wear (tenant facility). Indoor air samples will be collected within the basement area (three feet above grade) of the dry cleaners (two locations) and All American Sports Wear (one sample). One indoor air quality sample will be collected within the first floor of the All American Sports Wear facility. One indoor air sample will be collected in the basement and first floor,

respectively, of the three story residence located to the west (rear) of the dry cleaning establishment. As discussed prior, no indoor air quality samples are proposed within the dry cleaners unit as currently PCE is being used. One outdoor (ambient) air sample will be collected in the rear grassed area, exterior to the building. Indoor air samples will be collected via summa canisters set with regulators for a 8 hour collection window at specific locations (most frequently occupied and at breathing zone height) within the adjoining occupied locations. In this instance, these indoor air samples will be used to provide indoor air VOC concentrations in the basement and first floor of the three buildings to the south and north of the subject property (see Figure 6).

An indoor air sample will be taken from the basement and first floor of the 3 story apartment building location to the West (rear) of the Site, if access is granted by these entities. In addition to the proposed sub-slab and basement air sampling, BEI will also perform indoor air sampling within the first floor space. As the sub-slab and basement samples will be co-located and analyzed for the full TO-15 VOC list, it will allow a confirmation of vapor migration as the source of any VOCs detected within the first floor, if present. The soil gas sampling proposed in building structures to the north and south of the subject property also include a sub-slab sample and co-located indoor air sample from the basement, if access is granted. Additional soil vapor probes will be installed in front of the Site along North Avenue in order to determine the potential for soil vapor migration in this direction, if soil vapor is found to be contaminated at the Site. Furthermore, as required by the NYSDOH, an indoor chemical inventory and inspection will also be performed at the time of sampling. (See Figures 4-6).

Specifications: All soil gas samples will be collected in accordance with the October 2006, New York State Health Department (NYSDOH) "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" protocols. Dependent upon access and other timing issues, soil vapor intrusion work will be conducted as close in time as the groundwater sampling as feasible, within the heating season, if feasible. With the GeoProbe® equipped with a Post-Run Tubing System (PRT), soil gas samples will be collected from beneath whatever land surface materials (concrete, asphalt or grass[4]) are present, at

[4] Grassed areas will require the use of a plastic layer at grade to prevent short circuiting of soil gas during sampling.

depths specific to the type of sampling (sub-slab or soil gas) at each location. For sub slab soil gas samples, below concrete surfaces, the PRT tubing and sampling interval void will be set at 2-3 inches below the slab. For a representation of soil gas conditions below the building foundation (other than basement areas), potentially migrating off-site, the PRT tubing will be set at a minimum depth of 5 feet bgs. As depicted in Figure 6, soil gas sampling locations were selected in order to provide relevant data at the subject property relative to the surrounding properties. The actual location of each sampling point will be determined based on Site constraints.

The GeoProbe® direct push system will be used to selectively set up a subsurface soil gas sampling interval. After setting up the sealed penetration using hydraulic cement around the top of the PRT, the area around the soil gas sample collection point will be encompassed by a plastic container for the introduction of a tracer gas such as helium. Helium will be introduced via a tubing penetration into the plastic container as a tracer gas in order to quantify that no circumvention of air is occurring. Helium will be used in instances of deeper soil gas sampling locations; no helium is required for the sampling of sub-slab gas inside the building or indoor air quality.

Subsequent to the introduction of helium tracer gas, the annular space will be purged a minimum of one volume of soil gas using a personal sampling pump. During purging and sampling, the flow rate will not exceed 0.2 liters per minute. A pre-set regulator and dedicated summa cannister will be used to procure the soil gas sample. The cannister will be labeled with all pertinent information for the laboratory. Again, the regulator used will ensure a flow rate less than 0.2 liters per minute. Sufficient volume will be collected to achieve the detection limits required to evaluate the data relative to the October 2006 guidelines issued by the NYSDOH.

Indoor air samples will be collected over an 8 hour time frame. After the required pressure changes are observed on the cannister gauge, the cannister will be sealed and packaged for transport. After collection, the sampling location will also be field screened with a PID to provide real time data. Upon completion of each day's sample collection, the summa canisters will be transported under strict chain-of-custody to an NYSDOH-ELAP certified laboratory for VOC analysis by EPA Method TO-15 methodology. The testing procedure will include analysis for helium to evaluate sampling

interferences. The shallow borings associated with soil gas will be abandoned by clean sand and bentonite grout to grade.

Interior air sampling at adjoining structures depicted on Figure 6 will be conducted by placing summa canisters at breathing height, in occupied areas, for 8 hours. Upon completion of each sample collection, the canisters will be sealed and transported under strict chain-of-custody to a NYSDOH-ELAP certified laboratory for VOC analysis by EPA Method TO-15.

As previously discussed, indoor air sampling will be performed to supplement the soil gas and sub slab soil gas testing data. Indoor and outdoor air samples will be collected using summa canisters as described above at select locations (rear grassed yard area and within the All American Sports Wear). Indoor air quality testing (summa canisters) will be combined with a chemical inventory as per the NYSDOH 2006 guidance document to verify if VOC chemical sources other than the dry cleaning chemicals are being used on premises.

TASK 2- SOIL INVESTIGATION

Purpose: The main objective for soil sampling would be to facilitate the development of remedial options and/or delineation of Site conditions relative to this media.

Task 1 will be completed prior to the implementation of Task 2; the results of Task 1 will be used to refine the pre-selected locations for Task 2 sampling depicted on Figures 4 and 5. Some sampling locations were selected to supplement the previously identified areas of soil contamination. Other locations were selected to specifically evaluate remaining or newly defined Site conditions. Any compliant soil samples collected within the area of soil impacts may be used as "pre-confirmatory endpoint samples." If any previously undetermined Site features of concern are discovered, the sampling plan will be modified to investigate these areas.

Specifically, at grade level, soil samples will be collected in the former dry cleaning room, inside and exterior to the chemical storage room, within the former exposed soil areas, the planter near the steam

vent and in the steam press room (See Figures 4-6). One of these locations will include supplemental sampling for semi-volatile organic compounds (SVOCs) at the suspect location of a former underground storage tank (UST). The subgrade drywell will be located and opened. A bottom sediment sample will be collected and screened from this location. If screening evidence indicates impacts due to VOCs, then a sample will also be collected for supplemental disposal characterization purposes. As depicted in Figure 5 (basements of the building), bottom sediment or representative soil samples will also be collected in the floor drains, hole in floor, blow down pit, ejector pit, window well in the basement, with the installation of shallow soil borings via manual means or via mobile GeoProbe® (if feasible) beneath the concrete basement floor.

A total of eleven (11) soil borings will be installed as described below (see Figure 4). An attempt will be undertaken to extend these borings until refusal (bedrock) or groundwater is encountered. Soil borings will be extended at least ten (10) feet into the saturated zone or until refusal, whichever comes first. If bedrock is not encountered, one soil boring will be extended beyond ten (10) feet until bedrock is found.

Of the eleven soil borings, three sampling locations were specifically requested by the NYSDEC as detailed below: 1) one of the borings shall be located in the current dry cleaning equipment room in order to investigate possible PCE contamination, the out-of-service pipe and the whereabouts of the suspect former PCE above-ground storage tank 2) one boring shall be conducted into soils underlying the sub-grade drywell, after sampling bottom sediments. 3) another soil boring will be installed halfway between the storm drain and the sub-grade drywell in order to better delineate the extent of contamination, if any. All of the aforementioned sampling locations are depicted in Figure 4 and 6.

Specifications: BEI will use a GeoProbe® Model 540U direct push sampling rig mounted in a four-wheel drive truck and/or a mobile GeoProbe® for the collection of soil, soil gas and groundwater samples. A two or four-foot long soil sampling tool is attached to the drive rods for the collection of continuous undisturbed soil samples. The sample will be protected in a PVC liner that prevents the disturbance of soils prior to field analysis. Each sample will be opened and logged to document subsurface conditions including soil types and description of non-soil materials, field instrument

measurements and depth to groundwater, when encountered. There will be additional documentation, if present, of soil mottling, presence of odor, vapors and soil discoloration. A portion of each sample will be placed in a re-sealable plastic bag and screened for total volatile organic compounds by a Photoionizer detector (PID) or equivalent field measurement equipment. If field measurements readings are detected above background, the boring will extend until PID readings are consistent with ambient air concentrations or groundwater is encountered. Soil borings will be extended at least ten (10) feet into the saturated zone or until refusal, whichever comes first. If bedrock is not encountered, one soil boring will be extended beyond ten (10) feet until bedrock is found. Between each sampling event all equipment will be decontaminated following the protocol outlined in Section 6.0.

A manual GeoProbe® Slam bar system will be used at all locations that are not accessible for the portable or truck mounted GeoProbe®. As the portable GeoProbe® rig weighs over 850 pounds, there are no mechanical means with which to lower the portable GeoProbe® into the basement. The manual GeoProbe® slam bar system is capable of collecting discrete soil samples to ensure the evaluation of the vertical extent of any contamination. This system is however, limited to approximately 10-12 feet below grade surface (bgs) under optimal conditions, and less depth, when hard pan soils are encountered. BEI will exert all feasible means to insure the vertical extent of any contamination identified.

The sampling to be performed by the mobile GeoProbe® system is only capable of providing 1.375-inch macro-cores in a continuous four-foot core sample. The manual slam bar system can only produce 1-inch cores in two-foot continuous sections. Therefore, BEI will produce the largest borehole diameter sampling predicated on the ability to collect samples. The lithologic and/or field logging of all sample boreholes will be noted in two foot continuous increments.

To determine the horizontal extent of the contamination, supplemental sampling will be conducted outside the known area of concern (Figures 4 and 5). The sample with any evidence of suspect conditions will be recorded at each boring and will be appropriately containerized at the time of its collection and immediately maintained in an ice packed cooler.

Any structures present that require bottom sediment sampling (e.g., storm drains and the sub-grade drywell (before the soil boring is conducted) will be sampled as follows: Each of the bottom sediment soil samples specified for collection will be obtained using a field decontaminated manually-operated stainless-steel bucket auger or decontaminated GeoProbe® sampling apparatus. The bottom samples will be collected from three separate locations located at the base (bottom) of the structure, with biased sampling directed toward areas that are clearly underlying influent piping or are stained. The depth to bottom of the structure will be noted as well as the depth of water, if present. The samples will be composited using the USEPA approved sampling method of "quartering and coning method" after the collection of separate undisturbed aliquot for VOC analysis. The remainder of the discrete sample volume will be combined for analysis of the remainder of the analytical testing parameters, if any. Each sample will be placed in appropriate dedicated laboratory supplied glassware and handled under the QA/QC protocols established for this project. The field characteristics of each of the samples will be recorded (staining, odors, thickness of sludge or organic matter, etc.) as well as field screening with a PID. All of the information will be recorded for the field file.

If field screening confirms the likely presence of contamination in any of these structures, the soil borings to be performed interior to these structures will be conducted through PVC piping or dual tube sampling to ensure that a discrete sample is procured with depth and contamination is not induced vertically. BEI will leave any PVC casing in place and/or add bentonite to seal same after the boring is completed. As necessary, samples of the bottom sediments at impacted subgrade structures will be collected for disposal characterization purposes (see Task 3).

Upon completion of each day's sample collection, these samples will be transported under strict chain-of-custody to a state ELAP certified laboratory for analysis by EPA Method 8260 -Target Compound List (TCL) Organics by GC/MS and Tentatively Identified Compounds (TICs) with NYSDEC ASP B deliverables, or other analyses requested by the NYSDEC. At least one soil sample will be collected and sent off-site for analysis per soil boring. A full TCL analysis will be performed for 10% of all samples, which includes TCL Organics (EPA method 8260B), TCL Semi-Volatile Organics (EPA method 8270C) inclusive of pesticide/PCBs and TAL Metals. If petroleum is suspected at any of the eleven soil boring locations, the soil sample will also be submitted for TCL SVOC analysis.

As 10 % represents only a few samples overall, the field blanks and MS/MSDS samples will not be analyzed for the full TCL list. One or more soil samples will be collected in the area of the suspect former UST and will be submitted for TCL VOCs and TCL SVOC by EPA Method 8270C analysis. All borings will be abandoned by pumping a bentonite grout in the boring annular space to grade. All sampling points will be accurately located on a Site Investigation base map.

TASK 3 - GROUNDWATER INVESTIGATION

Purpose: It is unknown if groundwater and/or impacts to groundwater are present at the study Site. Prior soil boring installation has not yielded evidence of saturated unconsolidated soils at depth; however, bedrock was encountered. Dependent upon the field investigation results defined in Task 2 - Soil Investigation, an attempt will be made to continue all soil borings into the upper portion of the groundwater aquifer, if feasible using GeoProbe® technology. If groundwater is present, one sample will be collected per soil boring. Furthermore, soil borings that exhibit significantly elevated field PID responses, groundwater samples will be collected at one or more vertical depths (if feasible) using a GeoProbe® direct push sampling rig. Thereby, if present, comparable groundwater data will be developed to ascertain if a contaminant plume is present at the subject property, and in that event, as necessary, further identify actual or potential impacts to sensitive receptors. The investigation will also collect the necessary data to evaluate the feasibility of monitored natural attenuation (MNA), potential cleanup technologies and presumptive remedies. At least one upgradient groundwater sample will be collected from either a temporary GeoProbe® monitoring well or a piezometer, if same can be located at a desirable location. If groundwater is present, the location of the upgradient sample will be determined from the implementation of Task 4, which would be performed concurrently with Task 3. Dependent upon access and other timing issues, the groundwater sampling will be performed as close in time as the soil vapor intrusion work as feasible.

If groundwater is not encountered in the overburden, the remedial investigation will then be modified to include a tiered approach for the installation of shallow bedrock wells (see Task 4).

Specifications: With the GeoProbe® equipped with a mill-slotted well point sampling tool or sampling

point 15, samples will be initially collected at the upper groundwater zone (to be determined in Task 2, if feasible with GeoProbe® technology). Since tetrachloroethene is a dense non-aqueous fluid, groundwater grab samples will be collected from the bottom of the mill slotted screen. This will be achieved by lowering the new poly tubing through the probe rods to the bottom of the slotted screen with purging and sampled using a peristaltic pump with a low flow rate (less than 100 ml/minute). If feasible, a deeper groundwater sample will be collected from 10 feet below the water table surface for analysis. At least one (1) groundwater grab-sample will be collected from the overburden per soil boring and sent off-site for analysis, if present. Upon completion, the borings will be abandoned by pumping a bentonite grout in the boring annular space to grade. Sample collection procedure, quality assurance/quality control and equipment decontamination procedures are discussed in Section 6.0. Figures 4 to 6 indicate the location of the proposed groundwater sampling locations. All sampling points will be accurately located on a Site Investigation base map. All of the groundwater samples will be maintained per sample handling protocol and delivered to a state ELAP certified laboratory for confirmatory results for analysis by EPA Method 624 - TCL Purgeable Organics plus TICs with NYSDEC ASP B deliverables. If a groundwater sample can be collected downgradient of the former fuel oil UST, a sample analysis will also be performed for SVOCs by EPA Method 8270 (STARS List). All other modifications to the analytical testing program will be as set forth for the soil sampling program and as detailed in Section 6.0.

TASK 4 - PIEZOMETER INSTALLATION/FLOW CALCULATION

Purpose: If groundwater is determined to be present in the unconsolidated zone, then groundwater flow direction will need to be determined as well as other aquifer characteristics beneath the Site. Therefore, up to six (6) small diameter piezometer groundwater monitoring wells will be installed, if groundwater is present. The installation of piezometers and measurement of associated groundwater elevation data will enable a Site-specific calculation of the direction and velocity of groundwater flow at the subject property. BEI will utilize regional surface water flow and bedrock and topographic slope to locate the piezometers. The actual location of each well will be determined based on Site constraints or field analytical data. However, ultimately all locations of piezometers will be determined in conjunction with the NYSDEC and are generally projected along the perimeter of the Site and in

identified source areas. Site specific hydraulic conductivity data will be developed by the slug testing of the small diameter wells (see Appendix E).

Specifications: With a GeoProbe® direct push system, BEI will install up to six (6) groundwater piezometers. The depth to groundwater is not known but is estimated to be within 20 feet below grade. The final depth of each well will be dependent upon the thickness of unconsolidated deposits and measured depth to water. The wells that are installed in the front of the property can be installed as 2-inch wells; however, all wells installed at the rear of the property will out of necessity be one-inch diameter due to the inability to install 2-inch diameter wells by the portable GeoProbe®.

Therefore, well construction will consist of 1-inch or 2-inch diameter, Schedule 40 PVC riser pipe with a 0.020 inch slotted well screen, set approximately five feet above and ten feet below the water table. 1-inch or 2-inch diameter, schedule 40, flush joint threaded riser pipe will finish the well to grade. A 5-inch cast iron manhole and cover will be cemented in place to complete the installation. Drill cuttings from soils within projected source areas will be containerized on-site in a 55-gallon drum until sampling and disposal arrangements are completed. If drill cuttings are generated in areas not identified as a concern, same will be screened with the PID and cuttings retained on-site with the permission of the NYSDEC representative.

Upon completion of the wells, the location and casing elevations will be determined by a surveyor. Depth to groundwater will be measured from each well to the nearest 0.01 foot using a sonic interface probe. The collected data will be used to generate a groundwater gradient map indicating the direction of groundwater flow.

If groundwater is not encountered in the overburden, this task will be modified to include a tiered approach for the installation of several shallow bedrock wells. As confirmed by all parties during prior Site visits, it is impossible to mobilize a bedrock drilling rig into the rear of the property or interior to same. Therefore, bedrock wells, if necessary, can be installed in the front sidewalk area or other rig-accessible areas that may be useable. Bedrock wells will be drilled via air rotary drilling rig or other approvable means and will include a steel casing driven through the overburden and "set" several feet

into competent bedrock. Drilling through the overburden will continue until competent bedrock is reached, expected between 10 and 20 feet below grade surface. Steel casing will be installed in this hole and sealed to the bedrock via grouting. This casing will seal the well from surface infiltration. Drilling (using rotary core drilling or an equivalent) will continue through the bottom of the casing until water-bearing fractures are encountered. The borehole will be completed either as cased or open hole (if competent) monitoring well. This program and the number of bedrock wells required will be coordinated in the field with the NYSDEC representative prior to implementation.

5.3 PROJECT SCHEDULE

Within 30 days of the approval of the BCP Remedial Investigation Plan, BEI will begin performing Task 1 in order to confirm the requirements for Task 2, pending any off-site access or right-of-way agreements. After the completion of Tasks 1 and 2, if groundwater is encountered then Tasks 3 and 4 will be implemented. Dependent upon access and other timing issues, soil vapor intrusion work will be conducted as close in time as the groundwater sampling as feasible. These activities are anticipated to take less than one month to complete. Receipt of certified laboratory data in these tasks will require up to 45 days; with an additional 30 days for data usability analysis. A final report will be issued within 60 days of receipt of the complete validated testing data packages.

6.0 QUALITY ASSURANCE / QUALITY CONTROL PROCEDURES

Appropriate Quality Assurance /Quality Control (QA/QC) Procedures were developed to ensure that suitable and verifiable data results from sampling and analysis are maintained. To achieve this objective, the quality assurance procedures detailed in this section were adopted from NYSDEC, DER "Draft Technical Guidance for Site Investigation and Remediation", December, 2002 and will be followed for all sampling and laboratory analysis activities.

6.1 Quality Assurance Requirements

The person responsible for conducting the investigation and/or remediation will ensure suitable and verifiable data results from sampling and analysis. To achieve this objective, the quality assurance procedures detailed in this section will be followed for all sampling and laboratory analysis activities. Quality Assurance/Quality Control procedures were developed to ensure that suitable and verifiable data will result from the prescribed sampling and analysis programs. The procedures to be implemented during the investigation are summarized below.

6.1.1 Sampling Personnel

The activities associated with the field sampling and analysis program will be performed under the supervision of a Quality Assurance Officer, in accordance with the NYSDEC, DER "Draft Technical Guidance for Site Investigation and Remediation", December, 2000 (3/26/01). The samplers assigned will possess a minimum of two or more years experience in environmental field work. Additionally, all samplers will have received the mandatory forty-hour Occupational Safety and Health Administration (OSHA) training on working with potentially hazardous materials and appropriate Hazard Communication Program and Right-To-Know training.

6.1.2 Sampling Equipment

Individual QA/QC measures will be implemented for each of the types of equipment, field screening instruments, sample containers, etc. used in the performance of the sampling program as follows:

6.1.3 GeoProbe®

Prior to arrival on the subject property and between sample locations, all equipment associated with the GeoProbe® drilling system will be decontaminated by a physical scrub with detergent (Alconox) and potable water solution and rinsing them with potable water of demonstrated environmental quality.

6.1.4 Glassware

All sample glassware will be "Level A" certified decontaminated-containers supplied by a NYSDOH-Certified Commercial Laboratory. Samples analyzed for media potentially containing VOCs will be placed in Teflon-lined containers. All samples (except the soil gas samples) will be preserved by cooling them to a temperature of approximately four degrees Celsius during maintenance prior to transport to laboratory.

6.1.5 Sample Documentation

To establish and maintain proper sample documentation control, the following sample identification and chain-of custody procedures will be followed:

6.1.5.1 Sample Identification

Sample identification will be executed by use of a sample tag, log book and chain-of-custody forms. Said documentation will provide the following information: 1) the project code; 2) the sample laboratory number; 3) the sample preservation; 4) the date the sample was secured from the source media; 5) the time the sample was secured from the source media; and 6) the person who secured the sample from the source media.

6.1.5.2 Chain-of Custody Procedures

Due to the evidential nature of samples, possession will be traceable from the time the samples are collected until they are received by the testing laboratory. A sample is considered under custody if it: is in a person's possession; it is in a person's view, after being in possession; if it is in a person's possession and they locked it up; or, it is in a designated secure area. When transferring custody, the individuals relinquishing and receiving the samples will sign, date and note the time on the Chain-of-Custody Form.

6.1.5.5 Laboratory-Custody Procedures

A designated sample custodian will accept custody of the delivered samples and verify that the information on the sample tags matches that on the Chain-of-Custody Records. Pertinent information as to delivery, pick-up, courier, etc., will be entered in the "remarks" section. The custodian will enter the sample tag data into a bound logbook. The laboratory custodian will use the sample tag number, or assign a unique laboratory number to each sample tag and assure that all samples will be transferred to the proper analyst or stored in the appropriate source area. The laboratory custodian will distribute samples to the appropriate analysts. Laboratory personnel will be responsible for the care and custody of samples, from the time they are received, until the sample is exhausted or returned to the sample custodian. All identifying data sheets and laboratory records will be retained as part of the permanent documentation. Samples received by the laboratory will be retained until after analysis and quality assurance checks are completed.

6.2 Soil Sample Collection

The soil sampling will be conducted using a GeoProbe® direct push sampling rig or low profile rig or equivalent using a discrete sampling device. A new PVC liner will be installed into the sampling barrel between each sampling event. The equipment (drive point, barrel, subs and adaptors) will be decontaminated before each sample collection following NYSDEC Sampling Guidelines & Protocols, 1991. The cleaning procedure will include the use of a standard laboratory grade phosphate-free detergent (Alconox) followed by a municipal-supplied potable water rinse. The retrieved samples will be placed in a laboratory supplied certified containers. The samples will be stored in a cooler containing ice to maintain a temperature of 4° Celsius and delivered under strict chain-of-custody to a NYSDOH ELAP-certified laboratory providing Category ASP-B deliverables, where applicable. All generated soil cuttings will be maintained in a DOT approved 55 gallon drum, if required. Upon completion of the project a soil sample from the drum(s) will be analyzed for disposal by an NYSDOH ELAP-certified laboratory.

To ensure quality control, one (1) field blank will be collected per twenty soil samples by

rinsing the decontaminated field equipment with organic-free water and submitting the rinse water in standard sample containers to a certified laboratory for Target Compound List (TCL) Volatile Organic Compound analysis by EPA Method 8260 plus TICs. One (1) Matrix Spike/Matrix Spike Duplicate (MS/MSD) sample will be collected per twenty (20) soil samples and submitted with the rest of the samples to a certified laboratory for the same analysis. Trip blank samples are only required for analysis in coordination with groundwater samples to conform with an NYSDEC ASP-B deliverable package. All soil or groundwater samples will be analyzed for the TCL VOCs unless the Department requests otherwise, or there is reason to believe petroleum is present (suspected UST locations). If petroleum is suspect, the TCL for Semi-Volatiles will be used for analysis as well. One soil and groundwater (if present) sample will be collected and sent off-site for analysis per boring. A full TCL will be performed for 10% of all samples, which includes TCL Organic Volatiles (EPA method 8260B), Semi-Volatiles (EPA method 8270C) inclusive of pesticide/PCBs and TAL Metals. As 10 % represents only a few samples overall, the field blanks and MS/MSDS samples will not be analyzed for the full TCL list. A summary of the analytical samples proposed for the remedial investigation is provided in Table 1 which summarizes the number of samples by matrix, the type of analysis and associated QA/QC samples.

6.3 Groundwater Sample Collection

If feasible, any groundwater sampling performed will be conducted using a GeoProbe® direct push sampling rig equipped with a mill-slotted well point sampling tool or equivalent device depending upon accessibility. Once the desired depth is reached, new polyethylene tubing fitted with a Tubing Check Valve System will be inserted down into the rod to the depth of the slotted point. The groundwater will be then extracted through the polyethylene tubing by a peristaltic pump until 3 to 5 times the approximate volume in the probe rod has been purged. Groundwater sampling purging will be continued until turbidity measures less than 50 NTUs prior to sampling (less than 10 NTUs will be attempted to be used as a criteria). If this turbidity criteria cannot be achieved, then filtered and unfiltered samples will be collected for analysis for comparison.

The retrieved samples will be placed in new laboratory-supplied un-preserved 500 ml to 1 Liter plastic containers. The samples will be stored in a cooler containing ice to maintain a temperature of 4° Celsius and delivered under strict chain-of-custody to a NYSDOH ELAP-certified laboratory providing Category ASP-B deliverables. Purged development water will be contained in a DOT approved 55 gallon drum, if required. Upon completion of the project, a liquid sample from the drum(s) will be analyzed for disposal characterization by an NYSDOH ELAP-certified laboratory. If not required, same will be disposed at the wellhead.

The equipment (drive point, well point, subs and adaptors) will be decontaminated before each sample collection following NYSDEC Sampling Guidelines & Protocols, 1991. The cleaning procedure will include the use of a standard laboratory grade phosphate-free detergent (Alconox) followed by a municipal-supplied potable water rinse.

To ensure quality control to conform with an NYSDEC ASP-B deliverable package, one (1) trip blank with organic-free water will be maintained per sampling day and one (1) field blank per twenty (20) groundwater samples by rinsing the field equipment with organic-free water and submitting the rinse water in standard sample containers to a certified laboratory for Target Compound List Volatile Organic Compound analysis by EPA Method 8260 plus TICs. One (1) Matrix Spike/Matrix Spike Duplicate (MS/MSD) sample will be collected per twenty groundwater samples and submitted with the rest of the samples to a certified laboratory for the same analysis. Trip blank samples are only required for analysis in coordination with groundwater samples to conform with an NYSDEC ASP-B deliverable package. A full TCL will be performed for 10% of all samples, which includes TCL Organic Volatiles (EPA method 8260B), Semi-Volatiles (EPA method 8270C) inclusive of pesticide/PCBs and TAL Metals (with turbidity reduced to less than 10 NTus if feasible). As 10 % represents only a few samples overall, the field blanks and MS/MSDS samples will not be analyzed for the full TCL list. A summary of the analytical samples proposed for the remedial investigation is provided in Table 1b which summarizes the number of samples by matrix, the type of analysis and associated QA/QC samples.

6.4 Laboratory Analysis Requirements

6.4.1 *Certification and Data Acceptance*

Laboratories performing analysis will conform to the following:

- For the analysis of any aqueous samples for a parameter or category of parameters for which laboratory certification exists pursuant to NYSDOH ELAP Certification, the laboratory will be certified for that specific parameter or category of parameters pursuant to NYSDOH ELAP Certification.

- For the analysis of non-aqueous samples using specific analytical methods contained in the EPA Publication SW-846, "Test Methods for Evaluating Solid Waste", third edition, update IIF, January 1995, as amended and supplemented, for a parameter or category of parameters for which certification exists pursuant to NYSDOH ELAP Certification, the laboratory will be certified for that specific parameter or category of parameters pursuant to NYSDOH ELAP Certification or, at a minimum, have obtained temporary approval to analyze regulatory samples pursuant to NYSDOH ELAP Certification.

- For analysis of samples where Category B deliverables are required, NYSDOH ELAP CLP certification is required for the category of parameters to be analyzed for. The DER will reject analytical data from any laboratory for which its certification for the parameter analyzed for has expired, decertified and/or been suspended.

6.4.2 *Analytical Methods*

- Except as provided below, analytical methods used will have been published in the most current NYSDEC Analytical Services Protocol. Where possible, the method selected must achieve a detection limit that is below the lowest standard or guidance value that applies to the media being sampled and analyzed for the contaminant(s) that can reasonably be expected to be found.

- If an analytical method as described above does not exist for a specific contaminant or parameter within a specific matrix, or if an analytical method as described above for a given contaminant or parameter is demonstrated to be inappropriate for the matrix analyzed, or the method cannot achieve a detection limit below the applicable standard or guidance value, then the person responsible for conducting the investigation and/or remediation will:

    - Select an appropriate method from another source;
    - Document the rationale for selecting the method; and
    - Develop a standard operating procedure for the method, including a quality control section.
    - Exception: it is recognized that the analytical methods for semi-volatile compounds in soil frequently can not achieve detection limits below regulatory action levels. In these cases, EPA Method 8270C is acceptable irrespective of the detection limit.

- Methods acceptable to the DER will be utilized for the determination of the presence of free product in soil or water. Such methods include, without limitation, visual identification of sheens or other visible product, measurable thickness of product on the water table, the use of field instruments, ultraviolet fluorescence, soil-water agitation, centrifuging and hydrophobic dye testing.

- For contaminants that in their pure phase and at standard state conditions (20 degrees Celsius to 25 degrees Celsius and one atmosphere pressure) have densities greater than water, free product will be considered to be present if the contaminant is detected in groundwater at concentrations equal to or greater than one percent of the water solubility of the contaminant if groundwater contains only that organic contaminant. If a mixture of such contaminants is present, then the effective water solubility of the contaminant should be estimated for this determination.

- Gas chromatography methods with a mass spectrometer detector system should be used for analysis of semi-volatile contaminants (exclusive of herbicides, pesticides and PCBs). Other chromatography methods (liquid chromatography, HPLC) with appropriate detector systems should be used for the analysis of organic analytes amenable only to non-gas chromatographic methods. A mass spectrometer detector system is not required if the Site has already been characterized to the extent that all contaminants are known.

6.4.3 *Specific Requirements*

Laboratories will follow all quality assurance/quality control procedures specified in the analytical methods. Sampling methods, sample preservation requirements, sample handling times, decontamination procedure for field equipment and frequency for field blanks, field duplicates and trip blanks should conform to the NYSDEC Analytical Services Protocol (ASP), unless an alternate method/procedure has been approved.

Results from analysis of soils and sediments will be reported on a dry weight basis, except for those results required by the method to be otherwise reported.

6.4.4 *Sample Matrix Cleanup*

Acceptable sample matrix cleanup methods include, without limitation, those methods contained in the EPA Publication SW846 or the EPA "Contract Laboratory Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration" in effect as of the date of sample analysis.

Sample matrix cleanup methods will be performed if:

- Petroleum contaminated soils, sediments, or other solids are analyzed for semi-volatile organics and the method detection limits are elevated above the applicable remediation standard because of matrix interference;
- Gas chromatographic peaks are not adequately separated due to matrix interference. A peak will be considered inadequately separated when a rise in baseline or extraneous

peaks interfere with:

(1) the instrumental ability to correctly identify compounds present (including internal standards and surrogates), and/or;

(2) the integration of peak area and subsequent quantization;

- So specified by the analytical method; or
- Matrix interferences prevent accurate quantization and/or identification of target compounds.

6.4.5 *Laboratory Data Deliverables*

Unless otherwise approved in advance by the DER, laboratory data deliverables should be as follows (with the exception of the soil gas data).

- Category B laboratory data deliverables as defined in the Analytical Services Protocol (ASP) should be submitted for initial, confirmatory (post remediation) samples and final delineation samples for all sites. In addition, a Data Usability Summary Report will be prepared by a party independent from the laboratory performing the analysis.

- Analytical results without all quality control documentation and raw data may be provided for all intermediate sampling events and for all long-term groundwater monitoring samples where the site has DER oversight, provided the following information is submitted:

(1) A cover page, including facility name and address, laboratory name and address, laboratory certification number, if applicable, date of analytical report preparation and signature of laboratory director;

(2) A listing of all field sample identification numbers and corresponding laboratory sample identification numbers;

(3) A listing of all analytical methods used, including matrix cleanup method;

(4) The method detection limit and practical quantization level for each analyte for each sample analysis;

(5) All sample results including date of analysis;

(6) All method blank results; and

(7) All chain of custody documentation.

- Upon written request, the DER may require that deliverables package be upgraded to a "Category B" data deliverables package for any sample analysis. If the backup documentation is not available to generate "Category B" deliverables or that the lab is not qualified to generate "Category B" deliverables (not ELAP-CLP lab), reanalysis or resampling and analysis is an option.

- Identify any analytical cleanup methods, where applicable.

6.4.6 *Field Screening Methods*

Field screening methods for all sampling matrices (soil, water, air, interior surfaces) can only be used under the following conditions:

- For contaminant delineation if contaminant identity is known or if there is reasonable certainty that a specific contaminant may be present (for example, benzene, toluene, ethylbenzene, xylene in the case of sampling for a gasoline release); or
- To bias sample location to the location of greatest suspected contamination.

Field screening methods should not be used to verify contaminant identity or clean zones unless there has been a correlation study approved in advance by the DER for the specific site where screening methods are proposed for verification.

Where field screening is used:

- A standard operating procedure must exist or be developed which includes:

(1) A detailed step by step procedure for the analysis method.

(2) Duplicate analysis of a minimum of 10% of the samples.

(3) Quality assurance procedures (calibration standards, blanks, etc.) as specified by the method.

(4) Laboratory confirmation on a minimum of 10% of the samples by a standard ASP method is required. There should be no bias in the selection of duplicate or laboratory confirmation samples, such as selecting positive detections or duplication or confirmation. The duplicate or confirmation analysis should be done on a minimum of every 10^{th} sample, selected in the order they are presented for analysis. Laboratory confirmation occurs if the correlation between field screening and laboratory results are within +/- 30%.

- Analysis must be done by a Field Analyst with the following minimum qualifications:

(1) Completion of a certification course or training by an experienced analyst who has demonstrated proficiency in the method; or,

(2) Demonstration of the analyst's proficiency by correlation of the analyst's results with laboratory confirmation analysis.

Other field screening methods may be acceptable, subject to the DER's review of documentation.

6.4.7 *Analytical Parameter Requirements*

The following requirements apply for selection of analytical parameters:

- Samples from each area of concern should be analyzed for contaminants which may be present.
- Analysis of Target Compound List plus 30/Target Analyte List (TCL+30/TAL), petroleum hydrocarbons and pH should be conducted when contaminants in an area are unknown or not well documented, although a limited contaminant list may be used subject to the DER's approval. At the subject property, TAL total metals by EPA Method 6010/7471 series is proposed.

6.4.8 *Petroleum Storage and Discharge Areas*

Sample analysis should be conducted pursuant to the requirements of STARS #1" Petroleum Contaminated Soil Guidance Policy." Samples taken in non-petroleum

storage and discharge areas should be analyzed for the stored material. Analysis should be conducted using any gas chromatography method by a laboratory that is certified pursuant to NYSDOH ELAP for the category of parameters being analyzed for. Laboratory deliverables should be as specified in the method listed above.

6.4.9 *If Air Sampling is Required*

The quality assurance procedures specified in the method approved by the DER for the sampling should be followed. Quality assurance procedures should follow the guidelines or direction of the NYSDOH. The laboratory method to be used for soil gas or air sampling must be able to detect contaminant levels at or below typical background concentrations.

7.0 HEALTH AND SAFETY PLAN

A Site specific Health and Safety Plan has been developed and is attached as Appendix D . The plan will be adhered to by all personnel involved in the investigation and/or remediation. Incorporated into the plan is a section on community health and safety with measures to ensure the public living and working near the Site, including facility employees or visitors, are protected from exposure to Site contaminants during intrusive activities or on-site treatment actions.

8.0 COMMUNITY AIR MONITORING PLAN

A Community Air Monitoring Plan (CAMP) provides for real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

8.1 Continuous Monitoring

Continuous monitoring or monitoring in a manner acceptable to the Department will be performed for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching and the installation of soil borings or monitoring wells.

8.2 Periodic Monitoring

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater

sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

8.3 VOC Monitoring, Response Levels and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a periodic basis or in a manner acceptable to the Department. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings will be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

8.4 Particulate Monitoring, Response Levels and Actions

Particulate concentrations will be monitored or in a manner acceptable to the Department at temporary particulate monitoring stations at the downwind perimeter of the immediate work area (i.e., the exclusion zone) or as otherwise specified. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10

particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for State (DEC and DOH) personnel to review.

9.0 CITIZEN PARTICIPATION PLAN

As part of the Citizen Participation (CP) requirements, a formal CP plan (CPP) has been developed for implementation during this project. The CPP has been provided under separate cover.

TABLES

Table 1
Scope of Work for Remedial Investigation -Schmuklers Dry Cleaners

Activity (Task)/ Location (in bold)	**# Sampling Points**	**Location See Figures 4 to 6**	**No. Of Samples/Parameters**	**QA/QC Samples**
Task 1 - Soil Gas Vapor Investigation : **North Side of Property: 3 Story Building 1 Story Building**	2 sub-slab, 2 indoor air and 2 indoor air (summa canisters)	Basements of both Structures 2 sub-slab samples and 2 indoor air samples: co-located 1st Floors indoor air (summa canisters)	NYSDOH-ELAP certified laboratory for VOC analysis by EPA Method TO-15 analytes by TO-15 methodology using helium tracer (not sub-slab)..	None - internal lab QA/QC
Task 1 - Soil Gas Vapor Investigation: **South Side of Property - 3 Story Building**	1 sub-slab, 2 indoor airs with summa canister	Basement 1 sub-slab sample and 1 indoor air sample: co-located 1st Floor indoor air (summa canisters)	NYSDOH-ELAP certified laboratory for VOC analysis by EPA Method TO-15 analytes by TO-15 methodology using helium tracer (not sub-slab).	None - internal lab QA/QC

Table 1
Scope of Work for Remedial Investigation -Schmuklers Dry Cleaners

Activity (Task)/ Location (in bold)	**# Sampling Points**	**Location See Figures 4 to 6**	**No. Of Samples/Parameters**	**QA/QC Samples**
Task 1 - Indoor and Outdoor Air Investigation : **West Side (rear) of Subject Property& 3 Story Building**	3 soil gas samples; 1 sub-slab sample & 1 indoor air sample: co-located 1 outdoor ambient 1 indoor air (summa canister)	Outside Rear of Dry Cleaners 3 soil gas samples Basement 1 sub-slab sample & 1 indoor air sample: co-located Outside - ambient air sample 1st Floor 1 indoor air (summa canister)	NYSDOH-ELAP certified laboratory for VOC analysis by EPA Method TO-15 analytes by TO-15 methodology using helium tracer (not sub-slab).	None - internal lab QA/QC
Task 1- Indoor and Outdoor Air Investigation - off-property: **East Side of Property - West side of North Avenue**	2 soil gas samples	West side of North Avenue, in front sidewalk of dry cleaner facility.	NYSDOH-ELAP certified laboratory for VOC analysis by EPA Method TO-15 analytes by TO-15 methodology using helium tracer.	None - internal lab QA/QC

Table 1
Scope of Work for Remedial Investigation -Schmuklers Dry Cleaners

Activity (Task)/ Location (in bold)	**# Sampling Points**	**Location See Figures 4 to 6**	**No. Of Samples/Parameters**	**QA/QC Samples**
Task 1- Indoor and Outdoor Air Investigation - on property: **Dry Cleaners & Tenant Unit**	2 sub-slab samples and 2 indoor air sample: co-located. 1 indoor air sample	Basement of Dry Cleaners & Tenant Unit :1 sub-slab sample and 1 indoor air sample each: co-located 1st Floor - Dry Cleaners No sampling - known PCE use 1st Floor - Tenant Unit 1 indoor air sample	NYSDOH-ELAP certified laboratory for VOC analysis by EPA Method TO-15 analytes by TO-15 methodology using helium tracer (not sub-slab).	None - internal lab QA/QC

FIGURES

<[illegible]> - 1 Markers, Length = 0 feet

Schmuckler's Cleaners - 040° 54' 50.4" N, 073° 47' 06.6" W

Name: MT VERNON
Date: 10/24/105
Scale: 1 inch equals 2000 feet

Location: 040° 55' 08.3" N 073° 47' 08.8" W
Caption: Schmuckler's Dry Cleaners
359 North Avenue
New Rochelle, NY 10804

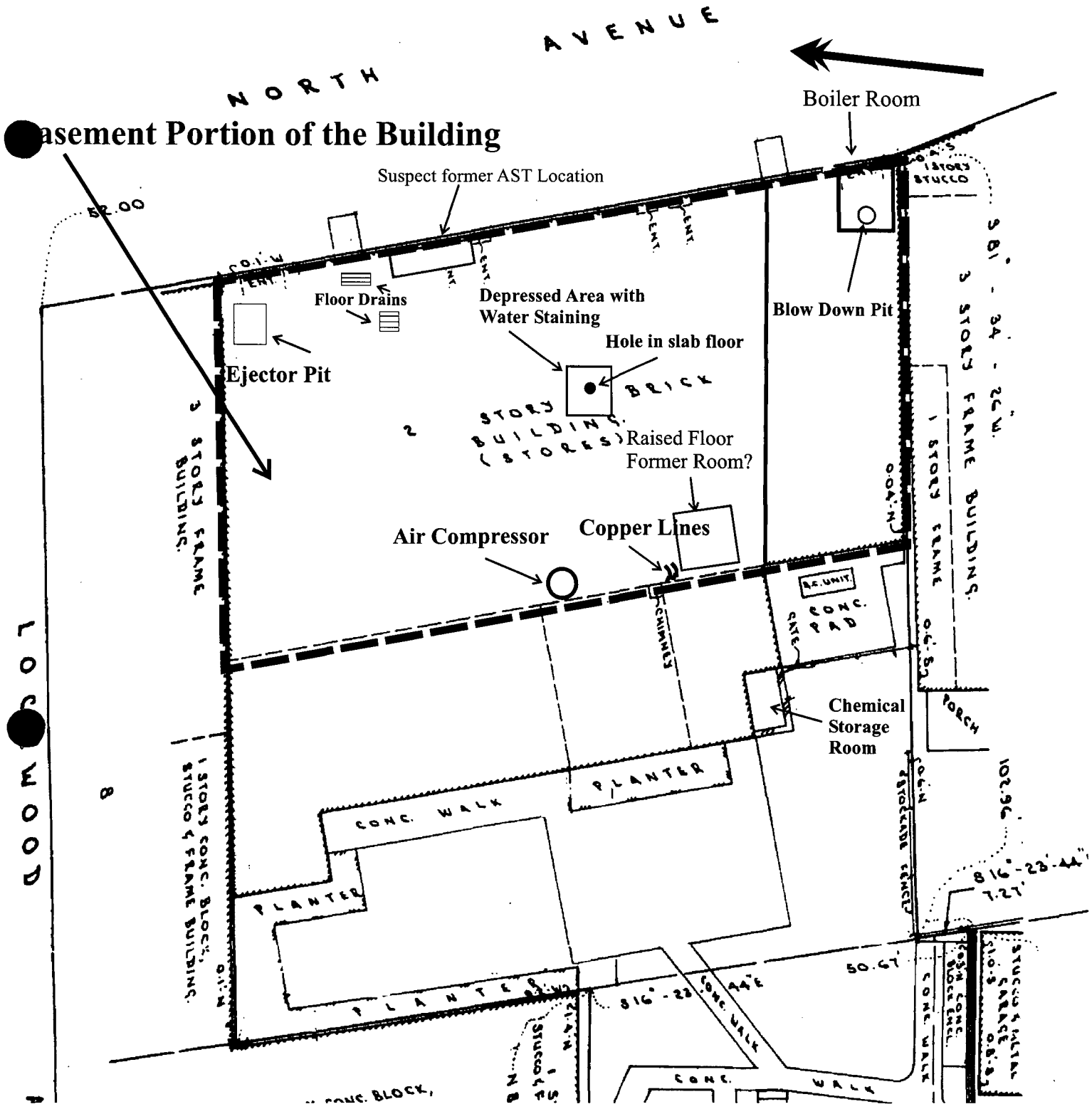
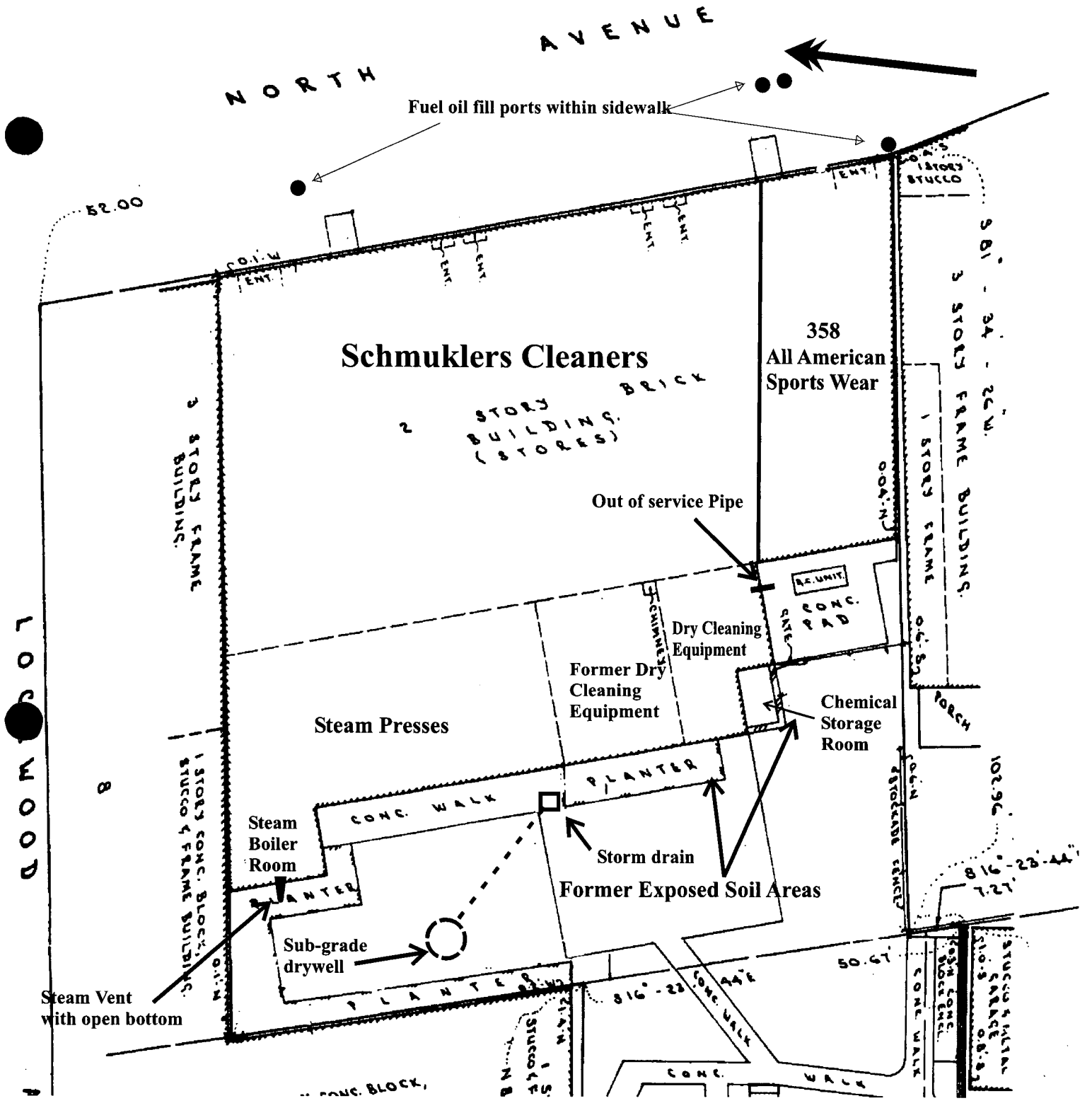


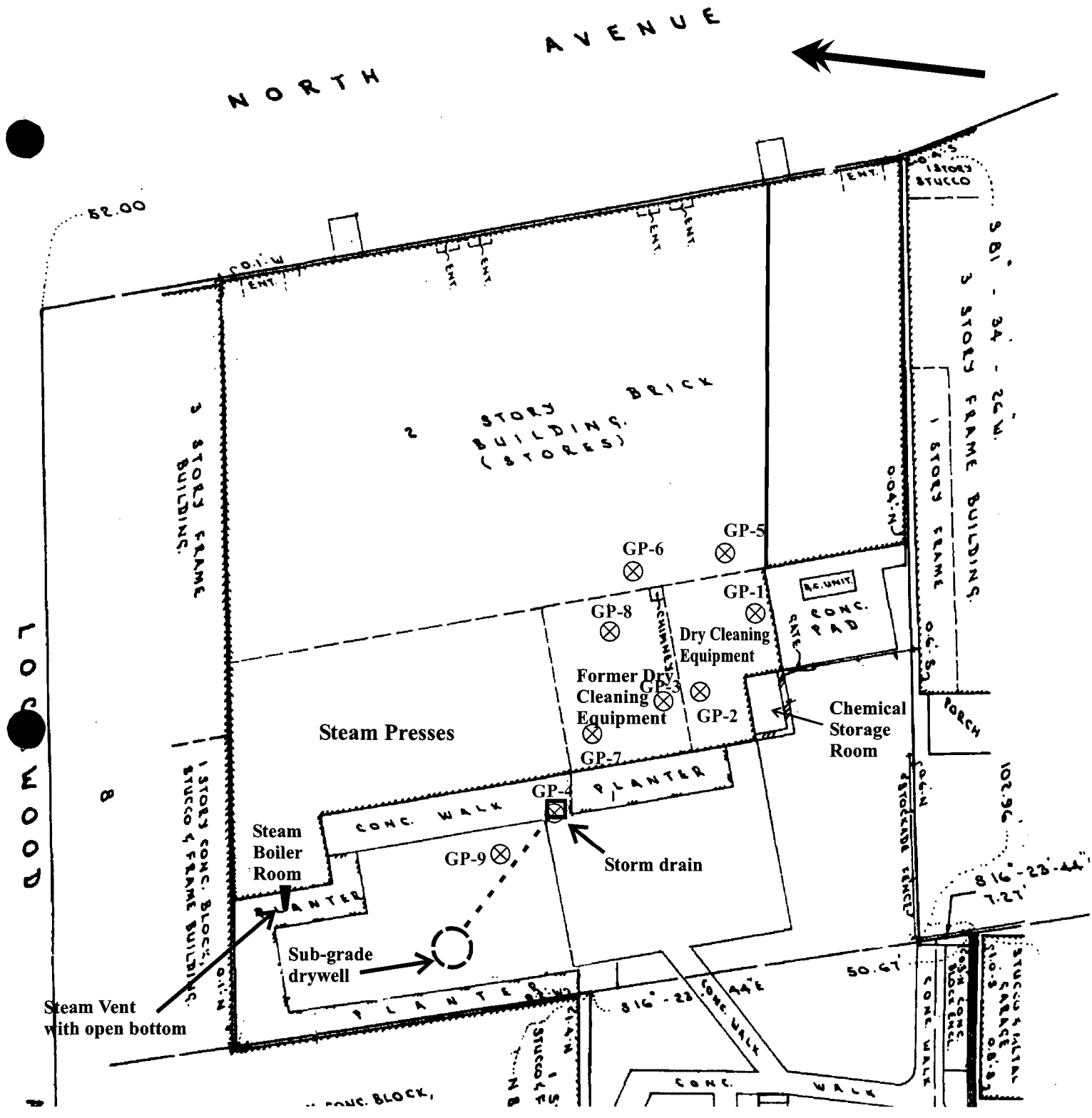
Figure 2a - Basement Details	**Schmuklers Cleaners** **358 - 364 North Avenue** **New Rochelle, NY**	Berninger Environmental Inc. 90 Knickerbocker Avenue Bohemia, New York 11716 (631) 589-6521



Scale:

0 52 ft.

Figure 2b - First Floor and Exterior Site Features	Schmuklers Cleaners 358 - 364 North Avenue New Rochelle, NY	Berninger Environmental Inc. 90 Knickerbocker Avenue Bohemia, New York 11716 (631) 589-6521



GP-1 PCE 33 PPB
GP-2 PCE 52 PPB
GP-3 PCE 62,000 PPB
GP-4 PCE 50,000 PPB/ 730 PPB
GP-5 PCE ND
GP-6 PCE 170 PPB
GP-7 PCE 11,000 PPB

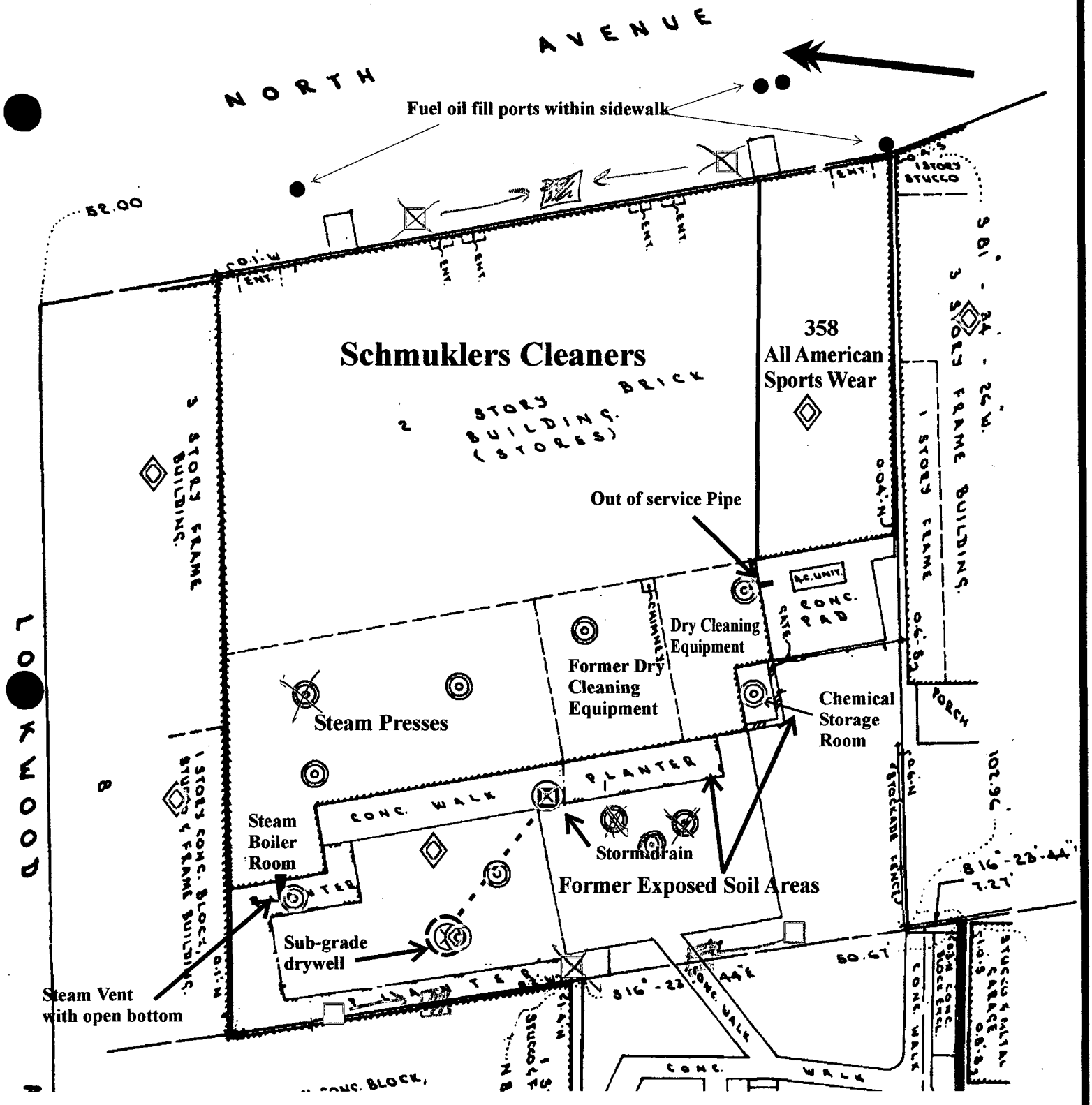
Scale:

0 52 ft.

Figure 3 - Prior Sampling Locations and PCE Concentrations

Schmuklers Cleaners
358 - 364 North Avenue
New Rochelle, NY

Berninger Environmental Inc.
90 Knickerbocker Avenue
Bohemia, New York 11716
(631) 589-6521



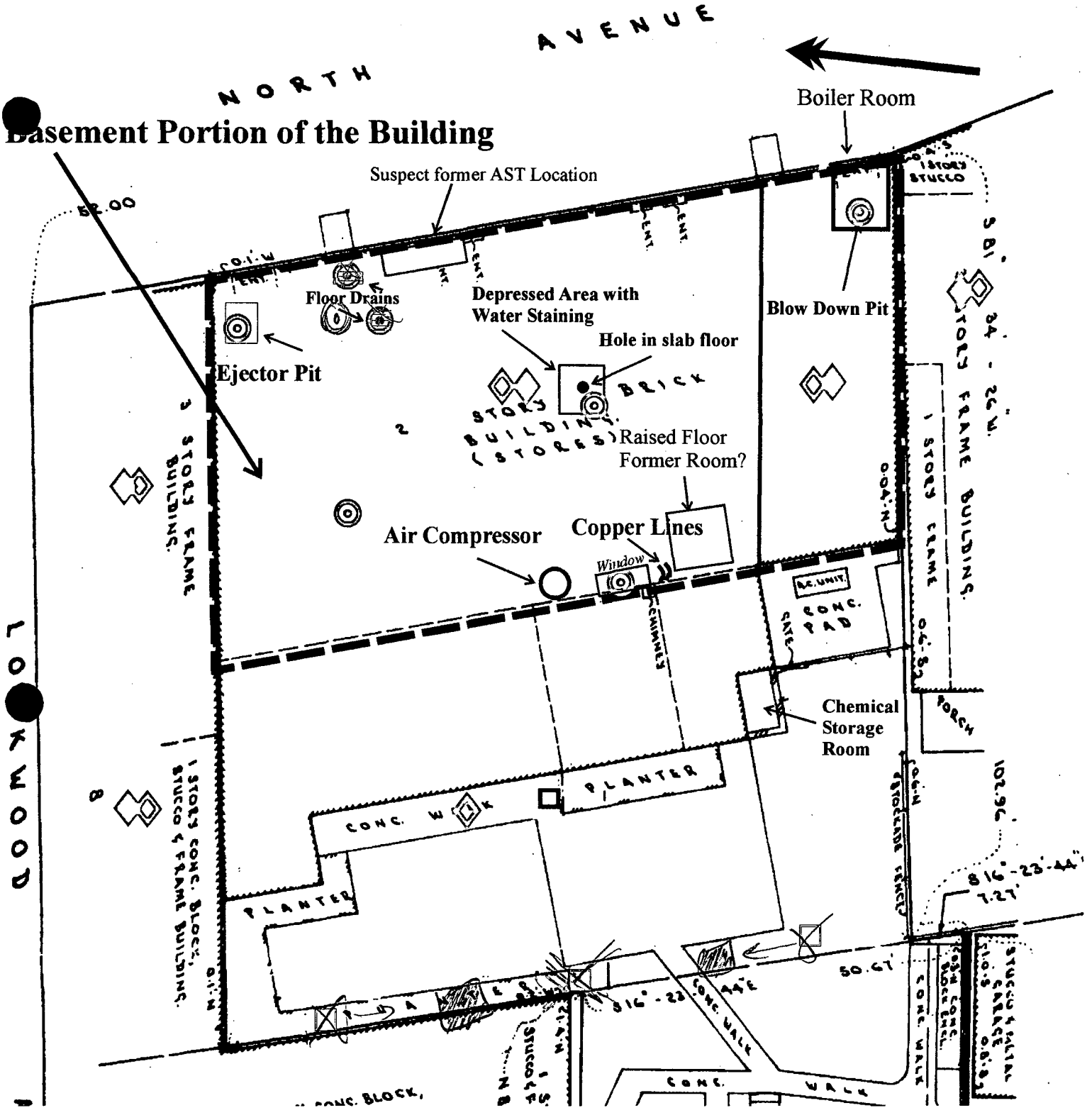
- Soil and groundwater (if present within unconsolidated soils) sampling location
- Bottom Sediment Sampling Location
- Indoor/Outdoor Air Sampling Location
- Soil Gas Sampling Location

Scale: 0 — 52 ft.

Figure 4 - Proposed First Floor and Exterior Sampling Locations
Revised March 2007

Schmuklers Cleaners
358 - 364 North Avenue
New Rochelle, NY

Berninger Environmental Inc.
90 Knickerbocker Avenue
Bohemia, New York 11716
(631) 589-6521 (631) 589-6528



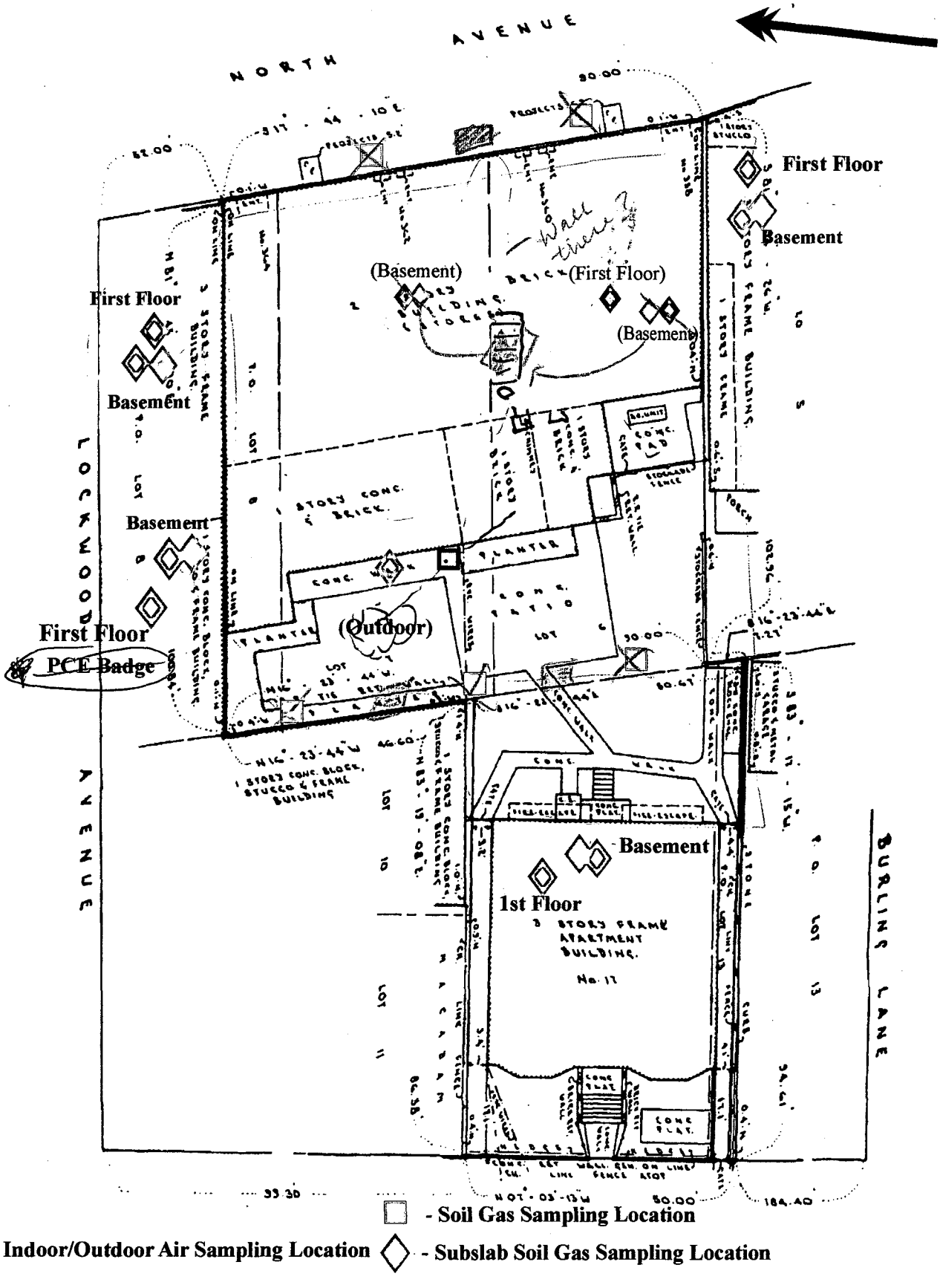
- Soil Gas Sampling Location
- Soil and groundwater (if present within unconsolidated soils) sampling location (inaccessible for probing rig)
- Indoor/Outdoor Air Sampling Location
- Subslab Soil Gas Sampling Location

Scale: 0 — 52 ft

Figure 5 - Proposed Basement Sampling Locations
Revised March 2007

Schmuklers Cleaners
358 - 364 North Avenue
New Rochelle, NY

Berninger Environmental Inc.
90 Knickerbocker Avenue
Bohemia, New York 11716
(631) 589-6521 (631) 589-6528



□ - Soil Gas Sampling Location

◇ - Indoor/Outdoor Air Sampling Location ◇ - Subslab Soil Gas Sampling Location

Figure 6 -Indoor/Outdoor Air and Soil GasSampling Locations

Revised March 2007

Schmuklers Cleaners
358 - 364 North Avenue
New Rochelle, NY

Berninger Environmental Inc.
90 Knickerbocker Avenue
Bohemia, New York 11716
(631) 589-6521 (631) 589-6528

APPENDICES

APPENDIX A

Metes & Bounds Description and Sanborn Maps

EDR® Environmental Data Resources Inc

"Linking Technology with Tradition"

Sanborn® Map Report

Ship to: Ms. Beth Christensen
First Search Technology
10 Cottage Street
Norwood, MA 02062

Order Date: 9/13/2005 **Completion Date:** 9/14/2005
Inquiry #: 1509691.1S
P.O. #: na
Site Name: 358 North Ave
Address: 358 North Ave
City/State: New Rochelle, NY 10801
Cross Streets:

Customer Project: na
1012696EDR 781-551-0470

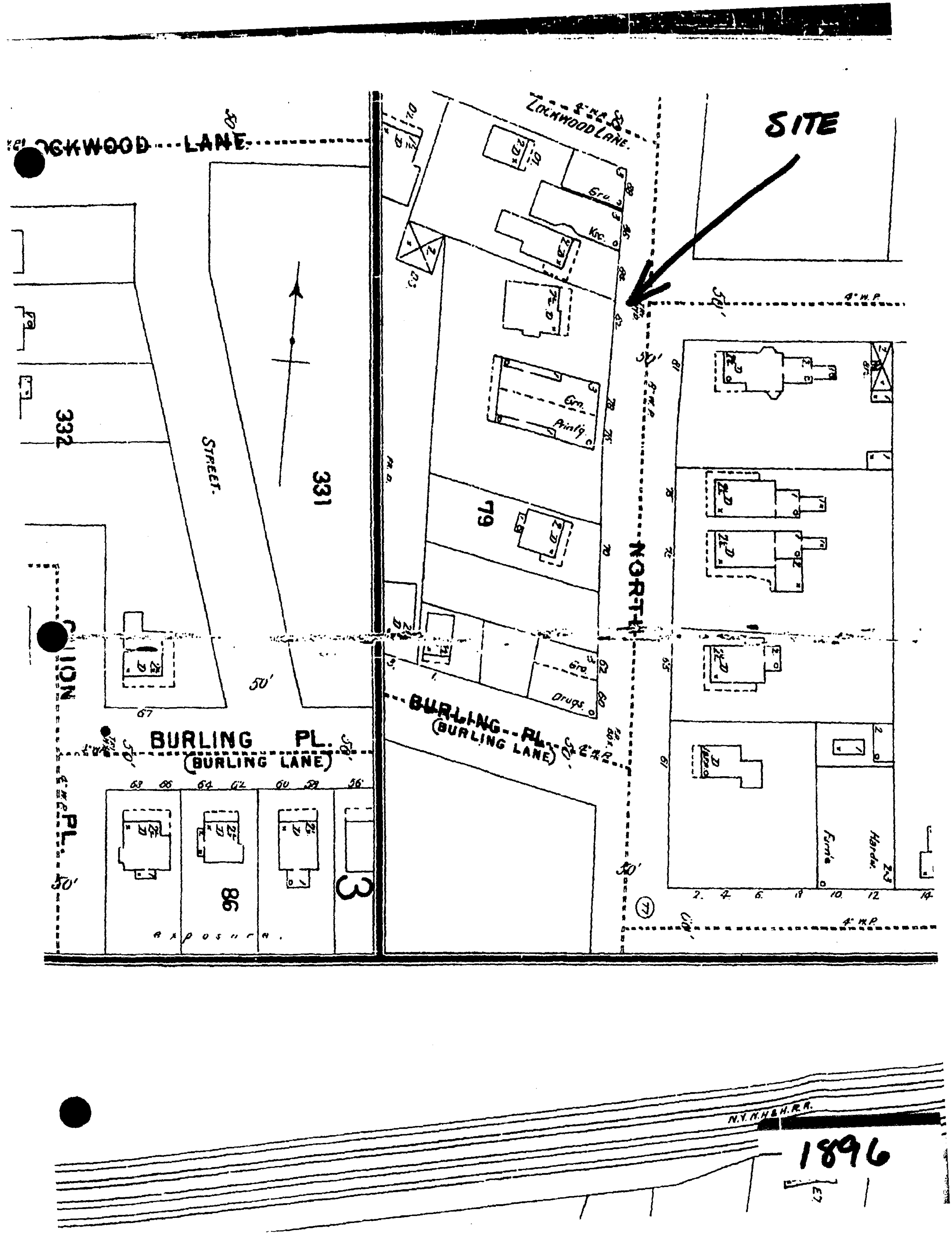
Based on client-supplied information, fire insurance maps for the following years were identified

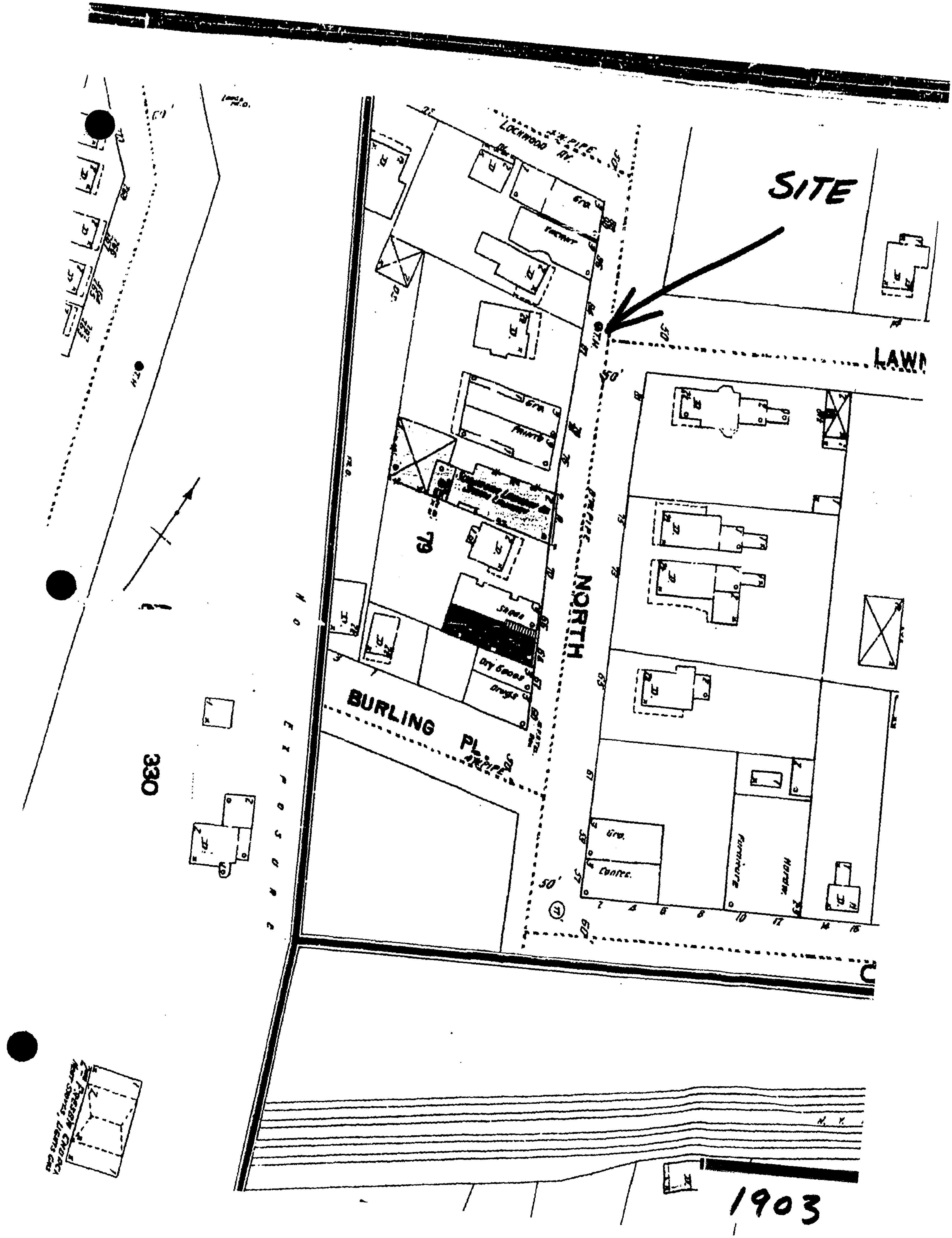
1896 - 1 - map
1903 - 1 - map
1911 - 1 - map
1931 - 1 - map
1942 - 1 - map
1951 - 1 - map
1990 - 1 - map
1991 - 1 - map
1992 - 1 - map
1993 - 1 - map
1994 - 1 - map
1995 - 1 - map
1996 - 1 - map

Total Maps: 13

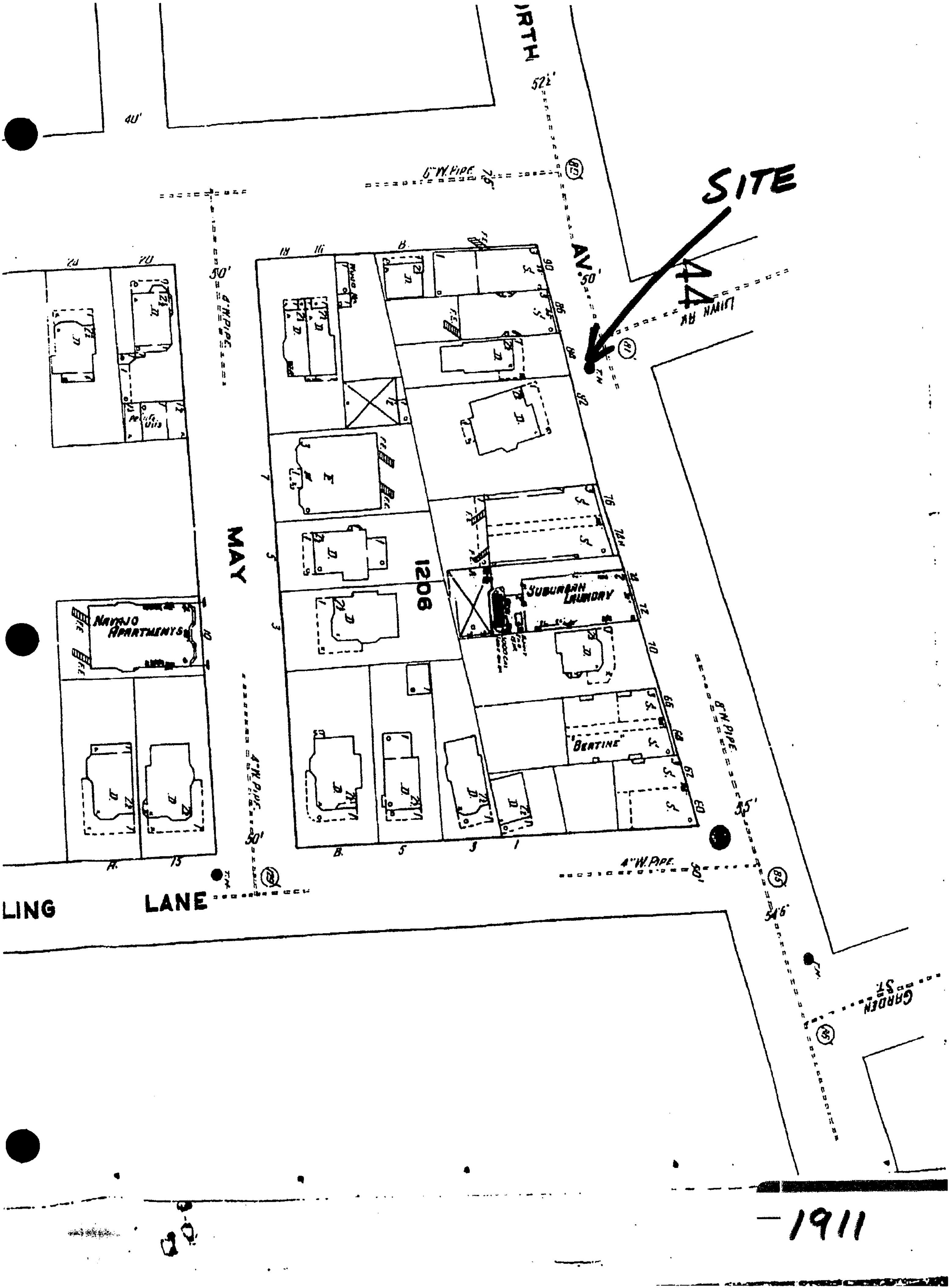
Limited Permission to Photocopy

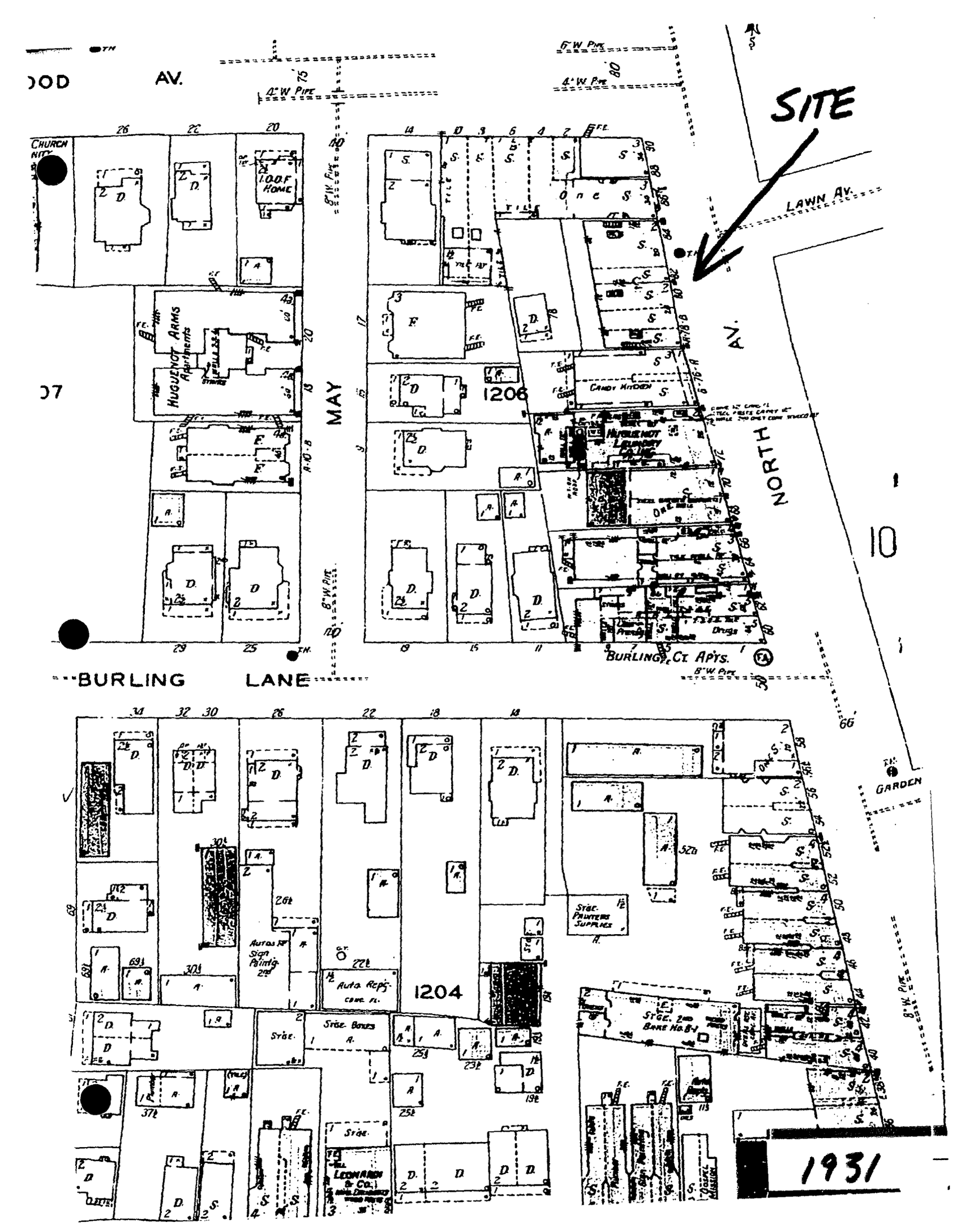
(the reseller) is not authorized to make any copies of the fire insurance maps accompanying this Report. As a condition of the reseller's client receiving limited permission from EDR, this Report must be delivered to such client in its entirety with the accompanying Sanborn Maps. The reseller's client is permitted to make up to THREE photocopies of this Sanborn Map Report and the accompanying Sanborn Maps, solely for the limited use of its customer. No one other than the reseller's client is authorized to make copies. Upon request made directly to an EDR Account Executive, such client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the reseller, its client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

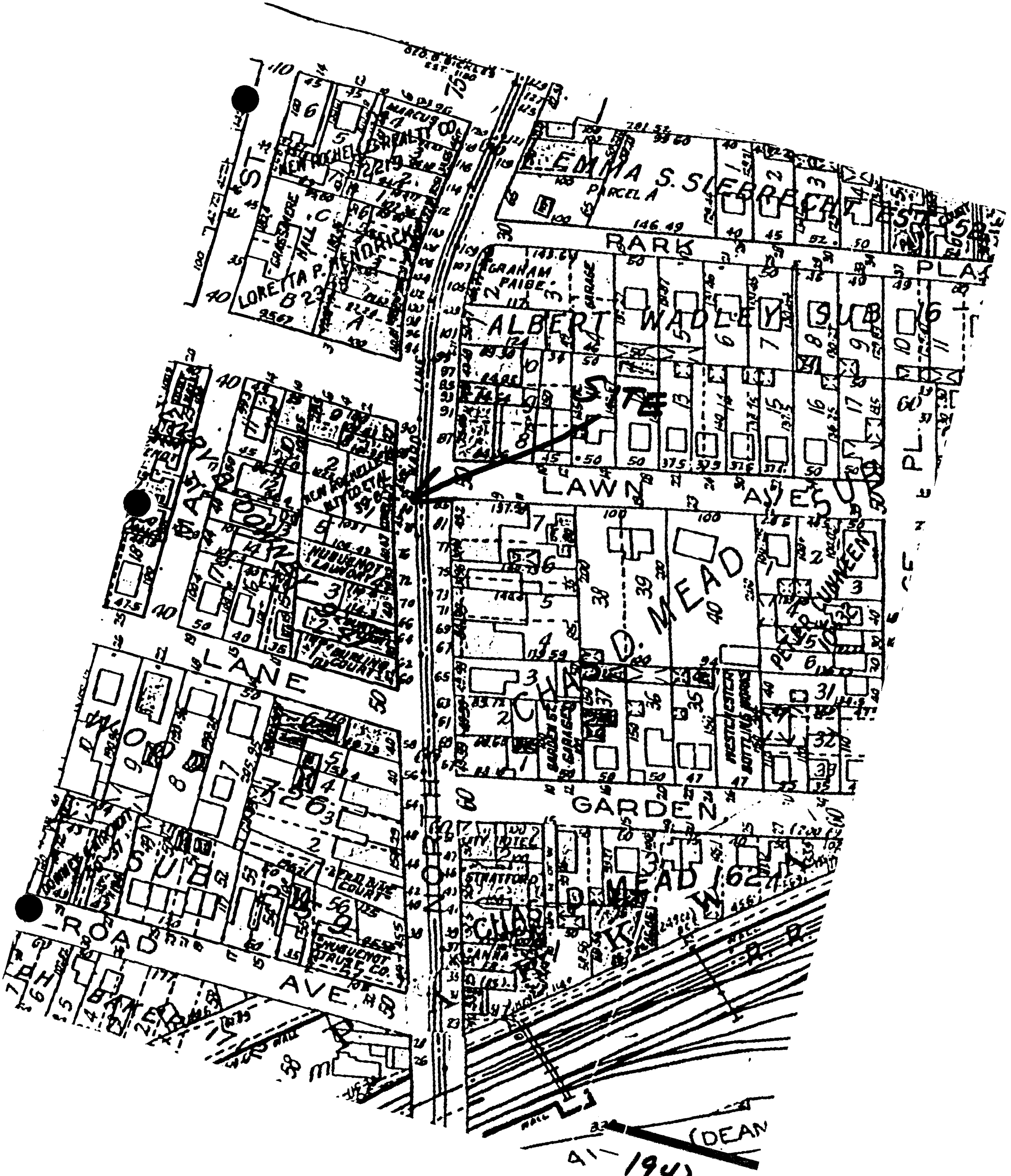

SITE
LOCKWOOD LANE
LOCKWOOD LANE
STREET
331
332
79
NORTH
BURLING PL.
(BURLING LANE)
BURLING PL.
(BURLING LANE)
Drugs
Gro.
Printg.
Furn.
Hardw.
N.Y. N.H. & H. R.R.
1896



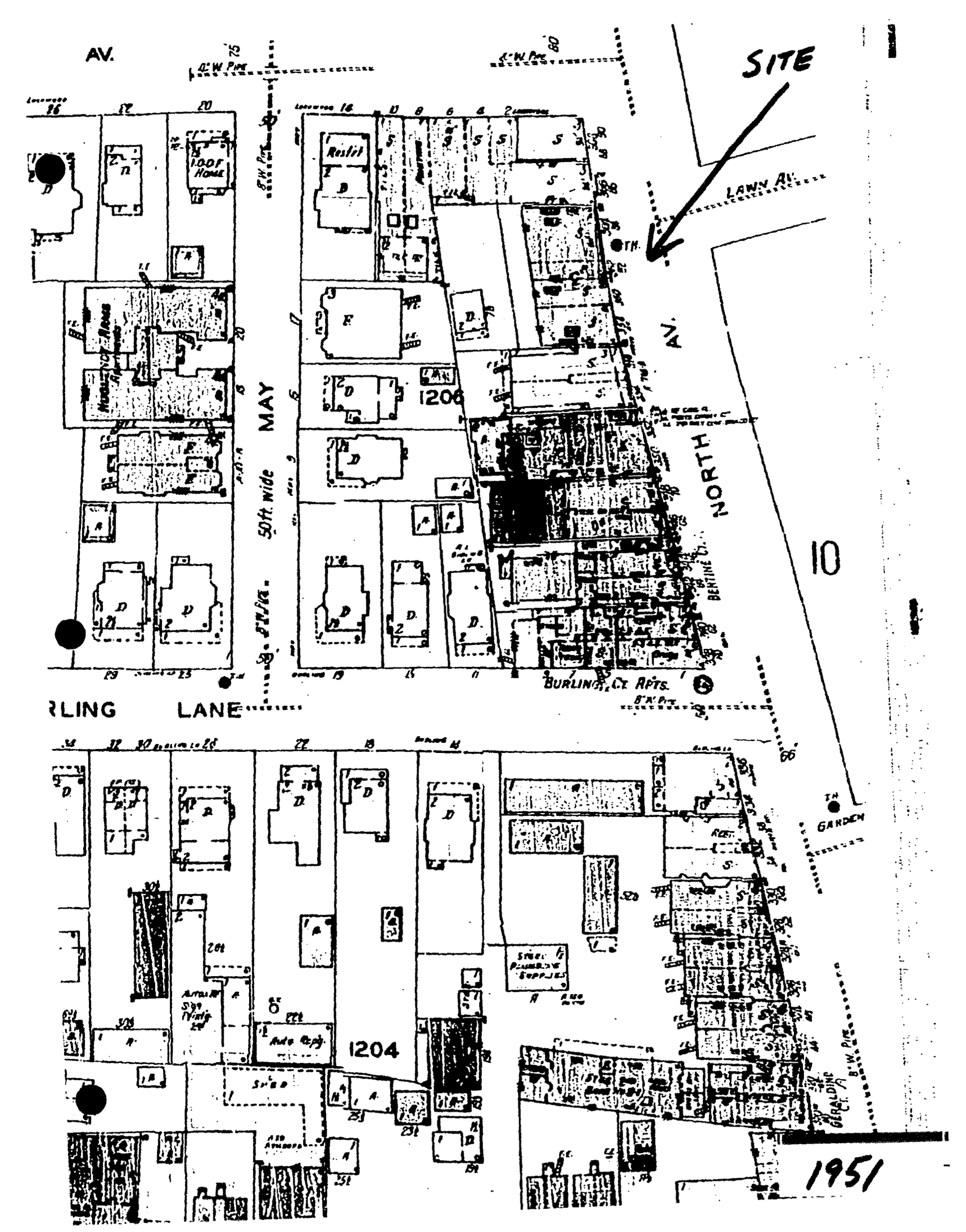
SITE
LOCKWOOD AV.
LAWN
NORTH
BURLING PL.
79
330
Shoes
Dry Goods
Drugs
Gro.
Confec.
Furniture
1903

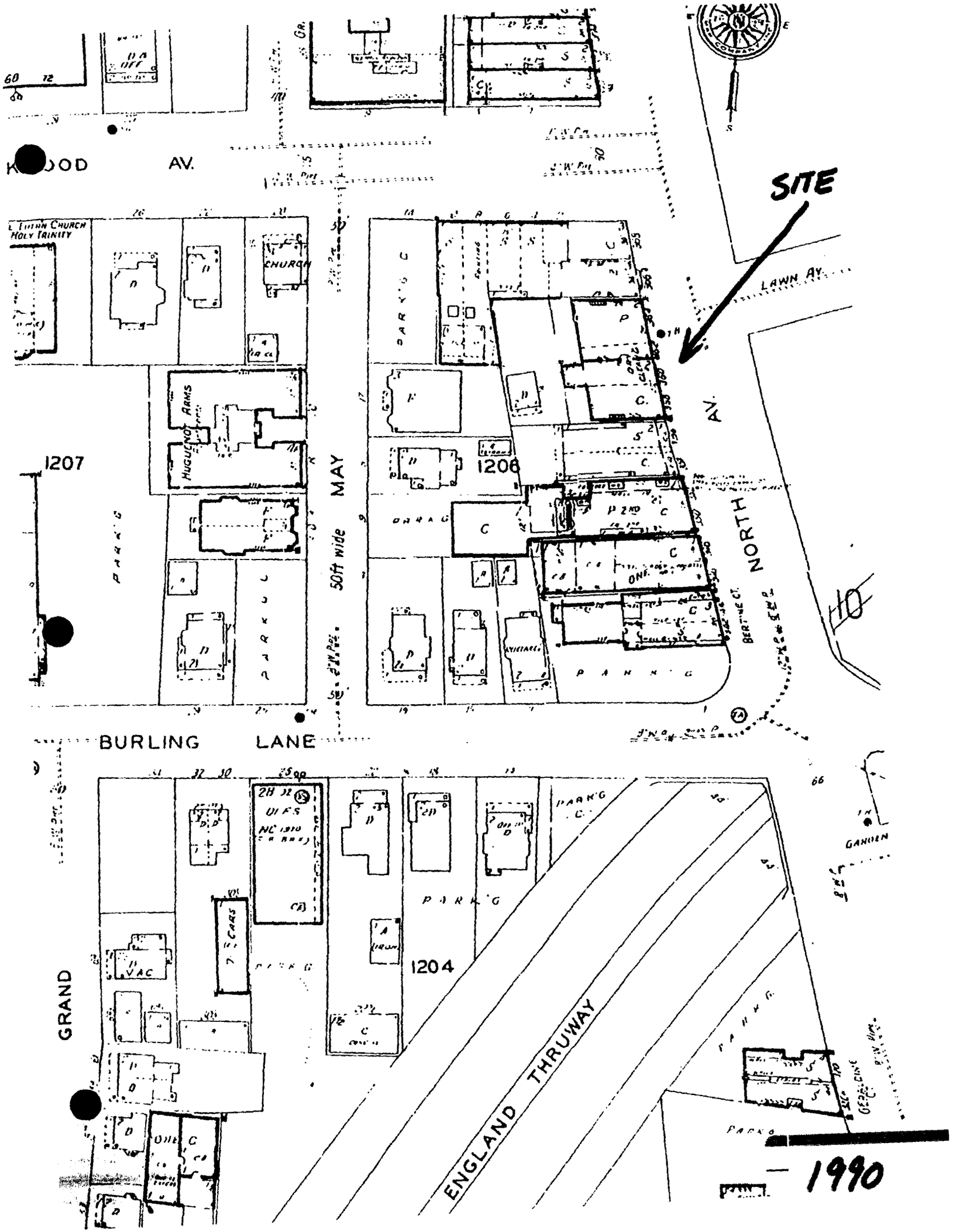

SITE
44
RTH
AV.
MAY
1206
LING
LANE
LINN AV
GARDEN ST.
NAVAJO APARTMENTS
SUBURBAN LAUNDRY
"BERTINE"
6" W. PIPE
4" W. PIPE
8" W. PIPE
-1911

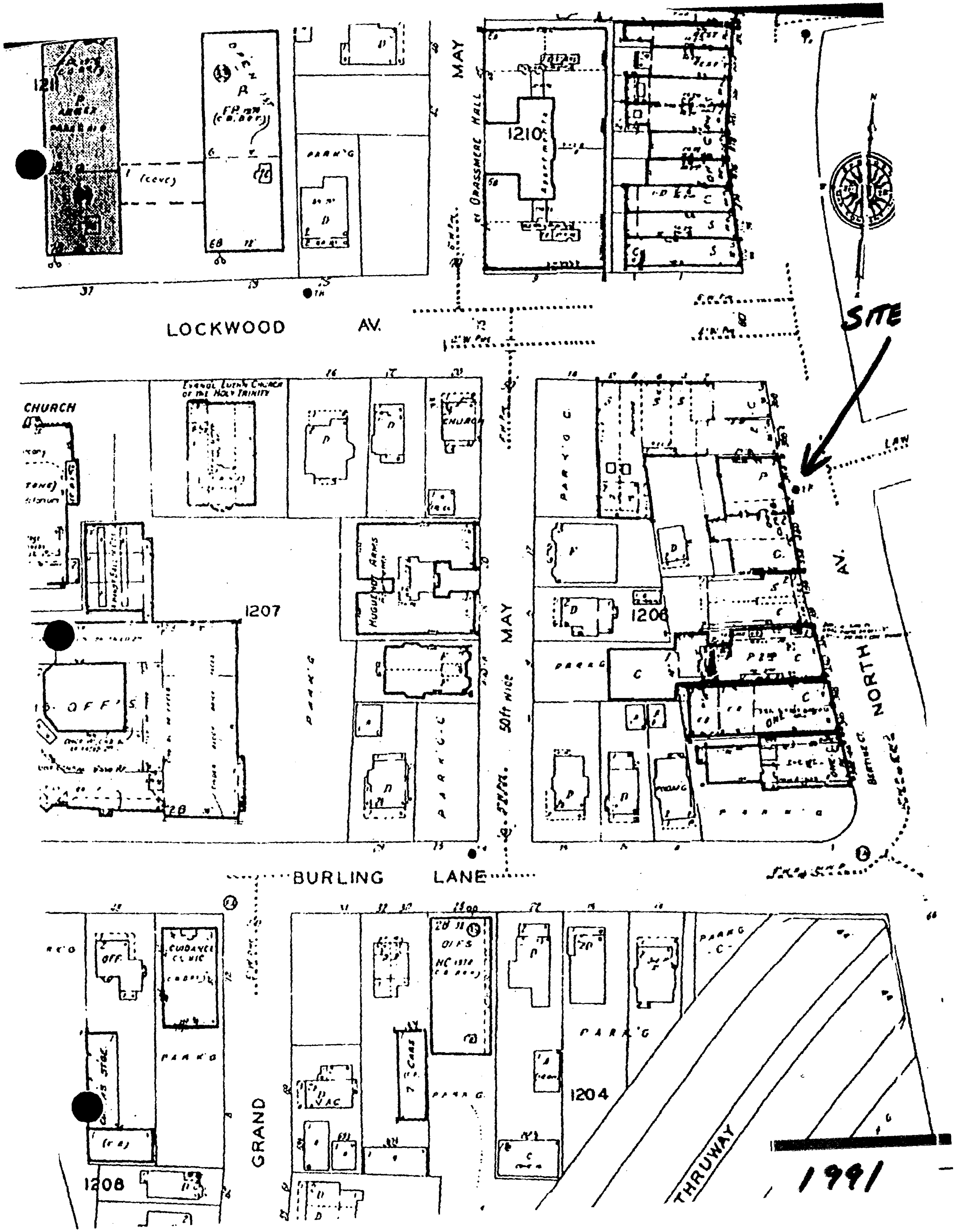

SITE
AV.
LAWN AV.
NORTH
MAY
BURLING LANE
BURLINGTON CT. APTS.
HUGUENOT ARMS Apartments
1206
1204
GARDEN
1931

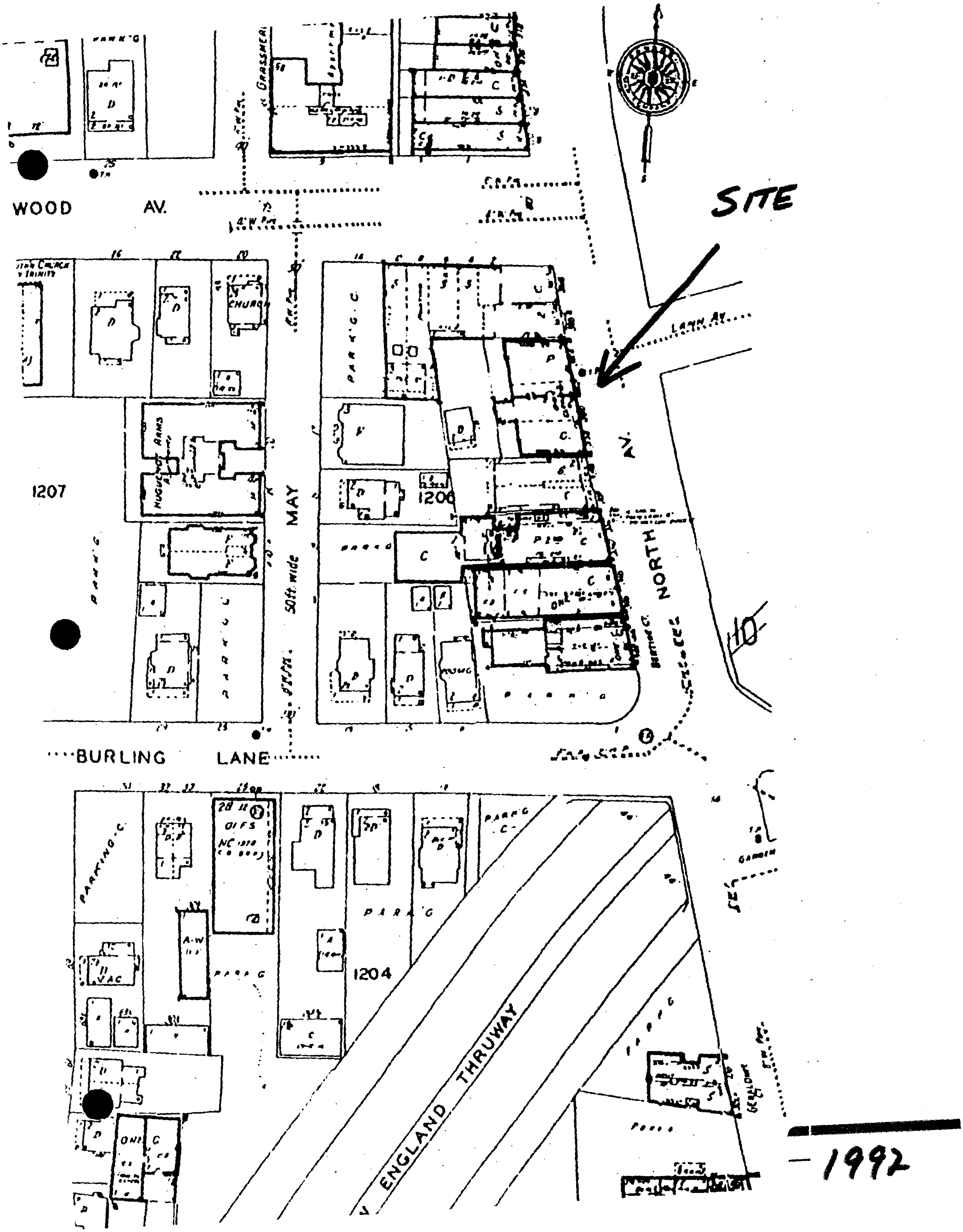


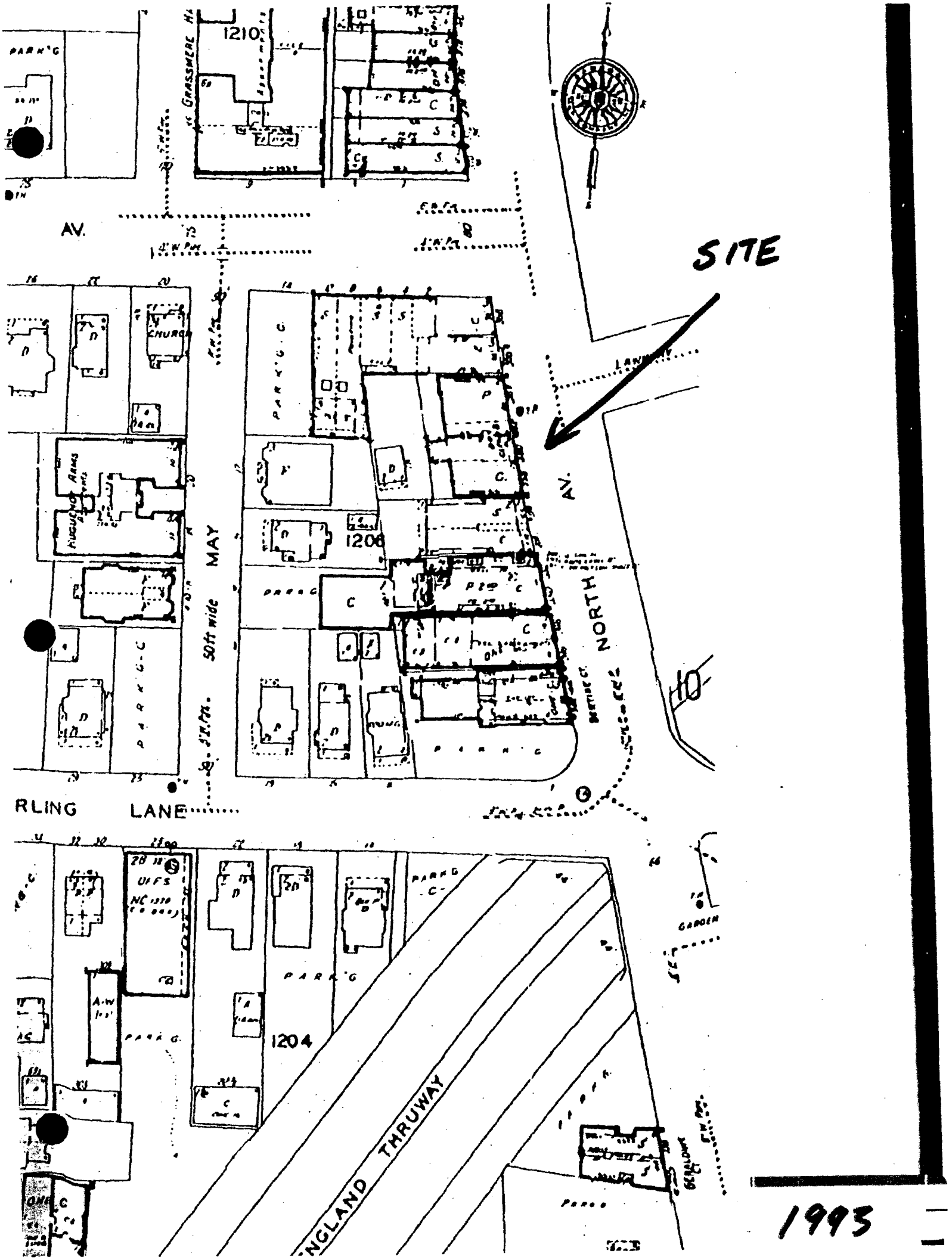
EMMA S. SIEBRECHT EST.
PARCEL A
PARK PL.
GRAHAM PAIGE
GARAGE
ALBERT WADLEY SUB
SITE
LAWN AVE
CHAS. D. MEAD
GARDEN
LANE
ROAD
AVE.
PRIVATE COURT
STRATFORD
R. R.
(DEAN
41-1942

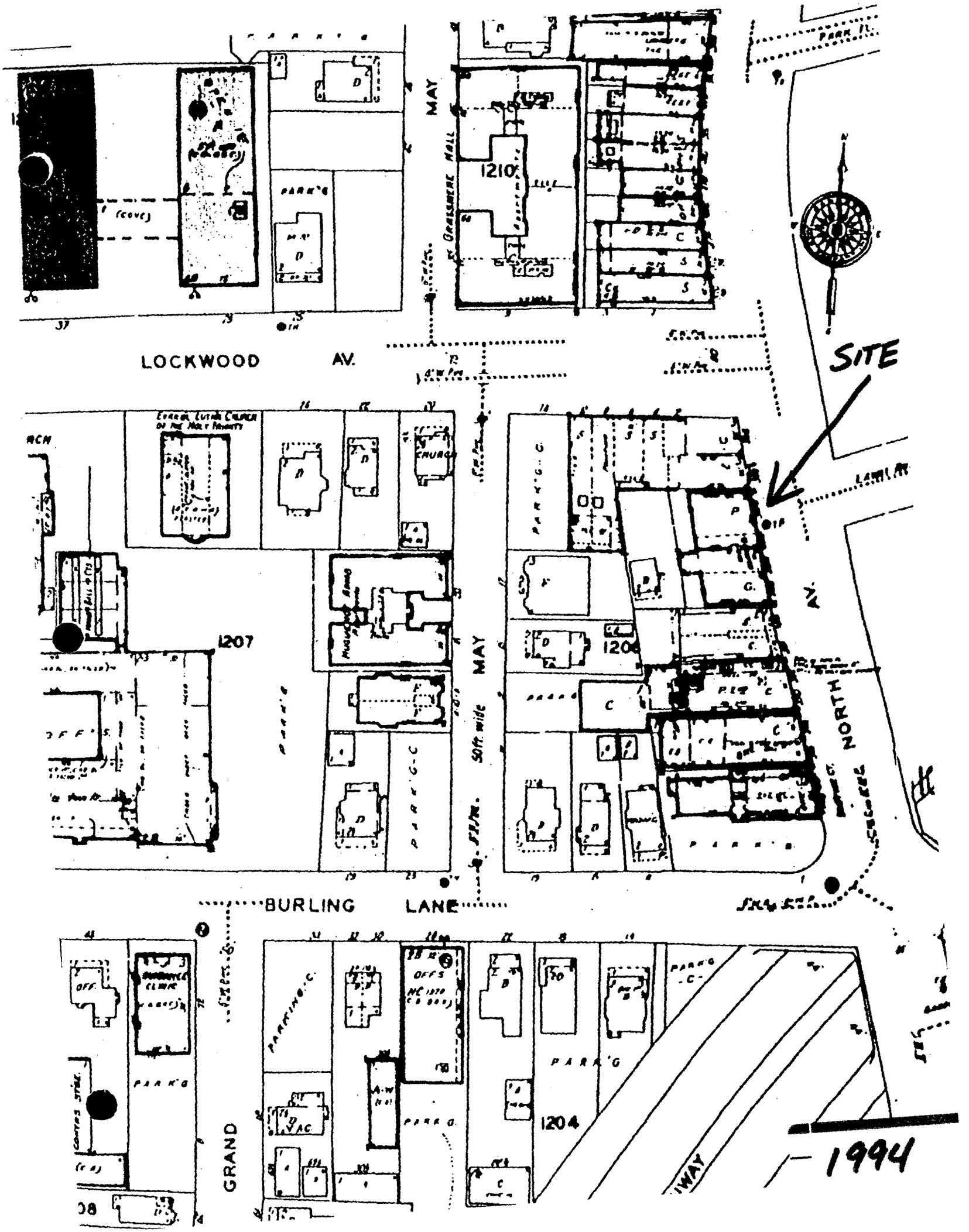

AV.
SITE
LAWN AV.
MAY
50ft. Wide
AV.
NORTH
10
1206
1204
BURLING CT. APTS.
RLING LANE
GARDEN
1951

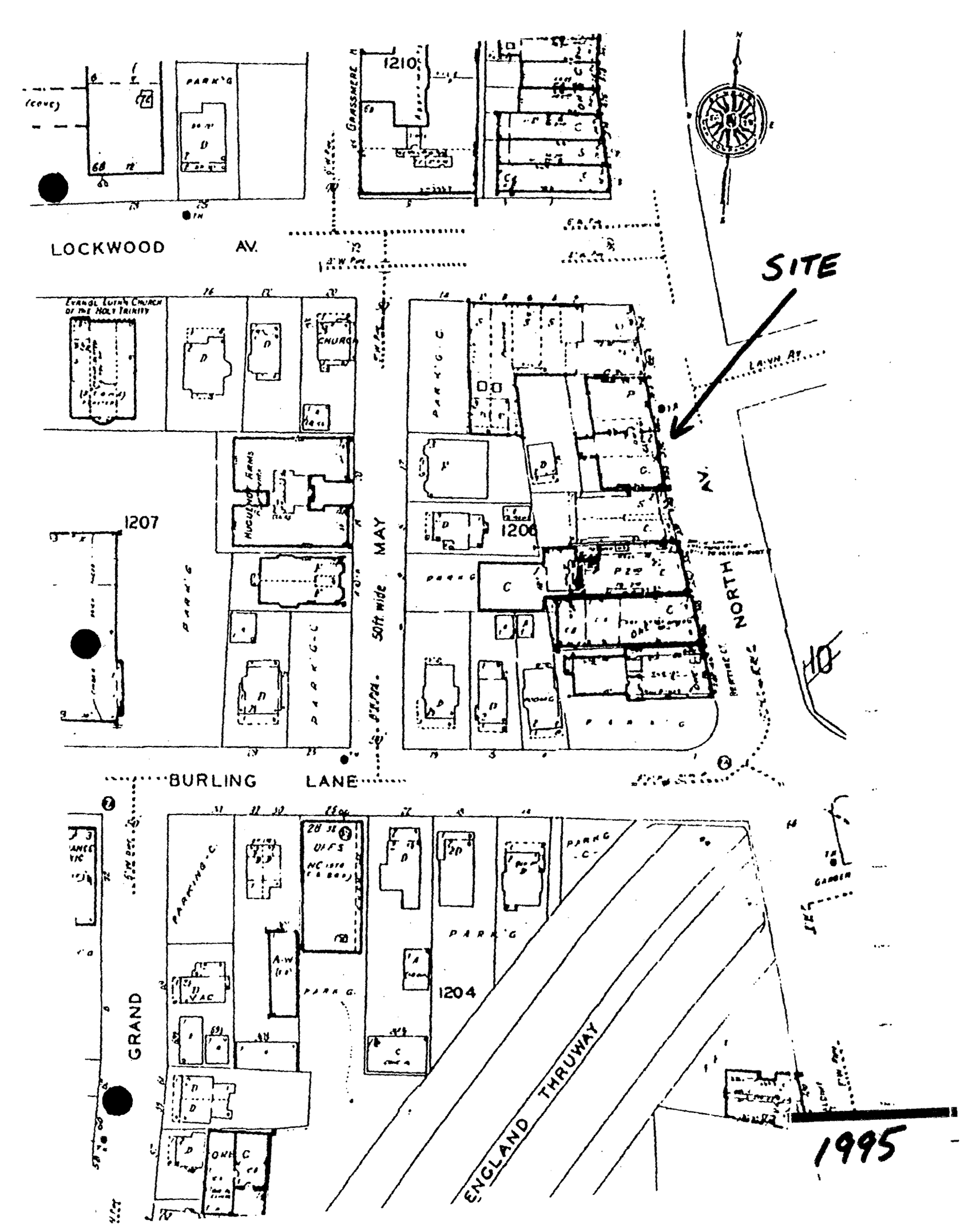

SITE
AV.
LAWN AV.
1207
1206
1204
MAY
50ft wide
NORTH
BURLING LANE
GRAND
ENGLAND THRUWAY
HUGUENOT ARMS
CHURCH
PARK'G
1990

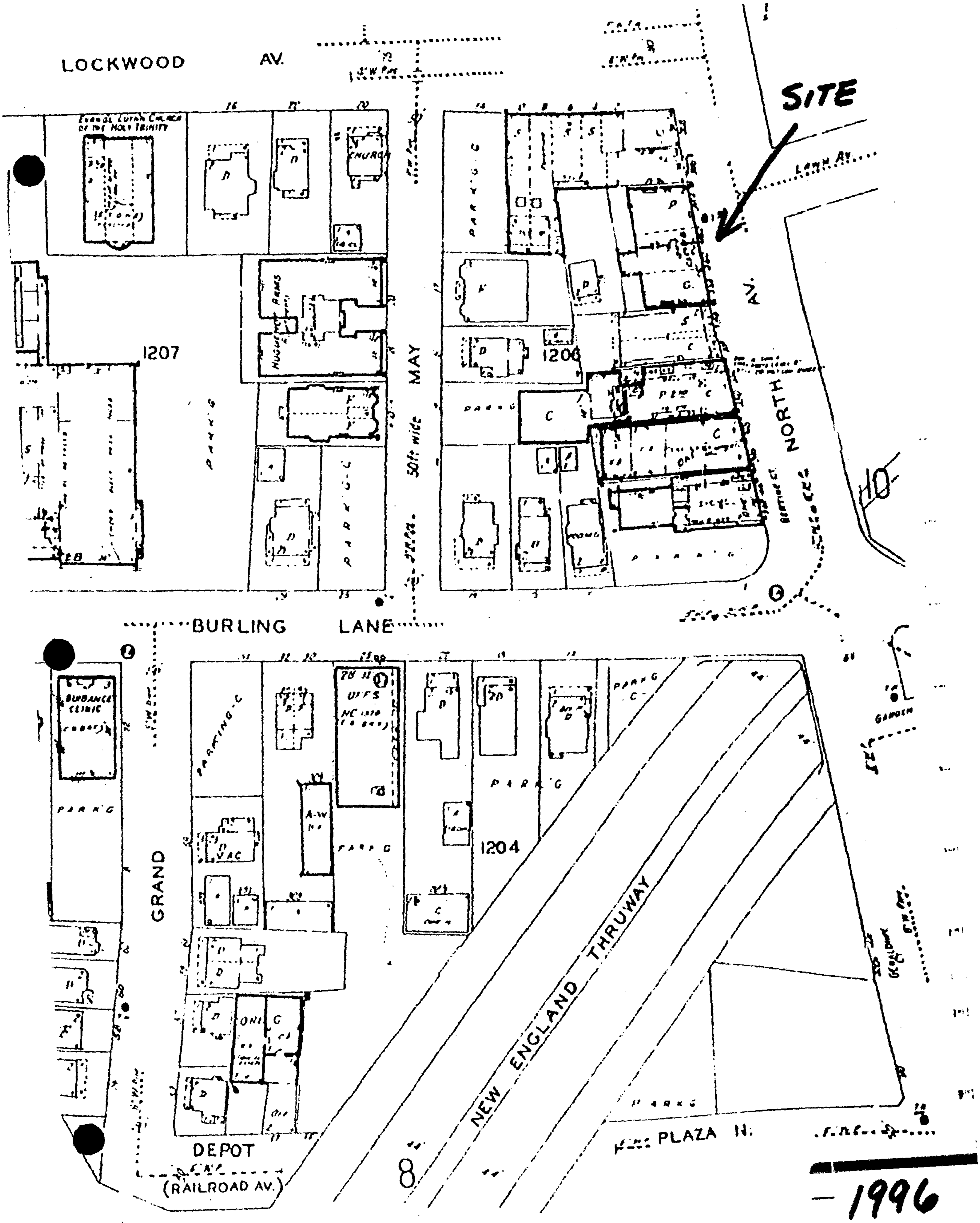

LOCKWOOD AV.
BURLING LANE
MAY
NORTH AV.
GRAND
THRUWAY
SITE
1211
1210
1207
1206
1204
1208
GRASSMERE HALL
EVANGL. LUTH. CHURCH OF THE HOLY TRINITY
CHURCH
HUGUENOT ARMS
OFF'S
GUIDANCE CLINIC
PARK'G
1991


SITE
WOOD AV.
MAY
50 ft. wide
BURLING LANE
NORTH AV.
LAWN AV.
ENGLAND THRUWAY
1207
1206
1204
CHURCH
HUGUENOT ARMS
PARK'G
PARKING C
VAC
A-W
O.F.S.
10
1992


SITE
1210
1206
1204
AV.
MAY
50ft wide
NORTH
LANE
ENGLAND THRUWAY
1995


LOCKWOOD AV.
SITE
MAY
1210
1207
1206
1204
BURLING LANE
GRAND
NORTH
50ft. wide
1994


LOCKWOOD AV.
SITE
1210
1207
1206
1204
MAY
50ft wide
NORTH
BURLING LANE
GRAND
ENGLAND THRUWAY
LAWN AV.
1995


LOCKWOOD AV.
SITE
LAWN AV.
MAY
50 ft wide
NORTH AV.
1207
1206
BURLING LANE
GRAND
1204
NEW ENGLAND THRUWAY
DEPOT
(RAILROAD AV.)
PLAZA N.
8
CHURCH
PARKING
-1996

PARCEL I

ALL those certain lots, pieces or parcels of land, situate, lying and being in the City of New Rochelle, Westchester County, New York, shown and designated as lots numbers One (1) and Two (2) on a certain map filed in the office of the Register of Westchester County and entitled "Map of Properties belonging to New Rochelle Realty Co. and New Rochelle Securities Co., New Rochelle, N. Y.," made by W. L. Hayes, Surveyor and dated July 19th, 1913, and filed in the Westchester County Register's Office (Now Westchester County Clerk's Office, Division of Land Records) on July 26, 1913 in Volume 39 of Maps at page 6, which said lots from said map are more particularly bounded and described as follows:

The said Lot One (1) is bounded and described as follows:

BEGINNING at a point on the westerly side of North Avenue, distant Two Hundred and forty-seven (247) feet northerly from the corner formed by the intersection of said westerly side of North Avenue with the northerly side of Burling Lane, when measured along said westerly side of North Avenue (which point of beginning is the southeasterly corner of Lot No. Two (2) on said map); running thence south 81 degrees 39 minutes 48 seconds west along the southerly boundary line of said lot No. Two (2) One Hundred and One and 88/100 (101.88) feet to land of Francis Rogers; thence south 16 degrees 23 minutes 44 seconds east along said Rogers' land Forty-five (45) feet to the northwesterly corner of land of Rogge;

[illegible] northerly

DESCRIPTION

PARCEL I - continued

LIBER 1127 PAGE 487

The said lot Two (2) is bounded and described as follows:

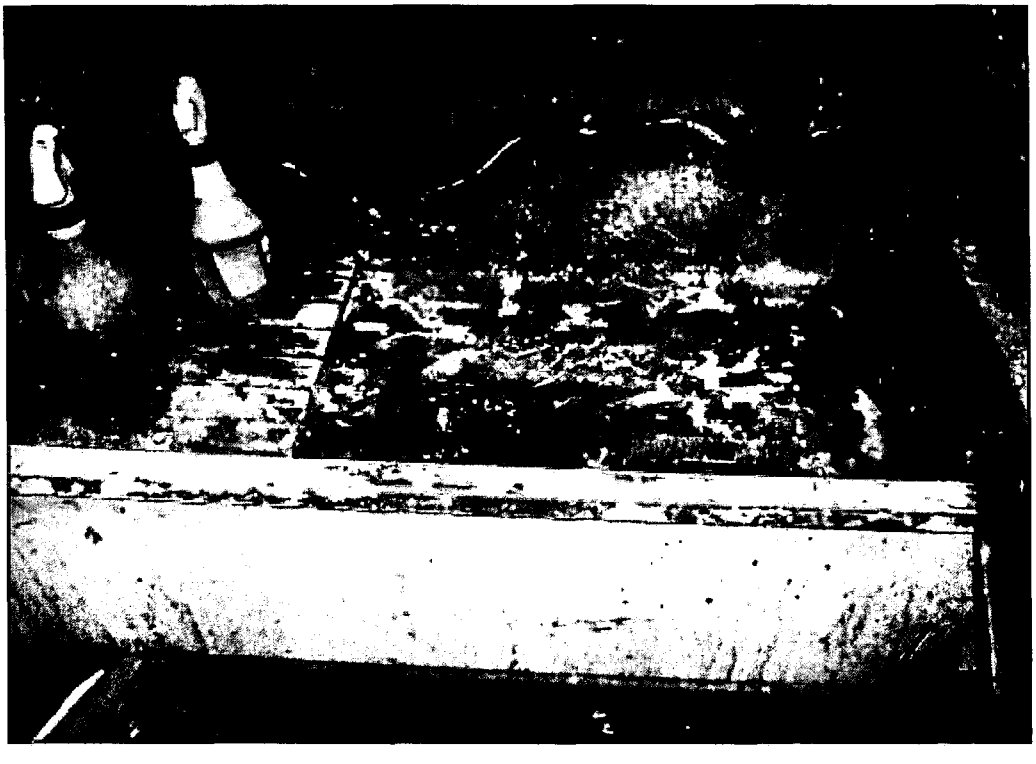
BEGINNING at a point on the westerly side of North Avenue distant Two Hundred and forty-seven (247) feet northerly from the corner formed by the intersection of said westerly side of North Avenue with the northerly side of Burling Lane, when measured along said westerly side of North Avenue (which point is the northeasterly corner of lot No. (1) on said map), thence running south 81 degrees 39 minutes 48 seconds West along said lot Number One (1), One Hundred and one and 88/100 (101.88) feet to land of Francis Rogers as shown on map; thence north 16 degrees 23 minutes 44 seconds West along said Rogers' land Forty-five (45) feet to land of Henry Zauner, as shown on said map; thence north 81 degrees 45 minutes 10 seconds east along said Zauner's land, One Hundred and 84/100 (100.84) feet to North Avenue aforesaid and thence running south 17 degrees 44 minutes 10 seconds east along North Avenue Forty-five (45) feet to the point or place of beginning.

TOGETHER with all the right, title and interest of the party of the first part of, in and to the land in North Avenue in front of and immedia ely adjacent to the above described premises to the center line of North Avenue.

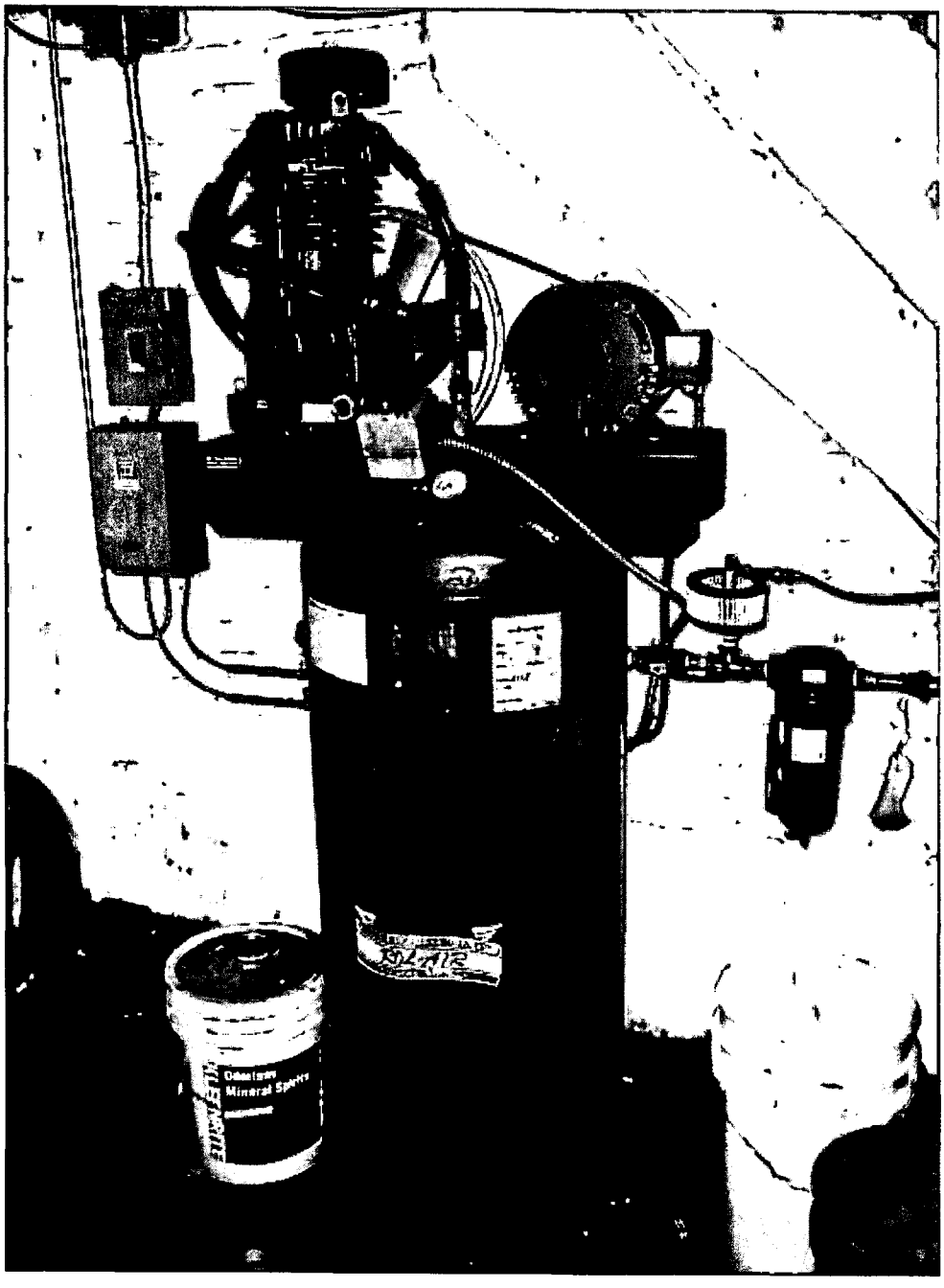
APPENDIX B

Photograph Log (2005) and Historic Records and Copies of Prior Studies

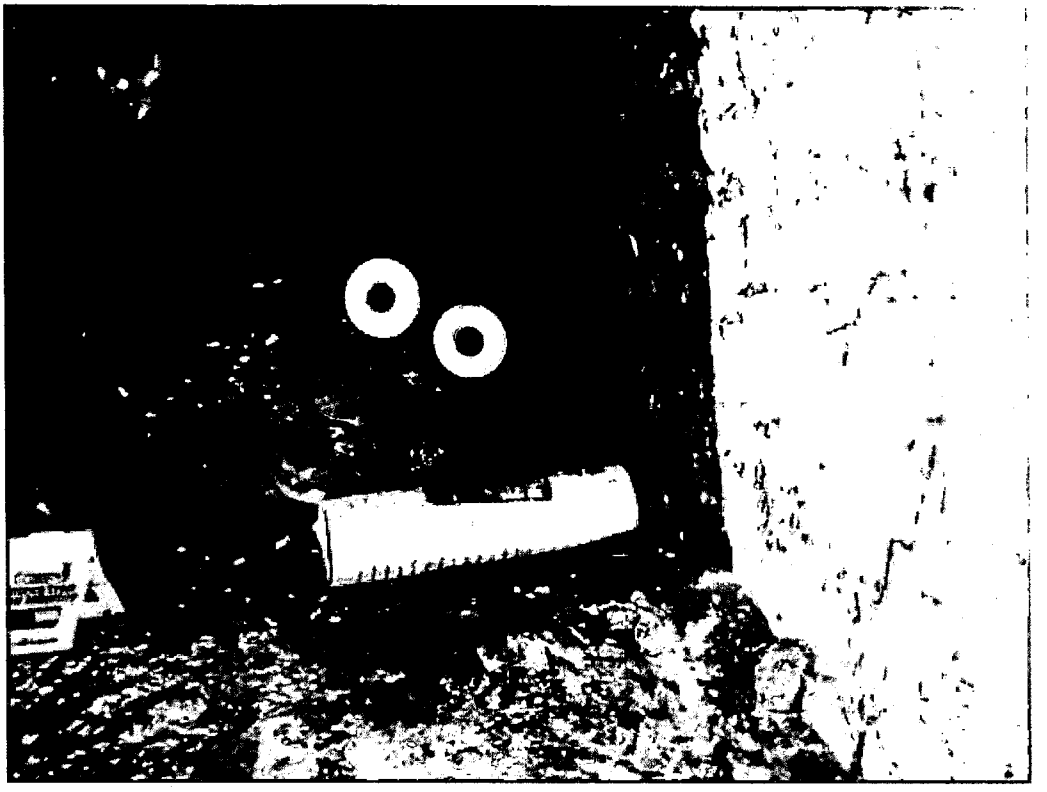
Photograph No.1: Subject property at 358 to 364 North Avenue, New Rochelle, New York.



Photograph No. 2: Slop sink within All American Sports Wear.



Photograph No. 3: Air compressor located within the basement.



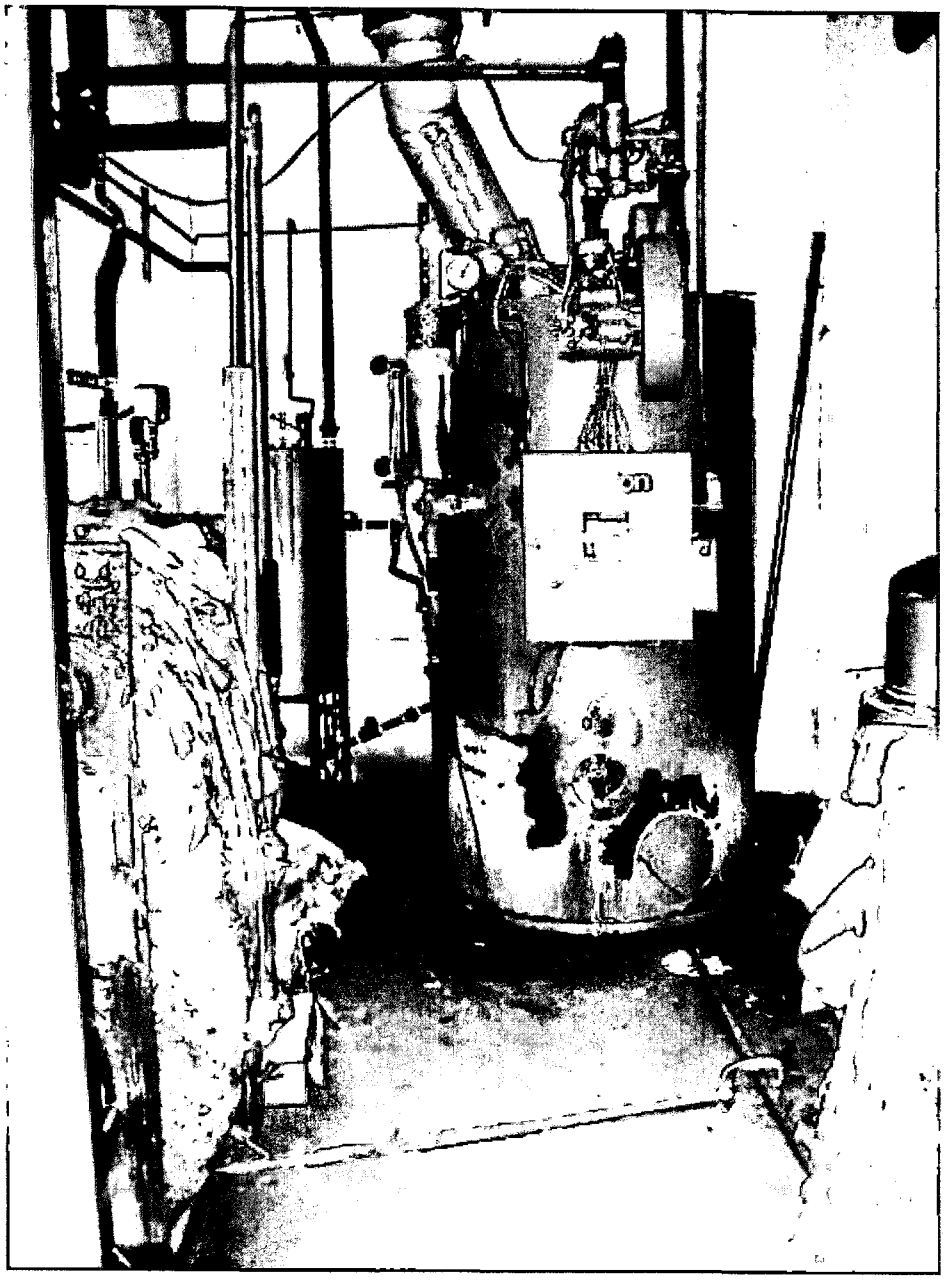
Photograph No. 4: Filters within window well along western wall of basement.

Photograph No. 5: Cut copper lines within basement.

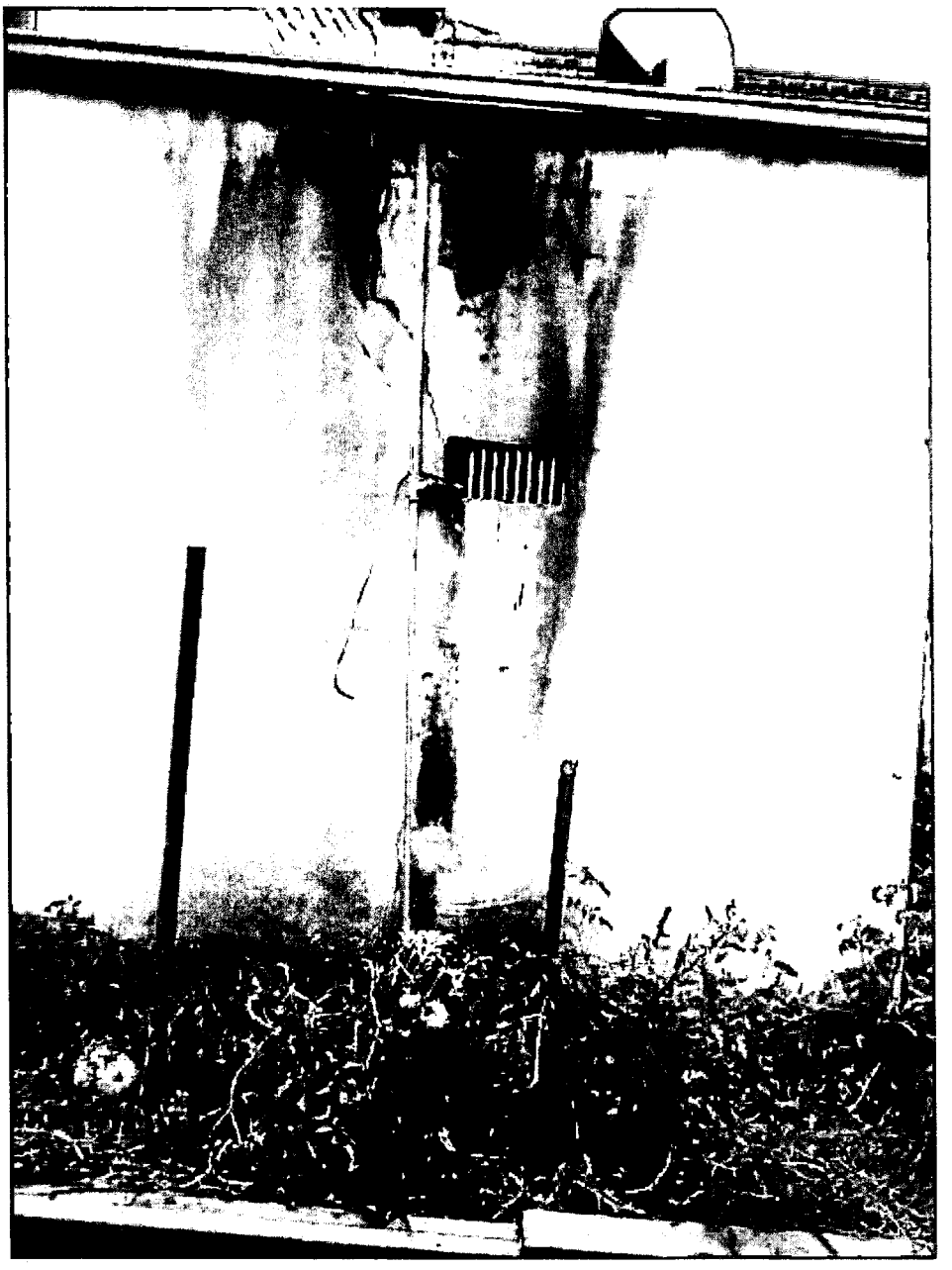
Photograph No. 6: Sump pit within boiler room.

Photograph No. 7: Water staining and hole within slab floor of the basement.

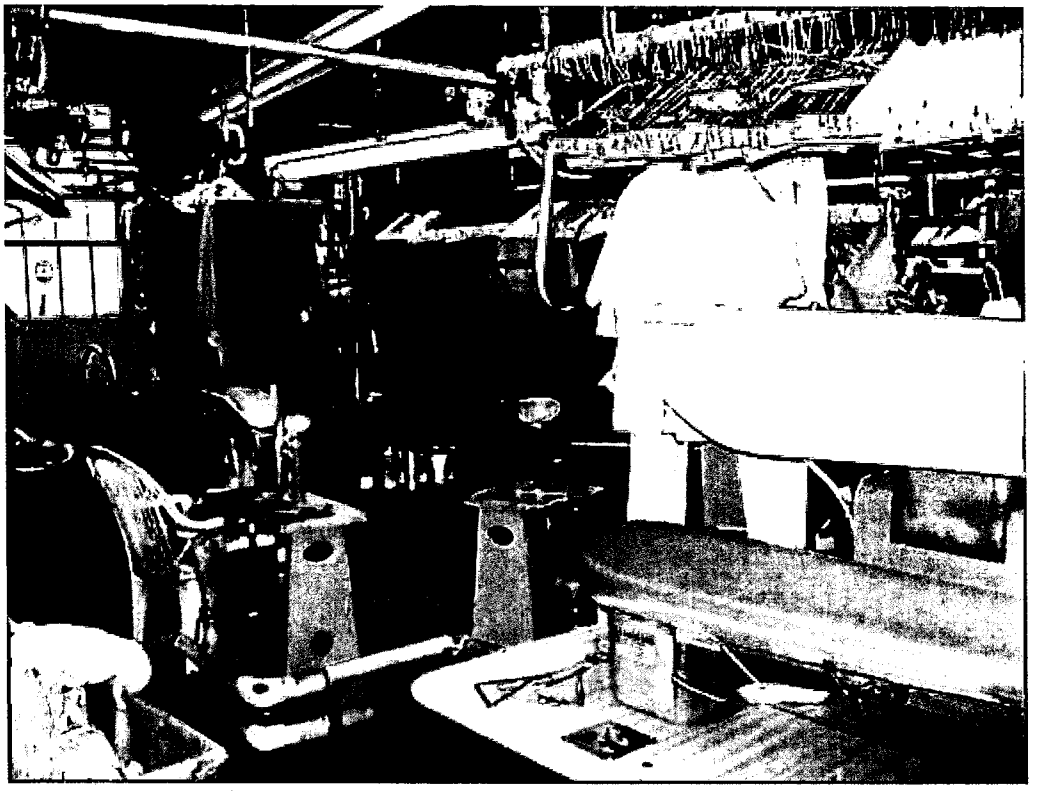
Photograph No. 8: Two floor drains within northeastern portion of the basement.



Photograph No. 9: Steam Boiler room.

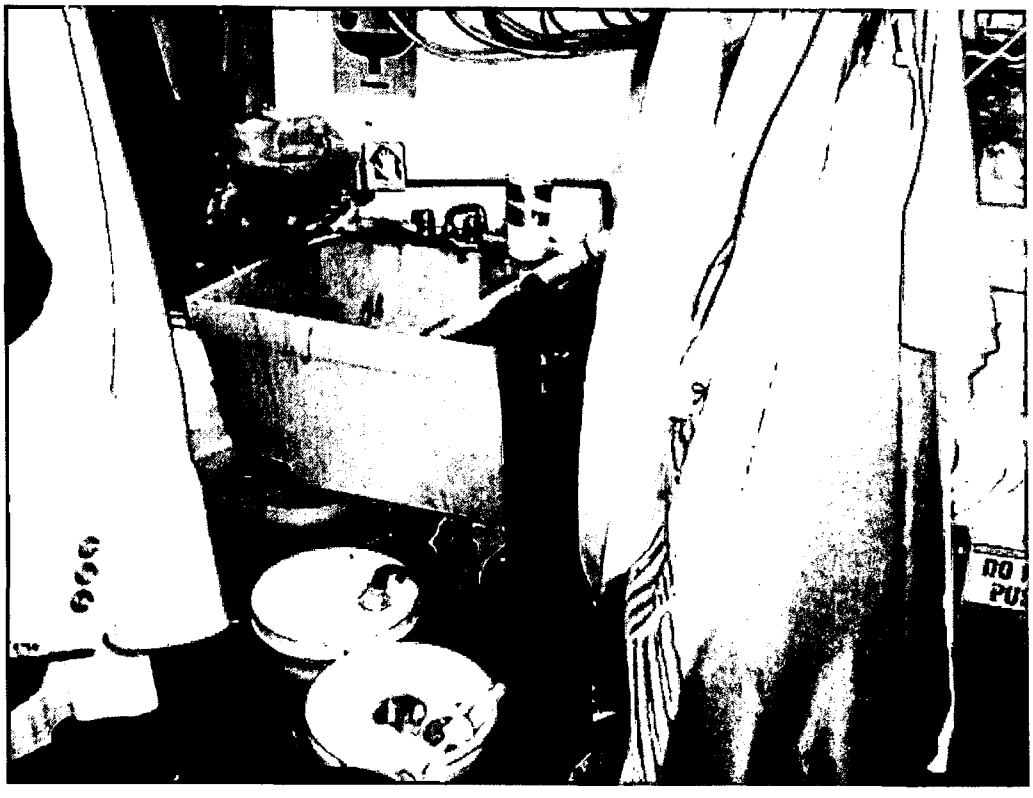


Photograph No. 10: Steam vent pipe.

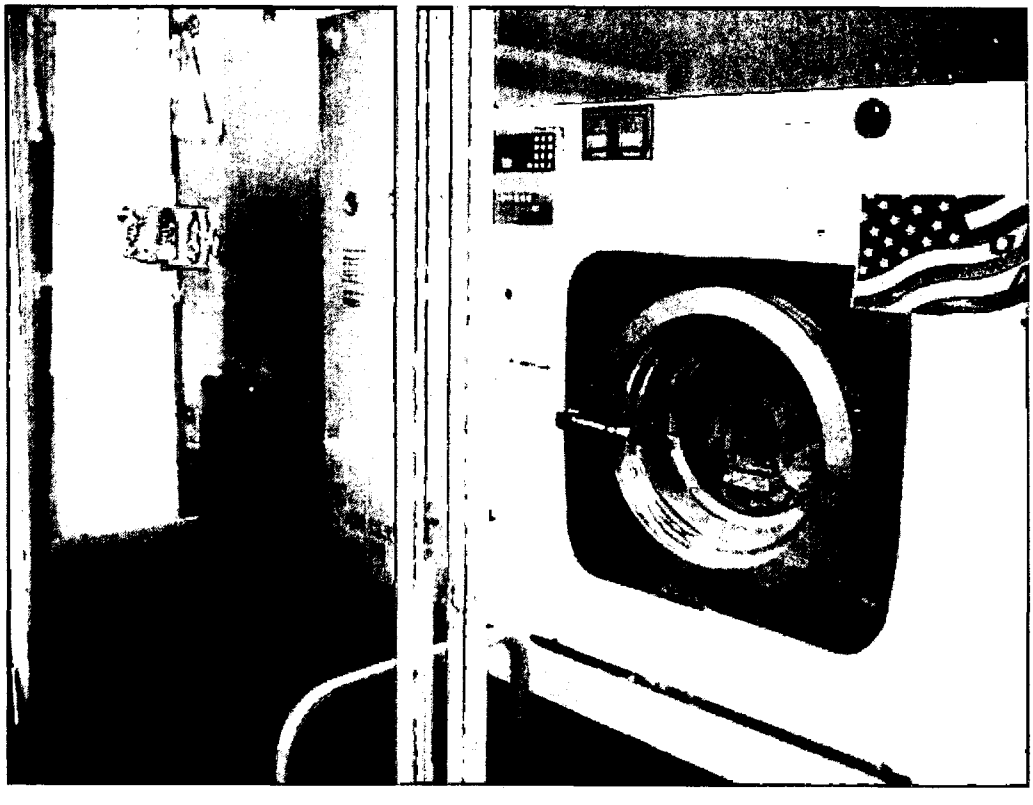


Photograph No. 11: Steam press area.

Photograph No. 12: Clothes washing machine.



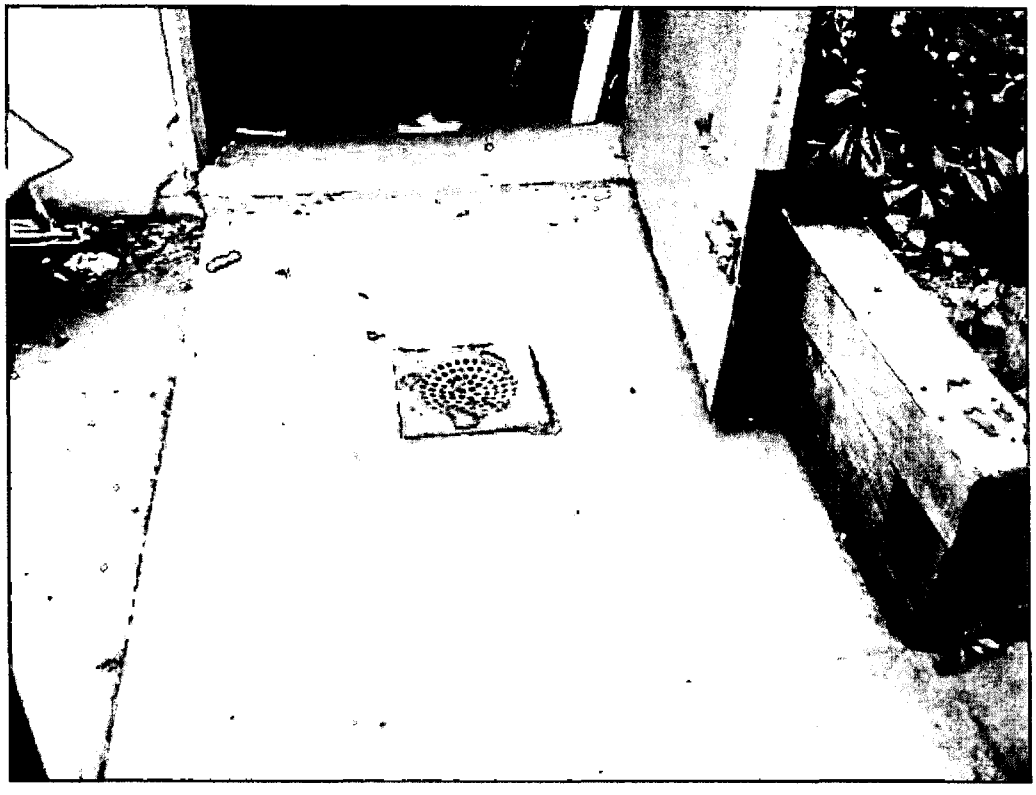
Photograph No. 13: Slop sink and containers of cleaning/laundry agents.



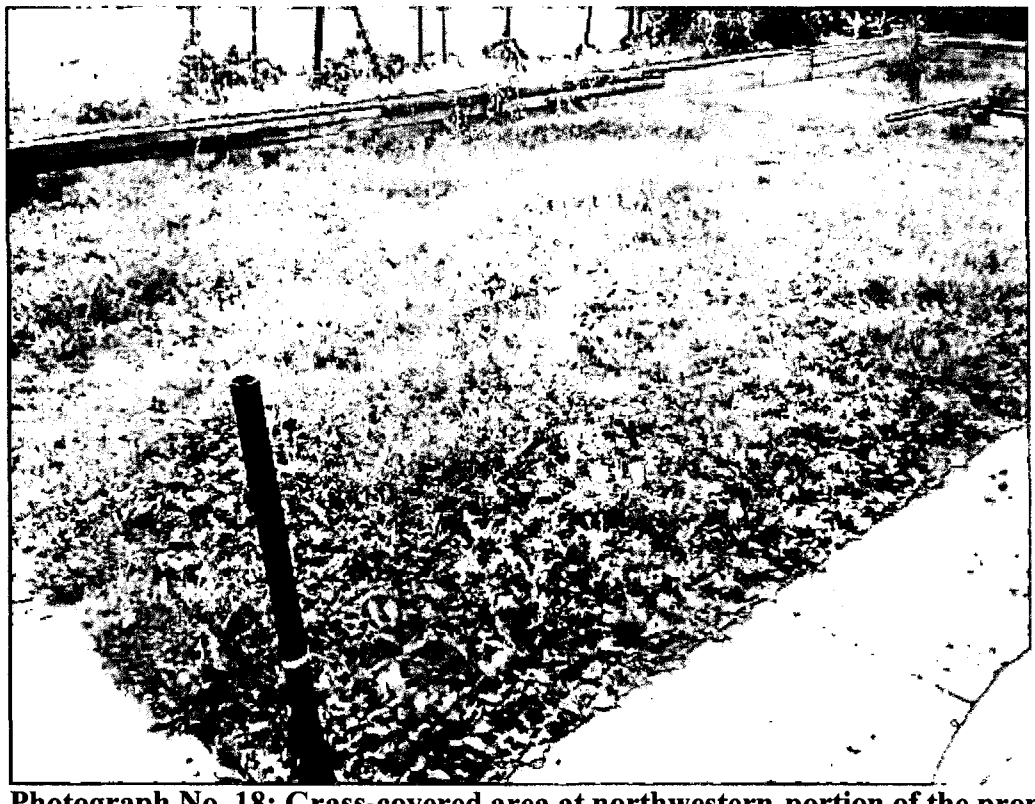
Photograph No. 14: Current dry cleaning equipment.

Photograph No. 15: Dry cleaning chemicals within equipment room.

Photograph No. 16: Hazardous waste storage room.

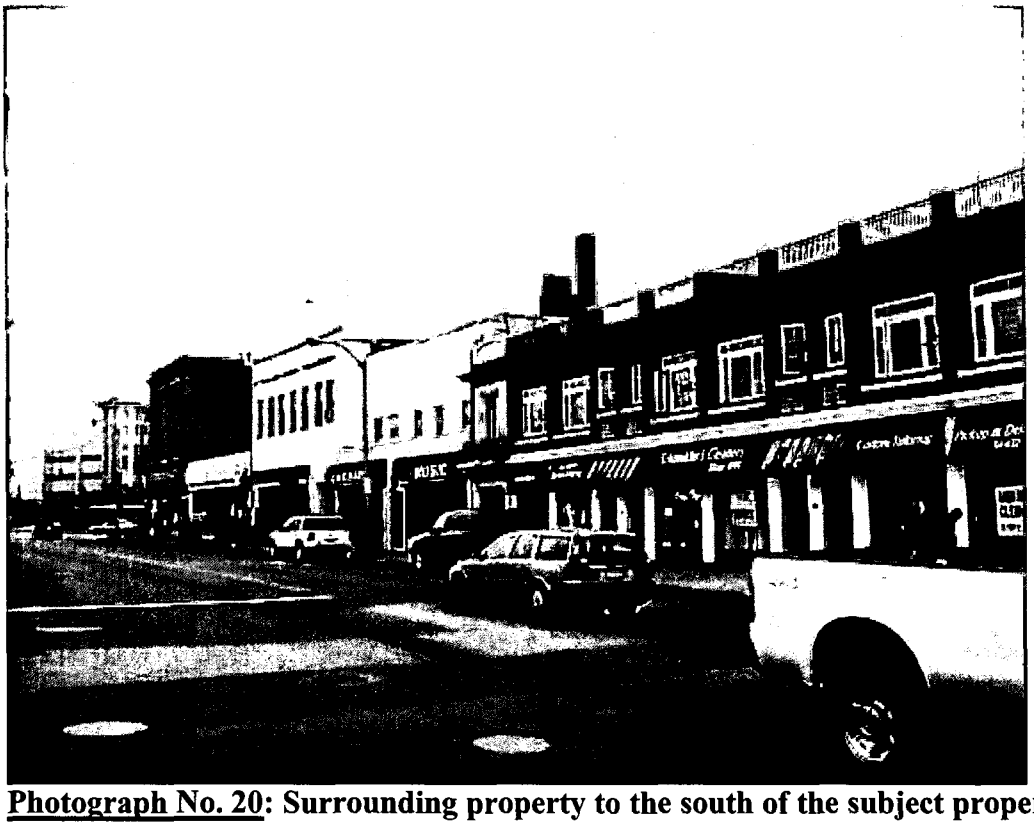


Photograph No. 17: Storm drain exterior to the western wall of the building.



Photograph No. 18: Grass-covered area at northwestern portion of the property where subgrade drywell is located.

Photograph No. 19: Adjoining property to the north of the subject property.



Photograph No. 20: Surrounding property to the south of the subject property along North Avenue.

Photograph No. 21: Property to the east across North Avenue.

CITY NEW ROCHELLE
CITY HALL
515 NORTH AVENUE
NEW ROCHELLE, NY 10801

APPLICATION FOR PUBLIC ACCESS TO RECORDS

DATE: September 12, 2005

TO: CITY CLERK

FROM: Preferred Environmental Services

ADDRESS: 325 Merrick Avenue, East Meadow, New York 11554

PHONE NUMBER: (516)-357-8200

I HEREBY APPLY TO INSPECT THE FOLLOWING RECORDS:

DEPARTMENT NAME: Building/Development

DESCRIPTION: All permits, applications, plans, surveys, plumbing plans Certificates of Occupancy, etc. For:

Schmucklers Cleaners at 358 North Avenue, New Rochelle Tax Map Parcel Number 4 -1206-0019

PURPOSE Information necessary for the preparation of an Environmental Assessment

William Schlageter
Signature
Preferred Environmental Services
Representing

For Agency Use Only

APPROVED
DENIED

For the following reasons:
Confidential Disclosure
_____ Part of Investigatory Files
_____ Unwarranted Invasion of Personal Privacy
_____ Record of which this Agency is Legal Custodian cannot be found
_____ Exempted by statute other than the Freedom of Information Act
_____ Agency does not have possession of requested records
_____ Other (specify)_____

_____ _____
Signature Title

Notice: Within five (5) days after mailing or personal delivery of denial, you have a right to appeal a denial of this application to the appeal officer, c/o City Manager, who must fully explain his reason for such denial in writing seven days after receipt of appeal. Such appeal must be dated and be accompanied by a true copy of the original application made to the records access Officer.

LOCATION: 364 North Avenue | SECTION 5 | BLOCK 1206 | LOT 19

BUREAU OF BUILDINGS — CARD #1 — CITY OF NEW ROCHELLE, N. Y.

NEW BUILDINGS

PLAN No.	FILED	FINISHED	TYPE OF BLDG.
[illegible]37	7/23/13	1913	2St.Br. Stores & Office (1/2 of bldg. on lot #20) 216-99

ADDITIONS AND ALTERATIONS

21827	1/15/47		Alt.
42059	8/12/87	3/21/91	-construct one story rear addition to dry cleaner establisment
49332	11/30/98	7/29/99	awning Pick Up & Del.
49331	11/30/98	7/29/99	awning Embroidery
49330	11/30/98	7/29/99	awning-Screen Printing
49329	11/30/98	7/29/99	awning-Custom Tailoring

DEMOLITIONS

49328	11/30/98	7/29/99	awning-Smucklers Clean
49327	11/30/98	7/29/99	awning over 1st fl. windows

CERTIFICATE OF OCCUPANCY

DATE	NUMBER
3/21/91	C.Com. #97 - 1991
7/29/99	CO# 213-99
	214-99
	215-99
	223-99
	224-99

TEMPOR'Y PERMITS

1/29/48	8
6/15/51	2093
6/17/52	2647
6/4/52	2622

DEPT. OF LABOR

11/14/46	ST-3204

ELECTRICAL PERMITS

FILED	FINISHED	CERT. No.
2/6/46	Feb/46	266
1/24/47	May/47	1624
3/7/47	Dec/47	1732
7/14/59	9/15/59	3266
6/24/60	7/11/60	4574
7/14/60	8/15/60	4653
6/1/65	1/21/66	9668
2/16/67	2/20/67	A1325
3-1-85		57-85

SIGNS

PERMIT No.	FILED	FINISHED
23706	3/15/50	Mar 50
35091	1/31/67	7/14/72

AREAWAYS

		A(1)

VIOLATIONS

TYPE	FILED	REMOVED
E/V	7/28/60	4/24/62
BC-Excav.	7/15/87	

REMARKS

Sign Information on reverse side of card.

LOCATION: 358 North Avenue | OWNER: | SECTION 4 | BLOCK 1206 | LOT 17 20

BUREAU OF BUILDINGS — CARD #2 — CITY OF NEW ROCHELLE, N. Y.

NEW BUILDINGS

PLAN No.	FILED	FINISHED	TYPE OF BLDG.
		1914	2 St.Br. Stores & Office (1/2 of bldg. on lot #19) 2½ St. Fr. Dw.

ADDITIONS AND ALTERATIONS

17167	3/18/37		Add.
44488	4/11/91	3/11/91-	addition

DEMOLITIONS

CERTIFICATE OF OCCUPANCY

DATE	NUMBER
6/23/37	1666
3/11/91	CC# 92-1991

TEMPOR'Y PERMITS

4/17/50	1369
4/2/51	1938
11/20/52	2918

DEPT. OF LABOR

3/8/37	16,938

ELECTRICAL PERMITS

FILED	FINISHED	CERT. No.
3/16/46		364
7/22/60	8/19/60	4686
2/16/67	2/20/67	A1326
4/5/82	6/8/82	16010
	4/1/88	029163
	4/9/88	035824

SIGNS

PERMIT No.	FILED	FINISHED
22916	9/24/48	10/27
35092	1/31/67	7/14/72

AREAWAYS

		A(1)

VIOLATIONS

TYPE	FILED	REMOVED
BC	1/11/80	2/13/80
BC	2/13/80	4/2/80

REMARKS

Do not write on this page.

TAX ASSESSOR

I certify that the block and lot and address described hereon are in accordance with the present tax records.

The lot hereon described has been previously designated as ______________________ and the change was effective ______________________.

______________________ (Signature) ______________________ (Date)

DEPARTMENT OF PUBLIC WORKS

Present records indicate that the lot hereon described: (Check Answers)

( ) 1. Is on a approved City Street.

( ) 2. Does not contain any City Easements. ( ) Contains Easements.

( ) 3. Is not designated as a flood area.

( ) 4. Will require the following approvals and permits from Public Works:

____

( ) 5. Is not within Public Works jurisdiction for the following reasons:

____

The Department of Public Works has no objection to the processing of the Building Permit other than those cited above.

______________________ (Signature) ______________________ (Date)

DEPARTMENT OF DEVELOPMENT

I have reviewed this application and plans and certify that this application may be processed for a Building Permit.

Comments: ______________________

______________________ (Signature) ______________________ (Date)

1. Application Number B-22-91 2. Date Filed 1.14.91 3. Total Fee $ 183.00
4. Fee Paid $ 183.00 5. Receipt No. D036973 6. Initials L. Peterson
7. Permit Number ____________ 8. Date Issued ____________

Bureau of Buildings
Department of Public Works
515 North Avenue
New Rochelle, NY 10801

Louis Goodman, R.A.
Building Official

City of New Rochelle
New [illegible]k

AIE 7

APPLICATION FOR A BUILDING PERMIT

Permit No. ____________ Date Issued MAR 11 199[illegible]

1. Address 358 North Avenue Block 1262 Lot(s) 19 PL. Zoned Dist. C-2
2. Lot Area: 8929 Sq. Ft. Area of structure or addition (lowest level): 205 Sq. Ft.
3. Statement of work proposed: It is proposed to LEGALIZE AN EXIST. ONE STORY ADDITION.
4. Height of structure or addition (average grade to roof top): 14 MAX Ft. 11 AVE.
5. Cubic contents of structure or addition: 2255 Cubic Feet
6. Construction Cost (include plumbing, electrical, heating, ventilation): $ 10,000
7. Class of Construction (State Code): Underline: (1a),(1b),(2a),(2b),(3),(4a),(4b),(5a),(5b)
8. Use(s) (State Code): Underline: (C1), (C2), (C3.1), C3.2), (C3.3), (C4.1), (C4.2), (C4.3), (C5.1),(C5.2),(C5.3),(C5.4),(C5.5),(C6.1) (C6.2),(C6.3),(C7), (B1),(B2),(B3),(B4), (A1),(A2)
9. Parking: [ ] Present Interior [ ] Exterior [ ] Proposed Interior [ ] Exterior
10. Use(s) of Structure by Area:

Space	Use(s) or Occupancy		No. of Dwelling Units or Occupants		Live Load Capacity		Area Sq. Ft.	
DRY CLEANERS	Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed
Cellar								
~~Basement~~ LOWER	Stor.	Stor.					1250	1250
First Floor	Dry Cleaning	"					1830	1830
Second Floor								
Floor								
Attic								
Roof								

11. System of Heating: ____________, Fuel ____________. If steam, what pressure? ________ P.S.I.
12. Is this application filed to remove a violation? [ ] Yes [X] No Date of Violation ________
13. If application is filed for demolition only, see special requirements for insurance and filing. Item 20 of this form.
14. Owner: GERALD COLUMB 358 NORTH AVE NEW ROCHELLE NY (Address) 10801 (Zip Code) ________ (Phone No.)
15. Engineer: ____________ ____________ (Address) ________ (Zip Code) ________ (Phone No.)
16. Architect: Robert Staniak 20 Cedar St. New Rochelle, NY (Address) 10801 (Zip Code) 633-7070 (Phone No.)

Builder to submit Contractor Information Form.

17. **AFFIDAVIT OF APPLICANT**

State of New York)
County of) ss.

Robert Stanziale (Print Name) being duly sworn deposes and says: That he resides at 20 Cedar St. New Rochelle (Address) and that he is: (Check One)

A. The Owner of the premises described hereon.

B. The _____ (Title of Office) of the New York Corporation _____ (Name of Corporation) with offices at _____ (Address of Corporation) duly authorized by resolution of the Board of Directors, and that said Corporation is duly authorized by the Owner to make this application.

C. A General Partner of _____ (Name of Partnership) with offices at _____ (Address of Offices) and that said Partnership is duly authorized by the owner to make this application.

D. The Lessee of the premises, duly authorized by the Owner to make this application.

E. The Architect or Engineer duly authorized by the Owner to make this application.

F. The Contractor duly authorized by the owner to make this application.

That the information contained in this application and on the accompanying drawings is true to the best of his knowledge and belief. The undersigned hereby agrees to comply with all the requirements of the New York State Uniform Fire Prevention and Building Code, the New Rochelle Building Code, Zoning Ordinance and all other laws pertaining to same, in the construction applied for, whether or not shown on plans or specified in this application.

Sworn to before me this 14th day of January, 1991

Laurex Swanson (Notary Public or Commissioner)

(Signature of Deponent)

633-0070 (Telephone Number)

18. **AFFIDAVIT OF OWNER** (Not required where Owner, Registered Architect or Professional Engineer is applicant.)

State of New York)
County of) ss.

_____ (Print Name) being duly sworn deposes and says: That he resides at _____ (Address) and that he is: (Check One)

A. The Owner of the premises described hereon.

B. The _____ (Title of Office) of the New York Corporation _____ (Name of Corporation) with offices at _____ (Address of Corporation) duly authorized by resolution of the Board of Directors, and that said Corporation is the Owner of the premises described hereon.

C. A General Partner of _____ (Name of Partnership) with offices at _____ (Address of Offices) and that said Partnership is the owner of the premises described hereon.

That the applicant _____ (Name of Applicant) is duly authorized to apply for the permit as described in this application and drawings. The undersigned hereby agrees to comply with all the requirements of the New York State Uniform Fire Prevention and Building Code, the Building Code, Zoning Ordinance and all other laws pertaining to same, in the construction applied for, whether or not shown on the plans or specified in the application.

The undersigned further states: That he will not commence work before a Building Permit is issued and that he will obtain a Certificate of Occupancy or Compliance immediately upon completion of the work proposed.

Sworn to before me this _____

day of _____, 19____

_____ (Notary Public or Commissioner)

_____ (Signature of Deponent)

_____ (Telephone Number)

19. **DESIGNER'S AFFIDAVIT FOR APPROVAL OF PLANS AND SPECIFICATIONS**

State of New York)
County of Westchester) ss.

Robert Stanziale AIA (Print Name) being duly sworn deposes and says: That he resides at 20 Cedar St. New Rochelle (Address) that he personally supervised the preparation of the Architectural plans and that to the best of his (Architectural, Structural, Mechanical, Other)

knowledge and belief, the work applied for, if performed in accordance with such plans will conform with all the provisions of the New York State Uniform Fire Prevention and Building Code, the New Rochelle Building Code, Zoning Ordinance and with the provisions of all other laws and regulations applicable thereto in effect this date.

Deponent further states that he prepared or personally supervised the preparation of the plans, specifications and energy conservation study and that to the best of his knowledge and belief, if constructed in accordance with such plans and specifications the structure will conform with all the applicable provisions of the New York State Energy Conservation Code and the specific requirements of the City of New Rochelle, New York, of 6,000 degree days.

Deponent further says that he is duly authorized by Leonard Codignola who is the owner in fee of all that certain lot, piece or parcel of land described on this application, to make application for approval of such plans and specifications in the Owner's behalf. (Owner's or Lessee's)

Sworn to before me this 14th day of January, 1991

Laurex Swanson (Notary Public or Commissioner)

(Signature of Designer)

Affix Seal of Registered Architect or Professional Engineer here.

20. **DEMOLITION**

Required for Filing: Photograph of structure showing front elevation and full height, proof of disconnection of utilities from Con Edison Company, Certificate of Extermination.

BUREAU OF BUILDINGS

CITY OF NEW ROCHELLE
DEPARTMENT OF PUBLIC WORKS

Louis Goodman, R.A.
BUILDING OFFICIAL

CITY HALL • 515 NORTH AVENUE • NEW ROCHELLE, N. Y. 10801 • 914- 654-2035

Date January 16, 1991

To: Raymond F. Kiernan, Fire Commissioner

From: Louis Goodman, R.A., Building Official

Subject: Addition to a Dry Claening Store @ 358 North Avenue Block 1206 Lot(s) 19

Building Permit Appl. No. B-022-91

Attached for your information and review are plans for the

( ) Sprinkler System

( ) Standpipe System

( ) Fire and Smoke Detection System

( ) Place of Assembly

( ) Multiple Residence

(X) General Construction and exhaust (polution).

proposed at the subject location. Please return this form with your findings indicated below.

Louis Goodman, R.A. Peter Warycha, C.
Building Official Deputy Bldg. Offic

To: Louis Goodman, R.A. Building Official Date _____

The plans for the subject premises, as submitted, have been reviewed our findings are as follows:

(✓) Acceptable

( ) Not Acceptable for the reasons noted: _____

( ) Not Acceptable, please have applicant contact this office.

Raymond F. Kiernan
Fire Commissioner

Bureau of Buildings
Department of Public Works
515 North Avenue
New Rochelle, NY 10801

Louis Goodman, R.A.
Building Official

City of New Rochelle
New York

CONTRACTOR INFORMATION FORM

1. Permit Application Number ____________

2. Address 315 North Avenue Block 1206 Lot(s) 19

3. Contractor DeGraudre + Grattangeli Inc Address 680 Pelham Rd New Rochelle
Phone No. ____________

4. Construction Superintendent ____________ Address ____________
Phone No. ____________

5. **AFFIDAVIT OF CONTRACTOR**

State of New York West) SS.
County of)

Donald DeGraudre, being duly sworn, deposes and says:
That he is the contractor, duly authorized by the owner, for the work proposed under the subject application.
That he resides at ____________ and that: (Circle and complete applicable sections.)

A. He does business as ____________ with offices at ____________.

B. He is the President (Title of office) of the New York Corporation DeGraudre + Grattangeli Inc (Name of Corporation) with office at 680 Pelham Rd New Rochelle NY (Address of Corporation).

C. He is a General Partner of ____________ (Partnership) with offices at ____________ (Address).

D. The provisions of the Workers Compensation Law do not apply to him in that all work to be performed under this application will be performed by him and that no laborer is or will be at any time employed by him at the subject location in the City of New Rochelle, N. Y. (Submit Workers Compensation Board approval.)

E. (Required for home improvements.) He is duly licensed by the County of Westchester, New York, under license number ____________.

The undersigned further states: That the work will be performed in accordance with the New York State Uniform Fire Prevention and Building Code, the New Rochelle Building Code, the New Rochelle Zoning Ordinance and all other applicable Codes and Regulations whether or not shown on the plans and specifications in the subject application, and he assumes responsibility for all acts and work performed by Sub-contractors, Laborers, and Materialmen in connection with the work to be performed.

Sworn to before me this 30
day of October, 1990

[signature]
Notary Public or Commissioner

x [signature]
Signature of Deponent

6. State Law requires that the Contractor submit a copy of Workers Compensation and New York State Disability Insurance naming the Bureau of Buildings, City of New Rochelle, New York, as certificate holder and showing coverage for general contracting, and the locations covered by such insurances. If a structure is to be demolished, a copy of Liability Insurance must also be submitted.

CONTRACTOR'S INSURANCE (Not required when 5D applies.)

Name of Compensation Carrier ____________

Policy Number ____________ Date of Expiration ____________

7. **OWNER'S AUTHORIZATION**

I, Gerald Colomb (Print Name), am the owner of the subject premises and I have authorized the contractor named on the front of this document to perform the work under the subject application.

30 Oct '91
Date

x [signature]
Signature of Owner

DEPARTMENT OF FIRE

Nº 53747

CITY OF NEW ROCHELLE, N. Y.

Expires OCTOBER 27, 1991

LICENSE or PERMIT

OCTOBER 27, 1990

Permission is hereby granted to SCHMUCKLERS CLEANERS

to MAINTAIN A DRY CLEANING ESTABLISHMENT

Located at 360 NORTH AVENUE

in accordance with the Fire Prevention Code of the City of New Rochelle, N. Y.

Fee $ 55.00

THIS IS NOT A RECEIPT AND IS NOT GOOD UNLESS ACCOMPANIED BY AN OFFICIAL

RECEIPT FOR $ 55.00

FIRE CHIEF

2N

POST CONSPICUOUSLY

Multimatic Shop Star 400 • 500

SPECIFICATIONS

TECHNICAL DATA	SHOP STAR 400	SHOP STAR 500
BASKET		
Capacity (maximum)	55 lbs.	65 lbs.
Volume	16.1 cu. ft.	18.6 cu. ft.
Diameter	44 in.	44 in.
Depth	17.5 in.	21 in.
Washer Speed*	36 rpm.	36 rpm
Extraction Speed*	360 rpm	360 rpm
Tanks (volume)		
Work Tank 1	66 gals.	66 gals.
Work Tank 2	37 gals.	37 gals.
Rinse Tank	66 gals.	66 gals.
Filter:		
Cartridges	16	16
Spin Disc†		
Still		
Volume	115 gals.	115 gals.
Gph	120	120
Machine Dimensions		
Width	86.6 in.	86.6 in.
Depth	64 in.	64 in.
Height	98.5 in.	98.5 in.
Partially dismantled for clearance Depth x Height	51.2 in. x 90 in.	51.2 in. x 90 in.
Base Area		
Width	86.6 in.	86.6 in.
Depth	48.0 in.	48.0 in.
Floor Load		
Weight without solvent	4,319 lbs.	4,519 lbs.
Weight with solvent	6,370 lbs.	6,570 lbs.
Power Requirements		
Steam Heated		
Max. Operational Load	45 amps.	45 amps.
Supply Connections		
Air Pressure	70-80 p.s.i.	70-80 p.s.i.
Size of Fitting	1/4 in.	1/4 in.
Steam Pressue	45-55 p.s.i.	45-55 p.s.i.
Temperature, max.	302° F.	302° F.
Size of Fittings, Steam/Cond.	3 in. x 1/2 in.	3 in. x 1/2 in.
Water Pressure	45-65 p.s.i.	45-65 p.s.i.
Size of Fittings, Inlet/Outlet	1/2 in. x 1 in.	1/2 in. x 1 in.
Electrical Requirements	208-220/60/3	208-220/60/3

All specifications subject to change without notice.
* See Variable Speed Drive Motor under options.
† Single or Twin (see page 3).

OPTIONAL

- ★ Microprocessor Control (see page 3).
- ★ Pre-Lint Filter (see page 3).
- ★ In-Line Solvent Cooler (see page 3).
- ★ Dosing Pump. Permits addition of many textile treatments.
- ★ Variable Speed Drive Motor. Permits selection of any drum speed to meet garment requirements.
- ★ Strainer for Marlow Pump (see page 3).
- ★ OSHA Fan & Carbon Canister (see page 3).
- ★ Single or Twin Spin Disc (see page 3).

Multimatic CORPORATION
162 Veterans Drive, Northvale, NJ 07647

City of New Rochelle
515 North Avenue
New Rochelle, NY 10801

Writer's Telephone:
(914)

City of New Rochelle
New York

LOUIS GOODMAN, R.A., C.E.O.
BUILDING OFFICIAL

NUMBER - 92-1991

CERTIFICATE OF COMPLIANCE - BUREAU OF BUILDINGS

TO: Mr. & Mrs. Gerald Columb
358 North Ave.
New Rochelle, N.Y.

DATE: March 19, 1991

ZONED DISTRICT: C-2

PERMIT NO.: 44488

LOCATION: 358 North Ave.

BLOCK: 1206 LOT(S): 19

THIS IS TO CERTIFY that all of the work performed under the above Permit No. - 44488 - to construct a one story rear addition (to legalize)

has been completed, inspected and found to comply with the New Rochelle Building Code and Zoning Ordinance of the City of New Rochelle, New York.

Additional Approvals: Per Affidavit

LG:js:dcb

LOUIS GOODMAN, R.A., C.E.O.
BUILDING OFFICIAL

SPECIAL CONDITIONS:

DEPARTMENT OF FIRE

Nº 53747

CITY OF NEW ROCHELLE, N. Y.

Expires OCTOBER 27, 1991

LICENSE or PERMIT

OCTOBER 27, 1990

Permission is hereby granted to SCHMUCKLERS CLEANERS

to MAINTAIN A DRY CLEANING ESTABLISHMENT

Located at 360 NORTH AVENUE

in accordance with the Fire Prevention Code of the City of New Rochelle, N. Y.

Fee $ 55.00

THIS IS NOT A RECEIPT AND IS NOT GOOD UNLESS ACCOMPANIED BY AN OFFICIAL

RECEIPT FOR $ 55.00

FIRE CHIEF

POST CONSPICUOUSLY

25. LOCATION PLAN: For new structures only, draw plot plan with dimensions of lot lines, North Arrow, and dimension to nearest intersection.

Do Not Write Below This Line

TAX ASSESSOR

I certify that the block and lot and address described hereon are in accordance with the present tax records.
The lot hereon described has been previously designated as ________ and the change was effective ________.

(Signature) (Date)

DEPARTMENT OF PUBLIC WORKS

Present records indicate that the lot hereon described: (Check Answer)

( ) 1. Is on an approved City Street.
( ) 2. Does not contain any City Easements. ( ) Contains Easements.
( ) 3. Is not designated as a flood area.
( ) 4. Will require the following approvals and permits from Public Works:
( ) 5. Is not within Public Works jurisdiction for the following reasons:

The Department of Public Works has no objection to the processing of the Building Permit other than those cited above.

(Signature) (Date)

DEPARTMENT OF DEVELOPMENT

I have reviewed this application and plans and certify that this application may be processed for a Building Permit.
Comments:

(Signature) (Date)

BUREAU OF BUILDINGS

Approvals Necessary	Date Approval Received
City Council	
Board of Appeals on Zoning	
Planning Board	
Board of Standards and Appeals	
New Rochelle Fire Department	
Westchester County Health Department	
Westchester County Department of Public Works	
Others	

Comments

1. Application Number 411-87
2. Date Filed 7/14/87
3. Total Fee 35
4. Fee Paid 35
5. Receipt Number 020435
6. Initials
7. Permit Number
8. Date Issued

Permit No. 42059 **APPLICATION FOR BUILDING PERMIT** Date 7/2/8

Application is hereby made to the Bureau of Buildings of the City of New Rochelle, N. Y., for the issuance of a Building Permit as per detailed statement and plans herewith submitted. The undersigned hereby agrees to comply with all the requirements of the Building Code, Zoning Ordinance, and all other laws pertaining to same, in the construction of the work proposed, whether or not shown on the plans or specified in the application.

Sign Here (Complete Item #18)

1. Address ~~360~~ 358 North Ave Block 1206 Lot(s) 19
2. Zoned District C-2 Lot Area 8989 sq. ft.
3. Statement of Work Proposed: It is proposed to ERECT A ONE STORY ADDITION for DRY CLEANING OPERATION
4. Area of Structure or Addition (lowest level) 1029 sq. ft.
5. Height of Structure or Addition (lowest level to roof top) 13 ft., number of stories 1
   Cellar ( ), Basement ( ), Penthouse ( ), Other
6. Cubic Contents of Structure or Addition 11 319 cu. ft.
7. Cost of Construction (including plumbing, heating, ventilations, electrical, etc.) 50,000 Dollars
8. Class of Construction: (underline) Fire Resistive (1a) or (1b), Non-combustible (2a) or (2b), Heavy Timber (3), Ordinary (4a) or (4b), Wood Frame (5a) or (5b).
9. Use(s) of Structure: (underline) Business (1), Mercantile (2), Industrial (3.1) or (3.2) or (3.3), Storage (4.1) or (4.2) or (4.3), Assembly (5.1) or (5.2) or (5.3) or (5.4) or (5.5), Institutional (6.1) or (6.2) or (6.3), Miscellaneous (7), Multiple Dwellings (8.1) or (8.2), One Family Dwelling (9), Two Family Dwelling (9).
10. Parking: Proposed Interior ( ), Exterior ( ), Present Interior ( ), Exterior ( ), Total After Work 0
11. Use(s) of Structure by Area:

Space	Use(s) or Occupancy		No. of Dwelling Units or Occupants		Live Load Capacity		Area Sq. Ft.	
	Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed
Cellar	STORAGE						4500	4500
Basement								
First Floor	STORES/DRY CLEANING						5700	6729
Second Floor	OFFICES						4500	4500
Floor								
Attic								
Roof								

12. System of Heating ________, Fuel ________ if steam, what pressure? ________ p.s.i.
13. Owner GERALD GOLOMB Address 360 NORTH AVE 10801 Tel.
14. Engineer Address NEW ROCHELLE Zip Tel.
15. Architect R. STANZIALE Address 2 HAMILTON AVE Zip 10801 Tel. 633-0070
16. Builder Address NEW ROCHELLE Zip Tel.
17. Construc. Superintendent Address Zip. Tel.

BLDG.

note: IS THIS APPLICATION TO REMOVE A VIOLATION — YES ✓ NO
DATE OF VIOLATION

18. AFFIDAVIT OF APPLICANT

State of New York)
County of West.) SS.

ROBERT STANZIALE (Print Name) being duly sworn, deposes and says: That he reside at

2 Hamilton Ave New Rochelle (Address) and that: (Check One)

A. He is the owner of the premises described hereon.

B. He is the _____ (Title of Office) of the New York Corporation _____ (Name of Corporation) with offices at _____ (Address of Corporation) duly authorized by resolution of the Board of Directors, and that said corporation is duly authorized by the owner to make this application.

C. He is a General Partner of _____ (Name of Partnership) with offices at _____ (Address of Offices) and that said partnership is duly authorized by the owner to make this application.

D. He is the Lessee of the premises and is duly authorized by the owner to make this application.

(E) He is the Architect or Engineer duly authorized by the owner to make this application.

F. He is the Contractor duly authorized by the owner to make this application.

That the information contained in this application and on the accompanying drawings are true to the best of his knowledge and belief. The undersigned hereby agrees to comply with all the requirements of the New Rochelle Building Code, Zoning Ordinance and all other laws pertaining to same, in the construction applied for, whether or not shown on Plans or specified in this application.

Sworn to before me this 14th day of July, 1987

Robert Stanziale (Signature of Deponent)

Telephone No. 633-0070

Evelyn O. Talley (Notary Public or Commissioner of Deeds)

19. AFFIDAVIT OF CONTRACTOR

State of New York)
County of West.) SS.

DONALD DeSANDRE (Print Name) being duly sworn, deposes and says: That he resides at

680 PELHAM RD NEW ROCHELLE (Address) and that: (Check One)

A. He does business as _____ (Name of firm) with offices at _____ (Address of Firm) and that he is the contractor, duly authorized by the owner for the work proposed.

(B) He is the _____ (Title of Office) of the New York Corporation DeSandre & Santangell Inc. (Name of Corporation) with offices at 680 Pelham Rd. New Rochelle (Address of Corporation) that said corporation is the contractor, duly authorized by the owner for the work proposed.

C. He is a General Partner of _____ (Name of Partnership) with offices at _____ (Address of Offices) and that said partnership is the contractor, duly authorized by the owner for the work proposed.

D. The provisions of the Workmen's Compensation Law do not apply to him in that all work to be performed under this application will be performed by him and that no labor is or will be at any time employed by him at the subject location in the City of New Rochelle, N. Y.

The undersigned further states: That the work will be performed in accordance with the Building Code of the City of New Rochelle, and all other applicable Codes and Regulations whether or not shown on the Plans and Specifications in this Application, and assumes responsibility for all acts and work performed by Sub-contractors, Laborers and Materialmen in connection with the work to be performed.

Sworn to before me this _____ day of _____, 19____

_____ (Signature of Deponent)

_____ (Notary Public or Commissioner of Deeds)

Telephone No. _____

20. State Law requires that [redacted] Insurance made out to the Bureau of Buildings, City of New Rochelle, New York showing coverage for general contracting, and the locations covered by such insurances. If a structure is to be demolished, a copy of Liability Insurance must also be submitted.

CONTRACTOR'S INSURANCE (Not required when 19.D applies)

Name of Compensation Carrier TRANSAMERICA INS. CO.

Policy Number WC 800600288 (RA-3) Date of Expiration 3/18/88

21. AFFIDAVIT OF OWNER (Not required where owner, Registered Architect, or Professional Engineer is applicant)

State of New York)
County of _____) SS.

_____ (Print Name) being duly sworn, deposes and says: That he resides at _____ (Address) and that: (Check One)

A. He is the owner of the premises described hereon.

B. He is the _____ (Title of Office) of the New York Corporation _____ (Name of Corporation) with offices at _____ (Address of Corporation) duly authorized by resolution of the Board of Directors, and that said corporation is the owner of the premises described hereon.

C. He is the General Partner of _____ (Name of Partnership) with offices at _____ (Address of Offices) and that said partnership is the owner of the premises described hereon.

That the applicant _____ (Name of Applicant) is duly authorized to apply for the permit as described in this application and drawings. The undersigned hereby agrees to comply with all the requirements of the Building Code, Zoning Ordinance, and all other laws pertaining to same, in the construction applied for, whether or not shown on the plans or specified in the application.

The undersigned further states: That he will not commence work before the Building Permit is issued and that he will obtain a Certificate of Occupancy immediately upon completion of the work proposed.

Sworn to before me this _____ day of _____, 19____

_____ (Signature of Owner)

_____ (Notary Public or Commissioner of Deeds)

Telephone No. _____

22. DESIGNERS AFFIDAVIT FOR APPROVAL OF PLANS AND SPECIFICATIONS

State of New York)
County of West.) SS.

ROBERT STANZIALE (Print Name) being duly sworn, deposes and says: That he resides at

2 HAMILTON AVE NEW ROCHELLE (Address) that he personally supervised the preparation of the architectural (Architectural, Structural, Mechanical, Other) plans and that to the best of his knowledge and belief, the work applied for, if performed in accordance with such plans will conform with all the provisions of the Building Code of the City of New Rochelle, and with the provisions of all other laws and regulations applicable thereto in effect this date.

Deponent further says that he is duly authorized by Gerald Golomb who is the owner in fee of all that certain lot, piece or parcel of land described on this application, to make application for the approval of such plans and specifications in the owners (Owner's or Lessee's) behalf.

Owner Gerald Golomb Address 360 North Ave New Rochelle

Sworn to before me this 14th day of July, 1987

Evelyn O. Talley (Notary Public or Commissioner of Deeds)

Robert Stanziale (Signature of Designer)

Affix Seal of Registered Architect or Professional Engineer Here

Exp. 11/85

18. AFFIDAVIT OF APPLICANT

State of New York)
County of _____) SS.

_____ being duly sworn, deposes and says: That he reside at
(Print Name)

_____ and that: (Check One)
(Address)

A. He is the owner of the premises described hereon.

B. He is the _____ of the New York Corporation _____
(Title of Office) (Name of Corporation)
with offices at _____ duly authorized by resolution of the Board of
(Address of Corporation)
Directors, and that said corporation is duly authorized by the owner to make this application.

C. He is a General Partner of _____ with offices at _____
(Name of Partnership) (Address of Offices)
and that said partnership is duly authorized by the owner to make this application.

D. He is the Lessee of the premises and is duly authorized by the owner to make this application.

E. He is the Architect or Engineer duly authorized by the owner to make this application.

F. He is the Contractor duly authorized by the owner to make this application.

That the information contained in this application and on the accompanying drawings are true to the best of his knowledge and belief. The undersigned hereby agrees to comply with all the requirements of the New Rochelle Building Code, Zoning Ordinance and all other laws pertaining to same, in the construction applied for, whether or not shown on Plans or specified in this application.

Sworn to before me, this _____
day of _____, 19___ _____
(Signature of Deponent)

_____ Telephone No. _____
(Notary Public or Commissioner of Deeds)

19. AFFIDAVIT OF CONTRACTOR

State of New York)
County of Westchester) SS.

DONALD DeSANDRE being duly sworn, deposes and says: That he resides at
(Print Name)

680 Pelham Rd New Rochelle and that: (Check One)
(Address)

A. He does business as _____ with offices at _____
(Name of Firm) (Address of Firm)
and that he is the contractor, duly authorized by the owner for the work proposed.

(B) He is the President of the New York Corporation DeSandre & Santangelo, Inc.
(Title of Office) (Name of Corporation)
with offices at 68 Pelham Rd NR and that said corporation is the contractor,
(Address of Corporation)
duly authorized by the owner for the work proposed.

C. He is a General Partner of _____ with offices at _____
(Name of Partnership) (Address of Offices)
and that said partnership is the contractor, duly authorized by the owner for the work proposed.

D. The provisions of the Workmen's Compensation Law do not apply to him in that all work to be performed under this application will be performed by him and that no labor is or will be at any time employed by him at the subject location in the City of New Rochelle, N. Y.

The undersigned further states: That the work will be performed in accordance with the Building Code of the City of New Rochelle, and all other applicable Codes and Regulations whether or not shown on the Plans and Specifications in this Application, and assumes responsibility for all acts and work performed by Sub-contractors, Laborers and Materialmen in connection with the work to be performed.

Sworn to before me this 10
day of Dec, 19 87 Donald DeSandre
(Signature of Deponent)

Notary Public
(Notary Public or Commissioner of Deeds) Telephone No. 636 5702

20. State Law requires that the Contractor submit a copy of Workmen's Compensation Insurance made out to the Bureau of Buildings, City of New Rochelle, New York showing coverage for general contracting, and the locations covered by such insurances. If a structure is to be demolished, a copy of Liability Insurance must also be submitted.

CONTRACTOR'S INSURANCE (Not required when 19.D applies)
Name of Compensation Carrier Transamerica Insurance Co
Policy Number WC 8006/0288 (RA-3) Date of Expiration 3/18/88

21. AFFIDAVIT OF OWNER (Not required where owner, Registered Architect, or Professional Engineer is applicant)

State of New York)
County of _____) SS.

_____ being duly sworn, deposes and says: That
(Print Name)
he resides at _____ and that: (Check One)
(Address)

A. He is the owner of the premises described hereon.

B. He is the _____ of the New York Corporation _____
(Title of Office) (Name of Corporation)
with offices at _____ duly authorized by resolution of the Board of
(Address of Corporation)
Directors, and that said corporation is the owner of the premises described hereon.

C. He is the General Partner of _____ with offices at _____
(Name of Partnership) (Address of Offices)
and that said partnership is the owner of the premises described hereon.

That the applicant _____ is duly authorized to apply for the permit as described
(Name of Applicant)
in this application and drawings. The undersigned hereby agrees to comply with all the requirements of the Building Code, Zoning Ordinance, and all other laws pertaining to same, in the construction applied for, whether or not shown on the plans or specified in the application.

The undersigned further states: That he will not commence work before the Building Permit is issued and that he will obtain a Certificate of Occupancy immediately upon completion of the work proposed.

Sworn to before me this _____
day of _____, 19____ _____
(Signature of Owner)

_____ Telephone No. _____
(Notary Public or Commissioner of Deeds)

22. DESIGNERS AFFIDAVIT FOR APPROVAL OF PLANS AND SPECIFICATIONS

State of New York)
County of _____) SS.

_____ being duly sworn, deposes and says: That he resides at
(Print Name)
_____ that he personally supervised the preparation of
(Address)
the _____ plans and that to the best of his knowledge and
(Architectural, Structural, Mechanical, Other)
belief, the work applied for, if performed in accordance with such plans will conform with all the provisions of the Building Code of the City of New Rochelle, and with the provisions of all other laws and regulations applicable thereto in effect this date.

Deponent further says that he is duly authorized by _____ who is the owner in fee of all that certain lot, piece or parcel of land described on this application, to make application for the approval of such plans and specifications in the _____ behalf.
(Owner's or Lessee's)

Owner _____ Address _____

Sworn to before me this _____
day of _____, 19____ _____
(Signature of Designer)

_____ *Affix Seal of Registered Architect or Professional Engineer Here*
(Notary Public or Commissioner of Deeds)

City of New Rochelle
515 North Avenue
New Rochelle, NY 10801

Writer's Telephone:
(914)

City of New Rochelle
New York

LOUIS GOODMAN, R.A., C.E.O.
BUILDING OFFICIAL

NUMBER - 97-1991

CERTIFICATE OF COMPLIANCE - BUREAU OF BUILDINGS

TO: Gerald Golomb
358 North Ave.
New Rochelle, NY

DATE: March 21, 1991

ZONED DISTRICT: C-2

PERMIT NO.:42059

LOCATION: 358 North Ave.

BLOCK: 1206 LOT(S): 19

THIS IS TO CERTIFY that all of the work performed under the above Permit No. - 42059 - to construct one story rear addition to dry cleaner establishment

has been completed, inspected and found to comply with the New Rochelle Building Code and Zoning Ordinance of the City of New Rochelle, New York.

Additional Approvals: Per Architect's Affidavits

:dcb
PW:js
3/22/91

LOUIS GOODMAN, R.A., C.E.O.
BUILDING OFFICIAL

SPECIAL CONDITIONS:

BUILDING PERMIT

BUREAU OF BUILDINGS
CITY OF NEW ROCHELLE, N. Y.

No. 42059

Zone District: C-2 Block: 1206 Lot (s)X 19 Date 8/12/87

Permission is granted to owner: G. GOLOMB

To CONSTRUCT ONE STORY REAR ADDITION TO DRY CLEANER ESTABLISHMENT

Located at 358 NORTH AVENUE

In accordance with approved plans and as specified in the application on file at the Office of the Bureau of Buildings and in accordance with all applicable City Ordinances and State Laws affecting such construction.

CONDITIONS OF PERMIT This permit will become null and void if construction is not started within Ninety (90) days of above date, or if construction is abandoned or suspended for a period of Six (6) months.

Approved plans must be retained on job for Inspector's use.

THIS BUILDING OR ANY PORTION THEREOF SHALL NOT BE OCCUPIED UNTIL A CERTIFICATE OF OCCUPANCY IS ISSUED.

☒ Final survey required for certificate of occupancy. **(2 copies)**

INSPECTIONS Request in writing, on forms furnished, the following inspections at least 24 hours before requiring same:

A. For Frame Construction:
1. Soil & Form – Footings excavated and properly formed ready for concreting. All forms to be tight.
2. Footing – After footings are stripped, before backfill, and before walls are constructed.
3. Survey – As built, survey necessary on all new structures and addition to structures.
4. Framing – Roughing, all framing exposed, no insulation or interior wall covering. Roof tight, Mechanical trades completed.
5. Drainage – Underground drain piping and dry wells exposed. All leaders properly connected to dry wells or to curb.
6. Final – Mechanical trades inspected and approved. Project completely finished, ready for Occupancy.

B. For Ordinary, Fire Resistive and Fireproof Construction: All of the above inspections (excluding Framing) plus inspection at critical points, prior to covering up, of all work.

THIS PERMIT IS ISSUED PURSUANT TO APPROVAL:

	Case No.	Res. No.	Date
☐ (A) By Board of Appeals on Zoning with a variance for			
☐ (B) of a Special Permit by Board of Appeals on Zoning as per plans submitted			
☒ (C) by the Planning Board		23-87	6/30/87
☐ (D) by the City Council			
☐ (E) by the Board of Standards and Appeals			

☒ (1) This permit does not include any of the following:
File for the following under separate application and plan:

- ☐ (a) Signs
- ☐ (b) Parking Lot
- ☐ (c) Fire Escapes
- ☐ (d) Sprinkler System
- ☐ (e) Demolition
- ☐ (f) Heating System
- ☐ (g) Air-Conditioning
- ☒ (h) Mechanical Ventilation
- ☒ (i) Gasoline Storage Tank
- ☐ (j) Elevator, Escalator, Dumbwaiter
- ☐ (k) Dry Cleaning Equipment
- ☐ (l) Support, fire hazard, noise level for any type of machinery or equipment.
- ☐ (m) Underpinning, shoring or sidewalk bridges
- ☐ (n) County Roads
- ☐ (o) Permission to lower curbs, or construct a driveway from Dept. of Public Works on
- ☒ (p) Other: Plumbing, Electrical, HVAC

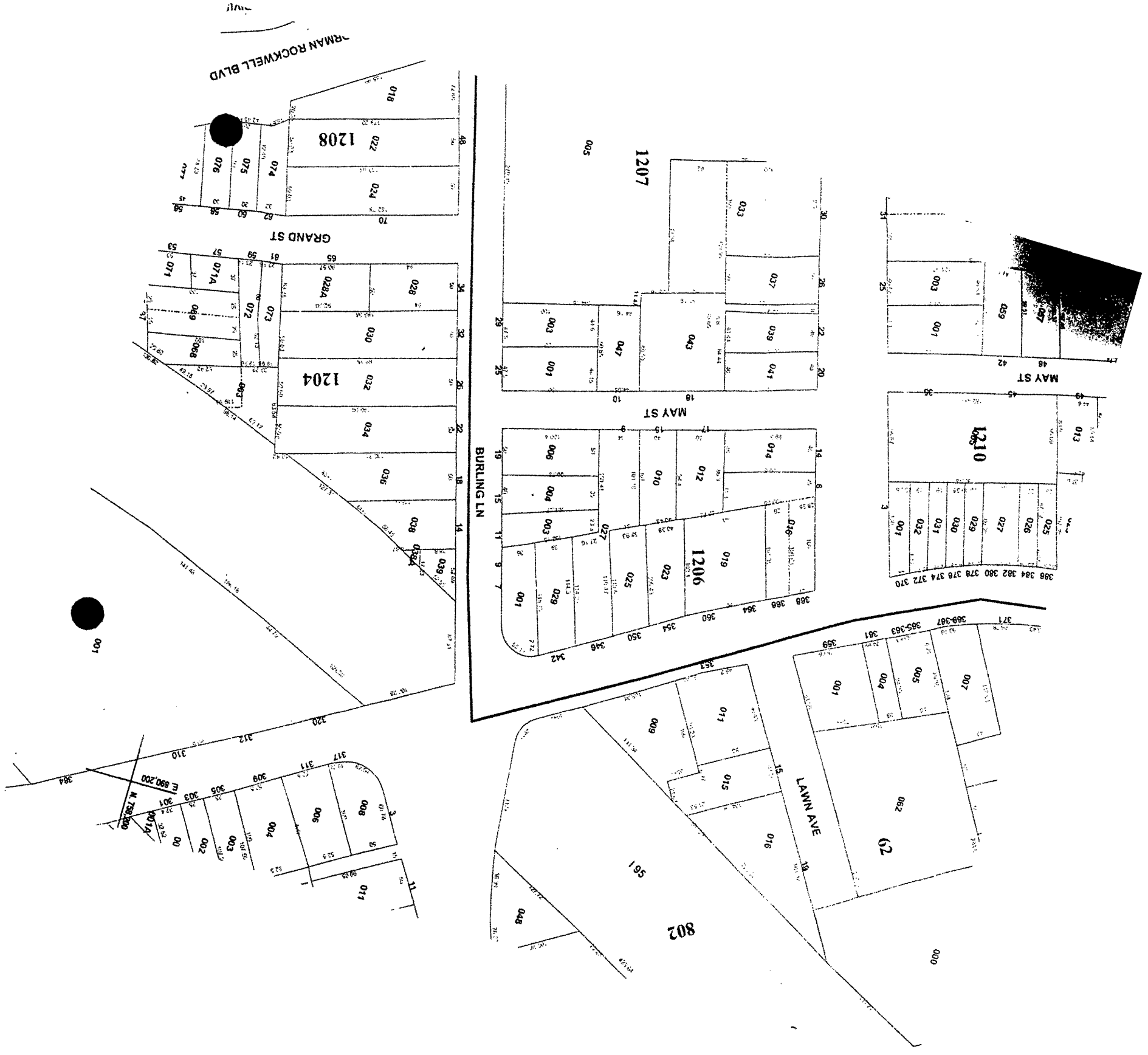
SPECIAL CONDITIONS

1. South portion of rear dddition to be filed separately.
2. Fire Dept. final inspection required prior to Certificate of Compliance.
3. Comply with NRPA 32 - Chapter 4.
4. All solvents to be non flammable - Class IV.
5. Contractor to request all inspections.
6. R.A. to submit Energy Affidavit.

LG:dc

BUILDING OFFICIAL

POST IN A CONSPICUOUS PLACE


GRAND ST
BURLING LN
MAY ST
LAWN AVE
1208
1207
1206
1204
1210
802

Location #17 May St.

Formerly Part of Block ____ Lot ____ Apport. No. ____ Date ____

19..29 Valuation 20000

Section 4 Block 1206 Lot 12

BUREAU OF ASSESSMENT — CITY OF NEW ROCHELLE N.Y. — OWNERSHIP RECORD

Conveyed	Recorded	Entered	From Whom to Whom	Address		Mortgages	R.S.	Tot. Consid.	Liber	Page
			Anna Michael, Exec of							
8.1.25	8.6.25	1.8.26	Eva G. Schmuckler	360 [illegible]			25.		2491	469
		12.22.53	[illegible]							
12.8.58	12.8.58	12.22.58	Israel Schmuckler & w		w.l. 19.20				5865	455
8.1.67	11.1.67	12.18.67	James McGoey & Lora Sue		"	RM. 62500	93.50		6742	673
12.26.79	12.28.79	2.2580	GERALD GOLOMB		W.F-EM 19-PM	26916.50 103,000	1446.85	133083	7608	666

Over

Over

Location # 358-64 North Ave | 1979 Valuation 60000 | Section 4 Block 1206 Lot 19

Formerly Part of Block | Lot | Apport. No. Date

BUREAU OF ASSESSMENT — CITY OF NEW ROCHELLE N.Y. — OWNERSHIP RECORD

Conveyed	Recorded	Entered	From Whom to Whom	Address		Mortgages	R.S.	Tot.Consid.	Liber	Page
			J Newton Schenck & W.							
2.3.09	2.8.09		Fred H. Deacon						1866	83
4.10.09	5.4.09	11.9.09	N. Rebecca Tee Co.						1891	302
4.30.21	5.3.21	7.10.21	Israel Schmuckler			18,000.	13.50		2306	196
8.1.21	5.17.21	7.21.21	Eva G. Schmuckler			47,000	16.50		2365	160
		1.22.52	[illegible]							
12.8.58	12.8.58	12.22.58	Israel Schmuckler & W		w.t. 12.20				5865	455
8.1.67	11.1.67	12.18.67	James McGoey & Lois Ive		"	P.M. 62500	93.50		6742	673
12.26.79	12.28.79	2.25.80	GERALD GOLOMB		WL-EM 12-PM	26916.86 103000	146.85	133083	7608	666

Over

TAX MAP PARCEL NUMBER / CURRENT OWNERS NAME / CURRENT OWNERS ADDRESS	PROPERTY LOCATION & CLASS / SCHOOL DISTRICT / PARCEL SIZE/GRID COORD	ASSESSMENT LAND / TOTAL	EXEMPTION CODE / TAX DESCRIPTION / SPECIAL DISTRICTS	COUNTY / CITY / SCHOOL TAXABLE VALUE	ACCOUNT NO.
	May St & Lockwood Ave				4-1206-0014
4-1206-0014	311 Res vac land		COUNTY TAXABLE VALUE	1,050	
368 North Avenue Mgmt Co	NEW ROCHELLE CS 551000	1,050	CITY TAXABLE VALUE	1,050	
Attn: Shapiro	Built: 0000; Zone: R-4	1,050	SCHOOL TAXABLE VALUE	1,050	
27 Country Ridge Rd	ACRES 0.10		CS000 COUNTY SEWER NR DIST	1,050 TO C	
Scarsdale, NY 10583	EAST-0689688 NRTH-0758769		CR001 COUNTY REFUSE #1	1,050 TO	
	FULL MARKET VALUE	32,012			
	366 North Ave				4-1206-0016
4-1206-0016	483 Converted Re		COUNTY TAXABLE VALUE	43,800	
368 North Avenue Mgmt Co	NEW ROCHELLE CS 551000	35,000	CITY TAXABLE VALUE	43,800	
Attn: Barry Shapiro	Built: 1921; Zone: R-4C-	43,800	SCHOOL TAXABLE VALUE	43,800	
27 Country Ridge Rd	4 units		CS000 COUNTY SEWER NR DIST	43,800 TO C	
Scarsdale, NY 10583	ACRES 0.20		CR001 COUNTY REFUSE #1	43,800 TO	
	EAST-0689753 NRTH-0758803		FC001 COM FIRE INSP 1	.00 FE	
	FULL MARKET VALUE	1335,366	RRF05 RES REFUSE FEE S	.00 MT	
	358 North Ave				4-1206-0019
4-1206-0019	481 Att row bldg		COUNTY TAXABLE VALUE	40,000	
Golomb Gerald	NEW ROCHELLE CS 551000	27,000	CITY TAXABLE VALUE	40,000	
Attn: Park Place Manageme	Built: 1913; Zone: C-2	40,000	SCHOOL TAXABLE VALUE	40,000	
46 Park Pl	FRNT 90.00 DPTH 101.00		CS000 COUNTY SEWER NR DIST	40,000 TO C	
PO Box 1860	ACRES 0.21		CR001 COUNTY REFUSE #1	40,000 TO	
New Rochelle, NY 10802	EAST-0689804 NRTH-0758753		FC002 COM FIRE INSP 2	.00 FE	
	FULL MARKET VALUE	1219,512			
	354 North Ave				4-1206-0023
4-1206-0023	482 Det row bldg		COUNTY TAXABLE VALUE	20,000	
Love Realty Corp	NEW ROCHELLE CS 551000	14,250	CITY TAXABLE VALUE	20,000	
354 North Ave	Built: 1905; Zone: C-2	20,000	SCHOOL TAXABLE VALUE	20,000	
New Rochelle, NY 10801	FRNT 40.00 DPTH 104.00		CS000 COUNTY SEWER NR DIST	20,000 TO C	
	ACRES 0.10		CR001 COUNTY REFUSE #1	20,000 TO	
	EAST-0689837 NRTH-0758690		FC001 COM FIRE INSP 1	.00 FE	
	DEED BOOK 12329 PG-151				
	FULL MARKET VALUE	609,756			
	350 North Ave				4-1206-0025
4-1206-0025	482 Det row bldg		COUNTY TAXABLE VALUE	20,000	
Nardozzi James P	NEW ROCHELLE CS 551000	14,200	CITY TAXABLE VALUE	20,000	
63 Hillside Ave	Built: 1906; Zone: C-2	20,000	SCHOOL TAXABLE VALUE	20,000	
New Rochelle, NY 10801	FRNT 39.00 DPTH 108.00		CS000 COUNTY SEWER NR DIST	20,000 TO C	

CITY NEW ROCHELLE
CITY HALL
515 NORTH AVENUE
NEW ROCHELLE, NY 10801

APPLICATION FOR PUBLIC ACCESS TO RECORDS

DATE: September 12, 2005

TO: CITY CLERK

FROM: Preferred Environmental Services

ADDRESS: 325 Merrick Avenue, East Meadow, New York 11554

PHONE NUMBER: (516)-357-8200

I HEREBY APPLY TO INSPECT THE FOLLOWING RECORDS:

DEPARTMENT NAME: Fire Department

DESCRIPTION: Records pertaining to fire department inspections, fire incidents, Storage/registration records pertaining to hazardous materials, underground storage tank records for: **Schmucklers Cleaners at 358 North Avenue, New Rochelle**

PURPOSE Information necessary for the preparation of an Environmental Assessment

William Schlageter
Signature
Preferred Environmental Services
Representing

For Agency Use Only

APPROVED
DENIED

For the following reasons:
____ Confidential Disclosure
____ Part of Investigatory Files
____ Unwarranted Invasion of Personal Privacy
____ Record of which this Agency is Legal Custodian cannot be found
____ Exempted by statute other than the Freedom of Information Act
____ Agency does not have possession of requested records
____ Other (specify)

Signature

Title

Notice: Within five (5) days after mailing or personal delivery of denial, you have a right to appeal a denial of this application to the appeal officer, c/o City Manager, who must fully explain his reason for such denial in writing seven days after receipt of appeal. Such appeal must be dated and be accompanied by a true copy of the original application made to the records access Officer.

914 653 0000

PREFERRED ENVIRONMENTAL SERVICES
325 Merrick Avenue, 2nd Floor, East Meadow, NY 11554 • Tel: (516) 357-8200 • Fax: (516) 357-8175

September 12, 2005

Freedom of Information Officer
Westchester County Department of Health
145 Huguenot Street
New Rochelle, NY 10801

Re: Freedom of Information Request
Schmuckler's Cleaners
359 North Avenue
New Rochelle, New York

To Whom It May Concern:

Preferred Environmental Services (Preferred) has been retained to prepare a Phase I Environmental Site Assessment (ESA) for the above-referenced property. As part of the Phase I ESA, we are respectfully requesting to review any and all information maintained by the Westchester County Department of Health associated with the subject property. Information pertinent to our Phase I ESA includes, but is not limited to sanitary waste disposal systems, underground injection control features, records of health department inspections, health department violations, storage and use of hazardous and/or regulated materials, etc.

Should you need any additional information or if there are any fees involved in the review of Westchester County Department of Health records, please feel free to contact me.

I thank you for your anticipated cooperation in this matter.

Sincerely,

PREFERRED ENVIRONMENTAL SERVICES

William Schlageter
Project Manager/Senior Hydrogeologist

Westchester gov.com

Andrew J. Spano
County Executive

Department of Health

Joshua Lipsman, M.D., M.P.H.
Commissioner

September 16, 2005

Preferred Environmental Services
325 Merrick Avenue 2nd Floor
East Meadow, NY 11554
Att: William Schlageter

Re: Freedom of Information
Request No. 0574
Schmuckler's Cleaners
359 North Avenue
New Rochelle, New York

Dear Mr. Schlageter:

This is to acknowledge the receipt of your Freedom of Information request dated September 12, 2005 which was received in this office on September 16, 2005.

Your request has been forwarded to the appropriate staff for response; it is anticipated that you will have a response to your request by October 7, 2005.

If you need to communicate with us in the future, please use the "Request Number indicated above. The FOIL office number is: (914) 813-5004. Thank you.

Sincerely,

Mary Landrigan
Freedom of Information Officer

ML/ns

Berninger Environmental, Inc.
roundwater consultants & geologists
615 Ninth Avenue
ohemia • New York • 11716
Phone: 631 • 588 • 2251
Fax: 631 • 588 • 2926

pril 26, 2005

Mr. Hal Shapiro
chmucklers Cleaners
58 North Avenue
lew Rochelle, New York 10804

te: **Schmucklers Cleaners** **Report of Investigation Services Provided**
358 North Avenue
New Rochelle, New York

Dear Mr. Shapiro,

Berninger Environmental, Inc. (BEI) provided environmental services as outlined in our quotation 05-1067 at the above mentioned location on Wednesday, April 20, 2005. The scope of work nvolved performing six borings in the area of the dry cleaning machine, just outside the machine oom, by the back door drain and two borings in the basement area. The borings were performed y drilling through the concrete floor using a rotary hammer and advancing hand boring equipment elow the floor to obtain soil samples.

Soil samples were obtained at a depth of one to three feet below the floor surface and field screened sing a PID (photo izonation detector) to scan for Volatile Organic Compounds (VOC's). The first oring GP-1 was located behind the dry cleaning machine and did not have any field screening le[illegible]on, the second boring GP-2 was located in front of the dry cleaning machine and also did not ave any detection. A third boring was attempted on the side of the machine but encountered refusal t three locations which we think was due to encountering a building foundation wall. The third oring GP-3 was located just outside the dry cleaning room through the wooden floor and had a field screening detection of 604.0 ppm (parts per million). The fourth boring location GP-4 was located outside the back door where a drain was located from the soils inside of the drain and had a field screening detection of 354.0 ppm. The fifth GP-5 and sixth GP-6 borings were located in the basement area where either former dry cleaning operations were conducted and also an area very close to the first floor dry cleaning machine. Both these borings had detections with GP-5 at 291.5 ppm and GP-6 at 64.5 ppm.

In performing the borings the sampling equipment was decontaminated between each sampling location and boring sample using a laboratory grade soap and potable water. Upon completion of the work the holes were filled in and sealed with a dry lock quick setting cement. The soil samples were placed into new laboratory glassware, labeled and placed into an ice filled cooler for transportation under a chain of custody to American Analytical Labs, a state certified laboratory. The soil samples were tested for dry cleaning chemicals using EPA Test Method 8010.

On April 25, 2005, BEI received and reviewed the laboratory test results for the soil samples obtained at the six locations in the Schmucklers Cleaners. Of the six samples analyzed all six had detection of some dry cleaner chemicals but, only two soil samples had exceedances above re[illegible]tory limits. The following detections are tabulated below:

Soil Sample Test Results in Parts Per Billion (PPB)

Chemicals Detected	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	Standard
Tetrachloroethene	33	52	**62,000**	**50,000**	ND	170	1,400
Trichloroethene	ND	ND	120	12	ND	20	700

All reported concentrations are listed in units (ug/kg) ppb.
TAGM 4046 represents the Administrative Guidance Memorandum For The Determination of Soil Cleanup Objectives and Cleanup Levels in New York State.

Additional chemicals detected were:

GP-4	1,2,3-Dichlorobenzene	@ 3.4 ppb	with a standard of	7.900 ppb.
GP-5	1,2,3-Trichloropropane	@ **440 ppb**	with a standard of	400 ppb.
GP-6	trans-1,2 Dichloroethene	@ 2.0 ppb	with a standard of	400 ppb
GP-6	Vinyl Chloride	@ 16 ppb	with a standard of	200 ppb

Of these chemicals only one 1,2,3-Trichloropropane had a detection above regulatory standards. Our review indicates two boring locations GP-3 the wooden floor just outside the dry cleaner room and the drain outside the back door with major concentrations of Tetracholorethene that exceed regulatory standards. Only one other chemical 1,2,3-Dichloropropane slightly detected above regulatory limits.

Based on these findings the area just outside the dry cleaning room and the drain outside the back door require additional investigation to determine the full extent of the contamination in order to provide a cost estimate for the remedial action to clean up these areas. Both these areas are accessible for portable hydraulic equipment to obtain deeper samples to define the extent of the contamination.

Our investigation is limited to the areas investigated by the boring locations placed in the areas around the existing dry cleaning machine, just outside this area where wooden floors exist and outside the rear door and in the basement area. The laboratory tests performed were chosen to cover the chemicals of concern involving dry cleaner operations. If you have any questions or comments please feel free to give me a call.

Based on the findings of the investigation work performed and the levels of contamination discovered the finding of this work requires reporting to the New York State Department of Environmental Conservation (NYSDEC) at the Hot Line 1-800-457-7362. If you would like for BEI to perform this services please just call me to discuss otherwise we assume you are performing.

In order to provide you with some estimated costs for the additional investigation services required to determine the full extent of the contamination and or possible remedial action we provide the following;

Estimated Costs For Additional Investigations:

Additional investigation with deeper borings and borings at other locations now that levels of contamination have been discovered. $ 5,000.00 to 10,000.00

Remedial Action:

This is a hard cost to figure as we still don't know the full extent of the contamination or all the areas contamination exist, or to what depth it goes and if groundwater has been affected at the subject site. $ 50,000.00 to 100,000.00

BEI would recommend that the property owner consider either the Voluntary or the Brownfield Clean-Up Programs in order to avoid any third party liability if contamination goes off-site either through the soils or if groundwater has been impacted. If you have any questions or comments please feel free to give me a call.

Sincerely,
Berninger Environmental, Inc.

Walter Berninger
President/Consultant

Berninger Environmental, Inc.
roundwater consultants & geologists
615 Ninth Avenue
lohemia • New York • 11716
Phone: 631 • 588 • 2251
Fax: 631 • 588 • 2926

une 02, 2005

Mr. [redacted]al Shapiro
:/o Schmucklers Cleaners
)58 North Avenue
Jew Rochelle, New York 10804

Re: Schmucklers Cleaners **Report of Additional Investigation Services**
358 North Avenue
New Rochelle, New York

Dear Mr. Shapiro,

Berninger Environmental, Inc. (BEI) provided additional environmental services as outlined in our quotation # 05-1073 at the above mentioned location on Thursday May 19, 2005. The scope of work involved performing five borings using a GeoProbe portable boring equipment in the area of two previous boring locations GP-3 and GP-4 along with three additional new boring locations to define the extent of the contamination.

The work started with the GP-4 boring location (see attached site sketch) which was the outside drain location and samples were obtained from 6 to 7 feet with a field reading of 47.1 ppm (parts p[redacted]illion). A second soil sample was obtained at 9 to 10 feet with a field reading of 105 ppm and a third depth at 10 to 11 feet stopped due to refusal which is believed to be bedrock. This soil sample had a field reading of 1,459 ppm, a rather high reading. The next boring was back inside the building again a previous boring location GP-3, which was located just outside the dry cleaning room to a deeper depth to determine if we could reach clean soils. A soil sample obtained from 3 to 4 feet had a field reading of 736 ppm and a deeper soil sample from 9 to 10 feet encountered refusal with a field reading of 9999.9 ppm the highest reading our meter can record.

Based on the outcome of these two borings and finding higher levels of contamination at deeper depths two other borings were located inside this room in an effort to try and reach clean soils to determine the extent of the contamination. Boring GP-7 was located approximately 8 feet further away from GP-3 and to the extent of accessability available for the boring equipment which also obtained soil samples from 6 to 7 feet with a field reading of 9999.9 ppm and 7 to 11 feet where again refusal was encountered with a reading of 9999.9 ppm. A third boring GP-8 was also located in the room 8 feet towards the front of the building and indicated the same field measurements and refusal at 11 feet.

One additional boring was performed, GP-9, with the remaining time left on the project just outside the drain in the grass area to try and determine the width of the contamination around the outside drain. This boring was advanced to a depth of 1 to 5 feet with a field reading of 17.5 ppm. Based on this decrease in concentrations it can be assumed that the contamination in the area of the drain [redacted] be limited in width and length in this area.

Soil Sample Test Results in Parts Per Billion (ppb)

Chemicals Detected	GP-4	GP-7	Standard
Tetrachloroethene	730	**11,000**	1,400
Trichloroethene	ND	29	700

All reported concentrations are listed in units (ug/kg) ppb.

TAGM 4046 represents the Administrative Guidance Memorandum For The Determination of Soil Cleanup Objectives and Cleanup Levels in New York State.

Additional chemicals detected were:
GP-7 1,2-Dichlorobenzene @ 78 ppb
1,4-Dichlorobenzene @ 29 ppb

Of these additional chemicals none were above regulatory standards.

Based on the high field readings of the other soil samples taken from the different borings we did not put them in the lab for testing in an effort to save additional costs.

Our review indicates that the room just outside the dry cleaning area is heavily contaminated and may extent beyond that room but does not appear to be as far as the basement area which adjoins ha[illegible]om. Secondly the area outside the back door by the existing drain is also heavily contaminated o bedrock but maybe limited in width and length based on the borings performed and a review of he laboratory test results.

Our investigation is limited to the areas investigated by the boring locations placed in the areas outside the dry cleaning area where the wooden floor exist, the dry cleaning room the basement rea and the drain outside the back door area. The laboratory tests performed were chosen to cover he chemicals of concern involving dry cleaner operations. If you have any questions or comments lease feel free to give me a call.

Based on the findings of the investigation work performed and the levels of contamination liscovered the finding of this work requires reporting to the New York State Department of Environmental Conservation (NYSDEC) at the Hot Line 1-800-457-7362. If you would like for BEI o perform this services please just call me to discuss otherwise we assume you are performing.

The next steps will involve the reporting of the investigation services perform to the NYSDEC and either yourself or the current property owner entering a clean-up program. This program will require additional investigation to define the full extent of the contamination to soils, air and groundwater. Once this is defined a remedial action plan will be developed and approved by the regulatory agencies and than remedial action can begin. This process could take as long as six to twelve months o get to remedial action and possibly longer.

BEI would recommend that the property owner consider either the Voluntary or the Brownfield Clean-Up Programs in order to avoid any third party liability if contamination goes off-site either through the soils or if groundwater has been impacted. If you have any questions or comments please feel free to give me a call.

Sincerely,
Berninger Environmental, Inc.

Walter Berninger
President/Consultant

enc: Lab results
Site sketch
Field readings

APPENDIX C

Berninger Environmental, Inc. - Project Personnel

Berninger Environmental, Inc. - Project Personnel

Mr. Walter Berninger - President

Responsible for: Project coordination, scheduling, material and equipment procurement and director of field activities. Field analytical equipment maintenance, calibration, operation and data collection.

Ms. Jill Haimson, PG, CGWP - HydroGeologist/Project Manager/QA Officer

Responsible for: Technical oversight, field analytical equipment maintenance, calibration and operation, data collection and interpretation, report preparation.

Mr. William Schlageter, HydroGeologist/Field Manager/Supplemental QA Officer/Health & Safety Officer

Responsible for: Technical oversight, field analytical equipment maintenance, calibration and operation, data collection and interpretation, support in report preparation.

Joel Meyers - Crew Leader

Responsible for: GeoProbe®® operator, sample technician. Senior Driller.

Peter Daniels - Technician

Responsible for: GeoProbe®® operator and assistant, sample technician and equipment decontamination. Driller's assistant.

Ms. Lori Beyers - Data Usability Analysis

Responsible for: Development of the data usability summary report (DUSR) for Site samples

APPENDIX D

Site Specific Health and Safety Plan

Site-Specific Health and Safety Plan for BCP Remedial Investigation

at

HNJ REALTY LLC.
358 - 364 North Avenue, New Rochelle, New York
Site No.: C360088
Index No.: A3-0542-0306

PREPARED FOR

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 BROADWAY
ALBANY, NEW YORK

PREPARED BY

BERNINGER ENVIRONMENTAL, INC.

Revised March 2007

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FOREWORD

The Occupational Safety and Health Act (OSHA) implementing regulations of 29 CFR 1910.120 govern hazardous waste operations and emergency response. These regulations require that employers of employees involved in certain specific hazardous waste operations 1) develop and implement a written safety and health Program for employees involved in hazardous waste operations, and 2) that the Program incorporate a site-specific safety and health plan.

Berninger Environmental, Inc. (BEI) has employees conducting activities which fall within the scope of these regulations, and thus, has in place a written safety and health Program as required. Its contents are contained in the BEI HAZWOPER Program Manual. Some activities conducted at the contaminated portion of the 358-364 North Avenue, New Rochelle property may fall within the scope of these OSHA regulations. Thus, to assure regulatory compliance, this site-specific safety and health plan covering activities conducted at the contaminated portion of the 358-364 North Avenue, New Rochelle property has been prepared. The Integrated Safety Management System (ISMS) and Environmental Safety, Health, and Quality check lists will be used to define safe work procedures for work conducted in uncontaminated areas of the property.

The regulatory requirements for site-specific safety and health plans are found at 29 CFR 1910.120 (b)(4) and include ten specific elements which are designated with the letters A through J. Each of these elements is addressed in this safety and health plan for the 358-364 North Avenue, New Rochelle property. Each element is listed below along with the section number where it is addressed in this safety and health plan.

	SAFETY AND HEALTH PLAN ELEMENT	SECTION NO. IN THIS PLAN
A)	Safety and health risk hazard analysis	4.0
B)	Employee training assignments and requirements	6.1
C)	Personal protective equipment requirements	4.0, 5.4
D)	Medical surveillance requirements	6.2
E)	Frequency and types of monitoring required	4.0, 5.2
F)	Site control measures	5.3
G)	Decontamination procedures	4.0, 5.6
H)	Emergency response plan	5.7
I)	Confined space entry procedures	none (no confined space entry)
J)	Spill containment program	5.3

1.0 INTRODUCTION AND PROJECT DESCRIPTION

A Remedial Investigation (RI)Work Plan (Work Plan) has been developed pursuant to the requirements of an executed Brownfield Cleanup Agreement (February 27, 2006) between the New York State Department of Environmental Conservation, Division of Environmental Remediation (DER), and HNJ Realty, LLC. the Volunteer. The site is a commercial property located at 358 through 364 North Avenue, New Rochelle, New York (see Figures 1-2), fully described as Section 4 - Block 1206 - Lot 19 of the tax maps of City of New Rochelle.

A RI Work Plan is directed to determine the nature and extent of site contamination and off-site migration pathways in order to allow a decision by the NYSDEC DER regarding remedial action required to be undertaken at the property.

This Site-Specific Health and Safety Plan (HASP) addresses the safety aspects of the spectrum of work activities to be conducted at the contaminated area(s). Activities at the contaminated area (but not the uncontaminated background area) fall under the scope of Code of Federal Regulations, 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response (HAZWOPER)*. The purpose of this document is to establish overall site-specific health and safety guidelines to be followed by all personnel conducting work at this site regardless of organizational affiliation. Work will be performed in accordance with requirements, as stipulated.

The levels of protection and procedures specified in this HASP are based on the best information available from historical data and recent evaluations of the area. Therefore, these recommendations represent the minimum health and safety requirements to be observed by all personnel engaged in work at the site. Unforeseeable site conditions, changes in scope of work, or hazardous conditions not previously considered will warrant a reassessment of the protection levels and controls stated. Refer to Section 5.1 for requirements pertaining to field modifications and changes to the HASP.

2.0 SITE ORGANIZATION AND COORDINATION

Subsurface Remedial Investigation activities will be performed by BEI personnel. All work is performed under the direction of the Site Supervisor and support staff, all of whom are BEI employees.

The following section describes the organizational structure for the subsurface investigation. Key personnel and their responsibilities are listed. Mr. Walter Berninger will be the Project Manager (PM), Ms. Jill Haimson will be the Site Supervisor (SS), Mr. William Schlageter will serve as the Field Manager/Site Safety and Health Officer (SSHO), and Mr. Joel Meyers will act as the Emergency Response Coordinator (ERC).

2.1 SITE SAFETY AND HEALTH OFFICER

The SSHO advises the Site Supervisor on safety and health issues and conducts briefings prior to initiation of site activities. The SSHO assesses the potential for worker exposures to hazardous agents, recommends appropriate hazard controls for protection of task site personnel, and will require personnel to obtain immediate medical attention in the event of a work-related injury or illness. The SSHO ensures any necessary monitoring of potential chemical hazards is performed, reviews the effectiveness of monitoring and personal protective equipment, and recommends upgrades or downgrades in protective safety and health measures. The SSHO ensures that appropriate fall protection measures are available and that needed work permits are obtained. The SSHO has stop work authority and advises emergency response personnel of an emergency. The SSHO authorizes the return to work following resolution of any safety and health hazards or other stop work issues. The SSHO ensures that this HASP is revised and approved if there are changes in site conditions or tasks. The SSHO will be available for consultation when required and will be aware of project-related work occurring on-site.

2.2 SITE SUPERVISOR

The Site Supervisor has primary responsibility for directing and managing all subsurface investigation field activities, including coordination with any support organizations. The Site Supervisor ensures that all on-site project personnel meet the required level of training, have reviewed the HASP, and are instructed in safe work practices. The Site Supervisor also ensures that a qualified SSHO is designated, maintains a current copy of the HASP, and documents field changes to the HASP in the project logbook. In addition, the Site Supervisor and staff perform oversight of field activities, maintain awareness of site operations, and ensure that all project

personnel adhere to ES&H requirements in order to prevent potential accidents from occurring. The Site Supervisor is responsible for ensuring that the following five core functions of the Integrated Safety Management System (ISMS) are fulfilled appropriately:

- Define the work, roles and responsibilities. Allocate resources to ensure that research goals are balanced with safe work practices.

- Identify and analyze the hazards using the ES&H evaluation, consultation with subject matter experts, material safety data sheet information, Work Smart Standards (WSS), lessons learned by other Principal Investigators (PIs) and staff, and other resources.

- Develop and implement hazard controls tailored to the work being performed.

    - Resources include BEI staff, subject matter experts, Laboratory Operating Manuals, Laboratory Stewards, and Lessons Learned and Alerts.
    - Examples of actions and tools include optimization of engineering controls and procedural approaches with training, HAZCOM job-specific training, job pre-briefings, compliance-based and project-specific training, ES&H permits (e.g., Lockout/Tagout process), and protective equipment.

Perform work within controls to ensure the work is done safely:

    - Communicate expectations to project staff.
    - Ensure that the controls identified in the ESH&Q evaluation and this HASP are carried out.
    - Ensure opportunity for procedure modification to respond to unanticipated situations.
    - Stop work if imminent danger exists.

- Provide feedback and continuous improvement:

    - Solicit feedback from project staff regarding ESH&Q issues and act on that input.
    - Communicate concerns to and seek help from supervisors and the ESH&Q group.
    - Reallocate resources to address issues that arise.
    - Ensure safety meetings and site briefings are performed.

2.3 PRINCIPAL INVESTIGATORS (PI) & FIELD PROJECT PERSONNEL

PIs and field project personnel involved in onsite operations are responsible for understanding the intent of the principles of Integrated Safety Management and are to be knowledgeable of the processes in place to satisfy the intent of Integrated Safety Management.

Define the Scope of Work

- Understand the expectations they are to meet in their particular work assignment.
- Understand the responsibilities of the Site Supervisor and SSHO.
- Provide documentation of training to the Site Supervisor.

Identify and Analyze the Hazard

- Notify the SSHO of any special medical conditions (i.e., allergies, diabetes, etc.).
- Actively participate in identification of hazards prior to beginning work.
- Ensure that potential work hazards have been evaluated by subject matter experts and are accounted for in all work practices.

Develop and Implement Hazard Controls

- Seek the help of the SSHO and other subject matter experts, as appropriate, to analyze the hazards.
- Ensure that control strategies are developed and implemented, as appropriate, before work begins.
- Ensure safety measures are incorporated into activities (i.e., through HASP addendums or amendments, work aides, or standard operating procedures).

Perform Work Within Controls

- Perform only those tasks that they believe they can do safely.
- Meet the responsibilities and safely perform the tasks that are delegated to them.
- Take all reasonable precautions to prevent injury to themselves and to their fellow employees; be alert to potentially harmful situations.
- Suspend work if unexpected concerns arise and modify plans to address concerns before resuming work.
- Comply with the work plan and HASP as well as postings and rules at the project site.

Provide Feedback and Continuous Improvement

- Keep the SSHO and Site Supervisor informed of any issues, problems, or concerns regarding all aspects of their work.
- Notify appropriate management personnel or the facility point of contact of any unsafe condition, violation, noncompliance, or environmental threat discovered in a facility.
- Report to the SSHO any changes in site conditions that may affect safety and health.
- Immediately notify the SSHO of symptoms or signs of exposure potentially related to any chemical, physical, or biological hazards present at the site and immediately report any accidents, injuries, and/or unsafe conditions to the SSHO.
- If unsafe conditions develop, task site personnel are authorized and expected to stop work and notify the SSHO and Site Supervisor of the unsafe condition.

3.0 INTEGRATED SAFETY MANAGEMENT SYSTEM (ISMS)

The ISMS process systematically integrates safety into management and work practices at all levels so missions are accomplished while protecting the public, the worker, and the environment. Direct involvement of workers during the development and implementation of safety management systems is essential for success. Therefore, all BEI personnel are expected to incorporate the following basic ISMS functions during all work activities:

- Defining the scope of work;
- Identifying and analyzing hazards associated with the work;
- Developing and implementing hazard controls;
- Performing work activities within these controls; and
- Providing feedback on the adequacy of the controls to continue improving safety management.

4.0 TASK SPECIFIC HAZARD EVALUATION AND CONTROLS

The purpose of this Remediation Investigation hazard evaluation is to identify and assess potential hazards that personnel might encounter and to prescribe methods of hazard control. Historical site data provided in Appendix A gives the results of chemical analyses in subsurface soils at the 358-364 North Avenue, New Rochelle property. Material Safety Data Sheets (MSDS) for chemicals that are likely to be handled when conducting field work are included in Attachment B.

A description of sampling procedures and the activities that may be conducted at the property is provided below.

4.1 WATER LEVEL MEASUREMENTS

Task Description: Manual water level measurements will be collected from any monitoring wells installed in order to determine current depth to groundwater in the area. These measurements are taken by lowering an electronic water level sounder down the well. As the sounder is brought out of the well the tip of the sounder that has been submerged is rinsed with distilled water to rinse off the groundwater. The rinse water is allowed to drip back down into the well.

Equipment and Materials: Equipment includes water level sounder.

Task Hazards and Controls:

- **Chemical Hazards**

  - Groundwater Contact: Based on previously obtained sample data, the risk of chemical or radiological surface water samples is minimal. However, direct contact with contaminated materials should be avoided; therefore, disposable latex or nitrile gloves and safety glasses will be worn when conducting groundwater monitoring and during the handling of sample tubes to prevent eye and skin contact.

  - Downhole equipment: Rinse downhole equipment with distilled water as it is brought out of the well.

Physical Hazards

- Tripping/Falling: Precautions should be taken to avoid trip, slip, and fall accidents when climbing irregular or slippery surfaces. Before changing location visually survey the area for slippery surfaces and tripping hazards.

- Heat/Cold Stress: Wear clothing appropriate for environmental and weather conditions. Temperature extremes may be a hazard for consideration depending on the timing of the activity. Refer to Section 5.5 for discussion of recognition of symptoms and controls.

- **Biological/Vector Hazards**

  - Ticks/Snakes/Pathogens: Be cautious of snakes, and vector carriers such as ticks. Check clothing and skin for ticks after walking in brush. Wash hands before eating and drinking.

- **Personal Protective Equipment Required to Address General Site Hazards**

  - Level of Protection: D
  - Protective Clothing: BEI-issued work clothes or disposable tyvek
  - Head Gear: Safety glasses
  - Gloves: Latex or nitrile (when conducting groundwater sampling or handling corrosive or oxidizing reagents)
  - Footwear: Sturdy work shoes

- **Monitoring Requirements**

  - None

4.2 FIELD SAMPLING AND ANALYSIS OF GROUNDWATER

Task Description: Procedures for field sampling and analysis of groundwater (if any) are described in the 358-364 North Avenue, New Rochelle Investigation Work Plan. Groundwater will generally be sampled with a peristaltic pump. Slow purge techniques will be used in order to reduce the disturbance caused by removal of large volumes of water from the system. Field parameters will be monitored until stable groundwater chemistry (e.g. specific conductance, pH,

Eh, temperature, dissolved oxygen) readings are obtained on the Myron 6P Ultrameter among others. The purge water will be collected in DOT approved 55-gallon drums, if deemed to be necessary or discharged in proximity to the wellhead with regulatory approval.

Samples will be handled and transported according to regulatory requirements and procedures outlined in the 358-364 North Avenue, New Rochelle Investigation Work Plan. Samples will be preserved and stored as required by the analytical protocols (e.g. cooled, preservative added). Storage on site may occur for short periods of time in ice chests containing "blue ice" but will be quickly transferred to refrigerator storage in the field laboratory or at the fixed base laboratory at the appropriate temperatures. All storage of contaminated samples will follow procedures and relevant regulations.

Equipment and Materials: Sampling equipment includes sampling tubing which is dedicated for each sample collected; peristaltic pump; filters and sample containers (for collecting samples). Some samples may be preserved with a few drops of nitric, hydrochloric or sulfuric acid. Calibration standards including pH and conductivity are also used.

Task Hazards and Controls:

- **Chemical Hazards**

  - Groundwater Contact: As no previously obtained sample data is available and refusal was encountered due to bedrock, at this time, the risk of chemical exposure from short-term exposure to groundwater is considered to be minimal. However, direct contact with contaminated materials should be avoided, therefore, disposable latex or nitrile gloves and safety glasses will be worn when conducting groundwater and surface water sampling to prevent eye and skin contact.

  - Reagent Contact: Corrosive or oxidizing reagents pose a contact hazard. To prevent eye and skin contact when corrosive or oxidizing reagents are used disposable latex or nitrile gloves and safety glasses will be worn.

- **Physical Hazards**

  - Tripping/Falling: Precautions should be taken to avoid trip, slip, and fall accidents when climbing irregular or slippery surfaces. Before changing location visually survey the area for slippery surfaces and tripping hazards.
  - Heat/Cold Stress: Wear clothing appropriate for environmental and weather

conditions. Temperature extremes may be a hazard for consideration depending on the timing of the activity. Refer to Section 5.5 for discussion of recognition of symptoms and controls.

- **Explosion Hazards**

  - Gas cylinders: Pressurized gas cylinders (if any) will be transported and handled in accordance with applicable Department of Transportation guidance and regulations. Care will be taken to secure the cylinders upright during transport to ensure they are not damaged. Cylinders will also be secured at the site so they will not tip over during the injection process.

- **Biological/Vector Hazards**

  - Ticks/Snakes/Pathogens: Be cautious of snakes, and vector carriers such as ticks. Check clothing and skin for ticks after walking in brush. Wash hands before eating and drinking.

- **Personal Protective Equipment Required to Address General Site Hazards**

  - Level of Protection: D
  - Protective Clothing: BEI-issued work clothes or disposable tyvek
  - Head Gear: Safety glasses
  - Gloves: Latex or nitrile (when conducting groundwater sampling or handling corrosive or oxidizing reagents)
  - Footwear: Sturdy work shoes

- **Monitoring Requirements**

  - Air Quality: Air monitoring with an organic vapor analyzer or other suitable instrument will be performed during all groundwater or surface water sampling activities. A VOC ambient air monitoring result of 3ppm will trigger a warning response. If a detection of 5ppm VOC in ambient air is detected, the SSHO will suspend work and instruct the workers to move to a safe zone until such time the work zone is tested safe.

4.3 FIELD SAMPLING AND ANALYSIS OF SOIL/SOIL GAS

Task Description: Procedures for field sampling and analysis of subsurface soils, soil gas, and soil vapors are described in the 358-364 North Avenue, New Rochelle Remedial Investigation Work Plan. Soil samples and soil gas samples will generally be obtained by a discrete sampler by hand, Geoprobe direct push sampling rig or Drilling Rig. This method ensures dedicated, undisturbed soil samples protected in a PVC liner or split spoon sampler. Field testing for total volatile organic compounds (VOCs) in the breathing zone (work zone), as well as the downwind perimeter will be monitored by a MiniRae portable Photoionization Detector (PID). The air monitoring action levels using PID readings cited in Section 8.0 - Community Air Monitoring Plan will be used to safeguard workers and observers during the implementation of the field investigation program. Discarded soil will be placed back in the bore hole if approved by the regulators or containerized as necessary.

Samples will be handled and transported according to regulatory requirements and procedures outlined in the 358-364 North Avenue, New Rochelle Remedial Investigation Work Plan. Samples will be preserved and stored as required by the analytical protocols (e.g. cooled, preservative added). Storage on site may occur for short periods of time in ice chests containing "blue ice" but will be quickly transferred to refrigerator storage in the field laboratory or at the fixed base laboratory at the appropriate temperatures. All storage of contaminated samples will follow procedures and relevant regulations.

Equipment and Materials: Sampling equipment includes a Geoprobe direct push sampling rig for exterior sample locations and a weighted slide hammer or mobile Geoprobe unit for interior sample collection. A PVC liner is dedicated for each soil sample collected. Soil gas samples will be collected directly into and containerized inside dedicated stainless steel summa canisters.

Task Hazards and Controls:

- **Chemical Hazards**

  - Soil Contact: Based on previously obtained sample data, the risk of chemical exposure from short-term exposure to soil samples is present (See Appendix A). However, direct contact with contaminated materials will be avoided, therefore, disposable latex or nitrile gloves and safety glasses will be worn when conducting soil and sediment sampling to prevent eye and skin contact.

- **Physical Hazards**

- Tripping/Falling: Precautions should be taken to avoid trip, slip, and fall accidents when climbing irregular or slippery surfaces. Before changing location visually survey the area for slippery surfaces and tripping hazards.

- Heat/Cold Stress: Wear clothing appropriate for environmental and weather conditions. Temperature extremes may be a hazard for consideration depending on the timing of the activity. Refer to Section 5.5 for discussion of recognition of symptoms and controls.

- **Biological/Vector Hazards**

  - Ticks/Snakes/Pathogens: Be cautious of snakes, and vector carriers such as ticks. Check clothing and skin for ticks after walking in brush. Wash hands before eating and drinking.

- **Personal Protective Equipment Required to Address General Site Hazards**

  - Level of Protection: D
  - Protective Clothing: BEI-issued work clothes or disposable tyvek
  - Head Gear: Safety glasses
  - Gloves: Latex or nitrile (when conducting groundwater sampling or handling corrosive or oxidizing reagents)
  - Footwear: Sturdy work shoes

- **Monitoring Requirements**

  - Air Quality: Air monitoring with an organic vapor analyzer or other suitable instrument will be performed during all soil sampling activities. A VOC ambient air monitoring result of 3ppm will trigger a warning response. If a detection of 5ppm VOC in ambient air is detected, the SSHO will suspend work and instruct the workers to move to a safe zone until such time the work zone is tested safe.

4.4 GEOPROBE BORINGS/ MONITORING WELL INSTALLATION/SOIL

REMOVAL

Task Description: Probe rods are installed by using a Geoprobe direct push rig which hydraulically pushes or hammers steel drive pipe into the ground (please refer to the 358-364 North Avenue, New Rochelle Remedial Investigation Work Plan for a more complete description). Sections of probe rods are added (threaded attachment) until the desired depth is reached. A sampling tool is opened to obtain the soil or groundwater, which then is retrieved. If desired, a small diameter well can then be constructed inside the hollow pipe as it is withdrawn from the ground or in the uncased hole after the drive pipe is removed completely. The drive point is left in the ground. Sampling equipment and probe rods are cleaned and decontaminated by detergent wash and potable water rinse. Hollow-stem augers and other drilling methods may also be used to install groundwater monitoring wells and/or to collect soil samples. These methods produce drill cuttings that will be collected with discarded soil back in the bore hole if approved by the regulators.

Soil will be removed via backhoe/trackhoe with operator. BEI personnel will be charge of directing soil removal and screening/sampling of soil column and stockpiles.

Equipment and Materials: Equipment includes Geoprobe rig, drill rigs and associated equipment and support vehicles such as air compressors, pressure washers, generators, probe rod, and well construction materials, backhoe, trackhoe, shovels, augers, etc.

Task Hazards and Controls:

- **Chemical Hazards**

  - Groundwater Contact: No previous sample data is available and refusal was encountered at the bedrock interface. Therefore, the risk of chemical exposure from short-term exposure to groundwater samples is considered to be minimal, at this time. However, direct contact with contaminated materials should be avoided, therefore, disposable latex or nitrile gloves and safety glasses will be worn when conducting groundwater sampling to prevent eye and skin contact.

  - Soil/drill cuttings Contact: Workers could be exposed to contaminated soil remaining on the probe rods and/or backhoe buckets as they are raised out of the ground. This hazard will be minimized by screening the drive pipe as it is raised out of the hole. Prior to removal from the site, all drill pipe, drill cuttings, and any core samples collected will be scanned for VOC contamination. An exclusion area

will be set up around the drill rig to prevent entry by personnel that are not trained or wearing proper protection. However, direct contact with contaminated materials should be avoided, therefore, disposable latex or nitrile gloves will be worn when conducting soil sampling to prevent eye and skin contact. Dust suppression will be implemented based upon community air monitoring. The same criteria will be used for on-site controls.

- **Physical Hazards**

  - Tripping/Falling: Precautions should be taken to avoid trip, slip, and fall accidents when climbing irregular or slippery surfaces. Before changing location visually survey the area for slippery surfaces and tripping hazards. Operators will avoid accessing locations greater than six feet above ground. If it becomes necessary to perform work on the drill mast, the mast will be lowered prior to performing work.
  - Heat/Cold Stress: Wear clothing appropriate for environmental and weather conditions. Temperature extremes may be a hazard for consideration depending on the timing of the activity. Refer to Sect. 5.5 for discussion of recognition of symptoms and controls.
  - Abrasions, Scrapes and Sprains: Always use appropriate care when using tools and mechanical equipment. Maintain awareness of body and limb location and think ahead to probable body and object path before applying force to tools. Wear protective clothing as listed below. Drill rods, augers, and tools will be properly stowed and restrained during transport. Support rails will have adequate strength to hold tools. Operators will avoid placing body parts at points of operation and/or pinch points.
  - Lifting: Use your legs to lift heavy objects, avoid awkward positions and twisting of the body and ask for assistance with awkward or heavy loads.
  - Mechanical Hazard: Working with drill rigs can result in injuries from equipment dislodging and striking unsuspecting personnel, and from impacts due to flying objects or overturning vehicles. Therefore, follow these precautions:
    - ✓ Drill rig/Backhoe will be inspected visually before each use. If inspection reveals unsafe conditions, rig will be removed from service and repaired. Only qualified individuals shall make repairs to the drill rig.
    - ✓ Drill rig cabs/Backhoe will be kept free of all nonessential items and all loose items will be secured.
    - ✓ Drill rigs/Backhoe will be provided with necessary safety equipment.
    - ✓ Drill rig/Backhoe shall be properly maintained per manufacturer's

recommendations. Only qualified individuals shall make repairs to the drill rig.

- ✓ Parking brakes will be set before shutting off any heavy equipment or vehicle.
- ✓ High pressure hoses will be secured to prevent "whipping" in the event of a failure.
- ✓ Only competent individuals shall be allowed to operate the drill rig.
- ✓ To minimize overhead hazards, wire cables will be inspected by the rig operator prior to use. Any frayed, kinked, marked, or otherwise damaged cables will be taken out of service. Operator and other personnel in area during lifting of tools onto rig mast shall position themselves so that they are not under the load and/or between equipment.

- Electrical Hazard: Of special concern to drilling operations is the possibility for conducting electricity through the drilling tower/backhoe through either inadvertent contact with underground or overhead power lines, or by lightning strikes. In addition, some of the equipment used is operated by electricity. Unless safe work practices are observed, serious injury or death can result. Therefore, observe the following precautions:
  - ✓ Treat all electrical wires and circuits as 'live" unless certain they are not.
  - ✓ Always maintain a firm work base to prevent a loss of balance and potential fall onto energized busses or parts (which should be covered with a good electrical insulator such as a rubber blanket).
  - ✓ All tools should have insulated handles, be electrically grounded, or double insulated.
  - ✓ Do not drill within 10 ft of an overhead power line that is ≤ 50 kV (or within 50 ft for > 50 kV) unless power to the line is first turned off for the duration of the drilling.
  - ✓ Ground fault circuit interrupters will be used for electrical extension cords in use between a fixed electrical system (permanent outlet) and a tool.
  - ✓ Prior to drilling have site representatives delineate location of underground power lines and other utilities.
  - ✓ Do not drill within 25 ft of any known underground power line; also allow a reasonable separation distance from other site utilities.
  - ✓ Maintain a watch for electrical storms. If electrical activity appears to be imminent, cease drilling operations and evacuate the area around the drill rig. If time permits do not leave auger or drill string in the borehole.
- Noise: Unprotected exposure of site workers to noise from drilling activities can result in noise induced hearing loss. Hearing protection must be worn where noise

levels are greater than 85 dBA. The SSHO will ensure that either ear muffs or disposable foam earplugs are made available to all personnel and are used by the personnel in the immediate vicinity of the drill rig.

- **Biological/Vector Hazard**

  - Ticks/Snakes/Pathogens: Be cautious of snakes, and vector carriers such as ticks. Check clothing and skin for ticks after walking in brush. Wash hands before eating and drinking.

- **Personal Protective Equipment Required to Address General Site Hazard**

  - Level of Protection: D
  - Protective Clothing: BEI-issued work clothes or disposable tyvek
  - Head Gear
    - Hard hat required for drill rig operations; not required for steam cleaning and washing
    - Safety glasses or goggles required during drilling and decon operations
    - Ear muffs or disposable foam earplugs required in the vicinity of drill rig
  - Gloves: Leather work gloves over nitrile or latex gloves during drilling or decon operations
  - Footwear: Steel-toed work shoes

- **Monitoring Requirements - Air Quality**

  - <u>VOCs</u>: Air monitoring with a PID or other suitable instrument will be performed during all well installation activities. A VOC ambient air monitoring result of 3ppm will trigger a warning response. If a detection of 5 ppm VOC in ambient air is detected, the SSHO will suspend work and instruct the workers to move to a safe zone until such time the work zone is tested safe.

  - <u>Particulate Monitoring, Response Levels, and Actions</u>: Particulate concentrations will be monitored continuously at temporary particulate monitoring stations at the downwind perimeter of the immediate work area (i.e., the exclusion zone) or as otherwise specified. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10)

and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

5.0 OTHER HEALTH AND SAFETY PLAN ELEMENTS

5.1 REVISIONS/ MODIFICATIONS TO THE HASP

The following actions will warrant revision and approval of this plan by the appropriate health and safety disciplines:

- Change in tasks (or previously unidentified tasks) that could impact employee health and safety.
- Changes in hazards (unknown or not previously addressed) which require a significant change in, or addition to, respiratory protection (as defined in exemptions to the plan modifications), physical/barrier protection features, or other engineering controls.

5.1.1 Modifications allowed

The SSHO may upgrade PPE. These changes must be documented in the field logbook. The change and reason or evidence for the change must also be documented in the field logbook. For upgrades to include respiratory protection (including air-purifying and supplied air) for previously unidentified non-radiological issues or contaminants such as VOCs, the appropriate health and safety disciplines must be contacted. The SSHO will approve and document changes in PPE in the field logbook. Upgrades to include respiratory protection will require the SSHO to ensure workers have 40 Hour HAZWOPER Training and to assess any additional medical surveillance requirements.

5.2 MONITORING

Historical soil and air monitoring site data indicate that chemical exposure of site personnel with proper personal protection can be minimized to not pose a significant concern within the scope of this project. However as only limited site characterization has been performed, monitoring will be required for all field activities. Site monitoring requirements may change based on site conditions. All changes must be documented in the site logbook.

5.3 SITE AND SPILL CONTROL

Site access is available from public roads through the area and therefore will not be controlled to the general site. However, certain areas of concern are interior or exterior to the building and are enclosed. As necessary, based on the levels of contamination identified during Remedial

Investigation, formal barricaded work zones will not be established unless new monitoring data indicate the need for such barriers. An exclusion zone may be required for drilling operations and other field activities if required to reduce the accidental spread of hazardous substances from contaminated areas to clean areas. The SSHO will determine, as needed, the locations of the support zone, contamination reduction zone, and the exclusion zone. Personnel accessing the zones must meet access requirements as stated in this plan.

5.4 PERSONAL PROTECTIVE EQUIPMENT

Level D protection is normally used when the potential for personnel contamination is low, as is the case with this project. Level D protection will include BEI-furnished clothing or disposable tyvek. Details and special requirements have been covered in the hazard control sections of the specific tasks in Sect. 4 above. Unexpected new hazards will require a reassessment of the specified PPE.

5.5 TEMPERATURE EXTREMES AND SITE CHARACTERISTICS

The effect of temperature extremes on personnel is a primary hazard associated with the activities conducted at the site. Symptoms and controls related to temperature extremes are considered in detail in this section.

Field activities conducted during the summer or winter pose a hazard because of temperature extremes. Since the project site is located in a relatively open area, workers shall dress appropriately for environmental conditions, wearing clothing that provides reasonable protection against winter cold and summer sun. Although extreme physical exertion will not be likely within the scope of this project, during hot weather workers are encouraged to be aware of their own symptoms of heat stress (headaches, dizziness, increased heart rate), to drink plenty of water, and to take breaks as needed. Heat stress symptoms, remedies, and monitoring are discussed in Section 5.5.1. Cold exposure effects are discussed in Section 5.5.2.

Workers are also encouraged to apply insect repellant and/or sunscreen as needed prior to field activities. Workers should exercise caution by visually inspecting their immediate area of activity for presence of poisonous/harmful plant, insect, and animal species as well as any hazard resulting from previous human activity.

5.5.1 Effects and Prevention of Heat Stress

If the body's physiological processes fail to maintain a normal body temperature because of

excessive heat, a number of physical reactions can occur. They can range from mild symptoms such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement, to death.

Heat-related health concerns can include the following:

- **Heat rash:** Caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat and is a nuisance.
- **Heat cramps:** Caused by profuse perspiration combined with inadequate fluid intake and chemical replacement, particularly salts. Signs include muscle spasm and pain in the extremities and abdomen.
- **Heat exhaustion:** Caused by increased stress on various organs to meet increased demands to cool the body. Signs include shortness of breath; increased pulse rate (120-200 beats per minute); pale, cool, moist skin; profuse sweating; dizziness; and lassitude.
- **Heat stroke:** Is the most severe form of heat stress. Body must be cooled immediately to prevent severe injury and/or death. Signs include red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and possibly coma. Medical help must be obtained immediately.

Medical attention must be obtained for the more serious symptoms of heat stress. One or more of the following methods are recommended to help reduce the potential for heat stress:

1. Provide plenty of liquids. To replace body fluids (water and electrolytes) lost due to sweating, use a 0.1 percent saltwater solution, more heavily salted foods, or commercial mixes. The commercial mixes may be preferable for those employees on a low-sodium diet.
2. Provide cooling devices to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency.
3. Wear long cotton underwear, which acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
4. Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing.
5. In extremely hot weather, conduct non-emergency response operations in the early morning or evening.
6. Ensure that adequate shelter is available to protect personnel against sun, heat, or other adverse weather conditions that decrease physical efficiency and increase the probability of accidents.
7. In hot weather, rotate workers wearing protective clothing.

8. Maintain good hygiene frequently changing clothing and showering daily. Clothing should be permitted to dry during rest periods. Workers who notice skin problems should immediately consult medical personnel.

5.5.2 Cold Exposure

Persons working outdoors in temperatures at or below freezing may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing for protection, the effects of cold exposure may occur even at temperatures well above freezing. Cold exposure may cause severe injury due to freezing of exposed body surfaces (frostbite), or profound generalized cooling (hypothermia), possibly resulting in death. Areas of the body which have high surface area-to-volume ratios such as fingers, toes, and ears are the most susceptible to frostbite.

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- **Frost nip or incident frostbite:** characterized by sudden blanching or whitening of skin.
- **Superficial frostbite:** skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- **Deep frostbite:** tissues are cold, pale, and solid; extremely serious injury.

Systemic hypothermia, or lowering of the core body temperature, is caused by exposure to freezing or rapidly dropping temperatures. Symptoms are usually exhibited in five stages: 1) shivering and loss of coordination; 2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F (35°C); 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing the extremities; and 5) death.

5.6 DECONTAMINATION

BEI will maintain on-site decontamination equipment such as a steam cleaner, potable water, alconox, pressure washer, water reservoir tank, and a wastewater transfer system and receiving tank. Groundwater, soil sampling, and drilling equipment will be decontaminated between each boring, well installation, sampling event, and prior to mobilization on or off site.

Decontamination of personnel shall be conducted only in the unexpected event that contamination is detected. At a minimum, personnel who have conducted work at the site will wash their hands prior to eating or drinking. BEI personnel shall supervise, assist, and document incidents involving personnel contamination.

5.7 EMERGENCY PREPAREDNESS/RESPONSE

All emergency services can be reached by dialing 911 from any facility or mobile telephone. Access to phones and/or radios will be provided to onsite personnel. The Emergency Response Coordinator (ERC) will coordinate all emergency response operations.

Should evacuation from the site become necessary, the evacuation route to the hospital is shown in Figure 2. Emergency telephone numbers are given below.

Emergency Telephone Numbers

FIRE / POLICE 911

New Rochelle City of: Fire Prevention
(914) 654-2212
90 Beaufort pl.
New Rochelle, NY 10801

New Rochelle City of: Police Department
(914) 654-2300
475 North Ave
New Rochelle, NY 10801

Water Departments: New Rochelle
(914) 632-6900
2525 Palmer Ave
New Rochelle, NY 10801

Sound Shore Medical Ctr
(914) 632-5000
16 Guion Pl., New Rochelle, NY 10801

Name: MT VERNON
Date: 10/24/105
Scale: 1 inch equals 2000 feet

Location: 040° 55' 08.3" N 073° 47' 08.8" W
Caption: Schmuckler's Dry Cleaners
359 North Avenue
New Rochelle, NY 10804

Figure 1

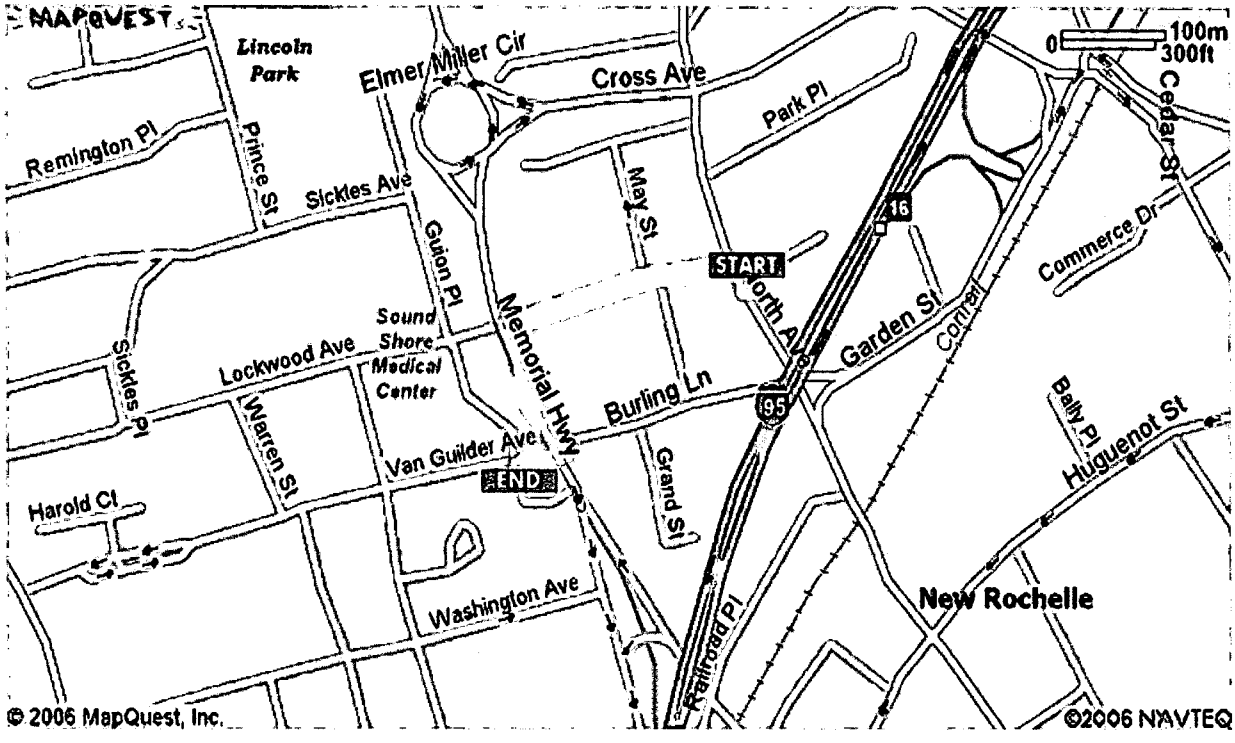


Figure 2 - EMERGENCY ROUTE TO SOUND SHORE MEDICAL CENTER

Sound Shore Medical Ctr
16 Guion Pl., New Rochelle, NY 10801

Total Est. Time: One minute **Total Est. Distance:** 0.26 miles

1: Start out going NORTHWEST on NORTH AVE toward LOCKWOOD AVE. <0.1 miles
2: Turn LEFT onto LOCKWOOD AVE. 0.1 miles
3: Turn LEFT onto MEMORIAL HWY / NORMAN ROCKWELL BLVD. <0.1 miles
4: Turn RIGHT onto VAN GUILDER AVE. <0.1 miles

6.0 TRAINING/MEDICAL REQUIREMENTS

6.1 SITE-SPECIFIC HAZARD COMMUNICATION AND ACCESS BRIEFING

- Since different training requirements may be needed based on the nature of different tasks to be performed, specific training requirements may be identified. However, generally applicable training requirements are presented here. Visitors not entering any exclusion zone or contamination reduction zone who have very limited potential for exposure to contaminants require:

- Site-specific hazard communication and access briefing.
- All project personnel performing hands-on work that could potentially expose them to hazardous substances, safety, or health hazards will meet the following training requirements:

- General Employee Training (GET)
- 40 hour HAZWOPER (SARA/OSHA) training, or equivalent (Note: for certain types of low risk work, 24 hour training is acceptable)
- Current HAZWOPER 8-hour Annual Refresher (as applicable)
- Site-specific hazard communication and access briefing

- In addition, the Site Safety and Health Officer requires:
- 8-hour HAZWOPER Supervisor training

- Personnel involved in service or maintenance work on energized equipment require:
- Lockout/Tagout training

Prior to beginning work at the project site, all personnel will review this Health and Safety Plan and sign the training acknowledgment form (Appendix C). The site-specific hazard communication and access briefing is documented in the project logbook. If site conditions change, or other hazards are detected, the training and access requirements will be revised accordingly.

6.2 MEDICAL SURVEILLANCE

- A medical surveillance program will be conducted in accordance with the requirements of 29 CFR 1910.120 for:

- All employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.
- All employees who wear a respirator for 30 days or more a year or as required by 29 CFR 1910.134.
- All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.
- Members of HAZMAT teams.

All BEI employees receive periodic medical examinations. Because of the low potential for exposure to hazardous agents, it is not expected that additional medical surveillance will be required for BEI personnel at the 358-364 North Avenue, New Rochelle property. Non-BEI personnel will be required to acknowledge coverage by a medical surveillance program sufficient to satisfy the requirements of 29 CFR 1910.120 (Appendix C).

Appendix A

HISTORIC SITE DATA

SUMMARY OF PAST INVESTIGATIONS

Phase II Site Investigation, April and May 2005

Environmental Investigation activities were conducted by BEI in April and May of 2005. The Environmental Investigation activities included the installation of nine soil borings (GP-1 through GP-9) utilizing Geoprobe drilling technology, as well as hand boring equipment. Soil samples were collected on a nominal continuous basis, field screened for the visual or olfactory presence of contaminants, as well as for volatile organic compounds (VOCs) utilizing a photoionization detector and containerized for submission for laboratory analysis.

Soil borings were installed within the current dry-cleaning equipment room (GP-1 and GP-2), within the reported former dry-cleaning equipment room (GP-3, GP-7 and GP-8), within the basement of the original building (GP-5 and GP-6), within a storm drain located within a concrete walkway exterior to a rear door (GP-4) and within a grass-covered area at the western portion of the property (GP-9).

Results of the Environmental Investigation indicated that the dry-cleaning chemical tetrachloroethene (PCE) was present within shallow soil samples (0 to 4 ft bgs) collected from GP-3, GP-4 and GP-7 at concentrations exceeding applicable New York State Department of Environmental Conservation (NYSDEC) Recommended Soil Clean-up Objectives (RSCOs) set forth in the *NYSDEC Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels* revised in 1995 and updated in 2001. The VOC 1,2,3-trichloropropane (a solvent) was also detected in the GP-5 sample at a concentration also in exceedence of its NYSDEC RSCO. (See appendix to work plan for specific concentrations).

During the May 19, 2005 investigation activities, PID readings of 9,999.9 ppm (representing the highest possible detection limit which the PID can register) were detected in samples collected from geoprobe borings GP-3 and GP-7 at depths between 6 and 11 feet bgs. These readings are indicative of a significant impact to soils.

Groundwater was not encountered in any of the soil borings. In the borings which were installed to depths of eleven feet bgs, refusal was encountered. The refusal was a result of bedrock present beneath the surface, as rock fragments were present within the sampling core.

Based upon the above investigation, NYSDEC Spill No. 05-05438 was assigned to the subject property on August 3, 2005. Subsequent to the issuance of a spill, the subject property was accepted into the NYSDEC Brownfield Clean-up Program (BCP).

Appendix B

MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheet for Perchloroethylene (Perc)

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: TETRACHLOROETHYLENE
FORMULA: CL2C:CCL2
FORMULA WT: 165.83
CAS NO.: 00127-18-4
NIOSH/RTECS NO.: KX3850000
COMMON SYNONYMS: PERCHLOROETHYLENE; ETHYLENE TETRACHLORIDE; CARBON BICHLORIDE; CARBON DICHLORIDE
PRODUCT CODES: 9218, 9453, 5380, 9465

EFFECTIVE: 02/12/87
REVISION #03

PRECAUTIONARY LABELING

BAKER SAF-T-DATA(TM) SYSTEM
HAZARD RATINGS ARE 0 TO 4 (0=NO HAZARD; 4=EXTREME HAZARD).

HEALTH - 3 SEVERE (CANCER CAUSING)
FLAMMABILITY - 0 NONE
REACTIVITY - 0 NONE
CONTACT - 3 SEVERE (LIFE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

DANGER: HARMFUL IF SWALLOWED OR INHALED

EXCEPTIONAL HEALTH AND CONTACT HAZARDS - READ MATERIAL SAFETY DATA SHEET
NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.

NOTE: THIS MATERIAL OR ITS VAPORS IN CONTACT WITH FLAMES OR HOT GLOWING SURFACES MAY FORM CORROSIVE ACID FUMES.

KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH

THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
TETRACHLOROETHYLENE	90-100	127-18-4

3 - PHYSICAL DATA

BOILING POINT: 121 C (250 F) VAPOR PRESSURE(MM HG): 13
MELTING POINT: -22 C (-8 F) VAPOR DENSITY(AIR=1): 5.8
SPECIFIC GRAVITY: 1.62 EVAPORATION RATE: 2.80

(H2O=1) (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: COLORLESS LIQUID WITH ETHER OR CHLOROFORM ODOR.

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: CLOSED CUP N/A NFPA 704M RATING: 2-0-0
FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %
FIRE EXTINGUISHING MEDIA: USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.
SPECIAL FIRE-FIGHTING PROCEDURES: FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS: CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE.

TOXIC GASES PRODUCED: HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON DIOXIDE

5 - HEALTH HAZARD DATA

ACCEPTABLE MAXIMUM PEAK ABOVE THE ACCEPTANCE CEILING CONCENTRATION FOR AN EIGHT-HOUR SHIFT=300 PPM FOR 5 MINUTES IN ANY 3 HOURS. (PEL) CEILING=200 PPM
THRESHOLD LIMIT VALUE (TLV/TWA): 335 MG/M3 (50 PPM)
SHORT-TERM EXPOSURE LIMIT (STEL): 1340 MG/M3 (200 PPM)
PERMISSIBLE EXPOSURE LIMIT (PEL): MG/M3 (100 PPM)
TOXICITY:

LD50 (ORAL-RAT)(MG/KG) - 8850
LD50 (IPR-MOUSE)(MG/KG) - 4700

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO
EFFECTS OF OVEREXPOSURE: INHALATION OF VAPORS MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS, IRRITATION OF RESPIRATORY TRACT, AND LOSS OF CONSCIOUSNESS. LIQUID MAY BE IRRITATING TO SKIN AND EYES. PROLONGED SKIN CONTACT MAY RESULT IN DERMATITIS. EYE CONTACT MAY RESULT IN TEMPORARY CORNEAL DAMAGE. INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTROINTESTINAL IRRITATION.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE DAMAGE TO KIDNEYS, LIVER, LUNGS, BLOOD, OR CENTRAL NERVOUS SYSTEM.

TARGET ORGANS: LIVER, KIDNEYS, EYES, UPPER RESPIRATORY SYSTEM, CENTRAL NERVOUS SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE IDENTIFIED

ROUTES OF ENTRY: INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES: CALL A PHYSICIAN.

IF **SWALLOWED**, DO NOT INDUCE VOMITING.
IF **INHALED**, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN

WITH WATER.
SOME EXPERIMENTS WITH TEST ANIMALS INDICATED THAT THIS SUBSTANCE MAY BE ANTICIPATED TO BE A CARCINOGEN.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, ALKALI METALS, ALUMINUM

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON DIOXIDE

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U210 (TOXIC WASTE)

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

b RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 50 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH> ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD,

UNIFORM, PROTECTIVE SUIT, POLYVINYL ALCOHOL GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

SPECIAL PRECAUTIONS: KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA. STORE IN A COOL, WELL-VENTILATED AREA AWAY FROM SOURCES OF HEAT, FLAME, OR IGNITION.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: TETRACHLOROETHYLENE (AIR ONLY)

HAZARD CLASS ORM-A

UN/NA UN1897

LABELS NONE

REPORTABLE QUANTITY 1 LBS.

INTERNATIONAL (I.M.O.)

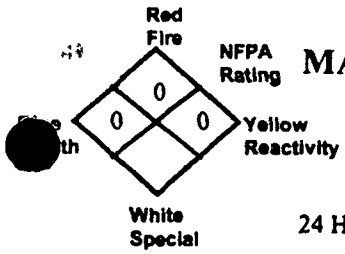
PROPER SHIPPING NAME TETRACHLOROETHYLENE

HAZARD CLASS 6.1

UN/NA UN1897

LABELS HARMFUL - STOW AWAY FROM FOOD STUFFS

Alconox ®



MATERIAL SAFETY DATA SHEET

Alconox, Inc.
30 Glenn Street
White Plains, NY 10603

24 Hour Emergency Number – Chem-Tel (800) 255-3924

I. IDENTIFICATION

Product Name (as appears on label)	ALCONOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 2001
Chemical Family:	Anionic Powdered Detergent
Manufacturer Catalog Numbers for sizes	1104, 1125, 1150, 1101, 1103 and 1112

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

There are no hazardous ingredients in ALCONOX as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point (F):	Not Applicable
Vapor Pressure (mm Hg):	Not Applicable
Vapor Density (AIR=1):	Not Applicable
Specific Gravity (Water=1):	Not Applicable
Melting Point:	Not Applicable
Evaporation Rate (Butyl Acetate=1):	Not Applicable
Solubility in Water:	Appreciable-Soluble to 10% at ambient conditions
Appearance:	White powder interspersed with cream colored flakes.
pH	9.5 (1%)

IV. FIRE AND EXPLOSION DATA

Flash Point (Method Used):	None
Flammable Limits:	LEL: No Data UEL: No Data
Extinguishing Media:	Water, dry chemical, CO_2, foam
Special Fire fighting Procedures:	Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards:	None

V. REACTIVITY DATA

Stability:	Stable
Hazardous Polymerization:	Will not occur
Incompatibility (Materials to Avoid):	None
Hazardous Decomposition or Byproducts:	May release CO_2 on burning

VI. HEALTH HAZARD DATA

Route(s) of Entry:	Inhalation? Yes Skin? No Ingestion? Yes
Health Hazards (Acute and Chronic):	Inhalation of powder may prove locally irritating to mucous membranes. Ingestion may cause discomfort and/or diarrhea. Eye contact may prove irritating.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Exposure may irritate mucous membranes. May cause sneezing.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided. Respiratory conditions may be aggravated by powder.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs administer fluids. See a physician for discomfort.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. Recover as much as possible and flush remainder to sewer. Material is biodegradable.
Waste Disposal Method:	Small quantities may be disposed of in sewer. Large quantities should be disposed of in accordance with local ordinances for detergent products.
Precautions to be Taken in Storing and Handling:	Material should be stored in a dry area to prevent caking.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

VIII. CONTROL MEASURES

Respiratory Protection (Specify Type):	Dust mask - Recommended
Ventilation:	Local Exhaust-Normal Special-Not Required Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are useful but not required.
Eye Protection:	Goggles are recommended when handling solutions.
Other Protective Clothing or Equipment:	None
Work/Hygienic Practices:	No special practices required

MATERIAL SAFETY DATA SHEET 600-0002-000

RECEIVED MAY 10 2005

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CAL GAS FOR PIDs

CHEMICAL NAME; CLASS: NONFLAMMABLE GAS MIXTURE

Containing One or More of the Following Components in a Nitrogen Balance Gas: Oxygen 0-23.5%; Isobutylene, 0.0005-0.9%

SYNONYMS: Not Applicable
CHEMICAL FAMILY NAME: Not Applicable
FORMULA: Not Applicable
Document Number: 50054

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

PRODUCT USE:	Calibration of Monitoring and Research Equipment
SUPPLIER/MANUFACTURER'S NAME:	AIR LIQUIDE AMERICA L.P.
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-6400
General MSDS Information:	1-713/868-0440
Fax on Demand:	1-800/231-1366

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH	OTHER
			TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	ppm
Isobutylene	115-11-7	0.0005-0.9%	There are no specific exposure limits for Isobutylene.					
Oxygen	7782-44-7	0-23.5%	There are no specific exposure limits for Oxygen.					
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established. See Section 16 for Definitions of Terms Used.
NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This is a colorless, odorless gas mixture. Releases of this gas mixture may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated. Isobutylene, a component of this gas mixture, may cause drowsiness and other central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this gas mixture is by inhalation.
INHALATION: Due to the small size of an individual cylinder of this gas mixture, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. The chief health hazard associated with this gas mixture is when this gas mixture contains less than 19.5% Oxygen and is released in a small, poorly-ventilated area (i.e. an enclosed or confined space). Under this circumstance, an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN	OBSERVED EFFECT
12-16% Oxygen:	Breathing and pulse rate increase, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea, vomiting, collapse, or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Over-exposure to this gas mixture may cause the following health effects:
ACUTE: Due to the small size of the individual cylinder of this gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. The most significant hazard associated with this gas mixture when it contains less than 19.5% oxygen is the potential for exposure to oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, unconsciousness, and death. The skin of a victim of over-exposure may have a blue color. Additionally, Isobutylene, a component of this gas mixture, may cause drowsiness or central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.
CHRONIC: Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.
TARGET ORGANS: ACUTE: Respiratory system, eyes. CHRONIC: Heart, cardiovascular system, central nervous system.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	1
FLAMMABILITY HAZARD	(RED)	0
PHYSICAL HAZARD	(YELLOW)	0

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
See Section 8			

For Routine Industrial Use and Handling Applications

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn.

No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to this ga[redacted]re.

R[redacted]IENDATIONS TO PHYSICIANS: Administer oxygen, if necessary; treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

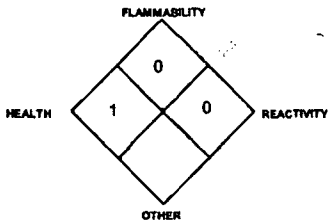
FIRE EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of an oxygen deficient environment and other safety hazards than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel.

Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen. Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area.

If leaking incidentally from the cylinder, contact your supplier.

7. HANDLING and USE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify the cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

STORAGE AND HANDLING PRACTICES: Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C [70°F]). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable. **WARNING! Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.**

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: WARNING! Compressed gases can present significant safety hazards. During cyl[redacted]se, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

P[redacted]TIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Re[redacted] Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Nitrous Oxide and Oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection when oxygen levels are below 19.5%, or during emergency response to a release of this gas mixture. During an emergency situation, before entering the area, check the concentration of Methane and Oxygen. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Wear leather gloves when handling cylinders. Chemically resistant gloves should be worn when using this gas mixture. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.072 lbs/ ft^3 (1.153 kg/m^3)
BOILING POINT: -195.8°C (-320.4°F)
FREEZING/MELTING POINT @ 10 psig: -210°C (-345.8°F)
SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906
pH: Not applicable.
SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023
MOLECULAR WEIGHT: 28.01
EVAPORATION RATE (nBuAc = 1): Not applicable.
EXPANSION RATIO: Not applicable.
ODOR THRESHOLD: Not applicable.
SPECIFIC VOLUME (ft^3/lb): 13.8
VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for Oxygen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.083 lb/cu ft (1.326 kg/m^3)
FREEZING/MELTING POINT @ 10 psig: -218.8°C (-361.8°F)
BOILING POINT: -183.0°C (-297.4°F)
SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 1.105
pH: Not applicable.
SOLUBILITY IN WATER vol/vol at 32°F (0°C) and 1 atm: 0.04.91
MOLECULAR WEIGHT: 32.00
EVAPORATION RATE (nBuAc = 1): Not applicable.
EXPANSION RATIO: Not applicable.
ODOR THRESHOLD: Not applicable.
VOLUME (ft^3/lb): 12.1
VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for the gas mixture.

APPEARANCE AND COLOR: This is a colorless, odorless gas mixture.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this gas [redacted]. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble [redacted]on.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.
DECOMPOSITION PRODUCTS: The thermal decomposition products of Isobutylene include carbon oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in the Nitrogen component of this gas mixture. Lithium reacts slowly with Nitrogen at ambient temperatures. The Isobutylene component of this gas mixture is also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen difluoride, and nitrogen trifluoride).
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

11. TOXICOLOGICAL INFORMATION

T[redacted]Y DATA: The following toxicology data are available for the components of this gas mixture:
ISOBUTYLENE:
LC_{50} (inhalation, rat) = 620,000 mg/kg/4 hours
LC_{50} (inhalation, mouse) = 415,000 mg/kg
NITROGEN:
There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.
SUSPECTED CANCER AGENT: The components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.
IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can be irritating to exposed skin and eyes.
SENSITIZATION TO THE PRODUCT: The components of this gas mixture are not known to cause human skin or respiratory sensitization.
REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture and its components on the human reproductive system.
Mutagenicity: No mutagenicity effects have been described for the components in this gas mixture.
Embryotoxicity: No embryotoxic effects have been described for the components in this gas mixture.
Teratogenicity: No teratogenicity effects have been described for the components in this gas mixture.
Reproductive Toxicity: No reproductive toxicity effects have been described for the components in gas mixture.
A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.
BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for the components of this gas mixture.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.
OXYGEN: Water Solubility = 1 volume Oxygen/32 volumes water at 20°C. Log K_{ow} = -0.65
NITROGEN: Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C. 1.6 volumes Nitrogen/100 volumes water at 20°C.
EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on the effects of this gas mixture on plant and animal life.
EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on the effects of this gas mixture on aquatic life.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

14. TRANSPORTATION INFORMATION

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.
PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)*or the gas component with the next highest concentration next to Nitrogen.
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)
[redacted]ENTIFICATION NUMBER: UN 1956
[redacted]NG GROUP: Not applicable.
DOT LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126
MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).
SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.
Note: DOT 39 Cylinders ship in a strong outer carton (overpack). Pertinent shipping information goes on the outside of the overpack. DOT 39 Cylinders do not have transportation information on the cylinder itself.
TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas is considered as Dangerous Goods, per regulations of Transport Canada.
PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)*or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION:	2.2 (Non-Flammable Gas)
UN IDENTIFICATION NUMBER:	UN 1956
PACKING GROUP:	Not Applicable
HAZARD LABEL:	Class 2.2 (Non-Flammable Gas)
SPECIAL PROVISIONS:	None
EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX:	0.12
ERAP INDEX:	None
PASSENGER CARRYING SHIP INDEX:	None

PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: 75
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126
NOTE: Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:
U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.
U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this gas mixture. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.
U.S. TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.
U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.
OTHER U.S. FEDERAL REGULATIONS:
- No component of this gas mixture is subject to the requirements of CFR 29 1910.1000 (under the 1989 PELs).
- Isobutylene is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 pounds.
- The regulations of the Process Safety Management of Highly Hazardous Chemicals are not applicable (29 CFR 1910.119).
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR Part 82).

15. REGULATORY INFORMATION (continued)

- Nitrogen and Oxygen are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Isobutylene is listed under this regulation in Table 3 as Regulated Substances (Flammable Substances), in quantities of 10,000 lbs (4,554 kg) or greater.

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No.
California - Permissible Exposure Limits for Chemical Contaminants: Nitrogen.
Florida - Substance List: Oxygen, Isobutylene.
Illinois - Toxic Substance List: No.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: Oxygen, Isobutylene.
Michigan - Critical Materials Register: No.
Minnesota - List of Hazardous Substances: No.
Missouri - Employer Information/Toxic Substance List: No.
New Jersey - Right to Know Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
Rhode Island - Hazardous Substance List: Oxygen, Nitrogen.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: No.
Wisconsin - Toxic and Hazardous Substances: ; No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this gas mixture is on the California Proposition 65 lists.

ADDITIONAL CANADIAN REGULATIONS:
CANADIAN DSL/NDSL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this gas mixture are not on the CEPA Priorities Substances Lists.
CANADIAN WHMIS REGULATIONS: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

16. OTHER INFORMATION

INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS

DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures.

For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommended recycling for scrap metal content. Air Liquide America will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders involves some preparation before the metal dealer may accept them. We perform this operation as a service to valued customers who want to participate.

MIXTURES: When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

P-1 *"Safe Handling of Compressed Gases in Containers"*
AV-1 *"Safe Handling and Storage of Compressed Gases"*
"Handbook of Compressed Gases"

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
619/670-0609
Fax on Demand: 1-800/231-1366

AIR LIQUIDE

Appendix C

HEALTH AND SAFETY PLAN ACCEPTANCE AND TRAINING ACKNOWLEDGMENT

tructions: This form is to be completed by each person that works on the 358-364 North Avenue, New Rochelle Remedial Investigation Work Plan site and returned to the Site Safety and Health Officer.

I have read and agree to abide by the contents of the SITE-SPECIFIC HEALTH AND SAFETY PLAN for work activities at the site. I have completed the training requirements specified in the plan. I am currently participating in a medical surveillance program that satisfies the requirements of CFR 1910.120.

Signature:	Date:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Return to:

Site Safety and Health Officer or

Berninger Environmental, Inc.

90 B Knickerbocker Avenue, Bohemia, New York 11716

APPENDIX E

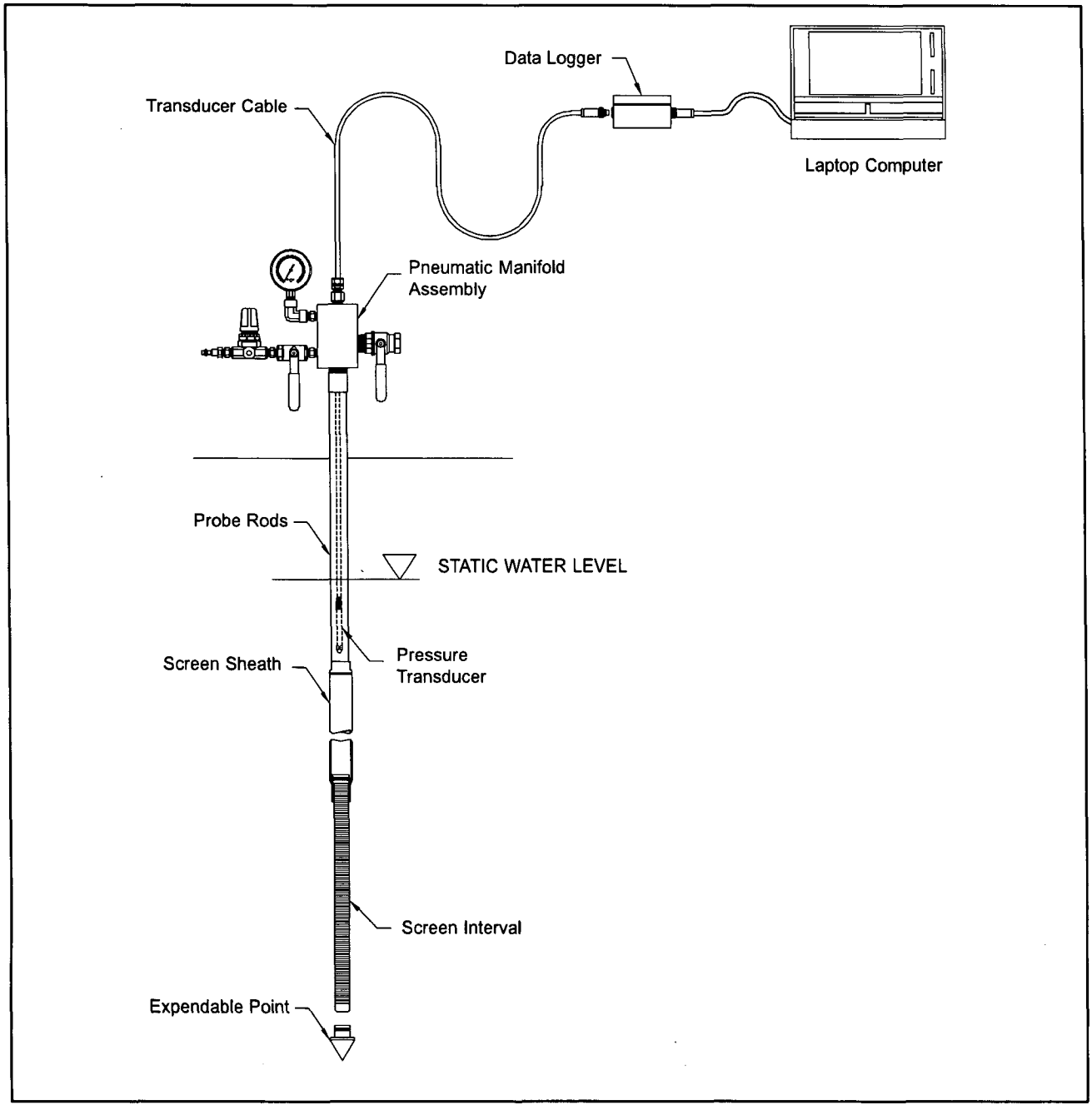
GeoProbe® Slug Testing SOP

GEOPROBE® PNEUMATIC SLUG TEST KIT

STANDARD OPERATING PROCEDURE

Technical Bulletin No. 19344

PREPARED: February, 2002



PNEUMATIC SLUG TESTING WITH A SP15/SP16 GROUNDWATER SAMPLER

Geoprobe® Systems

**Geoprobe® and Geoprobe Systems®, Macro-Core® and Direct Image®
are Registered Trademarks of Kejr, Inc., Salina, Kansas**

1.0 Ojective

The Pneumatic Slug Test Kit is used in conjunction with a groundwater sampler such as the Screen Point 15 or a monitoring well to conduct pneumatic slug tests in saturated formations of unconsolidated soils or sediments. This document identifies the equipment and techniques required to successfully operate the Pneumatic Slug Test Kit (GW1600) and obtain the necessary data to determine the formation hydraulic conductivity.

2.0 Background

2.1 Definitions

Geoprobe®: A brand name of high quality, hydraulically-powered machines that utilize both static force and percussion to advance sampling and logging tools into the subsurface. The Geoprobe® brand name refers to both machines and tools manufactured by Geoprobe Systems®, Salina, Kansas. Geoprobe® tools are used to perform soil core and soil gas sampling, groundwater sampling and testing, soil conductivity and contaminant logging, grouting, and materials injection.
**Geoprobe® is a registered trademark of Kejr, Inc., Salina, Kansas.*

Slug Test: Fetter (1994) defines a slug test as "an aquifer test made by pouring a small instantaneous charge of water into a well or by withdrawing a slug of water from the well" (e.g. with a bailer). The initial change in the water level or head (H_o) is recorded and then the time (seconds) and changing water level (H_t) at each time increment are recorded. The water level changes at each time increment are normalized by the initial change of water level (H_t/H_o) and plotted on semilog graph paper (Fig. 2.1). Information from this graph is then used to calculate the hydraulic conductivity of the formation.

Hydraulic Conductivity (K): Again, Fetter 1994 defines hydraulic conductivity (K) as "a coefficient of proportionality describing the **rate at which water <u>can</u> move through a permeable medium**" (emphasis added). Note that this definition says "can move". To know the actual flow rate at a location, the groundwater gradient must also be measured. There are two primary reasons why we are interested in the "K-value" of a formation, or portion of a formation. First, this helps us know if the formation is a viable aquifer, that is can it yield enough water for a well. Second, the K-value gives us a measure of how fast contaminants could move through a formation and reach a water supply well. This information can be used to determine the potential 'risk' caused by the presence of contaminants in the subsurface for risk based corrective action (RBCA) models (ASTM E 1739) and for evaluating the application of monitored natural attenuation (MNA) as a remedial option (EPA 1998). The formation hydraulic conductivity is also a key piece of information required to properly design many groundwater remediation systems.

2.2 Discussion

Water should not be added to a well located in a contaminated aquifer when performing a slug test. Likewise, as little water as possible should be removed from the well in order to minimize waste handling. Because of this, investigators slug testing for environmental purposes began using "mechanical slugs" to initiate slug tests and pressure transducers to record the data. A pressure transducer is especially needed in fast recovering wells.

A mechanical slug is simply a length of pipe filled with sand, capped on both ends, with a cord on one end to lower and recover the slug from the well. This method (Fig. 2.2) works well in many formations, but usually causes some splashing in the well as the slug is lowered or raised. When the slug test is over in 20 or 30 seconds, as for many sandy aquifers, this splashing 'noise' can interfere with the data collection and the results may be useless or questionable at best. This is why pneumatic slug testing was developed (Prosser 1981, Butler 1997).

In pneumatic slug testing the well head is sealed and air pressure is used to displace/lower the water level. As air pressure in the well is increased, the water level falls (Fig. 2.3) until the water pressure 'up' and the air pressure 'down' are equal. Once the water level is stable, a release valve is quickly opened, instantaneously releasing the air pressure. The water level recovers (rising head test) without splashing and the pressure transducer and data logger/computer record the changes in water level and time.

Pneumatic slug testing can provide very high quality data with essentially no "noise" or interference from splashing as is caused by the mechanical slug method. This becomes more important in very high-K formations which yield an oscillatory response to slug testing.

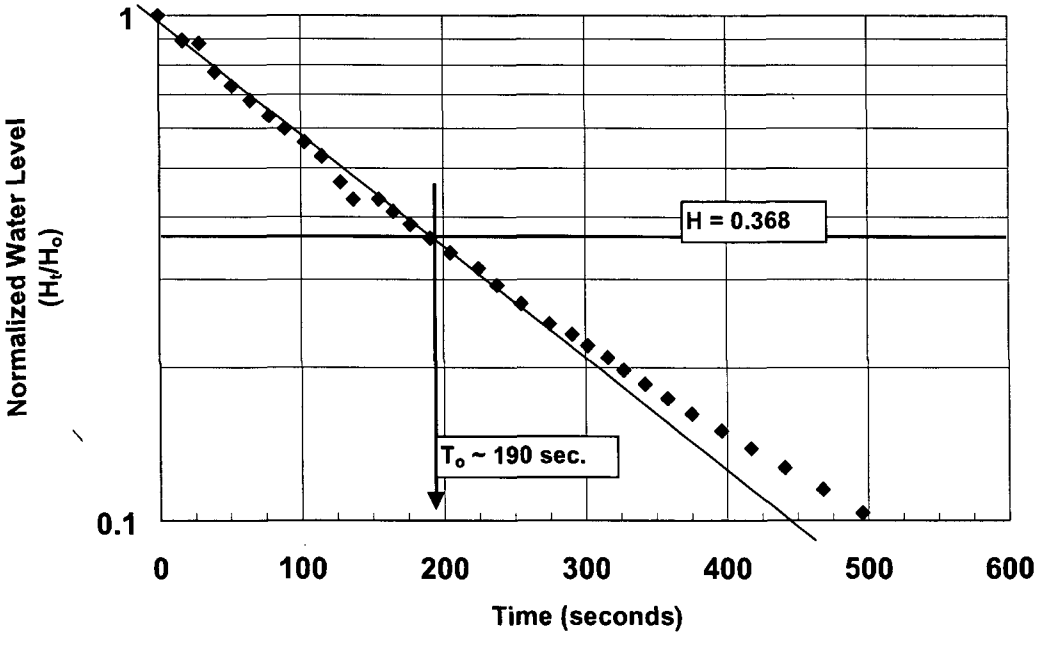


FIGURE 2.1:
Plot of normalized water levels recorded during a pneumatic slug test performed using a SP15 Groundwater Sampler.

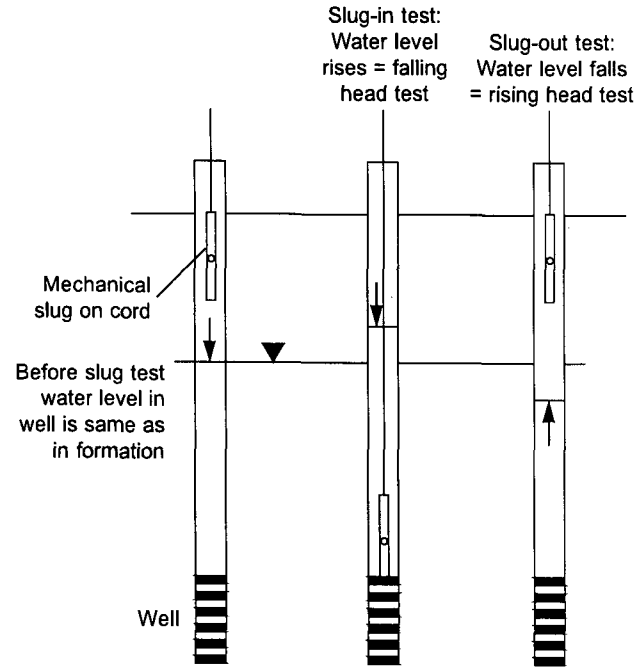


FIGURE 2.2:
Mechanical slug testing.

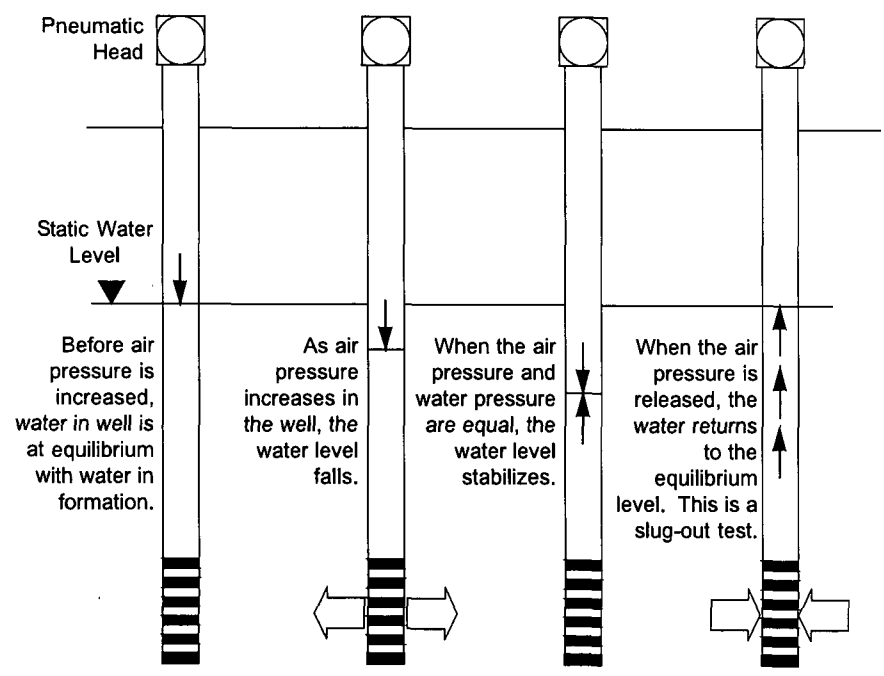


FIGURE 2.3:
Pneumatic slug testing.

3.0 Required Equipment

The following equipment is required in order to perform a pneumatic slug test with the GW1600 Slug Test Kit. Refer to Figure 3.1 for identification of the major parts included in the GW1600 kit.

Pneumatic Slug Test Kit (GW1600) includes:

Description	Quantity	Part Number
Pneumatic Head Assembly	(1)	17631
Low-Pressure Hose Assembly	(1)	17644
Foot Pump Assembly	(1)	17643
Transducer Assembly	(1)	19345
Data Logger	(1)	GW1610
Integral Data/Power Cable	(1)	19174
Power Cord	(1)	16839
Power Inverter (12VDC to 120VAC)	(1)	SC152
12V Socket Adapter (direct push machine to inverter)	(1)	10138
Data Acquisition Software (CD)	(1)	GW1615
Probe Rod Adapters:		
1.25-inch Pin x 1.5-inch Box	(1)	15813
2.125-inch rod adapter with valve	(1)	19165
Leak Test Fluid (8-ounce bottle)	(1)	12356
Teflon® Tape (1/2-inch x 50 feet roll)	(1)	8819
O-rings:		
1.25-inch Probe Rods	(1)	AT1250R
1.5-inch Probe Rods	(1)	15389
2.125-inch Probe Rods	(1)	AT2100R
Carrying Case*	(1)	19329

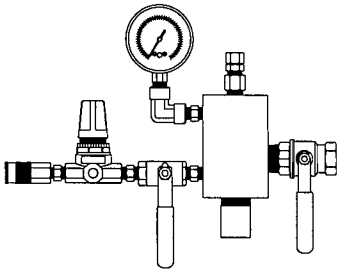
*Total weight of the Pneumatic Slug Test Kit and carrying case is approximately 29.8 lbs. (13.5 Kg).

Other materials or equipment that may be required for slug testing with this kit include:

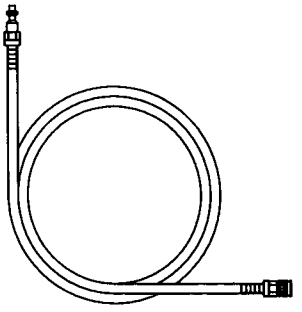
Well or Groundwater Sampler (installed and developed)
Lap Top Computer (for running data acquisition software)
Power Supply (120V line current or 12V vehicle battery connection)
Poly Tubing (TB25L) and Check Valve (GW42) or other device for well development
Miscellaneous Hand Tools (wrenches, pliers, screw drivers, etc.)

PVC casing adapters will be required for slug testing monitoring wells with PVC casing:

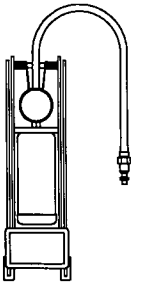
PVC Casing	Adapter Description	Quantity	Part Number
1/2-inch Schedule 80	Bushing, adapts 17558 to 1/2-inch PVC	(1)	17559
3/4-inch Schedule 40	Bushing, adapts 17558 to 3/4-inch PVC	(1)	19424
1-inch Schedule 40	Adapter, connects 17631 to 1-inch PVC	(1)	17558
2-inch Schedule 40	Coupling, adapts 19165 to 2-inch PVC	(1)	2164
Extension Tube, 18-inch, PVC (threads between 17631 and 17558)		(1)	17821



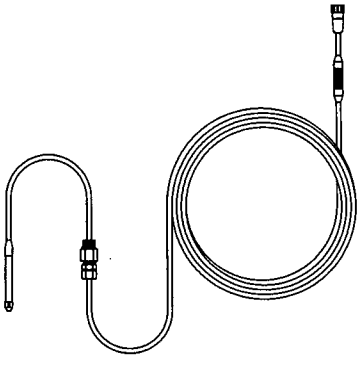
Pneumatic Head Assembly
(17631)



Low-Pressure Hose Assembly
(17644)

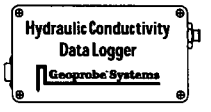


Foot Pump Assembly
(17643)

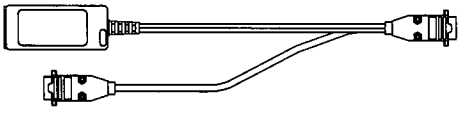


Transducer Assembly
(19345)

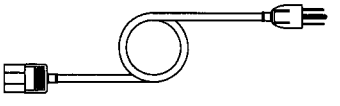
Data Logger
(GW160)

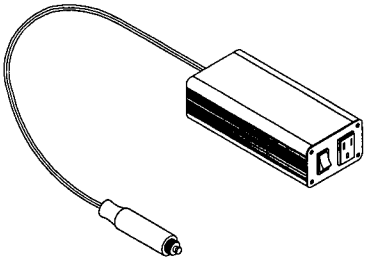


Integral Data/Power Cable
(19174)

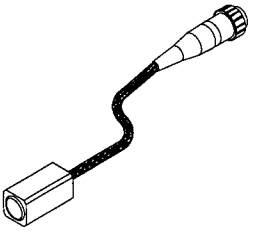


Power Cord
(16839)

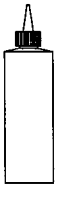




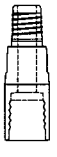
Power Inverter
(SC152)



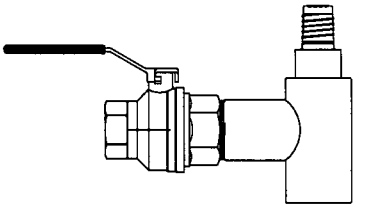
12V Socket Adapter
(10138)



Leak Test Fluid
(12356)



Adapter, 1.25 Pin x 1.5 Box
(15813)



2.125-inch Rod Adapter with Valve
(17532)

FIGURE 3.1:
Major components of the GW1600 Pneumatic Slug Test Kit. (Items not to scale)

4.0 Groundwater Sampler or Monitoring Well Installation

During the installation of the ground water sampler or monitoring well, the appropriate O-rings must be used on each casing or rod joint to assure that an airtight system is installed for pneumatic slug testing. To help preserve the integrity of the O-rings, first drive the rod to near ground surface, remove the drive cap, then install the O-ring and the next rod. When installing the SP15 sampler, be sure to use the appropriate O-rings on each part of the assembly as specified in the SOP. O-ring kits are available for the SP15 and SP16 groundwater samplers.

Follow the manufacturer's standard operating procedure (SOP) for installation of the sampler or monitoring well. Geoprobe® SOPs are available for the Screen Point 15 and Screen Point 16 Groundwater Samplers (Tech. Bull. No. 95-1500), Dual Tube (DT21) Groundwater Profiler Kit Instructions (Bull. No. 19275) or the Geoprobe® Prepacked Screen Monitoring Well SOPs (Tech. Bull. Nos. 96-2000 or 99-2500). Free copies of these bulletins may be obtained by contacting Geoprobe Systems®.

Standard Guides and Practices are also available from the American Society of Standards and Materials (ASTM D 6001, D 6724, D 6725) to provide further assistance on proper installation practices if needed. These Standards are available by contacting ASTM at 610-832-9585 or via the internet at www.astm.org.

In this Standard Operating Procedure (SOP) the Screen Point 15 groundwater sampler will be used to illustrate how the Pneumatic Slug Test Kit is used to conduct slug testing. The pneumatic slug testing procedures described here will be essentially the same for any Geoprobe® groundwater sampler or monitoring well. Only the adapter for attaching the pneumatic head to the well or sampler will be different.

The SP15 sampler is assembled and advanced to the bottom of the interval to be tested. Geoprobe® extension rods and screen push adapter (GW1535) are used to hold the screen in position as the rods and screen sheath are retracted with the direct push machine (Fig. 4.1). It is important to know the length of screen exposed to the formation so that an accurate K-value can be determined. For this reason, the length of screen to be exposed to the formation is measured and marked off on the extension rods before retraction is started. Approximately 2 inches (50 mm) must be added to the retraction distance to obtain the desired exposed screen length because of the expendable point and solid tip on the screen (Fig. 4.1, inset). Once the screen is in position, the sampler is ready for development.

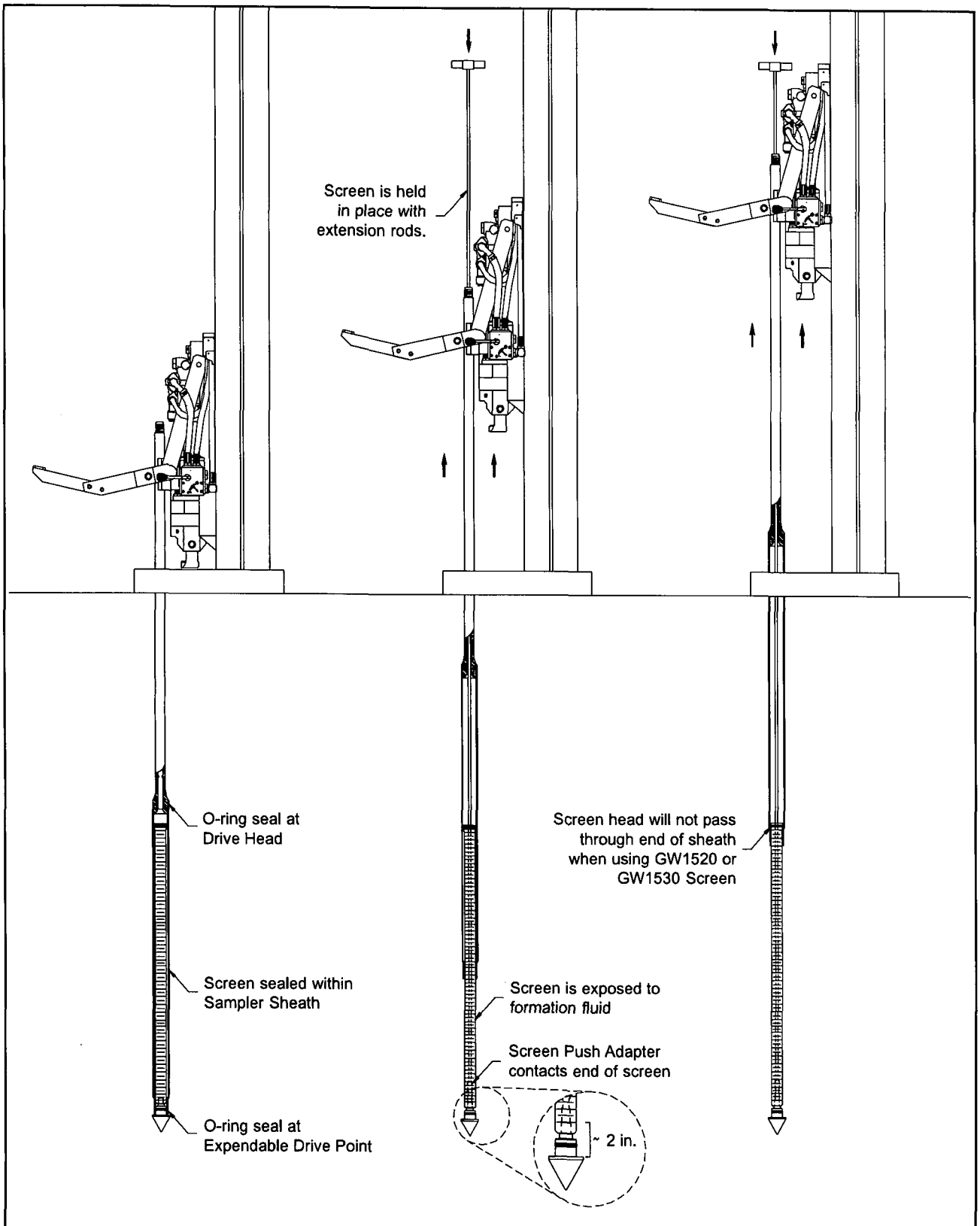


FIGURE 4.1:
Screen deployment for SP15 / SP16 Sampler

5.0 Development of Screened Interval

Appropriate well development is absolutely essential in order to obtain representative slug test results from a well or sampler. Without adequate development the K-value determined from slug testing may be more than ten times lower than the true value (Butler 1997). In ASTM Guide D 5521 *well development* is defined as:

> - the act of repairing damage to the borehole caused by the drilling process and removing fine grained materials or drilling fluids, or both, from the formation materials so that natural hydraulic conditions are restored ...

While the direct push method of well installation usually does not involve rotary drilling or drilling fluids, formation damage often occurs. This is usually compression of the formation as the tool string is advanced and may include smearing of clays on the borehole wall in formations containing these fine grained materials. In poorly cohesive materials such as saturated sands, reparation of the damage is usually easy and relatively quick. The simple tubing check valve (GW42) and polyethylene tubing are lowered into the screen interval and vigorously oscillated up and down (Fig. 5.1). The vigorous oscillating action both surges the screen interval and purges dislodged fines from the well simultaneously.

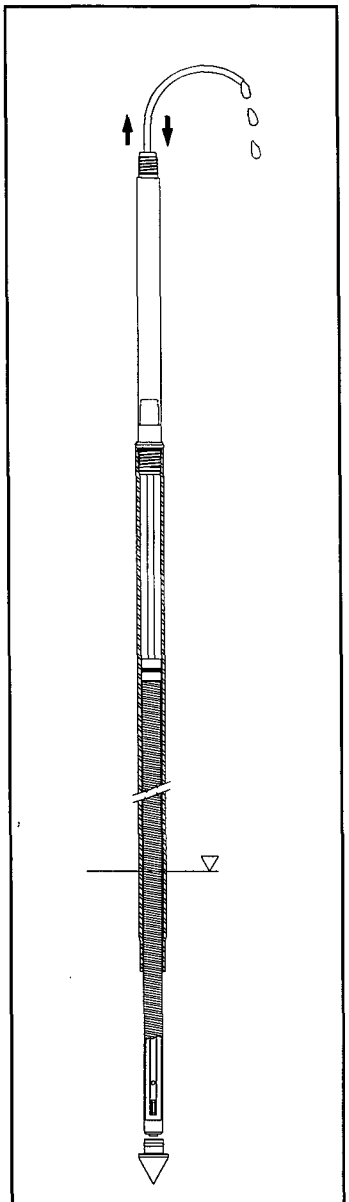


FIGURE 5.1: Surging with tubing and check valve assembly

Even in what are generally termed "clean sands", turbid, muddy water is purged from the well. Surging and purging should be conducted throughout the length of the exposed screen to properly develop the entire screen exposed to the formation. For each one-foot (30 cm) of screen length, purging from one to three gallons (4 to 12 liters) of water with the tubing check valve method is usually sufficient to obtain representative results. In sandy formations this may require from 5 to 20 minutes depending on the yield of the formation. When development of the well is complete, repeated slug tests will provide consistent results. Therefore, one way of checking for adequate development is to run three or more slug tests and see if the response curves are consistent and symmetrical. If the results change noticeably with each slug test, further development may be required.

In formations containing a significant proportion of clays, care must be taken in the development process so that clogging of the screen and irreversible well damage do not occur. In some of these formations, purging with a peristaltic pump or bladder pump may be the best option for development. In very low hydraulic conductivity formations, it may be necessary to core the formation across the interval to be screened in order to prevent significant damage to the formation which may not be repaired with usual development methods. One possible method for slug testing in very low-K formations is discussed in Section 13.2 (Slug Tests with the Dual Tube Groundwater Profiler).

6.0 Well Parameters Required for Calculation of Hydraulic Conductivity

Accurate documentation of well construction parameters (Fetter 1994, Butler 1997) and site specific geology are necessary so slug test data can be used to calculate the formation hydraulic conductivity. Without this information the slug test data is of little value. Establish a consistent reference mark for measuring all depths (top of casing or other) and use consistent units. Be sure to accurately document the following well construction parameters (Figure 6.1) and site geologic information:

L_e: Effective Screen Length, this will include length of any artificial sand pack extending above the well screen.

L_s: True Screen Length, only the length of screen exposed to the formation.

L_w: Length of the water column in the well (TD – SWL)

R_s: Screen radius

R_B: Radius of the filter pack or borehole over the screened interval

***R_c:** Casing radius (true internal radius of casing where water level changes occur)

r_t: Radius of transducer cable (required for wells one inch or less in diameter)

T_s: Depth the transducer is submerged below the SWL

SWL: Static water level as measured from reference point

TD: Total depth of well/screen as measured from reference point

h: Saturated thickness of the aquifer

H_0: Initial head change at instant slug test started. For the pneumatic slug test system this may be estimated from the stabilized pressure gauge readout in inches.

Aquifer Type: Is the aquifer confined or unconfined? (Review soil cores, well logs, or DP e-logs to make this determination.)

Formation Type: Give a verbal description of the formation being tested (clay, silt, sand, gravel, silty-sand, etc.) Best if this is described from a sample collected from the interval being tested.

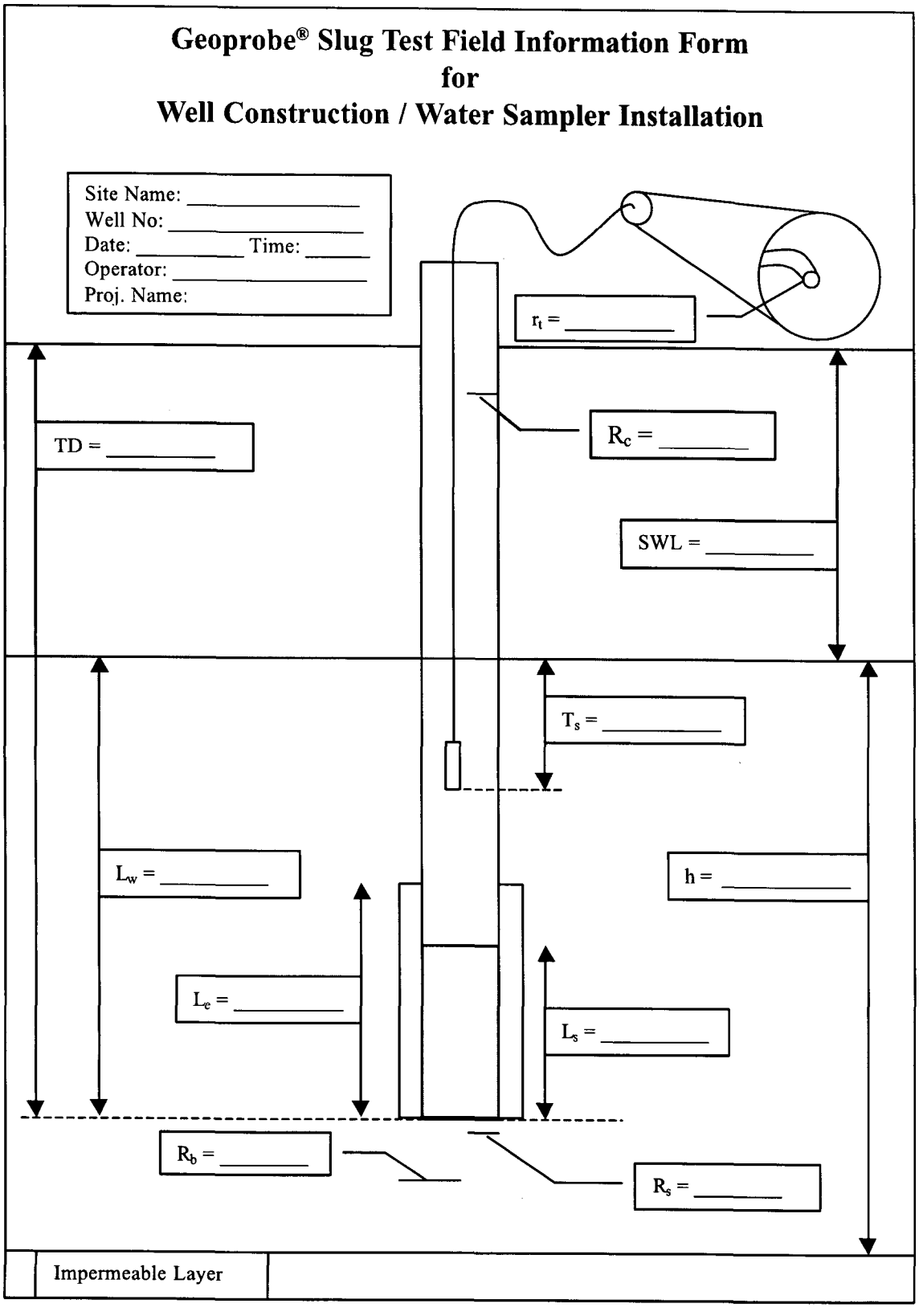
***NOTE:** **Casing radius must stay the same over the interval that the water level changes during the slug test or rate of water level change in the well will not be constant and errors in data will occur and results will be inaccurate.**

6.1 Correction of Casing Radius

For wells or piezometers less than two inches (50 mm) in diameter the radius of the casing should be corrected for the radius of the transducer cable. In these small wells the transducer cable begins to displace a significant proportion of the well bore and as such will cause a measureable error in the calculated K-value if not corrected for in the model equation. The corrected casing radius (Rcc) is calculated as follows:

$$Rcc = (R_c^2 - r_t^2)^{1/2}$$ (after Butler et al., 2002)

Geoprobe® Slug Test Field Information Form
for
Well Construction / Water Sampler Installation



Signature: _____ Date: _____

FIGURE 6.1:
Copy and use this form in the field to record construction and installation parameters for slug testing

7.0 Installation of the Pneumatic Manifold and Set-up for Slug Testing

Once the well or groundwater sampler is installed and developed, you are ready to install the Pneumatic Manifold Assembly (17631) on the casing or probe rods. The pneumatic manifold (Fig. 7.1) includes all connections, valves, and controls required to conduct pneumatic slug tests. The Pneumatic Head Assembly comes with an adapter that allows it to be connected directly to Geoprobe® 1.25-inch probe rods (Fig. 7.2). Other adapters included with the kit allow the pneumatic head to be attached to 1.5-inch and 2.125-inch Geoprobe® probe rods. Adapters for standard size PVC casings (1/2-, 3/4-, 1-, and 2-inch) are also available that allow for slug testing in direct push installed or conventional design monitoring wells or piezometers.

To install the pneumatic head on the SP15 rod string, use an O-ring (AT1250R) or Teflon® tape to seal the head on the probe rods. If probe rods of a diameter other than the 1.25 inches are being used, the appropriate adapter must be installed to attach the pneumatic head to the rod string. If the pneumatic head is being installed on PVC casing, use the correct adapter for the nominal casing size of the well (see Section 3.0).

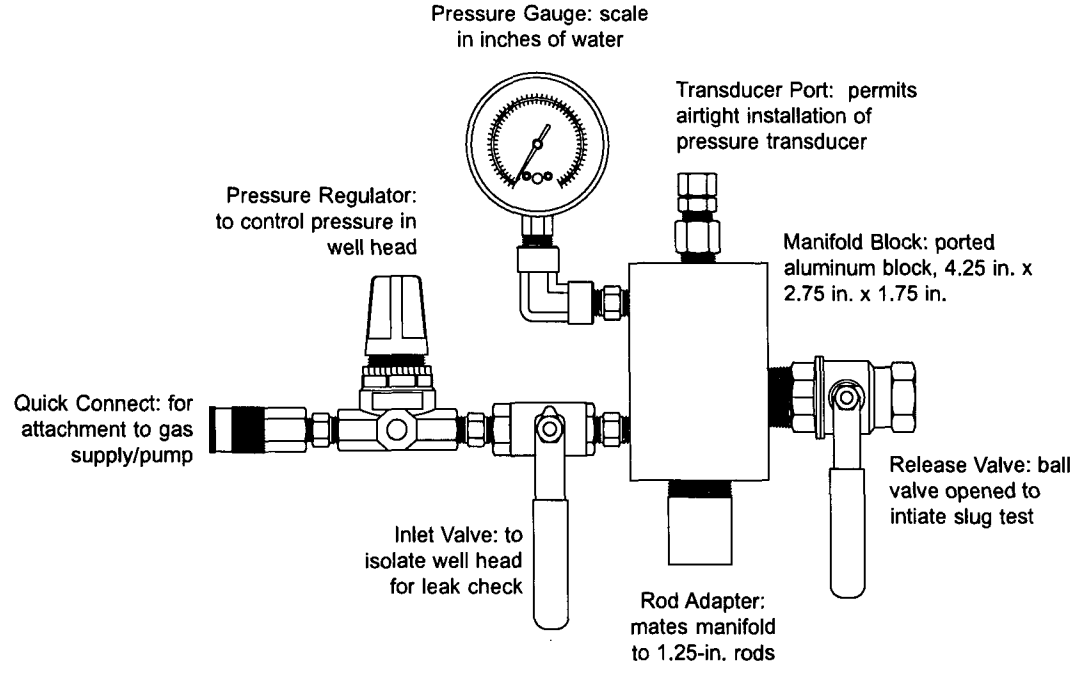


FIGURE 7.1:
Pneumatic Manifold Assembly (17631)

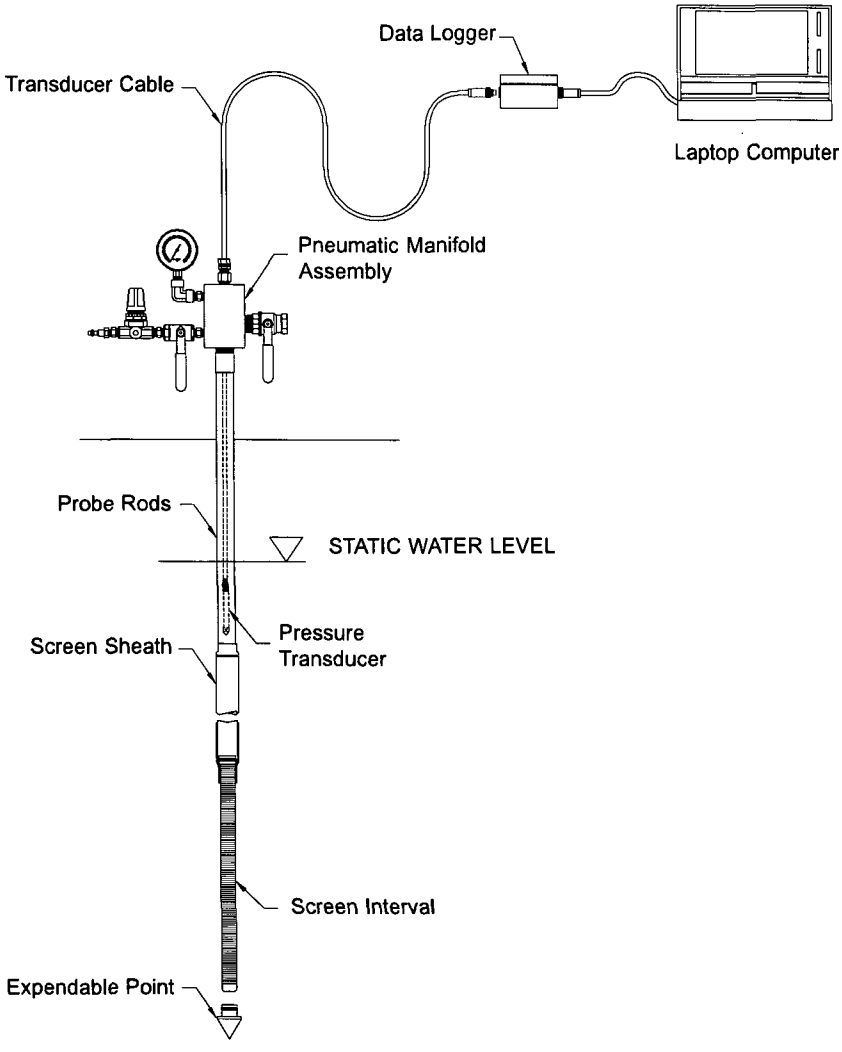


FIGURE 7.2:
Slug test setup for SP15/SP16 Groundwater Sampler

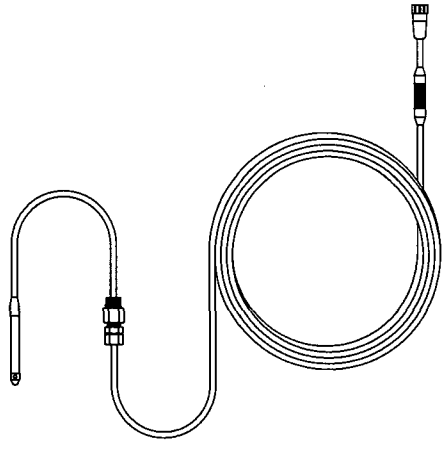


FIGURE 7.3:
Transducer assembly (19345)

7.1 Transducer

The pressure transducer (Fig. 7.3) supplied with the pneumatic slug test kit is vented. A breathable membrane located near the top end of the cable keeps the transducer at ambient atmospheric pressure.

CAUTION: Keep the breathable membrane clean and do not crimp the transducer cable as this will crimp the vent tube and interfere with accurate transducer response.

The specifications of the transducer supplied with the Pneumatic Slug Test Kit are as shown in Table 7.1.

Specification	English Units	Metric Units
Range	10psi g	689.5 millibars or 6.89×10^4 Pascals
Transducer diameter	0.39 inches	9.91 mm
Transducer length	4 inches	101.6 mm
Supply current	10 V	10 V
Sensitivity (approximate)	100 mV	100mV
Non-linearity & Hysteresis	± 0.1 % baseline	± 0.1 % baseline
Temperature Compensated Range	28.4 to 86° F	-2 to 30° C
Temperature error band	± 0.5%	± 0.5%
Cable length	100 ft	34.8 m
Cable diameter	0.225 inches	5.71 mm

TABLE 7.1:
Pressure transducer specifications.

Once the pneumatic head is in place the transducer assembly is installed. The transducer itself (Fig. 7.4) is inserted through the port on the top of the pneumatic head and lowered into the well. For most slug testing the transducer is set about 18 to 24 inches (45 to 60 cm) below the static water level.

NOTE: Be sure to cool the transducer to the ambient groundwater temperature before zeroing, usually three to five minutes required.

After zeroing the transducer (see Section 9.3), the 1/4-inch NPT x 1/4-inch tube nylon fitting is threaded into the transducer port. Teflon® tape is used to improve the seal on the threads. Wrap Teflon® tape around the transducer cable at the fitting (Fig. 7.5), lower the fitting cap into place, and thread the cap onto the fitting. The cap will compress the Teflon® tape around the transducer cable and provide an airtight seal.

CAUTION: Do not over tighten the nylon cap as the transducer cable or vent tube may be damaged. Finger tighten and snug as needed to obtain an air-tight fit. Well head pressures generally do not exceed 1 to 2 psi (about 10 to 20 inches of water, 25 to 50 cm of water, or 25 to 50 millibars).

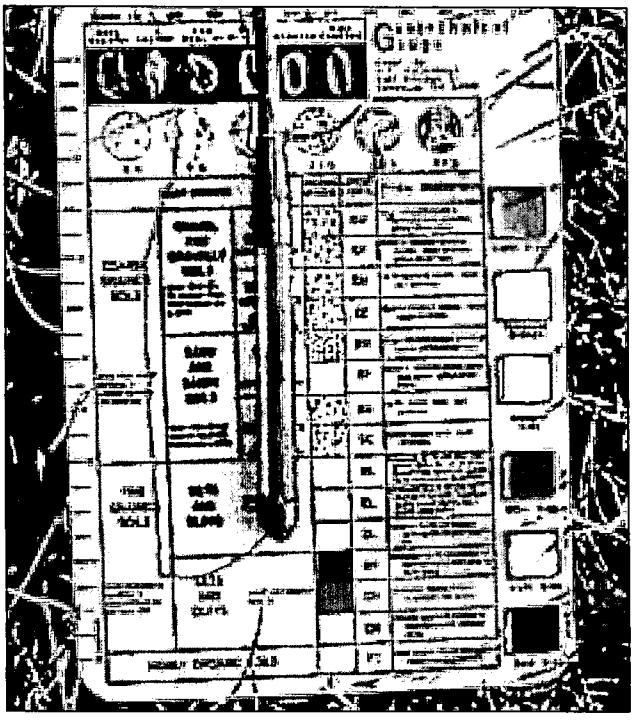


FIGURE 7.4:
The small outside diameter (0.40 inches) of the pressure transducer allows it to be used with Geoprobe® 1.25-inch OD probe rods and 0.5-inch Schedule 80 PVC casing.

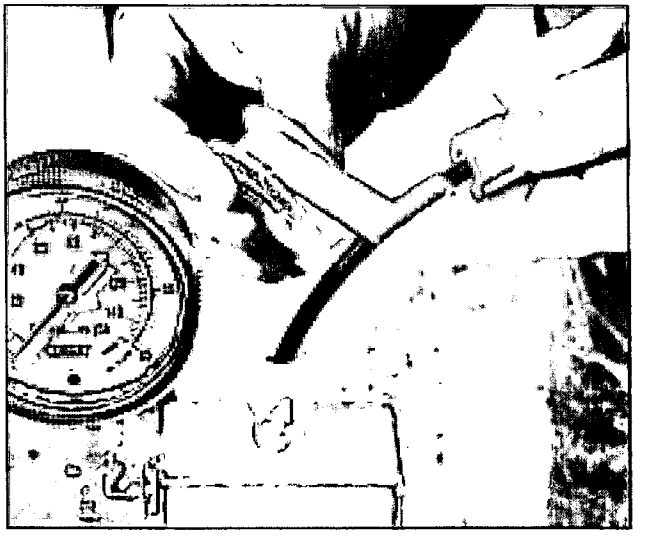


FIGURE 7.5:
Wrap Teflon® tape around the transducer cable to promote an airtight seal at the nylon cap.

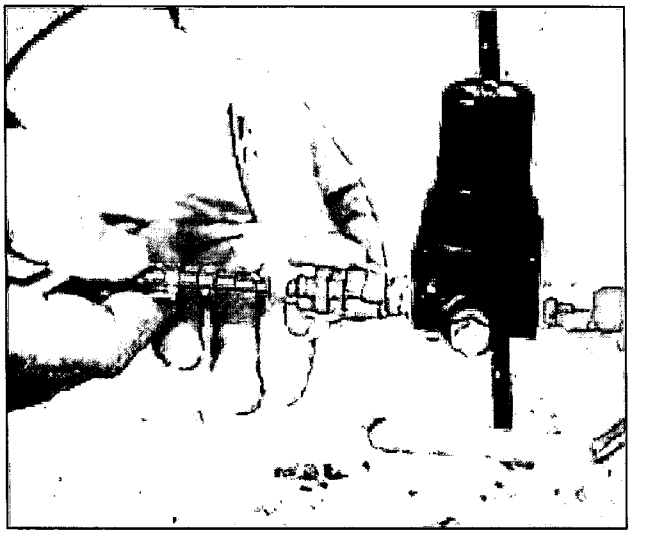


FIGURE 7.6:
Attach the foot pump to the pneumatic head using the low-pressure hose with quick connects.

7.2 Connecting Pump and Air Hose

The foot pump assembly (17643) included with the pneumatic slug test kit is used to supply air to pressurize the well head. Connect the foot pump to the inlet side of the pneumatic head with the low-pressure hose and quick-connect fittings (Figure 7.6). Typically 30 to 40 psi of air pressure is maintained in the supply hose during slug testing.

CAUTION: The pressure rating of the hose is low (45 psi) do not over-inflate and burst the hose.

You are now ready to connect the transducer to the data logger and the data logger to the laptop computer.

8.0 Data Logger

A single channel data logger (GW1610) and all necessary cables are supplied with the pneumatic slug test kit. Specifications of the data logger are shown in Table 8.1.

Specification	English Units	Metric Units
Size (L x W x H)	7.4 x 4.7 x 2.25 inches	188 x 120.2 x 56.8 mm
Weight	1.49 lbs	0.675 kg
Sensor Port	Twist-on, 8 pin connector, male	
Computer Port	Serial, female RS232 (DB-9)	
Supply Voltage	12 V	
Output Voltage (to transducer)	10 V	
Sampling Frequency	120 Hz	
Available Output Frequencies	1, 2, 10 and 38 Hz	

TABLE 8.1:
Data Logger specifications

The female 8-pin connector on the transducer is connected to the male 8-pin connector on the Data Logger. Next the Data/Power Cable (19174, Fig. 8.1) is connected to the serial port on the data logger and then the serial port on the laptop computer. The small in-line power transformer (Fig. 8.1) is connected to standard line current (115VAC). Line current may be obtained from a generator, small inverter (SC152) plugged into vehicle lighter socket, or conventional wall outlet if available. The same power supply will also operate the laptop computer if needed.

The slug test system is set up and you are now ready to initialize the software and begin data collection.

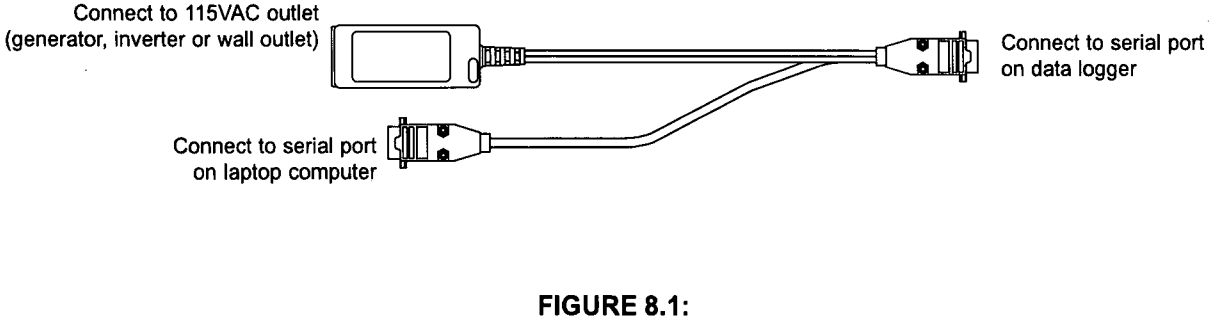


FIGURE 8.1:
Data/Power Cable (19174)

9.0 Slug Test Data Acquisition Software Version 1.00

Geoprobe Systems® has designed a simple, user friendly software system that allows you to acquire and file the transducer data on a lap top computer. The data files are stored in ASCII format for easy export to spreadsheet and data analysis programs. This is solely a data acquisition software system and does not provide data modeling or K-calculation options. The minimum computer requirements for installation and operation of the Data Acquisition Software are:

CPU:	Pentium 90 MHz
RAM:	16 megabytes minimum
Available Hard Drive Space:	12 megabytes minimum
Operating Software:	Windows 95, 98, 2000, NT, ME

9.1 Installation

The Data Acquisition Software comes on a compact disc (CD) with the Pneumatic Slug Test Kit, or can be purchased separately. Simply insert the CD into your computer CD drive, and from the "START" menu in Windows, select the "RUN" option to run the setup program on the CD. Follow the simple on-screen instructions to enter your personal identification information. The software installation should take less than three minutes. The installation will automatically place an icon on your Windows Screen labeled "SLUG TEST". Simply double-click on the icon to start the software. The following information provides a brief summary of the software operation for acquisition of slug test data.

9.2 Selecting Options

After initializing the software by double-clicking on the windows icon, the first window you see will let you select between using either English units or Metric units on the data display (Fig. 9.1). If English units are selected, the water level (head) will be displayed on screen in feet (ft). If Metric units are selected, the head will be displayed in millimeters (mm) of water. Simply click on the desired option.

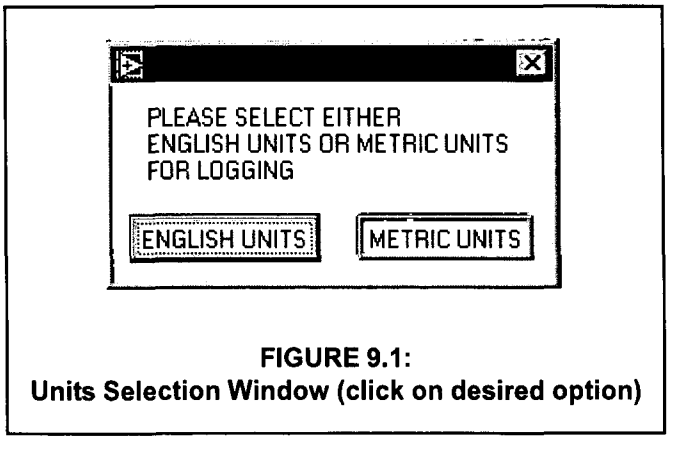
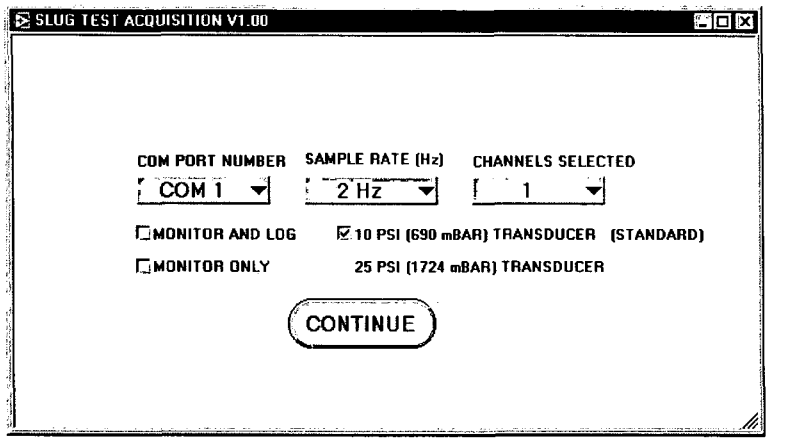
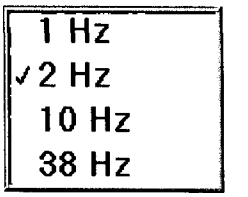


FIGURE 9.1:
Units Selection Window (click on desired option)

The next window (Fig 9.2) allows you to specify several options for system operation and data acquisition. Drop-down menus allow you to choose either Com Port 1 or 2 for your computer connection to the data logger, as well as the sampling rate or frequency in Hertz (Hz).

The sample rate determines the number of sample points that will be plotted on screen and saved in your file each second. The default rate is 2 Hz. You may select either 1, 2, 10, or 38 Hz from the drop-down menu.





Example drop down menu for selection of sampling frequency.

FIGURE 9.2:
Test Options Window (select options using pull down menus and check boxes)

In formations that are very slow recovering from a slug test (30 minutes or more), a sampling frequency of 1Hz is sufficient. If you are slug testing a very high hydraulic conductivity formation which recovers from a slug test in less than 10 to 20 seconds, you may wish to choose 10Hz or even 38Hz. When you select a higher sampling rate, the baseline will appear more noisy because less averaging is conducted to obtain each data point.

A 10 psi transducer comes with the kit and is the default value for this option.

You may choose to MONITOR ONLY or to MONITOR AND LOG from this screen. The MONITOR ONLY option will allow you to monitor the readout from the transducer, but you can not save the data to a file. The MONITOR AND LOG option will allow you to initially monitor the transducer readout and then begin saving the data to a file when desired.

If you select the MONITOR ONLY option, you will go directly to the MONITOR ONLY MODE screen when you click on the CONTINUE button (Fig 9.3). If you select the MONITOR AND LOG option you will proceed to the SITE INFORMATION screen when you click on the CONTINUE button (Fig. 9.4).

The MONITOR ONLY MODE may be used when first inserting the transducer into the well or sampler to verify that the transducer has cooled to ambient temperature (refer to notes on Figure 9.3). Gently oscillating the transducer up-and-down in the water will also dislodge any air bubbles from the transducer opening (Fig. 9.3).

The SITE INFORMATION window (Fig. 9.4) lets you enter a file name (6 characters) and transducer serial number. Tab between data entry boxes and click on CONTINUE to proceed to the next window.

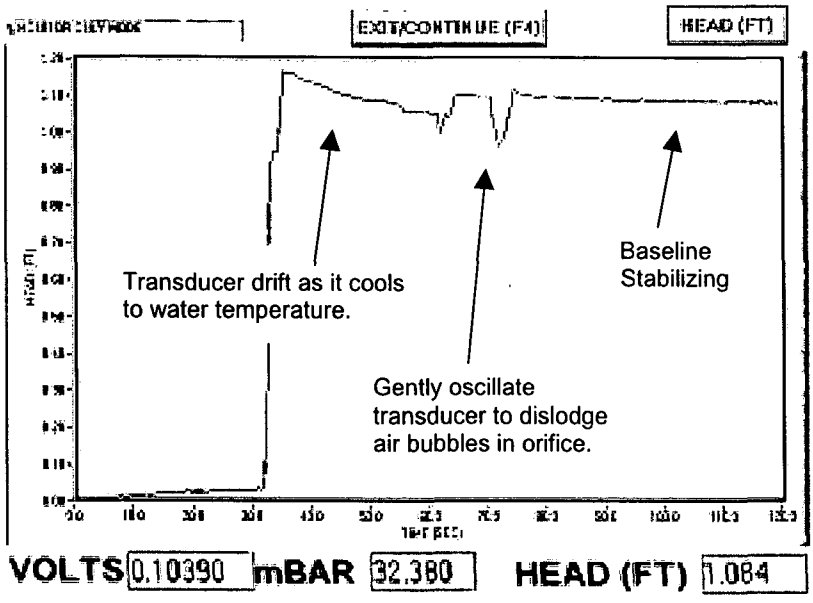


FIGURE 9.3:
Screen output when running in MONITOR ONLY MODE

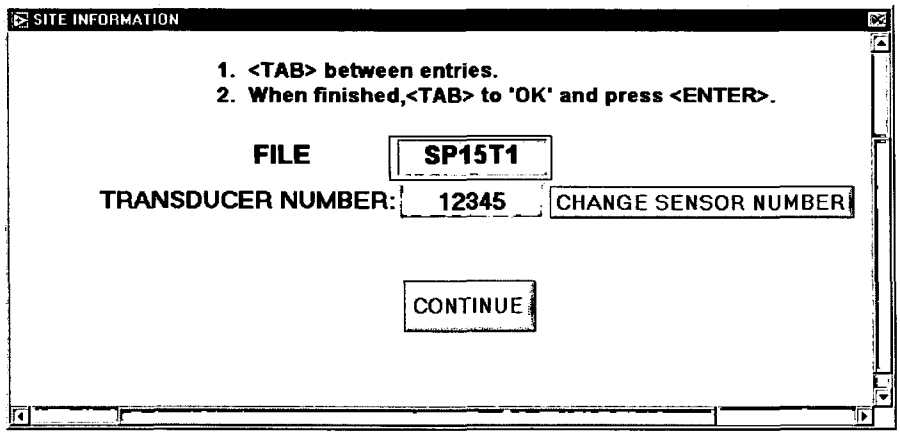


FIGURE 9.4:
Enter site information after selecting MONITOR AND LOG (Fig. 9.2)

9.3 Zero Transducer

Once you click on the CONTINUE button you will proceed to the TRANSDUCER ZERO window (Fig. 9.5). When the software is first initialized, you must zero the transducer before acquiring slug test data. First place the transducer in the groundwater to equilibrate with the ambient temperature. Then the transducer should be removed from the water to zero it at atmospheric pressure. If you cycle back through the software to run additional slug tests in separate files, you may choose to BYPASS the zero option if desired. Simply click on the BYPASS button to do so. It is recommend that the operator zero the transducer initially and then bypass this function if desired as additional files and slug tests are conducted.

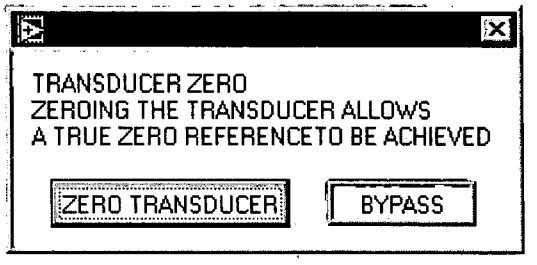


FIGURE 9.5
Select or bypass transducer zero function

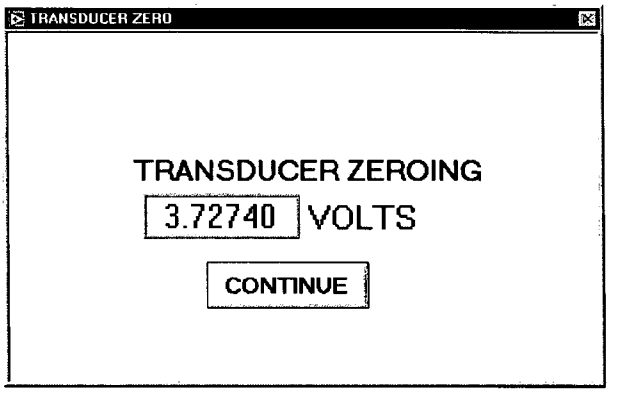


FIGURE 9.6
Transducer Zero Window

When the ZERO TRANSDUCER function is selected, the real-time transducer voltage is displayed in the VOLTS box (Fig. 9.6). Click on the CONTINUE button when the voltage has stabilized and you are ready to proceed with logging the slug test. If you selected a higher sampling rate (e.g. 10 or 38Hz), the voltage readout will be more variable.

9.4 Data Acquisition and Viewing Graph

After clicking on the CONTINUE button in the TRANSDUCER ZERO window, you will enter the Collect-and-Graph window (Figure 9.7). If the transducer is still above the water level, you will observe a very magnified baseline as the data points are plotted and scroll across the screen. Once the transducer is submerged below the water level several inches or more, what at first appeared to be a noisy baseline is seen to be a relatively quiet line at normal operating head/pressure values (Figure 9.8).

Once the transducer is stable and you are ready to start saving data, you may click on the BEGIN SAVING button or press the F1 key on the keyboard. When this is done the word **SAVING** is displayed near the top-center of the window (Figure 9.8). The filename with directory path is displayed in the top-left side of the window.

A mouse click on the HEAD button at the top-right of the window allows you to toggle between a Y-axis in feet of head (or mm of head in metric units) and the transducer voltage readout if desired. Once you have completed your slug test(s), a mouse click on the STOP button or pressing the F5 key will stop data collection and freeze the screen. This will enable you to review the collected data and briefly evaluate your results before continuing with further work.

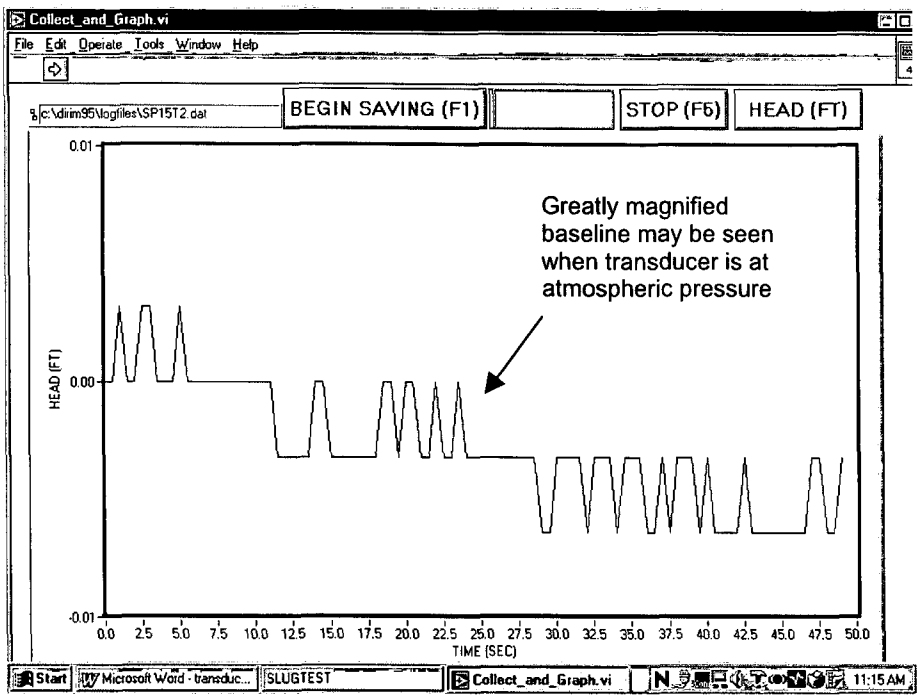


Figure 9.7
Real-time transducer data is plotted on the Collect-and-Graph window. The baseline will be greatly magnified and appear noisy when the transducer is above the water level.

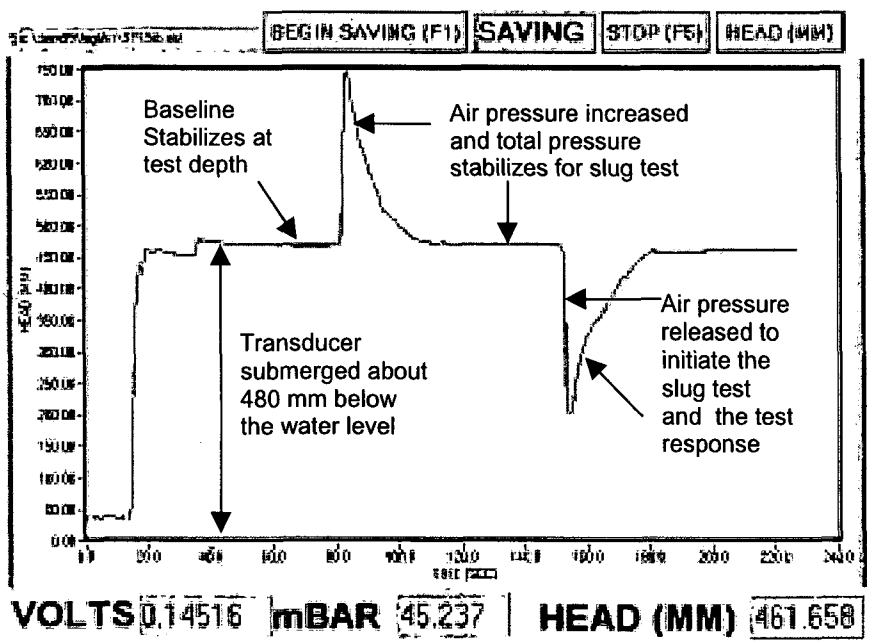


Figure 9.8
Simulated transducer data during a slug test (well head pressurized, stabilization, and release of pressure to initiate the slug test response)

9.5 Exiting Program

When the STOP button (or F5 key) is pressed on the Collect-and-Graph window, the QUIT/CONTINUE button appears in the top-center of the screen. Data collection is halted and the transducer log may now be reviewed without affecting the data file.

Click the QUIT/CONTINUE button when you are finished reviewing the slug test response and are ready to either exit the program or continue with additional slug testing. This brings up the QUIT window shown in Figure 9.9. Click on the YES button if you are ready to quit and exit the program. Click the NO button to go back to the Options window (Figure 9.2) to set up for additional slug test data acquisition.

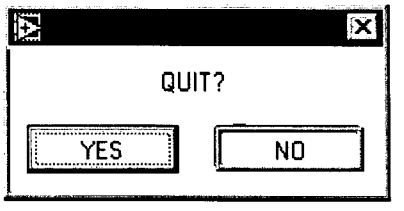


FIGURE 9.9:
Select YES to exit the program or NO to continue data aquisition with a new file

9.6 File Storage and Data Format

Two files are generated each time you enter a file name and click on the BEGIN SAVE button or press the F1 key while in the Collect-and-Graph window (Figure 9.7). The first file is where the time and transducer data are saved and it is denoted as a ".dat" file in the directory. The second file is an information file and it is denoted as a ".inf" file in the directory. Both file types are saved in the C:\dirim95\logfiles*.* directory on the computer hard drive. The data in the *.dat file is saved in columns in the following order:

Time (seconds) Transducer (voltage) Head (feet) Head (millimeters) Pressure (millibars)

The *.inf file saves some basic date and time started/ended information. It also specifies the column format of the data file for future reference if needed. This file may be edited to add information such as site name, location, operator, and client information as needed to meet project specifications. An example *.inf file is shown in Figure 9.10 below.

```
SITE INFORMATION -- SLUG TEST REV. 1.0


START DATE:  11/30/2001
START TIME:  4:03 PM
DATA FILE NAME:  C:\DIRIM95\LOGFILES\SP15TB.DAT
DATA FILE FORMAT:
TIME(S)   TRANSDUCER(V)   HEAD(FT)   HEAD(MM)   PRESSURE(MILLIBAR)
UNITS:   METRIC
TRANSDUCER NUMBER:  1388621   10 PSI (690 MILLIBAR)
END DATE:  11/30/2001
END TIME:  4:08 PM
```

FIGURE 9.10:
Format of the *.inf file saved with each data (*.dat) file

10.0 Running a Pneumatic Slug Test

The following summary is a step by step outline of the procedure required to run a pneumatic slug test.

1. Close inlet and release valves and close the pressure regulator on the pneumatic manifold assembly (Fig. 10.1).

   NOTE: Adjust zero setting on the pressure gauge if needed.

2. Operate foot pump to pressurize supply hose to ~ 30 to 40psi

3. Open inlet valve on pneumatic head (Fig. 10.1)

4. Slowly open the pressure regulator (Fig. 10.1). From the fully closed position it takes about five revolutions to begin opening the regulator. Observe the pressure gauge on the pneumatic head. Let the pressure in the well head rise slowly to a few inches above the level desired for testing (e.g. if you want to initiate the slug test with H_o of 10 inches let the gauge rise to about 12 inches).

5. Quickly close the inlet valve and allow the pressure observed from the transducer in the well head (as shown on the computer screen - Fig. 9.8) to return to equilibrium and stabilize. Record the stabilized gauge pressure. Observing the Collect-and-Graph window of the Slug Test software, the readings should return to the levels noted before pressurization was started (Fig. 9.8). For very permeable and porous formations, return to equilibrium (baseline) happens quickly (Fig. 10.2). For moderate to lower-K formations (silty-clayey sands) this may take several minutes (Fig. 10.3). For very low-K formations (silts/clays) it could take hours for the water level to return to equilibrium. In this situation, a mechanical slug test should be conducted to save considerable time.

6. Leak test the fittings on the pneumatic head and connection to the rods with the leak test fluid (12356) or equivalent. Tighten fittings if necessary and retest. If a leak appears to be downhole, tighten the probe rods with a wrench. If the leak persists and is slow relative to well recovery rate, the regulator may be used to stabilize the pressure in the well head. It is preferable to locate and correct the slow leak if possible before continuing with the slug test.

   NOTE: For slow leaks the on-screen transducer readout will appear stable because the water level rises as quickly as the air escapes, keeping the readout constant. You must monitor the pressure gauge on the pneumatic head to determine if a slow air pressure drop is occurring.

7. Once the transducer readout is back to equilibrium and stable, you are ready to initiate the slug test. To initiate the slug test, open the release valve as quickly as possible (Fig. 10.1). You should hear a "swoosh" of air venting from the valve if you listen closely.

8. Watch the Collect-and-Graph screen on the computer. You should observe a very rapid drop in the transducer readout (head) as the air is instantaneously released (Figs. 10.2 and 10.3). Then the rise/ recovery of the water level to the pre-test equilibrium level (baseline) will occur. Once the water level has returned to the pretest equilibrium level and is stable, the slug test is complete.

9. It is strongly recommended that you run at least three slug tests of different initial head values (H_o) to use for verification of appropriate well performance and development. If the well or sampler is responding properly, the normalized data from all three tests should overlay each other in the normalized data plot. If there is significant deviation between the repeat tests, additional development of the well or sampler may be necessary or other actions may be required to obtain valid data.

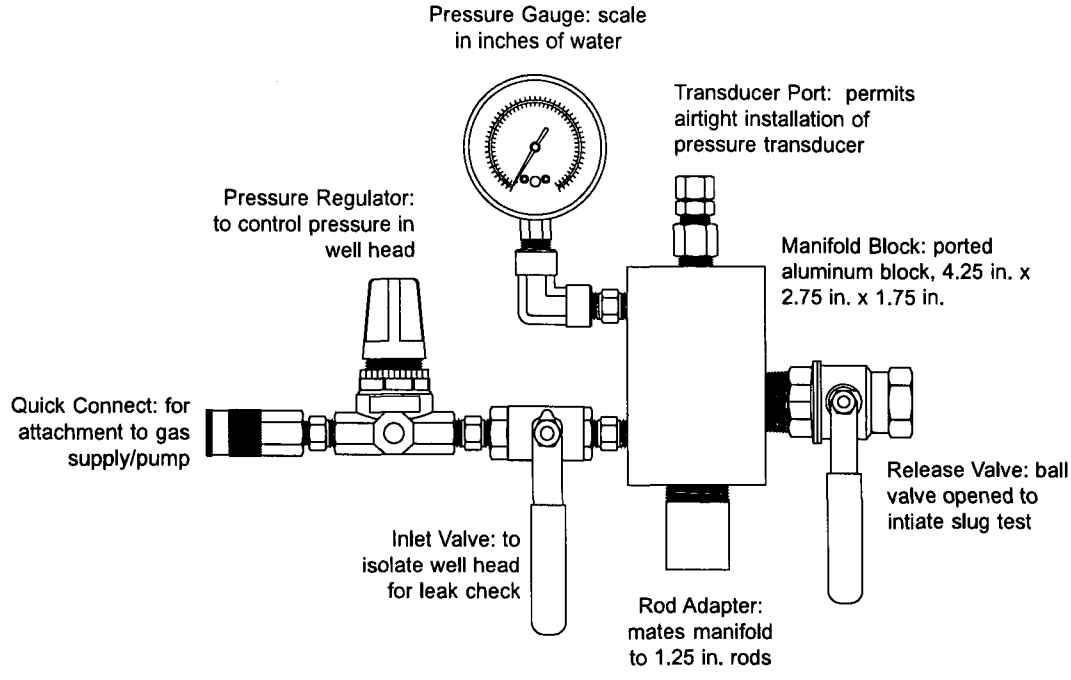


FIGURE 10.1:
Pneumatic Manifold Assembly (17631)

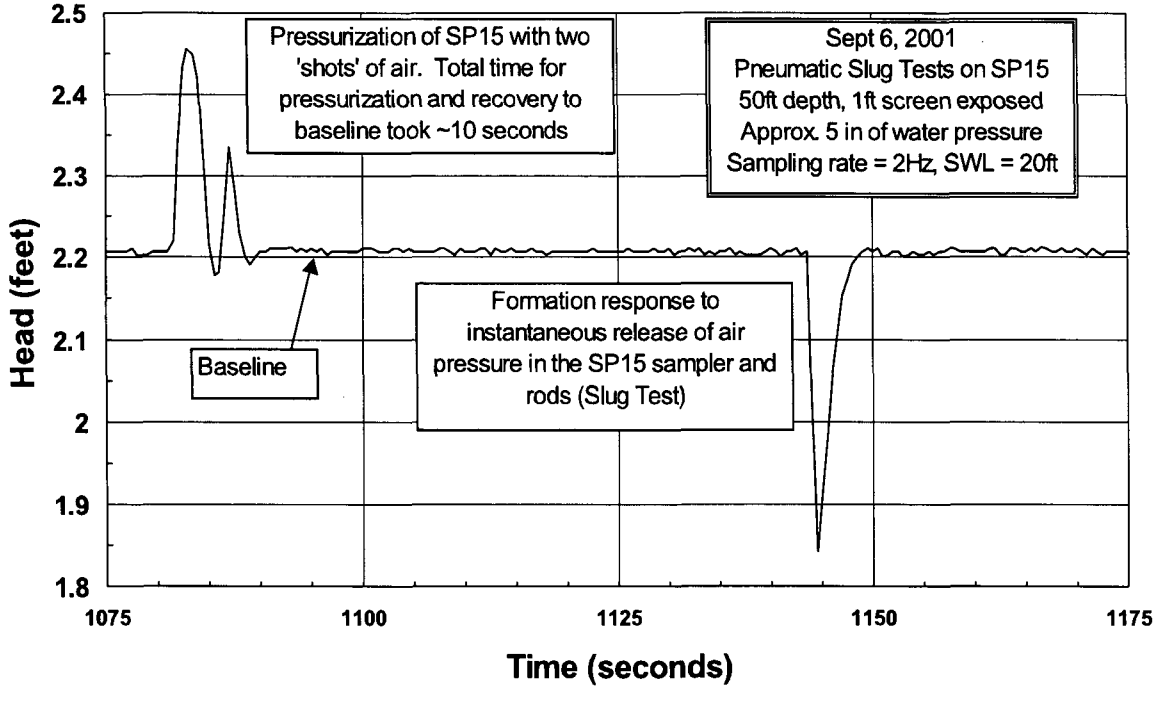


FIGURE 10.2:
SP15 slug test in a high-K formation

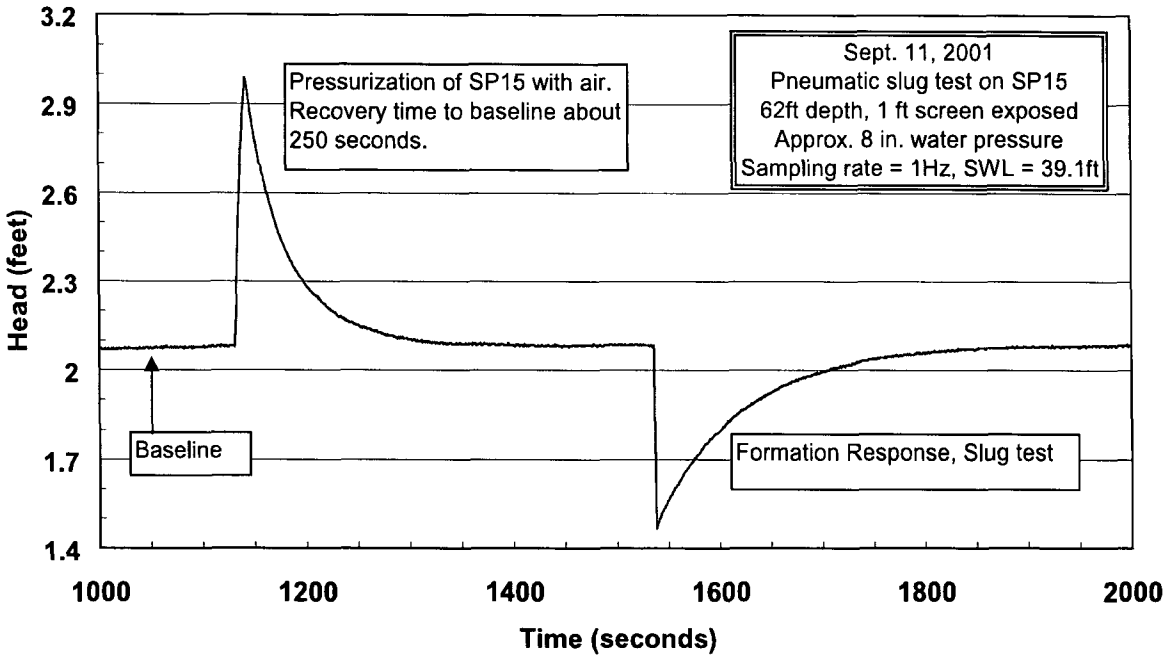


FIGURE 10.3:
SP15 slug test in a moderate-K formation

11.0 What the Data Looks Like

Response to slug tests takes on two general forms. The observed responses are comparable to a spring that has been stretched and released. If a large weight is attached to the end of the spring it slowly slides back to the equilibrium point and stops. If a small weight is attached to the spring it may oscillate back-and-forth around the equilibrium point a few times before coming to rest. This first type of behavior is called "overdamped" response and the second is called "underdamped" or oscillatory response (the water level oscillates up-and-down in the well in response to the slug test) (Butler 1997).

Overdamped response (Figs. 10.2 and 10.3) is what is most commonly observed during slug testing and is characteristic of formations that range from fine-grained materials (silts and clays) to sandy materials. The underdamped response (Figure 11.1) is less commonly observed and is characteristic of high hydraulic conductivity formations such as coarse sands and gravels. There is also a special case of critically damped response that lies between the underdamped and overdamped behaviors (Butler 1997, ASTM D 5581).

The portion of the slug test curve and data used in the modeling process to determine the hydraulic conductivity is the response and recovery that begins immediately after the pressure is released (pneumatic slug test initiated) and ends when the water level has returned to its pretest equilibrium pressure (see Figures 10.3, 10.4, and 11.1).

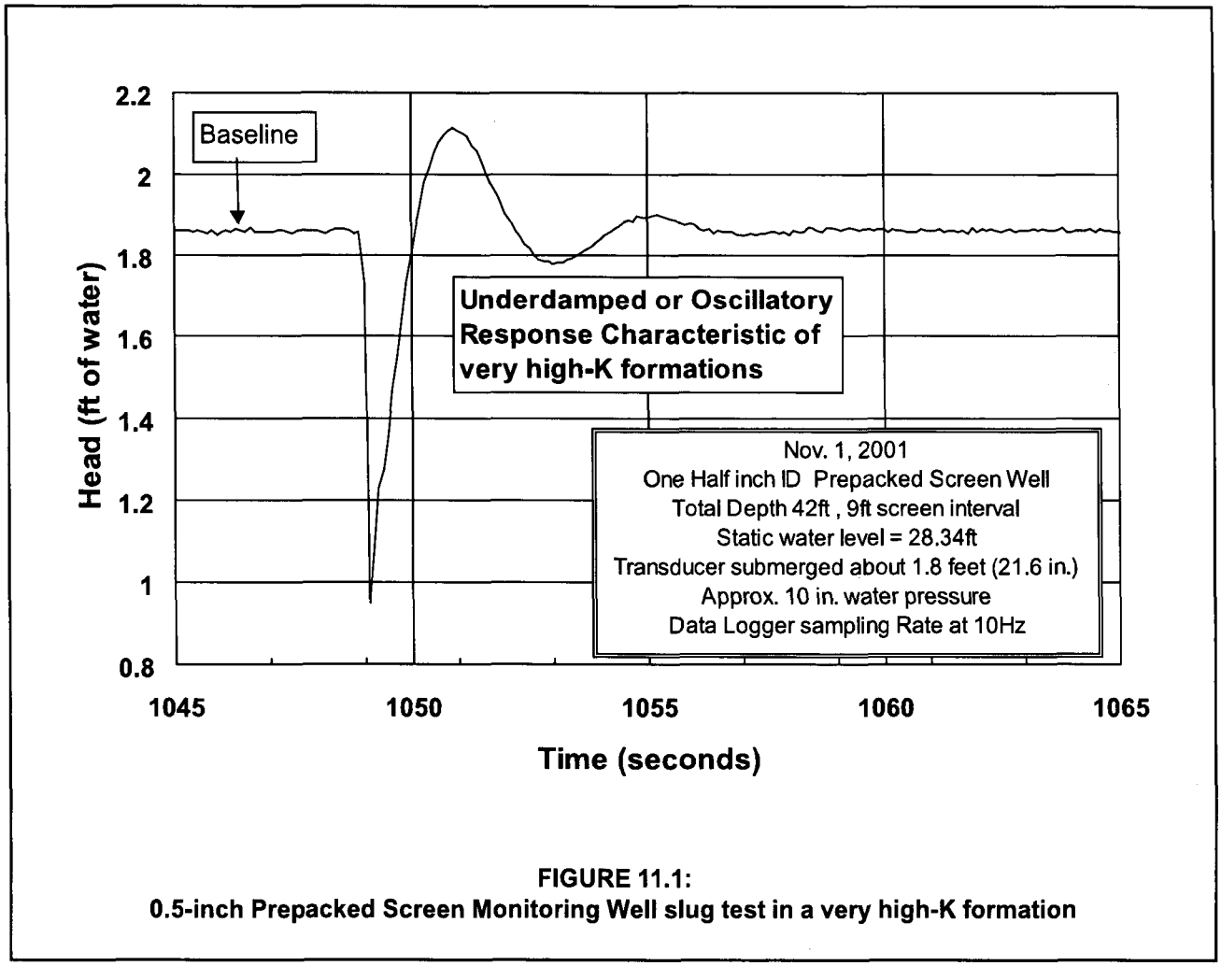


FIGURE 11.1:
0.5-inch Prepacked Screen Monitoring Well slug test in a very high-K formation

12.0 Data Analysis Methods

The same data analysis methods that are applied to larger-diameter wells are used for the smaller-diameter direct push tools and wells. These conventional analysis methods provide accurate results for the small-diameter tools (Butler et al. 2002) under almost all conditions. However, when tools or wells less than one inch inside diameter are used for slug testing in very high hydraulic conductivity formations (K > 250ft/day, >$8x10^{-2}$cm/sec), a simple linear correction is applied to determine the K-value (Butler, 2002). Probably just a fraction of the formations to be tested will have K-values exceeding this range.

Two factors must be considered in the selection of the appropriate data analysis method. First, is the formation being tested an unconfined aquifer or a confined aquifer? Second, is the aquifer response overdamped behavior or underdamped and oscillatory in nature? The following is a very brief selection of possible modeling methods that may be appropriate. An authoritative review of slug test data analysis methods is provided by Butler (1997).

Overdamped:

- Unconfined = Bouwer & Rice (1976) method, see also Bouwer (1989)
  ASTM D 5912
- Confined = Hvorslev (1951) method
  ASTM D 4104

Underdamped:

- Unconfined = Springer and Gelhar (1991) also know as the Hi-K Bouwer & Rice Method (Butler 1997, Butler and Garnett 2001)
- Confined = van der Kamp (1976) method also known as the Hi-K Hvorslev Method (Butler and Garnett 2001)
  ASTM D 5785

Critically Damped:

- Confined = Kipp (1985) method
  ASTM D 5881

Additional information on slug testing field procedures and data analysis methods is available in any of several ASTM Standard Guides and Practices (ASTM D 4043, D 4044, D 4104, D 5785, D 5881, D 5912). The Standard Guide D 4043 includes a decision tree for selection of the appropriate test and data analysis methods while Standard Method D 4044 provides information on field procedures for slug testing.

The selection and application of the appropriate data analysis method(s) is beyond the scope of this SOP for field techiniques. Many literature resources (Butler 1997, Fetter 1994, Freeze and Cherry 1979) and software resources (AQTESOLV, AquiferTest, etc.) are available for guidance in selection and application of the appropriate model to determine the formation hydraulic conductivity, transmissivity, and other formation parameters from the slug test data.

13.0 Pneumatic Slug Testing in Groundwater Profiling Tools and Monitoring Wells

The Pneumatic Slug Test kit can be installed on many of the available Geoprobe® groundwater sampling tools to conduct slug testing. The kit may also be used on PVC casing ranging in size from nominal 1/2-inch to 2-inch. The diagrams below indicate how the pneumatic slug test kit is used with several of the groundwater sampling tools and PVC well casings. Reference the appropriate standard operating procedures or instruction bulletins for details of sampler installation or well construction.

13.1 Slug Tests with the Groundwater Profiler (GW1600)

The Groundwater Profiler (GW1600) may be telescoped through Geoprobe® 2.125-inch rods when fine-grained materials overlay the sandy formation to be sampled and slug tested (Fig. 13.1). The profiler is available with either a 6.0-inch or 12.0-inch (length) stainless steel screen and may be advanced incrementally for sampling and slug testing at multiple depths in one borehole.

The groundwater profiler is advanced with Geoprobe® 1.25-inch rods so the pneumatic head will readily connect to the sampling system for slug testing. Because the 1.25-inch drive rods have an ID of only 0.625 inches, the calculated hydraulic conductivity value must be corrected if the test result indicates a K-value $\geq$ 200 ft/day ($7x10^{-2}$ cm/sec) (Butler, 2002). Clogging of the exposed screen as it is advanced to multiple depths can be problematic, even in relatively clean sands. Development for slug testing becomes critical.

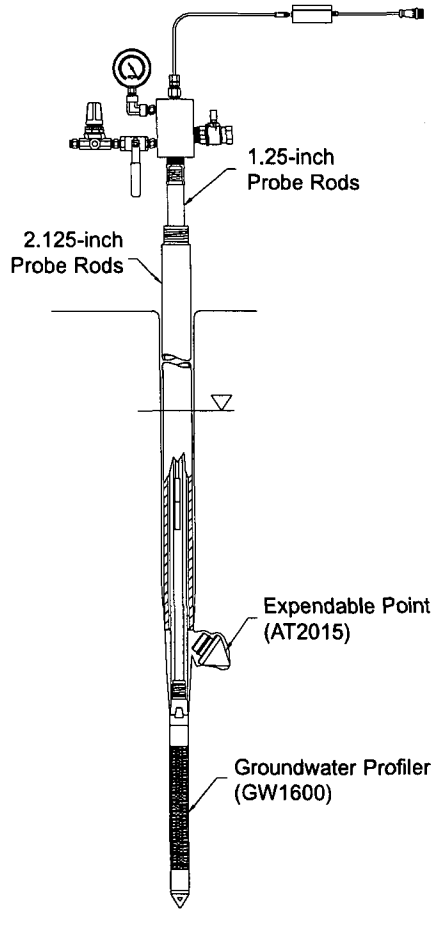


FIGURE 13.1:
Pneumatic slug testing with the Groundwater Profiler (GW1600)

13.2 Slug Tests with the Dual Tube Groundwater Profiler (GW2100)

The Dual Tube (DT21) Groundwater Profiler system (GW2100) may be used to conduct soil sampling, groundwater sampling, and slug testing (Fig. 13.2) at multiple depths in one probe advancement (Instructional Bulletin No. 19275). The 2.125-inch OD by 1.5-inch ID rods are the outer casing for this system and may be used to conduct slug tests in formations of very high hydraulic conductivity where the K-values exceed 500 ft/day ($1.76x10^{-1}$ cm/sec) (McCall et al. 2002). The pneumatic head adapter (PN 19165) for the 2.125-inch rods, which has a larger diameter release valve, is required for slug testing in very high-K formations.

The Dual Tube (DT21) Groundwater Profiler system (GW2100) may also be used to conduct pneumatic or mechanical slug tests in moderate to low hydraulic conductivity formations (Figure 13.3). When slug testing in cohesive materials with significant proportions of clay, a small coring device should be used to core the formation ahead of the outer rods and cutting shoe. This minimizes damage and compression of the formation allowing for accurate determination of K-values in these sensitive materials. After the pre-core is removed, the DT21 Profiler screen is installed in the core hole. An adapter for nominal 1/2-inch Schedule 80 PVC (PN 17561) is assembled onto 1/2-inch PVC casing and installed in the top of the DT21 profiler screen (Figure 13.3). This reduces the casing ID and significantly increases the recovery rate of the slug test.

In moderate-K formations (e.g. $< 10^{-3}$ cm/sec to $> 10^{-6}$ cm/sec), a PVC casing adapter and bushing (PN 17558 and 17559) may be used to attach the pneumatic head to the PVC casing so pneumatic slug tests may be conducted. In low- to very low-K formations (e.g. less than 10^{-5} cm/sec) polyethylene tubing (TB25L) may be placed over the transducer cable to further reduce the effective casing radius and speed up the slug test recovery rate. In this configuration the transducer and poly-shrouded cable become a mechanical slug-transducer. Mechanical slug testing with this configuration eliminates the need to wait for re-equilibration of the water level needed when pneumatic slug testing is conducted. In these low-K formations this re-equilibration of the water level needed for pneumatic slug testing will more than double the length of the slug test, which may be several hours in length. So use of the mechanical slug-transducer configuration can save over 50% of the time required for slug testing in these low-K formations.

13.3 Slug Tests in Monitoring Wells

Small-diameter direct push installed monitoring wells (Fig. 13.4) and conventional 2.0-inch PVC wells may also be used for slug testing with the Pneumatic Slug Test kit. Adapters and bushings to attach the pneumatic head assembly to nominal 1/2-inch up to 2-inch PVC casing are available (see Section 3.0). Follow the manufacturer's standard operating procedure (Geoprobe® Technical Bulletins 96-2000, 99-2500) or appropriate ASTM Standard Guide (D 6724) or Standard Practices (D 6725 or D 5092) for well installation and construction. Remember that appropriate development (ASTM D 5521) is necessary to obtain representative slug test results and K-values in small- or large-diameter wells. Once the well has been installed and developed, the PVC casing adapter (and bushing if required) is used to attach the pneumatic head assembly to the well casing (Fig. 13.4). Slug testing then follows the same procedures as described in the above sections. Remember that the pneumatic method can not be used in wells where the static water level is within the screen interval or will be lowered into the screen interval during the pressurization of the well head. Under these conditions mechanical slug test methods must be applied.

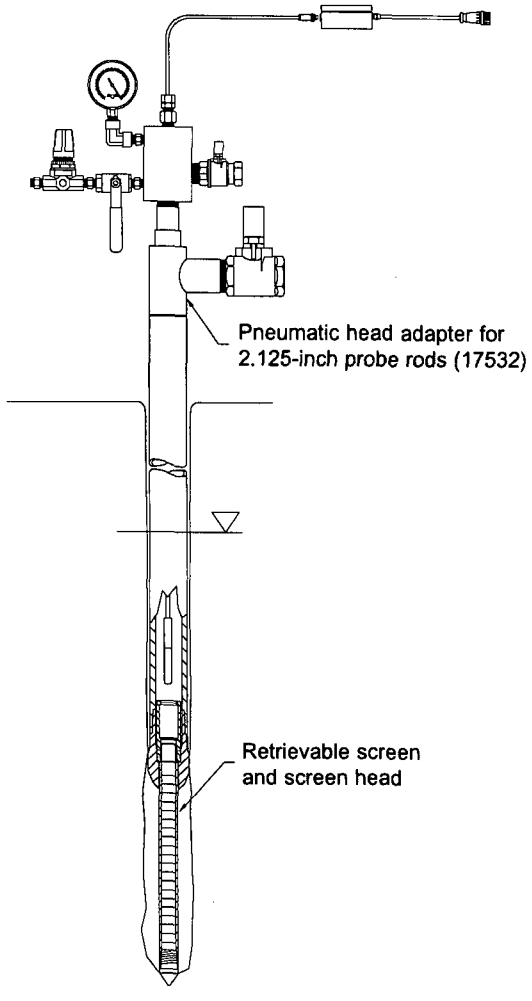


FIGURE 13.2:
Pneumatic slug testing with the Dual Tube Groundwater Profiler (GW2100)

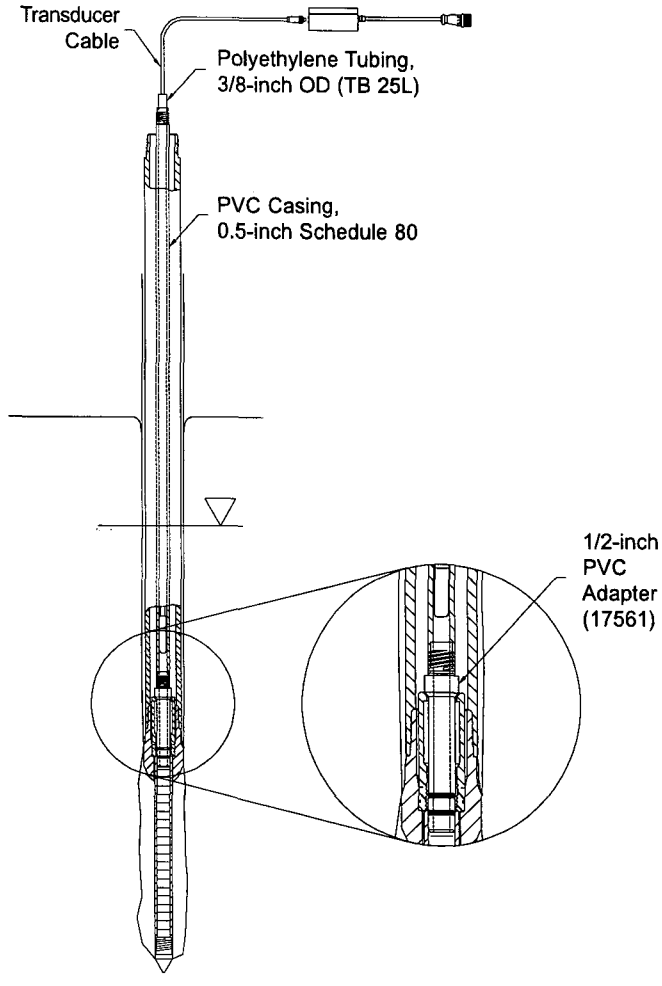


FIGURE 13.3:
Mechanical slug testing with the Dual Tube Groundwater Profiler (GW2100)

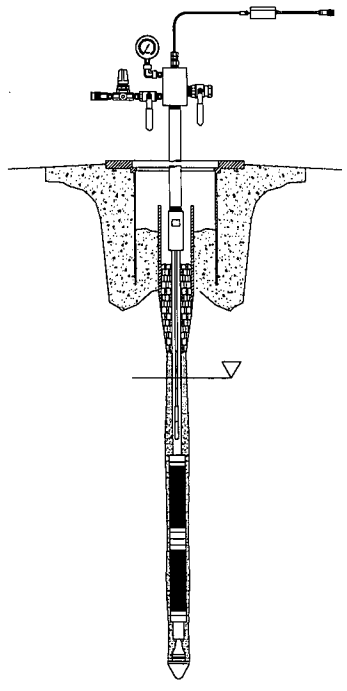


FIGURE 13.4:
Pneumatic slug testing with a prepacked screen monitoring well

14.0 Hints and Tips

Development!! Do it or just don't run the slug test.

Do not over-pressurize the well head as this can result in a damaged transducer and/or air in the formation which will result in inaccurate results.

Run multiple tests with varying initial head (H_o) to verify aquifer response and development meet model requirements (e.g. When normalized data for tests with different H_o are normalized and plotted on semi-log paper the results over lay one another).

Cool transducer to ambient groundwater temperature before zeroing and beginning slug test to prevent baseline drift.

After cooling the transducer in the groundwater, raise it just above the water level to zero at atmospheric pressure.

Watch the air pressure gauge on the pneumatic head to detect slow leaks. The water level will rise in the well as quickly as air escapes from a slow leak. The transducer readout on screen may appear stable when in fact the water level and air pressure in the well are both changing to maintain equilibrium in response to the slow leak.

Use smaller initial head values (H_o) especially in very high-K formations to be sure to get accurate results. In higher-K formations, using a large initial head will result in erroneous well response and incorrect results. Do not use initial head of over 20 inches (~50cm) under most conditions (less is preferable in high-K formations).

For smaller-diameter wells (1-inch or less), be sure to correct the casing radius (r_c) for the transducer cable radius before calculating the hydraulic conductivity. If this correction is not made, errors in the calculated K-value of 10% or greater may occur.

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Appendix I: Field Calibration of the Transducer

The transducer, data logger, and software system are designed with a built-in calibration that will calculate a head value in feet and millimeters, and a pressure value in millibars. This internal calibration factor is not exact, but should provide head and pressure values within 10% of the true values. Instrument drift over time is a normal phenomenon and results in these variations. While the precision of the data will be very good over time, the accuracy may shift from the true value due to this instrument drift.

Since the data is normalized (H_t/H_o) for use in modeling and calculation of the hydraulic conductivity, it is not mandatory that the reported head or pressure values be exactly accurate. Normalizing the data removes the units so that modeling is done with simple ratios. It would be possible to use simply the transducer voltage readout and normalize these by the H_o voltage value to obtain the same ratios as calculated with normalized head values originally stated in feet or inches. However, if for your project it is necessary to have accurate as well as precise head data, then a simple field calibration may be conducted prior to running slug tests to obtain an accurate calibration line.

Take a clear plastic four-foot long Macro-Core® soil sample liner or DT21 soil sample liner, cap the bottom, and tape it sealed. Stand the tube upright and fill it to over-running with clean water. (Refer to Sections 7.0, 8.0, and 9.0 for more information on the following actions.) Connect the transducer to the data logger and the data logger to the power supply and laptop computer. Turn on the computer and initialize the slug test software. Let the transducer equilibrate at ambient working temperature. Begin saving the *.dat file in the software (e.g. filename CAL730). With the transducer stabilized at atmospheric pressure, record data for at least one minute. Next, insert the transducer exactly 6 inches (152 mm) below the water level in the water-filled liner. Again take at least one minute of data at this water level. Lower the transducer to depths of 12, 18, 24, 30, and 36 inches (305, 457, 610, 762, and 914 mm) in the water column and leave it at each depth for a minimum of one minute after it has stabilized. Once the information for each depth interval is obtained exit from the file.

This data file may be imported into a spreadsheet or scientific software system for plotting and calculation of the calibration equation. An example of a portion of the raw data file is shown in Table A-1. Plotting this data (Figure A-1) is recommended for visual review and selection of the time intervals to be used to calculate the average transducer reading at each water depth interval and atmospheric pressure. Table A-2 shows the time interval and transducer voltage readouts for each water depth and atmospheric pressure used to calculate the average voltage for that condition. As an example, for the condition of 12 inches of water the plot (Fig. A-1) indicated that the transducer readout was stable from the 550- to 600-second interval. The average voltage over this interval was calculated by summing the voltage readout at each time increment and then dividing by the number of readings (n) summed:

$$\mathbf{(Sum(V_{550}\ to\ V_{600}))/n} = \text{average voltage for 12 inches of water over the time interval specified.}$$

This same calculation is conducted for each water depth interval monitored for an equal time period so equal weight is given to each depth interval. Then a linear regression analysis is applied to the paired data points (water depth, average voltage) to determine the least squares best fit regression line for calibration of the transducer under ambient conditions (Table A-3). Most spreadsheet and scientific software programs have a function or macro to calculate the regression line parameters and correlation coefficient. Rerunning the field calibration is recommended if the correlation coefficient is less than 0.99. If a correlation coefficient of 0.99 or better can not be obtained, the transducer may need maintenance or possibly replacement if it is considerably of range.

The slope of the regression line and the Y-intercept determined from the least squares fit can now be used to calculate a very accurate head level (see Table A-3) for slug tests run under this calibration. The transducer voltage is multiplied by the slope (m) and the intercept value is added to the result to get the true head reading. If very accurate data is required, calibrations may be conducted daily (or more often) if instrument drift is significant.

Field Calibration of 10psi transducer
Nov. 30, 2001
Wes McCall

Raw Data File:

Time (seconds)	Transducer (volts)	Head (feet)	Head (mm)	Pressure (millibars)
0	0.03545	0.36989	112.7417	11.04739
0.5	0.03545	0.36989	112.7417	11.04739
1	0.03545	0.36989	112.7417	11.04739
1.5	0.0217	0.2264	69.00566	6.76176
2	-0.01039	-0.10842	-33.045	-3.23803
2.5	-0.01192	-0.12436	-37.9045	-3.71421
3	-0.01253	-0.13074	-39.8483	-3.90468
3.5	-0.01222	-0.12755	-38.8764	-3.80944
4	-0.01192	-0.12436	-37.9045	-3.71421
4.5	-0.01131	-0.11798	-35.9607	-3.52373
5	-0.01131	-0.11798	-35.9607	-3.52373
5.5	-0.011	-0.11479	-34.9888	-3.4285
6	-0.0107	-0.1116	-34.0169	-3.33326
6.5	-0.0107	-0.1116	-34.0169	-3.33326
7	-0.01008	-0.10523	-32.0731	-3.14279
7.5	-0.00978	-0.10204	-31.1011	-3.04755
8	-0.00947	-0.09885	-30.1292	-2.95232
8.5	-0.00917	-0.09566	-29.1573	-2.85708
9	-0.00856	-0.08928	-27.2135	-2.66661
9.5	-0.00825	-0.08609	-26.2416	-2.57137
10	-0.00795	-0.08291	-25.2697	-2.47614
10.5	-0.00733	-0.07653	-23.3259	-2.28567
11	-0.00703	-0.07334	-22.354	-2.19043
11.5	-0.00672	-0.07015	-21.382	-2.09519
12	-0.00611	-0.06377	-19.4382	-1.90472
12.5	-0.00611	-0.06377	-19.4382	-1.90472
13	-0.0055	-0.0574	-17.4944	-1.71425
13.5	-0.0055	-0.0574	-17.4944	-1.71425
14	-0.00489	-0.05102	-15.5506	-1.52378
14.5	-0.00489	-0.05102	-15.5506	-1.52378
15	-0.00458	-0.04783	-14.5787	-1.42854
15.5	-0.00428	-0.04464	-13.6068	-1.33331
16	-0.00397	-0.04145	-12.6348	-1.23807
16.5	-0.00367	-0.03826	-11.6629	-1.14283
17	-0.00367	-0.03826	-11.6629	-1.14283
17.5	-0.00306	-0.03189	-9.71911	-0.95236
18	-0.00306	-0.03189	-9.71911	-0.95236
18.5	-0.00275	-0.0287	-8.7472	-0.85712
19	-0.00244	-0.02551	-7.77529	-0.76189
19.5	-0.00214	-0.02232	-6.80338	-0.66665
20	-0.00214	-0.02232	-6.80338	-0.66665
20.5	-0.00183	-0.01913	-5.83146	-0.57142
21	-0.00183	-0.01913	-5.83146	-0.57142
21.5	-0.00122	-0.01275	-3.88764	-0.38094
22	-0.00122	-0.01275	-3.88764	-0.38094
22.5	-0.00092	-0.00957	-2.91573	-0.28571
23	-0.00061	-0.00638	-1.94382	-0.19047
23.5	-0.00061	-0.00638	-1.94382	-0.19047
24	-0.00031	-0.00319	-0.97191	-0.09524
24.5	0	0	0	0
25	0	0	0	0
25.5	0.00031	0.00319	0.97191	0.09524
26	0.00061	0.00638	1.94382	0.19047
26.5	0.00061	0.00638	1.94382	0.19047
27	0.00061	0.00638	1.94382	0.19047
27.5	0.00092	0.00957	2.91573	0.28571
28	0.00122	0.01275	3.88764	0.38094
28.5	0.00183	0.01913	5.83146	0.57142

TABLE A-1:
Example of raw data file from field calibration of transducer

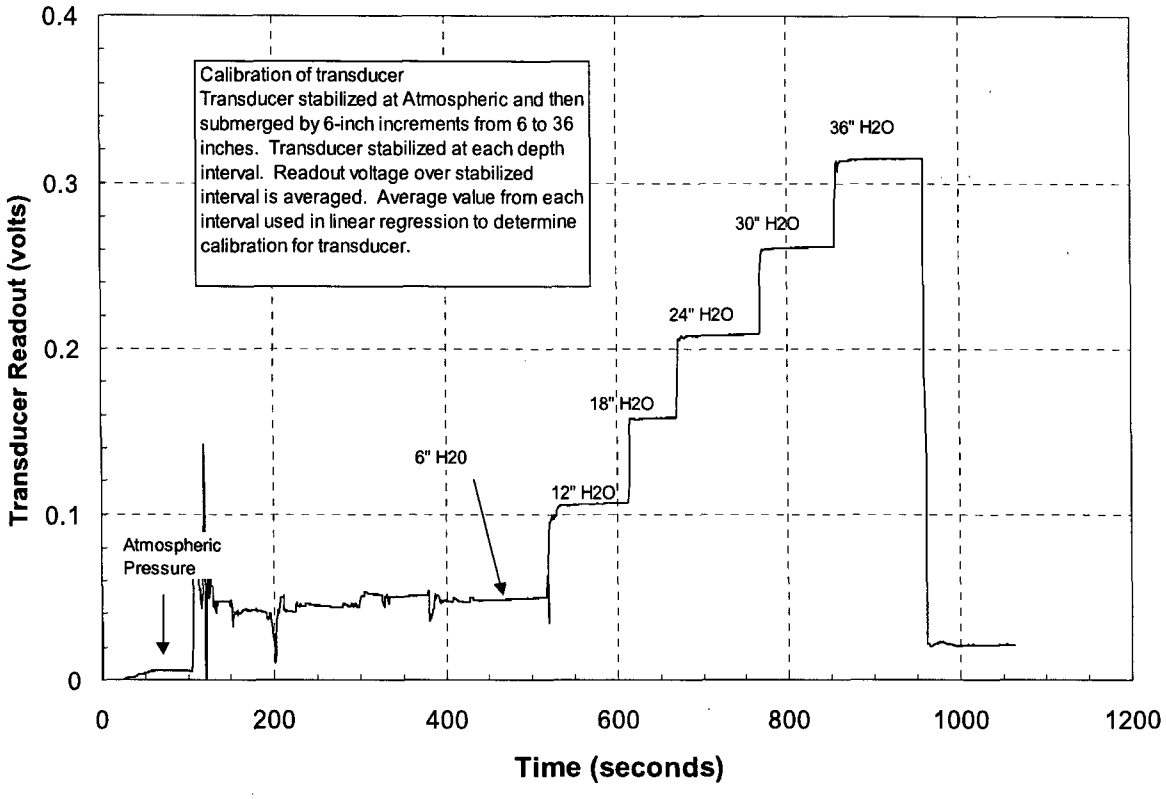

FIGURE A-1:
Plot of transducer voltage (raw data) collected during field calibration

Atmospheric Calibration		6" water Calibration		12" water Calibration		18" water Calibration		24" water Calibration		30" water Calibration		36" water Calibration	
50 to 100 seconds		450 to 500 seconds		550 to 600 seconds		625 to 675 seconds		700 to 750 seconds		800 to 850 seconds		900 to 950 seconds	
time (sec)	Voltage	time (sec)	Voltage	time (sec)	Voltage	time (sec)	Voltage	time (sec)	Voltage	time (sec)	Voltage	time (sec)	Voltage
50	0.00458	450	0.04828	550	0.10574	625	0.15708	700	0.20811	800	0.26068	900	0.31477
50.5	0.00428	450.5	0.04828	550.5	0.10574	625.5	0.15708	700.5	0.20811	800.5	0.26098	900.5	0.31446
51	0.00458	451	0.04828	551	0.10604	626	0.15708	701	0.20811	801	0.26098	901	0.31446
51.5	0.00458	451.5	0.04828	551.5	0.10604	626.5	0.15738	701.5	0.20811	801.5	0.26098	901.5	0.31446
52	0.00458	452	0.04828	552	0.10574	627	0.15708	702	0.20811	802	0.26098	902	0.31477
52.5	0.00458	452.5	0.04828	552.5	0.10574	627.5	0.15738	702.5	0.20811	802.5	0.26098	902.5	0.31446
53	0.00489	453	0.04859	553	0.10574	628	0.15738	703	0.20811	803	0.26098	903	0.31446
53.5	0.00458	453.5	0.04828	553.5	0.10574	628.5	0.15738	703.5	0.20842	803.5	0.26098	903.5	0.31477
54	0.00489	454	0.04828	554	0.10574	629	0.15738	704	0.20811	804	0.26098	904	0.31477
54.5	0.00489	454.5	0.04859	554.5	0.10574	629.5	0.15708	704.5	0.20811	804.5	0.26098	904.5	0.31477
55	0.00489	455	0.04828	555	0.10604	630	0.15738	705	0.20842	805	0.26129	905	0.31477
55.5	0.00489	455.5	0.04859	555.5	0.10604	630.5	0.15738	705.5	0.20811	805.5	0.26098	905.5	0.31477
56	0.0052	456	0.04859	556	0.10604	631	0.15738	706	0.20811	806	0.26098	906	0.31446
56.5	0.0052	456.5	0.04828	556.5	0.10604	631.5	0.15738	706.5	0.20842	806.5	0.26098	906.5	0.31446
57	0.0052	457	0.04828	557	0.10604	632	0.15738	707	0.20811	807	0.26098	907	0.31446
57.5	0.0055	457.5	0.04859	557.5	0.10604	632.5	0.15738	707.5	0.20811	807.5	0.26098	907.5	0.31446
58	0.0052	458	0.04859	558	0.10604	633	0.15738	708	0.20811	808	0.26098	908	0.31477
58.5	0.0055	458.5	0.04859	558.5	0.10604	633.5	0.15738	708.5	0.20811	808.5	0.26098	908.5	0.31477
59	0.0052	459	0.04859	559	0.10604	634	0.15769	709	0.20811	809	0.26098	909	0.31477
59.5	0.0052	459.5	0.04859	559.5	0.10604	634.5	0.15738	709.5	0.20811	809.5	0.26098	909.5	0.31477
60	0.0055	460	0.04859	560	0.10604	635	0.15769	710	0.20811	810	0.26129	910	0.31507
60.5	0.0055	460.5	0.04859	560.5	0.10604	635.5	0.15769	710.5	0.20811	810.5	0.26129	910.5	0.31477
61	0.0055	461	0.04859	561	0.10604	636	0.15738	711	0.20811	811	0.26098	911	0.31477
61.5	0.0055	461.5	0.04859	561.5	0.10604	636.5	0.15738	711.5	0.20811	811.5	0.26129	911.5	0.31477
62	0.0055	462	0.04859	562	0.10604	637	0.15738	712	0.20842	812	0.26098	912	0.31446
62.5	0.0055	462.5	0.04859	562.5	0.10604	637.5	0.15738	712.5	0.20811	812.5	0.26098	912.5	0.31446
63	0.00581	463	0.04859	563	0.10604	638	0.15769	713	0.20811	813	0.26129	913	0.31446
63.5	0.0055	463.5	0.04859	563.5	0.10604	638.5	0.15738	713.5	0.20811	813.5	0.26129	913.5	0.31477
64	0.00581	464	0.04859	564	0.10604	639	0.15769	714	0.20811	814	0.26098	914	0.31446
64.5	0.00581	464.5	0.04859	564.5	0.10604	639.5	0.15769	714.5	0.20811	814.5	0.26098	914.5	0.31477
65	0.00581	465	0.04859	565	0.10604	640	0.15738	715	0.20811	815	0.26098	915	0.31477
65.5	0.00611	465.5	0.04859	565.5	0.10604	640.5	0.15738	715.5	0.20842	815.5	0.26129	915.5	0.31477
66	0.00581	466	0.04859	566	0.10604	641	0.15769	716	0.20842	816	0.26098	916	0.31446
66.5	0.00581	466.5	0.04859	566.5	0.10604	641.5	0.15738	716.5	0.20842	816.5	0.26098	916.5	0.31477
67	0.00581	467	0.04859	567	0.10604	642	0.15769	717	0.20842	817	0.26098	917	0.31477
67.5	0.00581	467.5	0.04859	567.5	0.10604	642.5	0.15769	717.5	0.20842	817.5	0.26129	917.5	0.31477
68	0.00581	468	0.04859	568	0.10604	643	0.15769	718	0.20811	818	0.26098	918	0.31477
68.5	0.00581	468.5	0.04859	568.5	0.10604	643.5	0.15769	718.5	0.20811	818.5	0.26129	918.5	0.31477
69	0.00581	469	0.0489	569	0.10635	644	0.15769	719	0.20811	819	0.26129	919	0.31477
69.5	0.00611	469.5	0.04859	569.5	0.10604	644.5	0.15769	719.5	0.20842	819.5	0.26129	919.5	0.31477
70	0.00581	470	0.0489	570	0.10635	645	0.15769	720	0.20811	820	0.26098	920	0.31477
70.5	0.00611	470.5	0.04859	570.5	0.10635	645.5	0.15769	720.5	0.20811	820.5	0.26098	920.5	0.31477
71	0.00581	471	0.04859	571	0.10635	646	0.15769	721	0.20842	821	0.26129	921	0.31477
71.5	0.00611	471.5	0.0489	571.5	0.10604	646.5	0.158	721.5	0.20842	821.5	0.26098	921.5	0.31477
72	0.00611	472	0.04859	572	0.10635	647	0.15769	722	0.20842	822	0.26129	922	0.31477
72.5	0.00611	472.5	0.04859	572.5	0.10604	647.5	0.15769	722.5	0.20842	822.5	0.26129	922.5	0.31477
73	0.00611	473	0.0489	573	0.10635	648	0.15769	723	0.20842	823	0.26129	923	0.31477
73.5	0.00611	473.5	0.04859	573.5	0.10635	648.5	0.15769	723.5	0.20842	823.5	0.26098	923.5	0.31446
74	0.00611	474	0.04859	574	0.10635	649	0.15769	724	0.20842	824	0.26098	924	0.31477
74.5	0.00611	474.5	0.0489	574.5	0.10635	649.5	0.15769	724.5	0.20842	824.5	0.26129	924.5	0.31477
75	0.00611	475	0.0489	575	0.10635	650	0.15769	725	0.20842	825	0.26129	925	0.31477
75.5	0.00611	475.5	0.0489	575.5	0.10635	650.5	0.15769	725.5	0.20842	825.5	0.26129	925.5	0.31446
76	0.00611	476	0.0489	576	0.10635	651	0.15769	726	0.20842	826	0.26129	926	0.31477
76.5	0.00611	476.5	0.0489	576.5	0.10665	651.5	0.15769	726.5	0.20842	826.5	0.26129	926.5	0.31477
77	0.00611	477	0.0489	577	0.10635	652	0.158	727	0.20842	827	0.26159	927	0.31446
77.5	0.00611	477.5	0.0489	577.5	0.10635	652.5	0.15769	727.5	0.20842	827.5	0.26129	927.5	0.31477
78	0.00611	478	0.0489	578	0.10635	653	0.15769	728	0.20842	828	0.26129	928	0.31446
78.5	0.00611	478.5	0.0489	578.5	0.10635	653.5	0.15769	728.5	0.20842	828.5	0.26129	928.5	0.31477
79	0.00611	479	0.0489	579	0.10635	654	0.15769	729	0.20842	829	0.26129	929	0.31477
79.5	0.00581	479.5	0.0489	579.5	0.10635	654.5	0.15769	729.5	0.20842	829.5	0.26129	929.5	0.31477
80	0.00581	480	0.0489	580	0.10635	655	0.15769	730	0.20842	830	0.26129	930	0.31477
80.5	0.00581	480.5	0.0489	580.5	0.10635	655.5	0.15769	730.5	0.20842	830.5	0.26129	930.5	0.31477
81	0.00611	481	0.0489	581	0.10635	656	0.15769	731	0.20842	831	0.26129	931	0.31477
81.5	0.00581	481.5	0.0489	581.5	0.10635	656.5	0.15769	731.5	0.20872	831.5	0.26129	931.5	0.31477
82	0.00581	482	0.0489	582	0.10635	657	0.158	732	0.20842	832	0.26129	932	0.31446
82.5	0.00581	482.5	0.0489	582.5	0.10635	657.5	0.15769	732.5	0.20842	832.5	0.26129	932.5	0.31477
83	0.00611	483	0.0489	583	0.10635	658	0.15769	733	0.20872	833	0.26129	933	0.31507
83.5	0.00611	483.5	0.0489	583.5	0.10635	658.5	0.15769	733.5	0.20842	833.5	0.26129	933.5	0.31477
84	0.00611	484	0.0489	584	0.10635	659	0.158	734	0.20872	834	0.26129	934	0.31507
84.5	0.00581	484.5	0.0489	584.5	0.10665	659.5	0.158	734.5	0.20842	834.5	0.26129	934.5	0.31477
85	0.00611	485	0.0492	585	0.10635	660	0.15769	735	0.20842	835	0.26129	935	0.31477
85.5	0.00611	485.5	0.0489	585.5	0.10665	660.5	0.15769	735.5	0.20842	835.5	0.26129	935.5	0.31446
86	0.00611	486	0.0492	586	0.10665	661	0.158	736	0.20842	836	0.26159	936	0.31477
86.5	0.00581	486.5	0.0489	586.5	0.10665	661.5	0.15769	736.5	0.20872	836.5	0.26129	936.5	0.31477
87	0.00581	487	0.0489	587	0.10665	662	0.15769	737	0.20842	837	0.26129	937	0.31446
87.5	0.00581	487.5	0.0492	587.5	0.10665	662.5	0.15769	737.5	0.20872	837.5	0.26129	937.5	0.31477
88	0.00581	488	0.0489	588	0.10665	663	0.158	738	0.20842	838	0.26159	938	0.31477
88.5	0.00611	488.5	0.0489	588.5	0.10665	663.5	0.158	738.5	0.20842	838.5	0.26129	938.5	0.31477
89	0.00581	489	0.0489	589	0.10665	664	0.15769	739	0.20842	839	0.26129	939	0.31507
89.5	0.00581	489.5	0.0489	589.5	0.10665	664.5	0.15769	739.5	0.20872	839.5	0.26159	939.5	0.31477
90	0.00581	490	0.0489	590	0.10665	665	0.158	740	0.20842	840	0.26129	940	0.31477
90.5	0.00581	490.5	0.0489	590.5	0.10665	665.5	0.15769	740.5	0.20872	840.5	0.26159	940.5	0.31477
91	0.00581	491	0.0492	591	0.10665	666	0.158	741	0.20872	841	0.26129	941	0.31477
91.5	0.00581	491.5	0.0492	591.5	0.10665	666.5	0.158	741.5	0.20842	841.5	0.26129	941.5	0.31477
92	0.00581	492	0.0492	592	0.10665	667	0.158	742	0.20872	842	0.26129	942	0.31477
92.5	0.00581	492.5	0.0492	592.5	0.10665	667.5	0.15769	742.5	0.20872	842.5	0.26129	942.5	0.31477
93	0.00581	493	0.0492	593	0.10665	668	0.158	743	0.20842	843	0.26159	943	0.31477
93.5	0.0055	493.5	0.0492	593.5	0.10665	668.5	0.158	743.5	0.20842	843.5	0.26129	943.5	0.31477
94	0.00581	494	0.04951	594	0.10665	669	0.15769	744	0.20872	844	0.26129	944	0.31477
94.5	0.00581	494.5	0.0492	594.5	0.10665	669.5	0.158	744.5	0.20872	844.5	0.26159	944.5	0.31477
95	0.00581	495	0.0489	595	0.10696	670	0.16655	745	0.20872	845	0.26129	945	0.31477
95.5	0.00581	495.5	0.0489	595.5	0.10696	670.5	0.19253	745.5	0.20842	845.5	0.26159	945.5	0.31477
96	0.0055	496	0.0492	596	0.10696	671	0.20506	746	0.20872	846	0.26159	946	0.31477
96.5	0.00581	496.5	0.0492	596.5	0.10696	671.5	0.20597	746.5	0.20872	846.5	0.26159	946.5	0.31507
97	0.00581	497	0.0492	597	0.10665	672	0.20567	747	0.20872	847	0.26129	947	0.31477
97.5	0.0055	497.5	0.0492	597.5	0.10696	672.5	0.20567	747.5	0.20872	847.5	0.26129	947.5	0.31507
98	0.00581	498	0.0492	598	0.10696	673	0.20536	748	0.20872	848	0.26129	948	0.31477
98.5	0.00581	498.5	0.0492	598.5	0.10696	673.5	0.20536	748.5	0.20842	848.5	0.26159	948.5	0.31477
99	0.0055	499	0.0492	599	0.10696	674	0.20536	749	0.20872	849	0.26159	949	0.31477
99.5	0.00581	499.5	0.0492	599.5	0.10696	674.5	0.20689	749.5	0.20872	849.5	0.26159	949.5	0.31477
100	0.0055	500	0.0492	600	0.10696	675	0.2075	750	0.20872	850	0.26129	950	0.31477
Average Voltage at atmospheric	0.00567	Average Voltage at 6"	0.04879	Average Voltage at 12"	0.10632	Average Voltage at 18"	0.16236	Average Voltage at 24"	0.208384	Average Voltage at 30"	0.261221	Average Voltage at 36"	0.314723

TABLE A-2:
Calculate average transducer voltage for each depth increment

Transducer Calibration Factor

Inches of Water	Averaged Transducer Voltage
0	0.005677
6	0.048791
12	0.106326
18	0.162364
24	0.205384
30	0.261221
36	0.314723

Regression Output:

Constant (b)	-0.264402
Std Err of Y Est	0.410288
R Squared	0.999165
No. of Observations	7
Degrees of Freedom	5
X Coefficient (m)	115.4423
Std Err of Coef.	1.492468

Regression Line Y = mX + b

where:
Y = Inches of water
155.44 = m = slope of regression line
X = Transducer voltage
-0.2644 = b = Y-intercept

Example:
If transducer voltage = 0.1458
Then inches - water = 16.57

TABLE A-3:
Linear regression analysis of average transducer voltage for each water depth (from TABLE A-2) provides calibration data for transducer

Equipment and tool specifications, including weights, dimensions, materials, and operating specifications included in this brochure are subject to change without notice. Where specifications are critical to your application, please consult Geoprobe Systems®.

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