MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

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SECTION 1 - INTRODUCTION

1.1 General

This report addresses the area known as the Allendale School Property located north of the General Electric Company (GE) facility in Pittsfield, Massachusetts (Figure 1-1). This report constitutes an interim report on a Phase II - Comprehensive Site Assessment of the Allendale School Property as required by the Massachusetts Department of Environmental Protection (MDEP) pursuant to the Massachusetts Contingency Plan (MCP). GE has completed Phase I of the MCP process for the Allendale School Property, which is currently designated by the MDEP as within Phase II - Comprehensive Site Assessment of the MCP process.

The Allendale School Property was originally considered by the MDEP as part of the Hill 78 Area MCP site at the GE facility. GE has subsequently proposed, and the MDEP has agreed, that the Allendale School Property should be a separate "site" under the MCP. The MDEP has agreed that the requirements for the Phase I site investigation have been fulfilled by prior investigations and activities.

In a letter dated March 6, 1992, the MDEP classified the Allendale School Property under the MCP as a priority disposal site for which further remedial response action is necessary, and stated that a Scope of Work (SOW) for a Phase II - Comprehensive Site Assessment must be submitted within 60 days of the date of the letter. On May 4, 1992 GE submitted to the MDEP a Phase II SOW designed to address remaining data gaps associated with a Comprehensive Site Assessment. The activities proposed in that document were conditionally approved by the MDEP in a letter dated June 30, 1992 (included in Appendix A).

1.2 Format of Document

This document is divided into several sections. These sections include a detailed description of the property and related history, a summary of previous investigations, the results of the MCP Phase II investigations, and characterization of the polychlorinated biphenyls (PCBs) and other hazardous constituents detected at the property.

Specifically, Section 1.3 presents pertinent background information. Section 2 describes the physical and environmental setting. It includes maps and photographs, and discusses topography, surface drainage and vegetation, surface water, flooding potential, wetlands and critical wildlife habitats, regional geology and groundwater, land use, climatological, meteorological, and air dispersion information, and utilities. Section 3 provides a source description, and Section 4 provides a discussion of prior activities. Section 5 provides information related to the MCP Phase II investigation. Section 6 presents a general summary of the fate and transport characteristics of the principal constituent detected (PCBs), and Section 7 discusses potential migration pathways, based on the information presented in Sections 2 through 6. Section 8 summarizes the overall conclusions and future activities.

1.3 Background Information

The Allendale School Property is located to the north of the Hill 78 Area of the GE facility, across the Tyler Street Extension. It is depicted on Figures 1-1 and 1-2. The school was constructed in 1950. At that time, GE and the City of Pittsfield entered into an agreement under which GE gave the City permission to remove soil material from the GE property for use as fill material in the school yard. Additional information regarding this agreement is presented in Section 3.1.

Concerns associated with the Allendale School Property were initially identified by the MDEP during construction of the Altresco Corporation Cogeneration Facility, located within GE property southeast of the school property. The presence of PCBs in soil at the GE property led to MDEP concerns regarding the potential presence of PCBs in the soils of the Allendale School Property. In response, the MDEP performed a soil and surface water sampling program for this area in January 1990. The MDEP investigation detected low levels of PCBs in the surficial soils in the southeast corner of the Allendale School Property. The MDEP subsequently established a PCB concentration of 2 parts per million (ppm) (dry weight) as the "level of concern" for surficial soils in this area. Two samples collected from the school property by the MDEP exceeded this concentration. The results of the surface water analysis indicated that PCBs were not detected.

The detection of PCBs by the MDEP at the school property above this level of concern led to several subsequent sampling events by GE designed to characterize the extent of PCBs present, as well as to assess the potential presence of other hazardous constituents. These activities were conducted between April 1990 and September 1990. These activities are discussed in more detail in Section 4.

As a result of these investigations, GE and the MDEP evaluated a range of options for conducting a Short-Term Measure (STM) to reduce the potential for human contact with soils containing PCBs above the MDEP's level of concern. GE's evaluation was presented in a document entitled "Study of Potential Remedial Options for PCB-Containing Soils at the Allendale School Property" (Blasland & Bouck, September 1990). In a March 15, 1991 letter to GE, the MDEP conditionally approved the containment/capping option presented in that report. As conditionally approved by the MDEP, the STM involved the placement of a minimum of 2 feet of "clean" soil (and a geotextile layer) over all areas where soil PCB concentrations exceeded 2 ppm within the top 3 feet of existing soil. In addition, improvements to the existing surface water drainage system in the area were included.

The MDEP's conditions were incorporated into the study and a revised version of the report entitled "Study of Potential Remedial Options for PCB-Containing Soils at the Allendale School Property" was submitted in April 1991 (Blasland & Bouck, April 1991). Construction activities were initiated in June 1991 after school had recessed for the summer. These activities were completed in the summer of 1991, in accordance with the conditions set out by the MDEP.

In a letter dated March 6, 1992, the MDEP classified the Allendale School Property as a priority disposal site under the MCP for which further remedial response action is necessary, and stated that a Scope of Work (SOW) for a Phase II - Comprehensive Site Assessment must be submitted within 60 days of the date of the letter. On May 4, 1992, GE submitted to the MDEP a Phase II SOW designed to address the remaining data gaps associated with a Comprehensive Site Assessment. The activities proposed in that document were conditionally approved by the MDEP in a letter dated June 30, 1992 (included in Appendix A).

SECTION 2 - PHYSICAL AND ENVIRONMENTAL SETTING

2.1 Maps and Photographs

2.1.1 Mapping

Various maps of the school property and adjacent areas have been generated as part of the preparation of the Study of Potential Remedial Options for PCB-Containing Soils at the Allendale School Property (Blasland & Bouck, April 1991) and the Allendale School Property MCP Phase II SOW (Blasland & Bouck, May 1992). These figures include a Site Location Plan, a General Site Plan, and numerous working drawings used to illustrate specific information such as topography before and after STM implementation, STM-related construction specifications, and a summary of analytical data. A number of these figures have been used as a basis for generating the figures presented in this report.

2.1.2 Photographs

Table 2-1 presents a summary of available aerial photographs of the Allendale School Property. Aerial photographs representative of property conditions prior to the construction of the school (1942) and of recent conditions (1990) have been reproduced and are presented as Figures 2-1 and 2-2, respectively.

2.2 Topography, Surface Drainage, and Vegetation

Prior to STM-related construction activities, the topography of the school property generally sloped in a southerly direction across the property from the school to the Tyler Street Extension as well as slightly towards the southwest corner of the property. Surface elevations range from approximately 1,010 feet (above mean sea level) to 1,005 feet with banks located to the north and south of the property.

Following the STM-related construction activities, the general slope of the property remains unchanged; however, the surface elevations have changed slightly to account for the installation of the soil cap (with related grading to enhance surface water drainage). Figure 5 of the Potential Remedial Options Plan (Blasland & Bouck, April 1991) illustrates the topography of the property, as specified in that plan. This figure is included as Appendix B.

The Allendale School Property has historically experienced poor drainage, particularly near the Tyler Street Extension. In an effort to alleviate some of the drainage problems, drainage laterals were installed within the cap and a retention area was constructed in the southeast corner of the property. The drainage of this area was also evaluated by HMM, Inc., of Concord, Massachusetts, a consultant to GE. Based on this evaluation, drainage improvements to several stormwater lines were included as part of the STM-related construction activities. In the summer of 1992, an additional drainage lateral was installed to minimize surface water ponding in the vicinity of the playground equipment.

After the STM was completed, the vegetation of the Allendale School property was similar to pre-construction conditions. Vegetation includes a grass lawn over nearly the entire area of the property. An additional row of willow trees were planted parallel to the Tyler Street Extension to assist in removing any standing water. A number of trees were also planted around the periphery of the property as part of an interim measure related to the aesthetics of the Altresco Corporation Cogeneration Facility.

2.3 Surface Water

There are no permanent surface water bodies on the Allendale School Property. The Housatonic River is located approximately 1,800 feet directly south of the property, while Unkamet Brook is located approximately 3,000 feet to the east.

2.4 Flooding Potential

As stated in Section 2.3, the Housatonic River and Unkamet Brook are located approximately 1,800 feet and 3,000 feet from the property, respectively. However, the property is shown by the Federal Emergency Management Agency (FEMA) to be outside the 500-year floodplain associated with these two water bodies (FEMA, 1982).

Periodic standing surface water has occurred in some areas of the property in the past. However, analysis has indicated that this impact was the result of relatively poor surface water drainage on the property. As discussed previously in Section 2.2, improvements to the surface water drainage system have been made as part of the STM activities.

2.5 Wetlands and Critical Habitats

The Massachusetts Division of Fish and Wildlife's National Heritage and Endangered Species Program indicates that the Wood Turtle (Clemmys insculpta), the American Bittern (Botaurus lentiginosur), and the Least Bittern (Ixobrychus exilis) may inhabit the Pittsfield area, although this information is not confirmed. The Division of Fish and Wildlife lists the Wood Turtle and the American Bittern as species of special concern, and lists the Least Bittern as a threatened species. However, there is no specific evidence or likelihood that these species are present at the Allendale School Property.

2.6 Regional Geologic and Hydrogeologic Setting

Pittsfield, Massachusetts is centrally located within the Housatonic River Basin between the Berkshire Highlands and the western Taconic Range. The geologic framework of the Pittsfield area, in general, consists of a carbonate bedrock overlain by unconsolidated surficial deposits of glacial origin. Cambrian and Ordovician age carbonate rocks (limestone, dolomite, and marble) of the Stockbridge Group comprise the bedrock within the main axis of the Housatonic River valley. These rock types are more easily eroded than the harder schists and phyllites of the abutting Taconic Range to the west, or the gneisses and schists of the Berkshire Highlands to the east. Borings completed by Geraghty & Miller in 1990 within the Hill 78 Area encountered bedrock at depths ranging from 60 to 63 feet below grade.

Unconsolidated surficial geologic deposits within the Housatonic River Basin (excluding swamps and recent alluvium) are of glacial origin, formed by glacial fluvial modification of the landscape, as well as glacial scouring and deposition. These deposits are of Pleistocene age (1.6 million to 10,000 years ago) and are classified as either stratified or non-stratified, depending on their mode of deposition. Stratified deposits exhibit grain-size sorting and stratification (sediments in beds or layers), implying fluid deposition such as from glacial meltwater streams (glaciofluvial), or settling from suspension in a body of water adjacent to a glacier (glaciolacustrine). Nonstratified (till) deposits are not layered and exhibit poor sorting as they were deposited directly by a glacier without fluvial reworking. Known thicknesses of stratified and nonstratified deposits within the Housatonic River Basin range up to 240 feet and 90 feet, respectively (Norvitch et al. 1968). Till predominates in the upland areas, and stratified deposits occur primarily along the lower slopes. Holocene (10,000 years ago to the present) alluvial and swamp deposits are observed mainly in the valley bottoms.

Neither the stratified nor nonstratified surficial deposits are considered good aquifers; however the carbonate bedrock can provide sufficient water for domestic and industrial use if the well is installed within a solution or fault zone

(Norvitch et al., 1968). Production wells have been installed several hundred feet into the bedrock at the nearby Altresco Cogeneration Facility to provide operational cooling water.

2.7 Land Use

Land associated with the Allendale School Property is currently zoned as a residential district (single family-12,000 square feet per lot). It is currently used as a playground, and zoning is not anticipated to change for the foreseeable future. Further information related to historic land uses associated with the Site is presented in Section 5.2.

2.8 Meteorological, Climatological, and Air Dispersion Parameters

The Pittsfield, Massachusetts, area is characterized by a temperate climate with warm humid summers and cold winters. Annual precipitation in the form of rain and snowfall averages approximately 46 inches per year, distributed fairly evenly from month to month. Prevailing winds are from the west. The mean annual temperature is approximately 46°F, based on data recorded at the nearby Pittsfield Municipal Airport. The mean summer temperature is 68°F, while the mean winter temperature is 28°F.

More specific meteorological and air dispersion data are available for the Allendale School Area. These data have been collected as part of GE's Facility PCB Air Monitoring Program. As part of this program, a sampling site was established within the Hill 78 Area, located just south of the Allendale School Property. In addition, meteorological and air dispersion data were collected to represent this general area at a meteorologic station location within East Street Area 2 (approximately 1,000 feet to the southwest). This program and the data derived from it are discussed in more detail in GE's final report on the PCB air monitoring program, prepared by Zorex Environmental Engineers in November

1992 (Zorex, 1992), and in the separate report by Zorex on the estimated PCB concentrations in the ambient air at the Allendale School Property, which is included as Appendix C to this report.

2.9 Utilities

Underground and overhead utilities servicing the buildings associated with, and located near, the Allendale School Property include electric, water, telephone, and sewer. Engineering drawings for the underground utility lines are presented in Appendix D.

Drawings for water distribution mains, sanitary sewer lines, and storm drainage lines are presented as Appendices D-1, D-2, and D-3, respectively. As indicated by these figures, each of these types of utilities are present beneath streets adjacent to, or located near, the school property. In addition, municipal stormwater and sanitary sewer lines traverse the school property in two places. Along the southern portion of the property, a 15-inch stormwater line passes beneath the property extending from the end of California Avenue across the southern portion of the property to a manhole located along the Tyler Street Extension at the southwest property boundary. A 12-inch sanitary sewer line is also shown to pass underneath the property in the vicinity of this 15-inch stormwater line. This sanitary line connects with another 10-inch sanitary line in the southwest corner of the property. Another stormwater line extends generally north to south within the western portion of the property. This line is a 42-inch concrete pipe which eventually connects to the same manhole as the other 15-inch stormwater line that traverses the southern portion of the property.

In addition to the municipal stormwater and sanitary sewer lines extending beneath the school property, a number of 6-inch drainage laterals were placed beneath the surface of the cap installed on the southern portion of the school property as part of the STM. These drainage laterals are designed to collect and discharge water to the existing municipal storm sewer system as shown in Figure 5 of the Potential Remedial Options Plan (figure reproduced in Appendix B).

SECTION 3 - SOURCE DESCRIPTION AND EXTENT OF FILL

3.1 General

Analysis of data collected during sampling efforts conducted at the Allendale School Property showed the presence of PCBs, at generally low levels, in portions of the property. The presence of these PCBs appears to be associated with a light brown, medium- to fine-grained, sandy fill material which was found to be present on the property at depths ranging from about 1.0 to 5.5 feet below the surface.

At the time of these sampling efforts and the implementation of the STM activities, the origin of these fill materials was unknown. However, as a result of a records review by GE, it was discovered that in 1950, during the construction of the Allendale School, GE gave the City of Pittsfield permission to remove soil from the GE facility. Correspondence related to this removal (contained in Appendix E) indicates that GE gave the City of Pittsfield permission to remove approximately 40,000 cubic yards of material from an area bordered to the north by GE's property boundary, on the east by a line parallel to and approximately 1,450 feet east of New York Avenue, to the west by a line that is parallel to and approximately 800 feet east of New York Avenue, and on the south by a line which is parallel to and approximately 250 feet south of the GE property line. The area from which the soil was removed is now known as the Hill 78 Area.

3.2 Extent of Fill and PCBs

In the MDEP's June 30, 1992 conditional approval letter of the MCP Phase II SOW, the MDEP requested GE to identify the extent of the fill and the PCB-containing soil areas within the Allendale School Property. Section 3.2.1

describes the vertical extent of fill and PCBs while Section 3.2.2 presents the horizontal extent.

3.2.1 Vertical Extent of Fill and PCBs

Three cross-sections have been prepared to illustrate the distribution of PCBs relative to the type of unconsolidated soils present in the subsurface. The locations of these cross-sections are shown on Figure 3-1 and the cross-sections are presented on Figures 3-2, 3-3, and 3-4. Descriptions of the Allendale School Property soils were obtained from existing boring logs and have been extrapolated to the cross-section location lines shown on Figure 3-1.

The soils at the Allendale School Property are not homogeneous as a result of mixing, which would have occurred during transportation and placement of the material. However, several primary soil types have been identified in the area. As shown on the three cross-sections (Figures 3-2, 3-3, and 3-4), a surface layer of "topsoil," approximately 6-inches thick and composed primarily of silt, was encountered at each boring location.

Along cross-section A-A', the surface topsoil is underlain by a well graded, light brown, medium-grained sand, as illustrated on Figure 3-2. This material is referred to as "fill sand" on some of the boring logs and extends to the north toward the school, intersecting the B-B' cross-section (Figure 3-3). The brown, medium-grained sand grades to a red, coarse-grained sand, which appears to be undisturbed, at the western and northern boundaries of the study area.

The vertical distribution of PCBs along cross-section A-A' is also illustrated on Figure 3-2. This cross-section represents some of the highest PCB concentrations detected at the Allendale School Property and is representative of the soils found adjacent to the Tyler Street Extension. (It should be noted that the cap that was placed as part of the STM activities covers all of these sampling locations that contained PCBs.)

PCBs were detected predominantly in the brown "fill" sand. PCBs were also detected, in some locations, in adjoining deposits, most likely the result of mixing during transport and placement of the soil. The vertical extent of the PCBs is fairly well defined along cross-section A-A'. PCB analysis of soil samples collected above the black peat and silt layer (which is most likely the original land surface prior to the placement of fill soil) detected PCBs in most of the samples, particularly in the middle of the cross-section. Fewer PCB detections were found toward the ends of cross-section A-A'. PCB analysis of samples collected from the black peat and silt layer did not detect any PCBs.

Cross-section B-B' is representative of the soil types and PCB concentrations found on the northern part of the school property (Figure 3-3). A deposit of brown silt with variable percentages of sand, gravel and clay overlies the brown, medium sand along cross-section B-B'. At depths of 3 to 10 feet across the study area, undisturbed deposits of clay, or peat and silt underlie the sand. Of the 88 samples analyzed for PCBs along cross-section B-B', only six samples had PCB concentrations above 2 ppm. Five of the six samples with PCBs greater than 2 ppm were at depths of greater than 5 feet below grade. The remaining sample (6 to 12 inches below grade at boring B-57) had a PCB concentration of 11 ppm. The vertical extent of PCBs along the northern part of the property is well defined, as at least the deepest sample collected at all borings deeper than 1 foot along this cross-section had a less than detectable PCB concentration (Figure 3-3).

Along cross-section C-C', the surface topsoil is underlain by a well graded, light brown, medium-grained sand beginning near the Tyler Street

Extension. The presence of this sand changes into brown silt and red-brown coarse sand near boring B-52 (Figure 3-4). The vertical extent of PCBs is fairly well defined along this cross-section. The majority of the PCBs were detected near the Tyler Street Extension at borings B-2, K-21, B-8, and B-16. An area exists between borings B-16 and B-48 where one shallow sample location (AS-7) exists. Although the PCB concentrations in this area are not fully defined, this area was capped as part of the STM activities. PCB results from samples collected near the northern end of cross-section C-C' indicated the presence of PCBs in the 6- to 12-inch increments at boring locations B-48 and B-57, at concentrations of 4.1 ppm and 11 ppm, respectively. Samples collected at borings B-68 and B-55, to depths of up to 6 feet, did not show any detectable concentrations of PCBs.

3.2.2 Horizontal Extent of PCBs

A summary depiction of the horizontal extent of PCBs at the Allendale School Property is presented on Figure 3-5. The maximum PCB concentration at each location was selected and placed in one of three categories on this figure: less than 2 ppm, 2 ppm to less than 50 ppm, or greater than or equal to 50 ppm.

As illustrated on Figure 3-5, of the samples collected at 62 locations outside of the capped area, only two locations had a PCB concentration of greater than 2 ppm at any depth. These samples were collected at borings B-66 and B-67 at depths of greater than 5 feet below grade. The cap does not cover these two locations because the MDEP's specification was that the cap should cover all locations containing greater than 2 ppm within the top 3 feet, and these samples were collected at depths of over 5 feet below grade. Thirty of the locations outside the capped area were analyzed for PCBs in 1-foot increments to a depth of four feet and did not detect PCBs above 2 ppm. The remaining 30 locations were analyzed for PCBs to variable depths and also did not detect PCBs above 2 ppm.

As illustrated on Figure 3-5, the horizontal extent of PCBs at the Allendale School Property is well defined. Although over 100 samples have been collected outside the capped area, PCBs have not been detected above 2 ppm, except at two locations at depths of greater than 5 feet below grade. A geostatistical evaluation of the horizontal extent of PCBs is presented in Section 5.3.

SECTION 4 - PRIOR ACTIVITIES

4.1 General

As previously mentioned in Section 1.3, concerns regarding the presence of PCBs in soils at the Allendale School Property were raised by the MDEP during construction of the Altresco Cogeneration Facility, due to the finding of PCBs in soils at the adjacent GE/Altresco property. As a result, the MDEP collected soil and surface water samples from the Allendale School Property in January 1990 and analyzed them for PCBs. The results indicated that PCBs at generally low levels were present in soils at the school property, but no PCBs were found in the surface water. The finding of PCBs in the soils led to several subsequent sampling events between April 1990 and September 1990, and the results of these activities led to the implementation of STM activities. Details regarding these activities and other related activities are presented in the following subsections.

4.2 Soil Investigations

As a result of the MDEP's finding of PCBs in soils at the Allendale School Property, Geraghty & Miller, Inc., of Albany, New York, a consultant to GE, conducted a soil sampling program on April 25, 1990, to further expand the existing database. This program included the collection of 34 samples from 24 locations on the school property and adjacent residential areas. Each of these samples was initially screened in the field for volatile organic compounds (VOCs) utilizing a photoionization detector (PID). No PID readings above background levels were detected. In addition, each sample was split into two parts with one part analyzed for PCBs, using EPA method 8080, and the other part provided to MDEP for independent analysis of select samples.

The results of both the MDEP and GE investigations identified an area within the school property where surficial soils were found to contain PCBs above the MDEP's stated level of concern (2 ppm). This area was located in the southeast corner of the school property, in a marshy area adjacent to the Tyler Street Extension. Based on these results, a fence was installed by GE to prevent access to this area.

Following these initial investigations, a phased sampling and analysis plan was implemented by GE during July, August, and September 1990, to further characterize the extent of PCBs. These efforts were designed to delineate both the vertical and horizontal extent of material containing PCBs above the MDEP's established level of concern. These efforts included the collection and PCB analysis of a total of 372 samples from 72 locations on the school property. Based on these investigations, the vertical extent of PCBs greater than 2 ppm was generally found to range from 0 to 6 feet below grade, and the horizontal extent of PCBs above 2 ppm in the top 3 feet of soil was determined to be approximately 2.5 acres. The results of the PCB analyses of the soil samples taken from the Allendale School Property are presented on Figure 4-1.

In addition to the data collected regarding the presence of PCBs, efforts were performed to assess the potential presence of other hazardous constituents in soils on the property. These efforts included the collection of five samples taken from locations within the area that contained PCBs in concentrations greater than the MDEP's level of concern and analysis of those samples for the constituents listed in Appendix IX of EPA's regulations at 40 CFR Part 264, plus three additional constituents -- benzidine, 2-chloroethyl vinyl ether, and 1,2-diphenylhydrazine (Appendix IX+3). These samples were collected in July 1990 from locations K-16, K-17, K-18, K-19, and K-20 (as shown in Figures 3-1 and 4-1). The results of the Appendix IX+3 analyses of these samples are presented in Table 4-1. These analyses showed, in addition to PCBs, the presence of:

(a) two VOCs that are common laboratory contaminants and are, thus, most likely attributable to laboratory contamination; (b) several semi-volatile organic compounds (SVOCs) at estimated concentrations below the applicable quantitation limits; (c) low concentrations of two chlorinated herbicides (unlikely to be related to GE); (d) low concentrations of polychlorinated dibenzofurans (PCDFs) at levels that would be anticipated to be associated with the presence of PCBs (note also that the PCDF analyses were subject to interferences by polychlorinated diphenyl ethers); and (e) various metals at concentrations that appear to be within regional background levels, as indicated by a comparison (also shown in Table 4-1) with background metals concentrations found in Housatonic River floodplain soils collected upstream of the GE Facility.

As part of a separate effort, additional soil sampling at the school property was conducted in March 1991 in connection with an interim measure proposed by HMM Associates, on behalf of Altresco Corporation, to plant trees at a number of locations on the school property (as well as certain other areas) which contained less than 2 ppm PCBs. In conditionally approving this interim measure, the MDEP had required additional sampling for PCBs at locations where trees were proposed for planting. In accordance with the MDEP's directive, samples (4-foot borings) were taken by Geraghty & Miller (on Altresco's behalf), in March 1991, at 30 such locations along the western, northern, and eastern boundaries of the school property and were analyzed in 1-foot increments for PCBs. The locations of these samples and the PCB results are shown on Figure 4-1. Each soil sample was also screened for VOCs with a PID, but no PID readings above background were found. As a result of this effort, additional information regarding PCB distribution was obtained at 30 locations on the Allendale School Property. As shown on Figure 4-1, all PCB concentrations from these samples were below 2 ppm. In fact, with the exception of two samples (1.2 ppm and 1.59 ppm), PCBs were not detected above 1 ppm.

4.3 Short-Term Measure Activities

As a result of the 1990 soil investigations described above, GE and the MDEP evaluated a range of remedial options for reducing the potential for human contact with soils containing PCBs above the MDEP's level of concern (2 ppm). GE's evaluation was presented in a document entitled "Study of Potential Options for PCB-Containing Soils at the Allendale School Property" (Blasland & Bouck, September 1990). The MDEP conditionally approved the containment/capping option in a March 15, 1991, letter to GE. As conditionally approved by the MDEP, the STM was to involve the placement of a minimum of 2 feet of "clean" soil (and a geotextile layer) over all areas where soil PCB concentrations exceeded 2 ppm within the top 3 feet of existing soil. In addition, improvements to the existing surface water drainage system in the area were to be implemented and a vegetative cover was to be placed over the surface of the area. The MDEP's conditions were incorporated into the study and a revised version of the report entitled "Study of Potential Remedial Options for PCB-Containing Soils at the Allendale School Property" was submitted in April 1991 (Blasland & Bouck, April 1991).

Construction activities for this STM were initiated in June 1991 after school had recessed for the summer. In accordance with the MDEP's letter of March 15, 1991, two composite grab soil samples were collected on July 3, 1991 from the soil pile that was to be used to construct the cap. This soil came from off-site sources (a soil pile stored at the construction contractor's facility) and thus should represent general "background" soil. Of these two soil samples, one (MF-1) was analyzed for PCBs, pesticides, and herbicides, and the other (MF-2) was analyzed for the Appendix IX+3 constituents. The results of these analyses are included in Table 4-1 (and the underlying analytical data sheets are included in Appendix G). No PCBs or pesticides/herbicides were detected in these soils. The other constituents found in sample MF-2 included low levels of two VOCs (below 0.002 ppm) and several SVOCs (all below 2 ppm), as well as a number of metals at background levels. These results were submitted to, and approved by, the MDEP.

Construction activities at the school property were completed in the summer of 1991, in accordance with the conditions set out by the MDEP. Thus, a minimum of a 2-foot soil cap, along with a geotextile layer, was placed over all areas of the school yard which showed PCB concentrations in excess of 2 ppm in the top 3 feet of soil.

As constructed, the cap covers an area of approximately 5 acres. In addition to grading the cap to enhance surface drainage, additional surface drainage pipes were installed within the cap to improve the conveyance of surface water from upgradient residential areas to the City of Pittsfield's stormwater system. A section of the cap was overlain with sod while the remainder was seeded before school resumed in September 1991.

An inspection schedule, calling for one visual inspection every six months, has been developed to monitor the condition of the cap. Any repairs that are identified by GE or the MDEP are promptly initiated.

SECTION 5 - MCP PHASE II INVESTIGATION

5.1 General

Prior investigations and activities at the Allendale School Property produced much of the information required by the MCP, 310 CMR 40.545(3), for a Phase II - Comprehensive Site Assessment. The additional investigative activities proposed as part of the MCP Phase II SOW were designed to: (1) obtain historical land use information pertaining to the Allendale School Property; (2) evaluate the data on PCBs in soils through geostatistical methods to verify the extent of PCBs in the soil at the property; (3) further define groundwater quality and flow direction in the area and evaluate the extent of groundwater quality impacts (if any) at the property; and (4) estimate the concentrations of PCBs in the ambient air at the site. In addition, in its conditional approval letter of June 30, 1992, the MDEP directed GE to compare the presence of other constituents found at low levels in the soil at the property (specifically, herbicides and SVOCs) to background levels of those constituents. The results of these activities are detailed below.

5.2 Historic Land Use Information

Historical information relating to previous land uses of the Allendale School Property has been compiled and reviewed as part of Phase II activities. Review of the available information reveals the following:

The Allendale School Property was originally a part of the Allen Farm established in 1886 by the late William Russell Allen. The Allen Farm was comprised of 1250 acres generally bordered by the Lanesboro town line to the north, the Boston & Albany Railroad tracks to the south, Benedict Road to the west, and the Coltsville town line to the east (Berkshire Eagle, no date).

Until 1919, the Allen Farm was used to breed, raise, and train trotting horses. In 1919 the Allen Farm was offered for sale after the death of the late

William Russell Allen in 1916. In 1920, several hundred acres of the Allen Farm located south of Dalton Avenue were purchased by the Pittsfield Industrial Development Company with the anticipation that the General Electric Company might need the land for future expansion (Berkshire Eagle, no date).

In 1920, GE purchased a portion of the Allen Farm located east of what is now Plastics Avenue. Later, in 1927, GE purchased an additional portion of the Allen Farm connecting the main plant with the property located east of Plastics Avenue. These parcels of land were both purchased from the Pittsfield Industrial Development Company. The remaining portions of the Allen Farm, owned by the Pittsfield Industrial Development Company, were slated for housing development (Berkshire Eagle, no date).

In 1950, the 12-acre parcel of land now referred to as the Allendale School Property (formerly a portion of the Allen Farm) was purchased from the Pittsfield Industrial Development Company by Daniel England, Carolyn England Singer, and Benjamin England. This parcel was then donated by these individuals to the City of Pittsfield in memory of the late David England Sr. (Berkshire Eagle, 1950). The Allendale School was built on this property in 1950 and 1951.

5.3 Geostatistical Analysis of Soils Data

In its March 6, 1992 letter, the MDEP requested GE to evaluate whether the extent of PCBs in soil at the Allendale School Property had been determined. As proposed in the MCP Phase II SOW, and conditionally approved by the MDEP, the PCB soil data at the Allendale School Property were analyzed using geostatistical methods as described below.

Kriging was the geostatistical tool used in the analysis of PCB extent at the Allendale School Property. Kriging is an unbiased estimating technique which is potentially useful in situations where there is dense sample spacing and the underlying reasons for spatial variation are largely unknown (i.e., random error predominates). In other situations, this technique is a poor substitute for professional judgements and knowledge of the physical/chemical processes which govern the distribution of constituents within a given area. Such knowledge should be applied where available in interpreting spatial distributions of constituents.

Results from soil sampling and PCB analysis at 125 locations were used in the geostatistical analysis of PCB extent at the school property. The geostatistical methods used in this analysis require that coordinates (northings and eastings) be assigned to each sampling location. In addition, a single PCB concentration must be assigned to each location. Eastings and northings were estimated for each of the 125 sampling locations by scaling off of Figure 4-1. When more than one sample was collected from a soil boring at a given location, the maximum observed PCB concentration in the first 3 feet below grade was assumed to represent the PCB concentrations at that location. This assumption overestimates the PCB concentrations present in surficial soils, but facilitates a conservative evaluation of the extent of PCBs in soil at the Allendale School Property.

Using this approach, the maximum PCB concentrations in the borings ranged from 0.012 ppm to 1,100 ppm. As is typical of PCB concentrations in environmental media, the data were not normally distributed and were highly skewed. The normal probability plot and summary statistics for the data generated by the geostatistical software package Geo-EAS are shown in Appendix F. The data more closely fit a log-normal distribution than a normal distribution as shown by the normal probability plot and summary sheet for the natural log-transformed data in Appendix F. However, the log-transformed probability plot does exhibit some flattening of the curve as a result of a large number of less than detectable concentrations.

Each of the geostatistical methods used in this analysis uses two basic geostatistical tools. These tools are the development of a semivariogram and estimation by kriging. The semivariogram is a fundamental component of any geostatistical analysis. The semivariogram models the spatial correlation of a variable as a function of distance. The spatial correlation will generally show that samples that are taken close together tend to be more alike than samples taken further apart. The variogram indicates both the amount of the correlation and the distance at which samples become independent (uncorrelated). Within the range of correlation, information can be shared between locations with closer, more highly correlated locations sharing more information. Kriging is a weighted moving-average procedure where the weights assigned to nearby sampling locations are based on the best linear unbiased estimator as determined from the spatial variability defined by the semivariogram. Kriging has the advantage of not only computing an estimated value at each point, but also computing the variance associated with the estimate.

The soils PCB data were examined using two geostatistical techniques. The first method involved use of a non-parametric geostatistical technique for which knowledge of the underlying population distribution is not required. The soil PCB concentrations were first ranked from highest to lowest (1 to 125). A semi-variogram was then created based on the assigned ranks and distance between sample locations (the distance between sample locations is calculated based on the coordinates of each location). A computational grid with a 30-foot by 30-foot spacing was superimposed on the school property. (Selection of a 30-foot by 30-foot grid yields some 750 estimated PCB concentrations, which is a fairly dense data set.) Kriging was used to estimate a "rank value" for each grid node. These estimated rank values in the grid were correlated with selected PCB concentrations to develop contour lines reflecting the selected concentrations, as shown on Figure 5-1. For example, locations ranked 38 or less of the 125 sample locations had a maximum soil PCB concentration greater than 2 ppm. Conservatively, a rank value of 40 was selected as the contour interval to represent the concentration of 2 ppm in Figure 5-1. Other contours shown in Figure 5-1 were developed in a similar fashion.

The second method assumed a log-normally distributed population and used log-transformed PCB concentrations during the statistical analysis. In the second procedure, the natural logs of the maximum soil PCB concentrations were computed for each sampling location. A semivariogram was developed based on the natural log of PCB concentrations and the distance between locations. Kriging was used to compute an estimated natural log value at each node of the 30 foot by 30 foot grid. The kriged natural log values were retransformed to concentration units and multiplied by a bias correction factor based on the computed variance. The bias is a mathematical artifact of the log transformation. The bias correction factor ranged from 3 to 31 percent, depending on the location of the grid node. Estimated maximum soil PCB concentration contours using the log-transformed data are shown in Figure 5-2.

As illustrated on Figures 5-1 and 5-2, the estimated PCB distributions obtained using the two geostatistical techniques presented above are quite similar. In both cases, the estimated extent of PCBs greater than 2 ppm -- using the conservative assumption that the maximum PCB concentration within the top 3 feet of soil represents the PCB concentration at that location -- is under the capped area. The 1 ppm isopleth is generally under the capped area with the exception of small areas in the southwestern corner of the site and between the eastern edge of the cap and Virginia Avenue. The estimated 2 ppm isopleth extends into a small area in the southeastern corner of the site as illustrated on Figures 5-1 and 5-2. This occurrence is an artifact of the weighting scheme used by the kriging algorithm and is not representative of an actual occurrence of PCBs at this concentration. In other words, this anomaly is caused by a large number of samples under the capped area with PCB concentrations of greater than 2 ppm.

As illustrated on Figures 5-1 and 5-2 the extent of PCBs at the Allendale School Property is well defined, and concentrations above the MDEP level of concern are under the capped area.

5.4 Groundwater Sampling and Analysis

5.4.1 Piezometer Installation and Sampling Activities

The MDEP's March 6, 1992 letter directed that a groundwater sampling program be undertaken at the Allendale School Property to better determine groundwater quality in the area and to better define the groundwater flow direction. The MDEP's letter specified that this program should include the installation and sampling of two new groundwater monitoring wells -- one well located between the residences to the east of the school yard and the east edge of the cap, and the other well located upgradient of the school yard, within the northern portion of the school property. These wells were intended to supplement a number of wells that are downgradient of the Allendale School Property at or near the Hill 78 Area.

With the MDEP's concurrence, as provided in the MCP Phase II SOW, two temporary piezometers were installed and sampled in lieu of monitoring wells. These two temporary piezometers (A-1 and A-2) were installed at the locations shown on Figure 5-3. Groundwater data collected from piezometer A-1 were expected to aid in determining groundwater quality in the area, while data from piezometer A-2 were expected to provide information related to upgradient conditions. In addition, water level elevation data from these two piezometers, along with water level data from existing monitoring wells 78-1, 78-6, NY-3, and NY-4 (shown on Figure 5-3), were to be collected to better define the groundwater flow direction in this area.

The temporary piezometers were installed by Clean Berkshires, Inc. for GE on August 25, 1992. They consisted of a 2-inch threaded steel casing with 9 feet of 0.020 slotted stainless steel screen. The casings were joined together with threaded couplings and the terminal end of the piezometer consisted of a steel well point. The piezometers were installed to a depth of approximately 9 feet using a tripod rig with a 140 pound hammer. Each of the piezometers was capped, locked, and fenced to prevent unauthorized access.

On August 31, 1992, groundwater elevation measurements were taken at the two temporary piezometers as well as at monitoring wells 78-1, 78-6, NY-3, and NY-4. On the same day, groundwater samples were collected from the two temporary piezometers by Blasland & Bouck Engineers. These groundwater samples were collected with teflon bailers, placed in precleaned laboratory containers, and stored in an isolated cooler iced to 4°C. Samples were shipped overnight under chain-of-custody to IT Analytical Services (ITAS) of Knoxville, Tennessee, for analysis. The samples were analyzed by ITAS for the VOCs listed in the Contract Laboratory Program (CLP) Target Compound List (TCL), plus 1,2,4-trichlorobenzene using EPA Method 8240. In addition, unfiltered groundwater samples were analyzed for PCBs using EPA Method 8080.

Prior to collection of the groundwater samples, each piezometer was purged in an attempt to "develop" the piezometers and to remove standing water in order to collect "representative" groundwater samples. All purge water was containerized and disposed of properly. Purging of piezometers was achieved in accordance with the field procedures outlined in the Sampling and Analysis Plan (Blasland & Bouck, September 1990).

Following this sampling event, but before receipt of the analytical results from ITAS, the two temporary piezometers were abandoned by removing the piezometer casings and well points and sealing the boreholes with bentonite grout slurry and covering them with topsoil. The piezometers were removed for safety reasons prior to the beginning of the school year in September 1992, with MDEP concurrence. Following this removal it was determined that the groundwater samples had been analyzed for PCBs in an unfiltered condition only (rather than both filtered and unfiltered). This procedure allows for potential effects associated with suspended solids present in the groundwater samples which are not necessarily reflective of any PCB migration in groundwater.

As a result, GE requested and received permission from the MDEP to re-install and re-sample temporary piezometers at the same locations during the school's Christmas recess. Such temporary piezometers were re-installed on December 28, 1992, at approximately the same locations as the previous piezometers, as shown on Figure 5-3. Each piezometer consisted of a 2-inch threaded steel casing with 5 feet of 0.020 slotted stainless steel screen. The casings were joined together with threaded couplings and the terminal end of the piezometer consisted of a steel well point. New piezometers A-1 and A-2 were installed with a sledge hammer by Clean Berkshires, Inc., to depths of 9.53 and 7.68 feet below grade, respectively. Each of the piezometers was capped, locked, and fenced to prevent unauthorized access.

On December 30, 1992, groundwater samples were collected from these new piezometers by Blasland & Bouck Engineers using the same procedures described above, and were shipped overnight to ITAS under chain-of-custody for expedited analysis. These samples were analyzed by ITAS for PCBs, using EPA Method 8080, in both unfiltered and filtered states. In addition, on December 30, 1992, water elevation data were collected from the two new temporary piezometers and from existing monitoring wells 78-1, 78-6, NY-3, and NY-4 (see Figure 5-3). On December 31, 1992, the top-of-casing elevations of the piezometers were surveyed by Hill Engineers, Inc. The two temporary piezometers were then removed, and the boreholes were sealed with bentonite grout slurry and covered with topsoil. The measuring point elevations and groundwater elevations measured in December 1992 are shown in Table 5-1.

5.4.2 Analytical Results

The analytical results of the groundwater samples collected during both sampling events are presented in Table 5-2. The results of the August 1992 sampling event show the presence of PCBs in the unfiltered samples at a concentration of 0.9 ppb in piezometer A-1 and at a concentration of 4.2 ppb in piezometer A-2. Methylene chloride, acetone, and 1,2,4-trichlorobenzene were also detected in the sample from piezometer A-1 and in the associated method blank, while methylene chloride and acetone were detected in the sample from piezometer A-2 and the associated method blank.

The analytical results from the December 1992 sampling event show the following: total PCBs were detected in groundwater at piezometer A-1 at a concentration of 0.6 ppb, while the PCB analysis of the filtered sample from this location showed no detectable PCBs; PCBs were detected in an unfiltered groundwater sample at piezometer A-2 at a concentration of 1.3 ppb in the original sample and at 1.1 ppb in a blind duplicate sample; and PCB analysis of filtered groundwater from piezometer A-2 indicated the presence of PCBs at a concentration of 0.19 ppb in the original sample and at 0.17 ppb in a blind duplicate sample.

The analytical laboratory data sheets from these sampling events are included in Appendix G in an organized way.

5.4.3 Interpretation of Groundwater Results

The lack of any VOCs (other than those present in the method blanks) in groundwater during the August 1992 sampling event at piezometers A-1 or A-2 indicates that VOCs are not of concern at the Allendale School Property.

The presence of PCBs in unfiltered groundwater samples at low parts per billion levels is not unexpected given the subsurface PCBs present in the school yard and the low but detectable concentrations of PCBs (below 2 ppm) present in areas near the locations of piezometers A-1 and A-2 (see Figure 4-1.) In addition, because piezometers do not undergo a rigorous development process, the likelihood of small soil particles with sorbed PCBs being suspended in groundwater is increased. The presence of PCBs at low levels in the filtered groundwater samples at piezometer A-2 may be attributable to PCBs sorbed to colloidal particles in groundwater. Measured PCB levels in filtered water samples were not much higher than the detection limit (generally 0.065 ppb, but in a few cases at slightly higher or lower levels). At these low levels, it is difficult to precisely quantitate PCB concentrations, and hence the numerical values should be viewed with caution. Indeed, MDEP's proposed revisions to the MCP (January 1993) indicates a practical quantitation limit of 0.325 ppb.

Figure 5-4 presents a potentiometric groundwater surface map for the area based on groundwater level measurements made on December 30, 1992. As shown on Table 5-1, the construction depths and screened intervals of the monitoring wells and piezometers in the vicinity of the Allendale School Property are variable. However, with the exception of NY-4, each monitoring point has been screened to intersect the surface of the groundwater table. NY-4 is screened from a depth of 18 to 33 feet, approximately ten feet below the water table surface in an area of interbedded silt and sand. Due to the possible influence of vertical components of flow on the measurement obtained at well NY-4, this data point has not been considered in preparation of Figure 5-4.

As illustrated on Figure 5-4 the potentiometric surface of the groundwater table appears to be influenced by localized topography. An example of this is the component of flow from the east near Virginia Avenue, which is towards the school property. The topography of this area consists of a slope that begins further to east and ends at Virginia Avenue. The groundwater table is also fairly shallow (approximately 3 feet below grade) in the vicinity of piezometer A-1. This observation is consistent with the historically poor drainage experienced in this area. Groundwater flow from the area near the Allendale School is towards the south-southwest. Observations of groundwater flow from areas within the GE facility indicate that the overall groundwater direction in this area is to the south towards the Housatonic River.

5.5 Air Monitoring

To determine the ambient air levels of PCBs at and near the GE Facility, a year-long air monitoring program for PCBs was conducted from August 1991 to August 1992. A final report summarizing the results of this program was submitted to the MDEP in November 1992 (Zorex, 1992). This program included an air monitoring station at the GE Hill 78 Area just south of the Allendale School Property. This station showed a mean PCB concentration of 0.0007 ug/m^3 over the year-long period.

Zorex Environmental Engineers has prepared a separate report evaluating the ambient PCB data from the Hill 78 Area monitoring station in relation to meteorological parameters measured during the monitoring program and potential source areas, and using air dispersion modeling to estimate ambient air concentrations of PCBs at the Allendale School Property. That report is attached as Appendix C. Its principal conclusions are as follows:

- o Statistical analysis shows that the mean ambient PCB concentration at the Hill 78 Area monitor (0.0007 ug/m^3) was not significantly above the detection limit used (0.0005 ug/m^3).
- o Ambient PCB concentrations at, and near, the GE Facility appear to be related positively with ambient temperature on a seasonal basis. In general, the highest PCB concentrations were recorded in the summer months. The mean summer PCB concentration at the Hill 78 Area monitor was 0.0011 ug/m^3.
- o Apart from temperature, no significant relationships can be discerned between ambient PCB concentrations recorded at the Hill 78 Area monitor and other meteorological parameters such as wind direction, wind speed, and atmospheric stability class.
- o The most likely source of the PCBs detected at the Hill 78 Area monitor is the Hill 78 Landfill. Based on this assumption, air dispersion modeling has been used to estimate PCB concentrations in nearby areas, including the Allendale School Property. After accounting for the general background levels of PCBs in the ambient air, this modeling results in an estimated maximum source impact at the Allendale School Property of: (a) mean annual PCB concentrations ranging from 0.00008 ug/m^3 or less on the northern side of the property to 0.00048 ug/m^3 on the southern edge; and (b) mean summer PCB concentrations ranging from the 0.0001 ug/m^3 on the northern side to 0.0011 ug/m^3 on the southern edge.
- o After adding back the estimated background levels of PCBs (0.00025 ug/m^3), the total estimated ambient PCB concentrations at the Allendale School Property on an annual basis range from 0.00033 ug/m^3 to

0.00073 ug/m^3 and those for the summer range from 0.00035 ug/m^3 to 0.00135 ug/m^3.

- o Due to uncertainties about the source(s) of the PCBs measured at the Hill 78 monitor, it is useful, as a sensitivity analysis, to make the alternative assumption that the PCB concentrations measured at the Hill 78 monitor are representative of those on the school property. This approach would indicate that the average concentrations on the school property including background are 0.0007 ug/m^3 on an annual basis and 0.0011 ug/m^3 for the summer. These values fall within the range of modeled PCB concentrations on the school property after background is added in, thus lending support to the modeling results.

Based on review of this report, it appears that the total annual average ambient PCB concentration at the Allendale School Property is not significantly above the detection limit used (0.0005 ug/m^3), and that the maximum annual average source (non-background) contribution is below that level.

These ambient PCB concentrations for the Allendale School Property are well within or below the ambient air PCB concentrations measured in other areas in the U.S., as shown in Table 5-3.

5.6 Evaluation of Non-PCB Constituents in Soils in Relation to Background

The MDEP's conditional approval letter for GE's Phase II SOW stated that, for the Phase II Report, GE should evaluate the presence of non-PCB constituents found at low levels in the soil at the Allendale School Property (specifically, SVOCs and herbicides) and compare the concentrations of those constituents to background levels. According to the MDEP's letter, constituents found to be above background must be evaluated in the Risk Assessment.

As discussed in Section 4.2 and shown in Table 4-1, the Appendix IX+3 analyses of selected soil samples from the school property indicated low levels of a number of constituents in addition to PCBs. The only VOCs found were common laboratory contaminants, most likely attributable to laboratory contamination. The SVOCs found in the in-situ were all at estimated concentrations below quantitation limits and were below the concentrations detected in the composite grab sample of the soils used for capping, which came from off-site sources and thus should represent background. The metals found were at concentrations within the range of local background levels, as shown in Table 4-1. The herbicides found consisted of 2,4,5-T at two locations and 2,4,5-TP at one location, all at low levels (see Table 4-1). These low and isolated levels of herbicides are most likely attributable to common lawn care practices rather than releases from the GE facility. As an illustration of the magnitude of the detected concentrations, it is useful to compare the 2,4,5-T and 2,4,5-TP concentrations detected at the Allendale School Property to data collected in other areas. For example, in surface soils (top six inches) collected from five counties in Alabama, concentrations of 2,4,5-T were found to range from non-detectable to greater than 0.1 ppm (Howard, 1991). The concentrations of 2,4,5-T and 2,4,5-TP detected at the Allendale School Property, which ranged from non-detectable to 0.07 ppm, are well within that range. In these circumstances, it does not seem necessary or warranted to make any further evaluation of these constituents.

In addition, low levels of PCDFs were found in the soils at the Allendale School Property, as would be expected in an area that contains PCBs. It should be noted that PCDF analyses of the Allendale samples were subject to interferences by polychlorinated diphenyl ethers. In any event, the sampling locations where the PCDFs were found are now covered by the two-foot soil cap. Nevertheless, further consideration will be given to the appropriate handling of the PCDFs in the Risk Assessment/Characterization for this property.

SECTION 6 - FATE AND TRANSPORT CHARACTERISTICS

The principal chemical of concern detected at the Allendale School Property is PCBs. Hence, this section provides a general characterization of the environmental fate and transport properties of PCBs.

The PCBs found in the soil at the Allendale School Property consisted predominantly of Aroclor 1260, with additional detections of Aroclor 1254 in a few samples. Aroclor 1254 was also detected in certain soil samples that were collected as part of the tree planting interim measure. The PCBs detected at low concentrations in the unfiltered groundwater samples consisted of Aroclor 1254 and Aroclor 1260. The PCBs detected in the filtered groundwater samples were measured as Aroclor 1254. It should be noted that some of these detections of PCBs in groundwater samples are in the neighborhood of the analytical detection limit. At these low levels, the potential errors in precisely quantitating PCB concentrations limit the value of individual observations.

Table 6-1 presents the water solubility, log octanol/water partitioning coefficient (log Kow), vapor pressure, and Henry's Law constant for these PCB Aroclors. Such chemical properties, when taken in combination with the physical properties of the surrounding matrix and the environmental factors to which the matrix and chemicals are subjected, determine a chemical's transport in the environment.

The overall volatility of a pure compound is measured by its vapor pressure. However, since some compounds in the environment are dissolved in water, the tendency of a compound to remain in the water matrix (as measured by its Henry's Law constant) must be considered.

The Henry's Law constant provides an indication of the tendency of a compound to volatilize from water, and thus provides a means of ranking the relative volatility of a chemical (Verschueren, 1983). The Henry's Law constant for a given constituent can be calculated by dividing the vapor pressure of a compound by its water solubility.

Water solubility also affects the biodegradability of a compound and chemical transport through the soil column. In addition, water solubility can affect chemical transformation potential via such processes as hydrolysis, photolysis, and oxidation.

The octanol/water partitioning coefficient (Kow) of a compound represents the tendency of the compound to partition between a nonpolar organic constituent (i.e. octanol) and water. The Kow has been shown to correlate well with both the water solubility and the soil/sediment adsorption coefficient, and can be used in the estimation of these properties.

The fate and transport of PCBs in the environment are greatly influenced by their low water solubility and high affinity for soil organic matter. In general, the adsorption of PCBs to soils increases with increasing soil organic content, decreasing soil particle size, and increasing congener chlorination (Lyman et al., 1982; Pignatello, 1989). While theoretical aqueous-phase PCB concentrations are in the low parts-per-billion levels (Baker et al., 1986; Dragun, 1989), (Table 6-1), the actual aqueous-phase PCB concentrations that are typically detected in the environment are often lower (unless affected by suspended particles). PCBs could potentially volatilize from soil, but strong adsorption to soils tends to limit the extent of volatilization (ATSDR, 1989).

PCBs are fairly persistent in the environment and degradation via chemical oxidation, hydrolysis, and photolysis in terrestrial or aquatic systems is generally insignificant. PCBs may, however, be subject to loss via biotransformation and biodegradation. Experimental evidence indicates that PCBs are susceptible to biodegradation under both aerobic and anaerobic conditions. In general, the degradability of PCB congeners under aerobic conditions increases as the degree of chlorination decreases. Variations in this trend exist and are attributed to preferential degradation of meta- and para-substituted PCBs.

Field and laboratory research has shown that the lesser chlorinated PCB congeners are subject to aerobic biodegradation by microorganisms indigenous to soils. Aerobic biodegradation can result in a complete breakdown of the PCBs, causing a net decrease in total PCB concentrations. Various breakdown products have been identified, and include chlorinated catechol, chlorobenzoic acid, and carbon dioxide (Bedard et al., 1987a; 1987b; Hankin and Sawhney, 1984; Fries and Marrow, 1984).

As with aerobic degradation, preferential degradation of meta- and para-substituted congeners has been observed under anaerobic conditions (Quensen et al., 1988). Field and laboratory research has shown that the more highly chlorinated PCBs are transformed to less chlorinated congeners by anaerobes (Quensen et al., 1988) and that the lower chlorinated PCBs may be further degraded to carbon dioxide, water, and chloride by aerobes (Chen et al., 1988).

SECTION 7 - POTENTIAL MIGRATION PATHWAYS

This section discusses the potential migration pathways associated with the PCBs that have been observed in soils at the Allendale School Property. This section takes into account the physical and environmental setting of the property (Section 2), the results of the investigations (Sections 4 and 5), and the fate and transport characteristics of the PCBs observed (Section 6). (Potential receptors and exposure points and routes will be identified and discussed in connection with the Risk Assessment/Characterization for this property, as described in Section 8.2 below.)

Previous investigations have revealed that the PCBs at the Allendale School Property tend to be associated with a light brown sandy soil in the southern portion of the property. Theoretical release mechanisms for the PCBs in the soil/fill material at the site include: 1) volatilization; 2) dust uplift; 3) transport in storm water runoff and flooding; and 4) leaching or direct releases from subsurface soil/fill, possibly to groundwater.

The potential for volatilization of a chemical constituent from soil is a function of the physical properties of the chemical (e.g., vapor pressure, Henry's Law constant, and Kow), the physical and chemical characteristics of the soil matrix (e.g., soil compaction, percent organic matter), and environmental factors (e.g., weather conditions). At the Allendale School Property, the propensity for volatilization of PCBs from soil is expected to be insignificant given the high affinity for these chemicals to bind to organic matter. In addition, the areas where PCBs above the level of concern were detected are covered by a soil cap of a minimum of 2 feet, thus further reducing any volatilization to the air.

The potential for chemical migration via fugitive dust emissions is also considered to be insignificant because soil and grass cover the area and surficial soils in the southeastern portion of the site are somewhat moist, given the historically poor drainage of the area. In addition, the capping of approximately 5 acres of the property is expected to successfully impede any potential for chemical transport via fugitive dust emissions.

The potential for chemical transport via storm water runoff is mainly governed by the location and topography of the site. The only surface waters in the general vicinity of the site include the Housatonic River and Unkamet Brook. As discussed previously (Section 2.4 - Flooding Potential), the site is outside the 500-year floodplain associated with these two water bodies, and direct uplift and transport of suspended soils during flood stages is not expected. The southeast corner of the site is marshy, and has previously demonstrated periodic inundation. Indeed, since much of the site retains substantial amounts of precipitation, significant migration via overland runoff is not expected to occur. The recent installation of drainage laterals and a retention area should not increase the potential for significant storm water runoff. Samples collected by the MDEP in 1990 from this area did not identify the presence of any site-related constituents in standing surface water. Therefore, direct partitioning from the soils to standing water has not been observed nor is it expected. This is consistent with the known affinity for PCBs to bind to organic matter and resist partitioning into aquatic media.

The potential for leaching of chemical constituents to groundwater and subsequent migration is expected to be low because of the high affinity of PCBs to adsorb to soils. While low levels of PCBs have been detected in groundwater, these concentrations were mainly associated with unfiltered samples from shallow piezometers. Low levels of PCBs were also detected in one filtered groundwater sample (and a duplicate) at a concentration very close to the detection limit. This filtered PCB result may reflect some migration to, and potential transport of, PCBs via groundwater. It seems more likely, however, that the presence of low levels of PCBs in this groundwater sample can be attributed to fine suspended or colloidal particulates entrained in the groundwater due to the difficulties in attempting to develop the piezometers.

SECTION 8 - CONCLUSIONS AND FUTURE ACTIVITIES

8.1 Conclusions

Investigations of the Allendale School Property have revealed the presence of PCBs in the soil, mainly associated with sandy soil/fill material that was probably transported to the site from the GE facility when the school was constructed in 1950-51. The horizontal extent and vertical extent of the PCBs in the soil have been well defined. In 1991, a STM was implemented which included the placement of a cap of a minimum of two feet of clean soil, along with a geotextile layer, over all areas of the school yard where soil PCB concentrations exceeded 2 ppm within the top three feet of existing soil. Geostatistical analysis indicates that all areas containing PCB concentrations above 2 ppm (the MDEP's level of concern for this site) are under this cap. Analysis of soil samples for other hazardous constituents reveals no other constituents of concern at this site (except, possibly for PCDFs).

Groundwater sampling and analysis shows that VOCs are not present in the site groundwater. Concentrations of PCBs in unfiltered groundwater samples were found to range from 0.6 ppb to 4.2 ppb. Concentrations of PCBs in filtered groundwater samples were found to range from non-detectable to 0.19 ppb (which is close to the analytical detection limit).

Ambient air concentrations of PCBs at the Allendale School Property have been estimated based on extrapolations from air concentrations measured at the Hill 78 Area south of the school property, using dispersion modeling techniques. This analysis indicates that the average non-background PCB concentrations at the school property range from 0.00008 ug/m^3 to 0.00048 ug/m^3 on an annual basis and from approximately 0.0001 ug/m^3 to 0.0011 ug/m^3 during the summer months, and that the average total ambient PCB concentrations at the school property (including general background PCB levels) range from approximately

0.00033 ug/m^3 to 0.00073 ug/m^3 on an annual basis and from 0.00035 ug/m^3 to 0.00135 ug/m^3 during the summer months. A sensitivity analysis that compared these estimated values to the concentrations measured at the Hill 78 Area monitor was performed. This analysis indicates that the modeled results at the Allendale School Property are generally comparable to those measured at the Hill 78 Area monitor on both an annual and a seasonal (summer) basis, thus lending support to the modeling results.

Review of the available data on the Allendale School Property does not indicate a need for supplemental Phase II field investigations.

8.2 Future Activities

The MCP Phase II SOW for the Allendale School Property provided that, if no supplemental Phase II investigations are required, a Risk Assessment/Characterization Scope of Work would be submitted following receipt of the MDEP's approval of the Interim Phase II Report. As noted above, review of the available data on the school property does not indicate a need for supplemental field investigations at this time. Accordingly, it is proposed that a Risk Assessment/Characterization SOW be submitted to the MDEP within 60 days after the MDEP's approval of this Interim Phase II Report, unless the MDEP determines that supplemental investigations are necessary. Upon MDEP approval, the Risk Assessment/Characterization will be performed in accordance with the procedures and schedule set out in that SOW, and the results will be included in a Final Phase II Report on this site.

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Tables

TABLE 2-1

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

SUMMARY OF HISTORICAL AERIAL PHOTOGRAPHS ILLUSTRATING ALLENDALE SCHOOL PROPERTY: 1942 - 1990

Date	Photographer	Approximate Scale of Photos	Coverage of Photos
July 13, 1942	Nat. Arch.[1]	1:16,300	Full coverage of property before construction of school.
October 3, 1957	Col-East[2]	1:19,200	Full coverage of school property
April 14, 1969	Col-East	1:4,800	Southeast corner of school property
March 21, 1979	Col-East	1:6,000	Southeast corner of school property
April 13, 1983	Quinn[3]	1:12,000	Full coverage of school property
November 1, 1987	Col-East	1:19,200	Full coverage of school property
April 23, 1990	Lockwood[4]	1:6,000	Full coverage of school property

Notes:

[1]Nat. Arch. - USGS National Archives, Washington, D.C.
[2]Col-East - Col-East, Inc., North Adams, Massachusetts
[3]Quinn - Quinn Associates, Inc., Horsham, Pennsylvania
[4]Lockwood - Lockwood Mapping, Inc., Rochester, NY

TABLE 4-1

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

SUMMARY OF APPENDIX IX+3 CONSTITUENTS DETECTED IN SOILS
(Dry Weight Parts Per Million, ppm)

Parameter[1]	In-situ Soils[2]						Background Soils (used for site cap)[3]	
	K-16 (0-1.5')	K-17 (0-1.5')	K-17 (0-1.5') (Dup.)	K-18 (0-1.5')	K-19 (0-1.5')	K-20 (0-1.5')	MF-1 (Grab Composite)	MF-2 (Grab Composite)
Volatiles								
Methylene Chloride	0.009	0.009	0.006	0.007	0.004J[5]	0.004J	NA[6]	ND
Acetone	ND[7]	ND	ND	ND	0.014	0.009J	NA	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	NA	0.0012
Tetrachloroethene	ND	ND	ND	ND	ND	ND	NA	0.0019
Semivolatiles								
Fluoranthene	0.100J	0.130J	0.065J	0.160J	0.090J	0.055J	NA	1.86
Pyrene	0.110J	0.130J	0.066J	0.170J	0.088J	0.068J	NA	1.66
bis(2-ethylhexyl) phthalate	0.210J	0.240J	0.270J	0.270J	0.210J	0.300J	NA	ND
Benzo(a)anthracene	ND	0.038J	ND	0.050J	ND	ND	NA	0.820
Benzo(b)fluoranthene	0.051J	0.069J	ND	0.082J	0.046J	ND	NA	1.01
Benzo(k)fluoranthene	0.045J	0.058J	ND	0.069J	0.044J	ND	NA	1.01
Benzo(a)pyrene	0.046J	0.052J	ND	0.065J	ND	ND	NA	0.645
Phenanthrene	0.057J	0.069J	ND	0.087J	0.047J	ND	NA	1.68
Chrysene	ND	0.084J	ND	0.100J	0.059J	ND	NA	0.845
Benzo(ghi)perylene	ND	0.041J	ND	0.052J	ND	ND	NA	0.380
Indeno (1,2,3-cd) pyrene	ND	ND	ND	0.044J	ND	ND	NA	0.403
Acenaphthylene	ND	ND	ND	ND	ND	ND	NA	0.171
Anthracene	ND	ND	ND	ND	ND	ND	NA	0.360
Fluorene	ND	ND	ND	ND	ND	ND	NA	0.191
PCBs/Pesticides/Herbicides								
Aroclor 1260	ND	3.6	4.4	0.98	4.5	1.7	ND	ND
2,4,5-T	ND	0.05	0.06	0.06	ND	ND	ND	ND
2,4,5-TP	ND	ND	ND	0.07	ND	ND	ND	ND
PCDDs/PCDFs								
Total TCDF	0.0012*[8]	0.0033*	0.0023*	0.0024*	0.0088*	0.00036*	NA	NA
Total PeCDF	0.0023*	0.0051*	0.0046*	0.006*	0.0196*	0.00036*	NA	NA
Total HxCDF	0.003*	0.0037*	0.0058*	0.0053*	0.016*	0.00025*	NA	NA

(See Notes on Page 2)

TABLE 4-1

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

SUMMARY OF APPENDIX IX+3 CONSTITUENTS DETECTED IN SOILS
(Dry Weight Parts Per Million, ppm)

Parameter[1]	In-situ Soils[2]						Background Soils (used for site cap)[3]		Local Background Levels[4]
	K-16 (0-1.5')	K-17 (0-1.5')	K-17 (0-1.5') (Dup.)	K-18 (0-1.5')	K-19 (0-1.5')	K-20 (0-1.5')	MF-1 (Grab Composite)	MF-2 (Grab Composite)	
Arsenic	7	13	9	17	3	6	NA	3	2.2-5.1
Barium	27.3	64.8	39.1	43.9	25.4	24.9	NA	25	38.6-56.7
Beryllium	0.3	0.3	0.3	0.5	0.3	0.3	NA	ND	ND
Cadmium	ND	0.7	ND	ND	ND	ND	NA	ND	ND-0.78
Chromium	6	8	10	10	7	7	NA	9.1	11.2-20.1
Cobalt	6	10	8	8	6	6	NA	6.8	ND-8.9
Copper	10	11	13	12	10	10	NA	13.7	15.4-29.5
Lead	17	11	13	14	12	7	NA	ND	25.1-58.4
Nickel	9	12	12	14	10	9	NA	11.4	11.6-15.3
Thallium	ND	ND	ND	17	ND	ND	NA	ND	ND
Tin	ND	4	ND	5	ND	ND	NA	ND	15.4-22.0
Vanadium	8	11	12	13	8	10	NA	NA	13.2-19.9
Zinc	45.6B[9]	53.4B	57.1B	64.3B	47.5B	43.4B	NA	61.5	69.6-96.9

Notes:

[1] Only those parameters detected in at least one sample are summarized.
[2] Soil samples were collected at the Allendale School Property in July 1990 by Geraghty & Miller on behalf of GE and analyzed for Appendix IX+3 constituents by IT Analytical Services, Knoxville, Tennessee.
[3] Soil samples were collected on July 3, 1991 by Geraghty & Miller on behalf of GE and analyzed by Alpha Analytical Laboratories, Westborough, Massachusetts.
[4] Background levels for metals are based on Housatonic River floodplain soil samples collected upstream of the GE Facility. These levels were reported in the Addendum to the MCP Interim Phase II Report for the Housatonic River (Blasland & Bouck, August 1992).
[5] J-indicates an estimated value less than the CLP required quantitation limit.
[6] NA - Not Analyzed.
[7] ND - Not Detected
[8] * - Indicates the presence of interferences by polychlorinated diphenyl ethers.
[9] B - Indicates that analyte was also detected in the associated method blank.

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TABLE 5-1

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

MONITORING POINT CHARACTERISTICS AND GROUNDWATER ELEVATION MEASUREMENTS

Monitoring Well/Piezometer	Measuring Point Elevation[1]	Well Depth (feet below grade)	Screen Length (feet)	Screen Depth (feet below grade)	Depth to Groundwater (feet below measuring point)	Ground Water Elevation (feet relative to NGVD, 1929)
A-1	1008.00	9.5	5	4 to 9	4.38	1003.62
A-2	1012.01	7.7	5	2.2 to 7.2	3.58	1008.43
78-1	1026.36	23	15	8 to 23	9.94	1016.42
78-6	1012.05	18	15	3 to 18	6.49	1005.56
NY-3	1005.39	25	15	10 to 25	15.22	990.17
NY-4	1024.26	33	15	18 to 33	8.69	1015.57

[1] Elevations relative to National Geodetic Vertical Datum (NGVD) of 1929 (Hill Engineers, Architects & Planners, January 8, 1993)

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TABLE 5-2

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

SUMMARY OF MCP PHASE II GROUNDWATER ANALYSES[1]

Parameter[2]	Piezometer	
	A-1 (ppb)	A-2 (ppb)
Methylene Chloride	1 B[3]J[4]	1BJ
Acetone	53B	49B
1,2,4-Trichlorobenzene	1 BJ	ND[5]
Total PCBs[6]	0.9	4.2
Total PCBs (12/92)[7]	0.60	1.3[1.1][8]
Filtered PCBs (12/92)[7]	ND	0.19[0.17]

Notes:

1 Samples were collected by Blasland & Bouck Engineers, P.C. on August 26, 1992 (unless otherwise noted) and were submitted to IT Analytical Services of Knoxville, Tennessee, for analysis.

2 Samples were analyzed for Target Compound List Volatile Organics and/or PCBs.

3 B - Indicates that analyte was also detected in the associated blank.

4 J - Indicates an estimated value less than the CLP-required quantitation limit.

5 ND - Not Detected

6 From samples collected on August 26, 1992. Total PCBs were measured as Aroclor 1254 only, in unfiltered samples.

7 From samples collected on December 30, 1992. Total PCBs were measured as Aroclors 1254 and 1260. Filtered PCBs were measured as Aroclor 1254.

8 [] - blind duplicate results.

TABLE 5-3

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT FOR THE
ALLENDALE SCHOOL PROPERTY

SUMMARY OF PCB CONCENTRATIONS IN AMBIENT AIR

Locations	Range of Detected PCB Concentrations (ug/m^3)
U.S. Cities[1]	0.001 - 0.01
Urban Areas[2]	0.0005 - 0.03
Rural Areas[3]	0.0001 - 0.002
Great Lakes Region[4]	0.0004 - 0.003
Nonurban Continental Areas[5]	0.0001 - 0.0005
Remote Areas[6]	0.00002 - 0.0005
Vineyard Sound, MA[7]	0.004 - 0.005
University of RI[8]	0.0021 - 0.0058
Providence, RI[9]	0.0094
Kingston, RI[10]	0.001 - 0.015
Boston, MA[11]	0.0071

References:

(1) Represents a range of PCB concentrations from U.S. cities collected from 1975 to 1980 as reported by Waid (1986).
(2) Data from Eisenreich et al. (1983) as reported by Erickson (1992).
(3) Data from Eisenreich et al. (1983) as reported by Erickson (1992).
(4) Represents a summary of available data for the Great Lakes Basin as presented by Eisenreich et at. (1981).
(5) Represents a range of PCB concentrations as reported by Waid (1986).
(6) Data from Eisenreich et al. (1983) as reported by Erickson (1992).
(7) Data from Harvey (1974) as reported by University of Wisconsin (1980).
(8) Data represents three 2-day samples collected in January and February 1973 (Bidleman and Olney, 1974).
(9) Data represents one 1-day sample collected in May 1973 (Bidleman and Olney, 1974).
(10) Data from Bidleman et al. (1975) as reported by University of Wisconsin (1980).
(11) Data collected in Boston in 1978 by Bidleman (1981) as reported by HSDB (1993).

TABLE 6-1

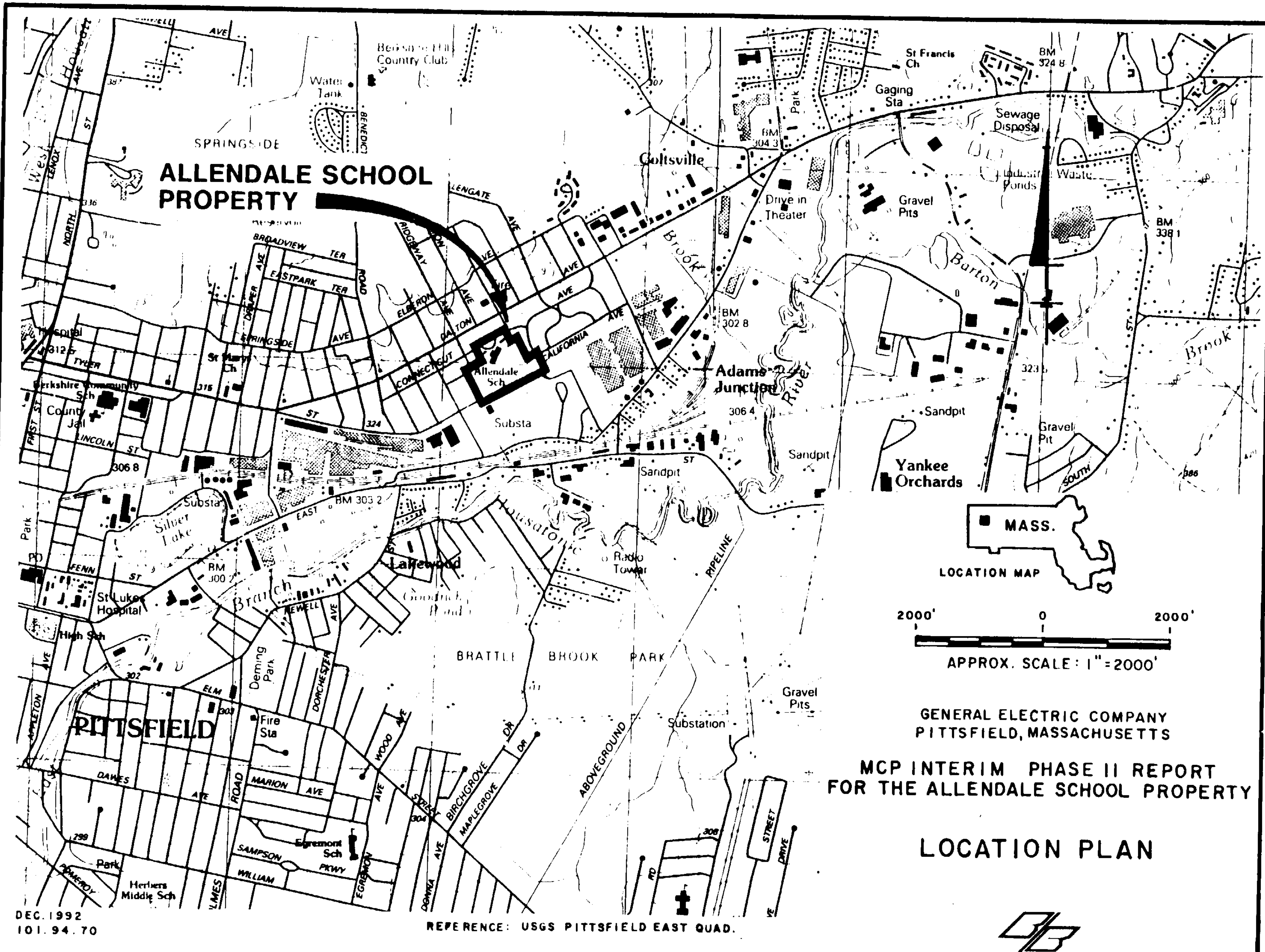
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

PHYSICAL AND CHEMICAL PROPERTIES OF SELECT CONSTITUENTS

Chemical	Water Solubility (mg/L @ 25°C)	Reference	Log Kow	Reference	Vapor Pressure (mm Hg @ 25°C)	Reference	Henry's Law Constant (atm-m^3/mole @ 25°C)	Reference
PCBs								
Aroclor 1254	0.012	(a)	6.5	(a)	7.71E-5	(a)	2.0E-3	(b)
Aroclor 1260	0.00027	(a)	6.8	(a)	4.05E-5	(a)	4.63-3	(b)

References:

(a) ASTDR for the chemical
(b) estimated



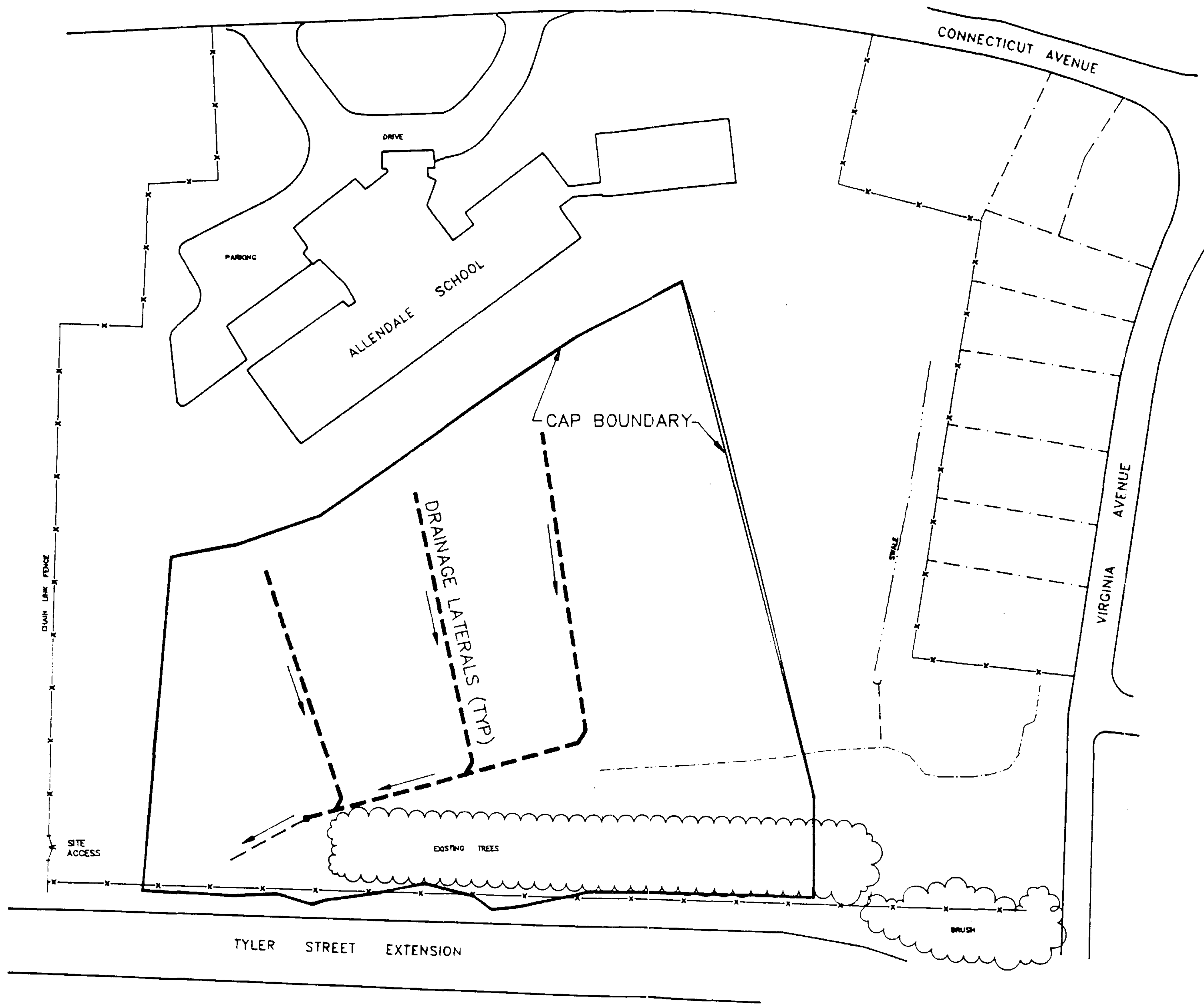
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT
FOR THE ALLENDALE SCHOOL PROPERTY

LOCATION PLAN

FIGURE 1-1

FIGURE 1-2



LEGEND:

- —x—x— EXISTING CHAIN LINK FENCE
- — — — APPROXIMATE LOWLAND BOUNDARY
- —·—·— EXISTING DRAINAGE SWALE
- EXISTING TREES AND BRUSH

100' 0 100'

APPROXIMATE SCALE: 1" = 100'

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

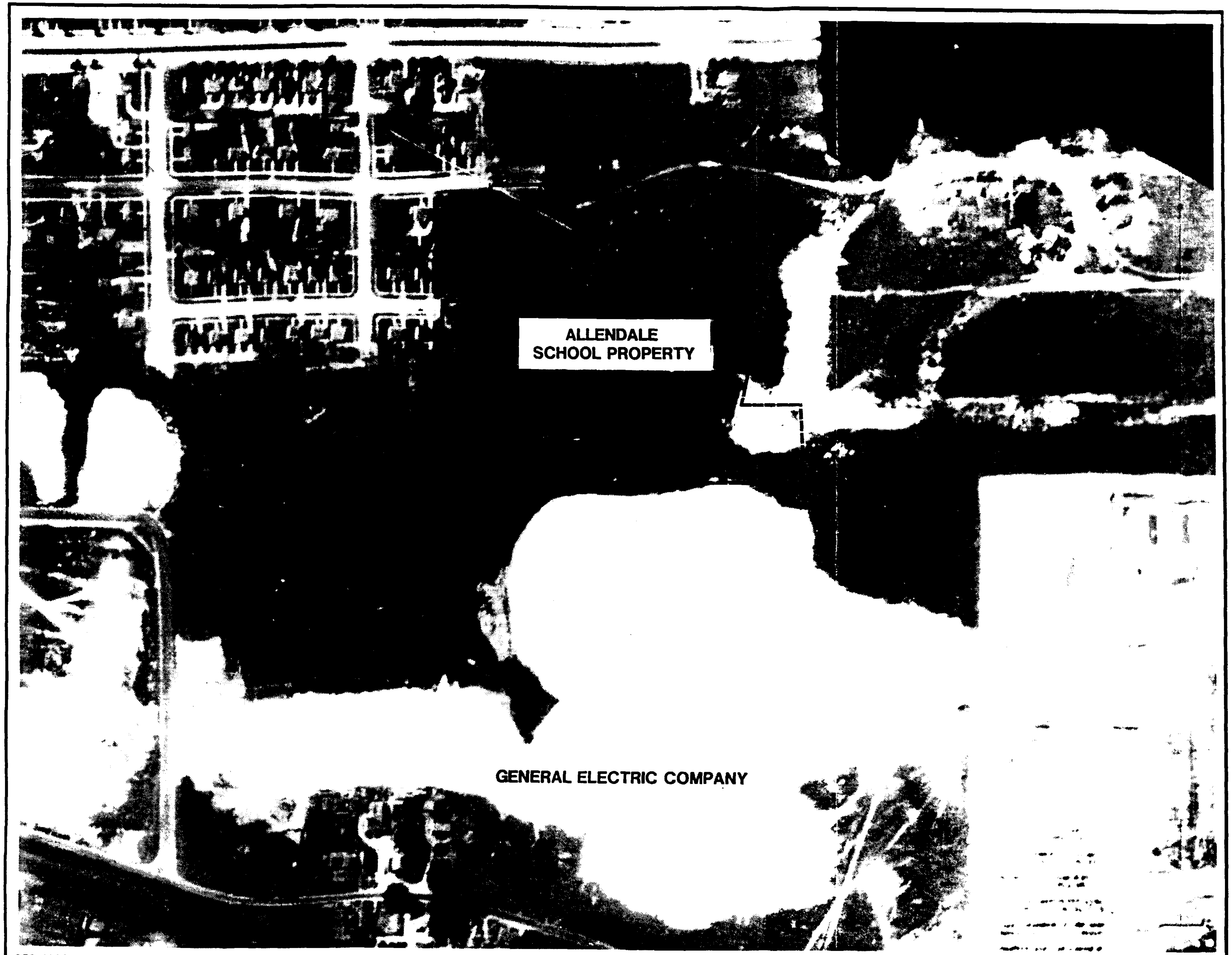
MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

SITE PLAN

1/93 54-TWD,AK,JLG
1019470N\10194G12.DWG

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

FIGURE 2-1



DEC. 1992
101.94.70

LEGEND

------- APPROXIMATE LIMIT OF ALLENDALE SCHOOL PROPERTY

250' 0 250'

APPROX. SCALE: 1" = 250'

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT
FOR THE ALLENDALE SCHOOL PROPERT

1942 AERIAL PHOTO

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

FIGURE 2-2

LEGEND

------ APPROXIMATE LIMIT OF ALLENDALE SCHOOL PROPERTY

250' 0 250'

APPROX. SCALE: 1" = 250'

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT
FOR THE ALLENDALE SCHOOL PROPER

1990 AERIAL PHOTO

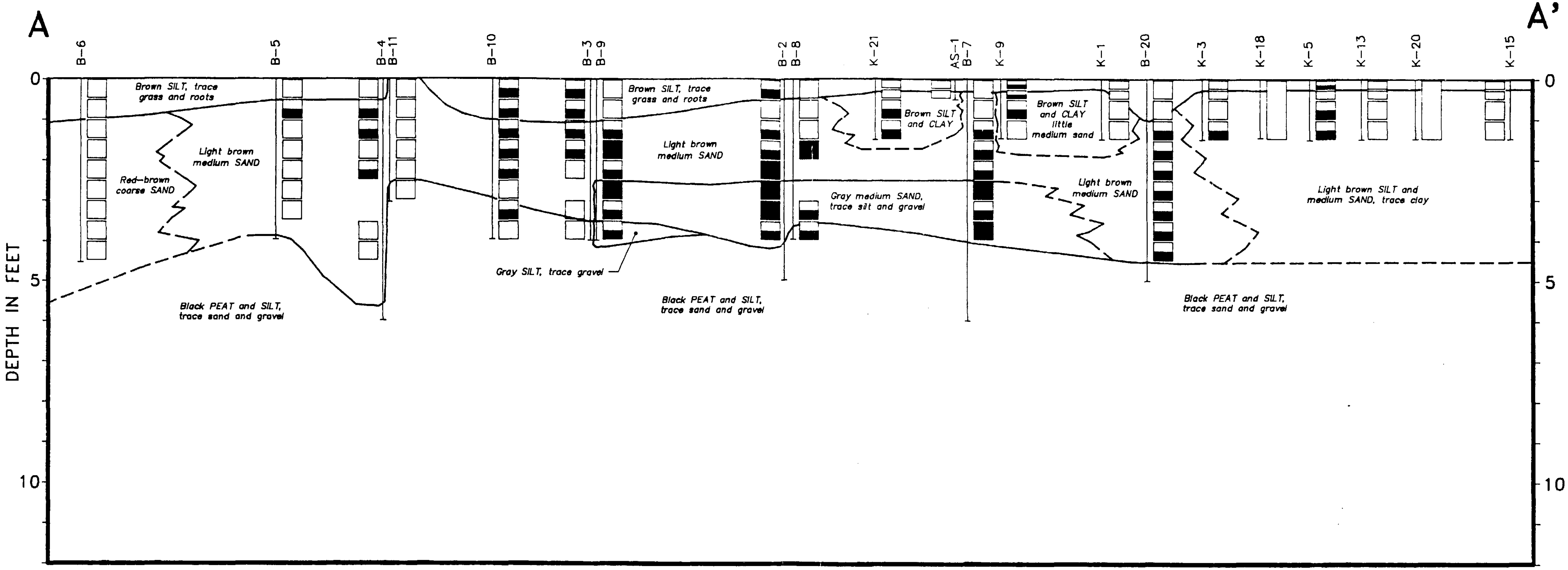
BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

DEC. 1992
101.94.70

FIGURE 3-1

CONNECTICUT AVENUE
VIRGINIA AVENUE
TYLER STREET EXTENSION
ALLENDALE SCHOOL
PARKING
DRIVE
SWALE
CHAIN LINK FENCE
SITE ACCESS
EXISTING TREES
BRUSH
A
A'
B
B'
C
C'
LEGEND:
EXISTING CHAIN LINK FENCE
APPROXIMATE LOWLAND BOUNDARY
EXISTING DRAINAGE SWALE
EXISTING TREES AND BRUSH
APRIL 1990 – SAMPLING LOCATIONS
JULY 1990 – SAMPLING LOCATIONS
AUGUST 1990 – SAMPLING LOCATIONS
AUGUST 17, 1990 – SAMPLING LOCATIONS
AUGUST 23, 1990 – SAMPLING LOCATIONS
AUGUST 24, 1990 – SAMPLING LOCATIONS
AUGUST 27, 1990 – SAMPLING LOCATIONS
FEBRUARY 1991 – SAMPLING LOCATIONS
A—A' CROSS SECTION LOCATION
100' 0 100'
APPROXIMATE SCALE: 1" = 100'
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY
CROSS SECTION LOCATION MAP
X.SAMPS.SAMP
1/18/93 DMW 80
1019470N\10194AR1
BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

FIGURE 3-2



LEGEND:

B-11 ← SOIL BORING NUMBER

← SOIL BORING

PCB CONCENTRATION:

3 INCH SAMPLE:
- LESS THAN 2.0 ppm
- 2.0 ppm TO LESS THAN 50.0 ppm

6 INCH SAMPLE:
- LESS THAN 2.0 ppm
- 2.0 ppm TO LESS THAN 50.0 ppm
- GREATER THAN OR EQUAL TO 50 ppm

18 INCH SAMPLE:
- LESS THAN 2.0 ppm

← BOTTOM OF BORING

50' 0 50'

HORIZONTAL SCALE: 1" = 50' (APPROX.)

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

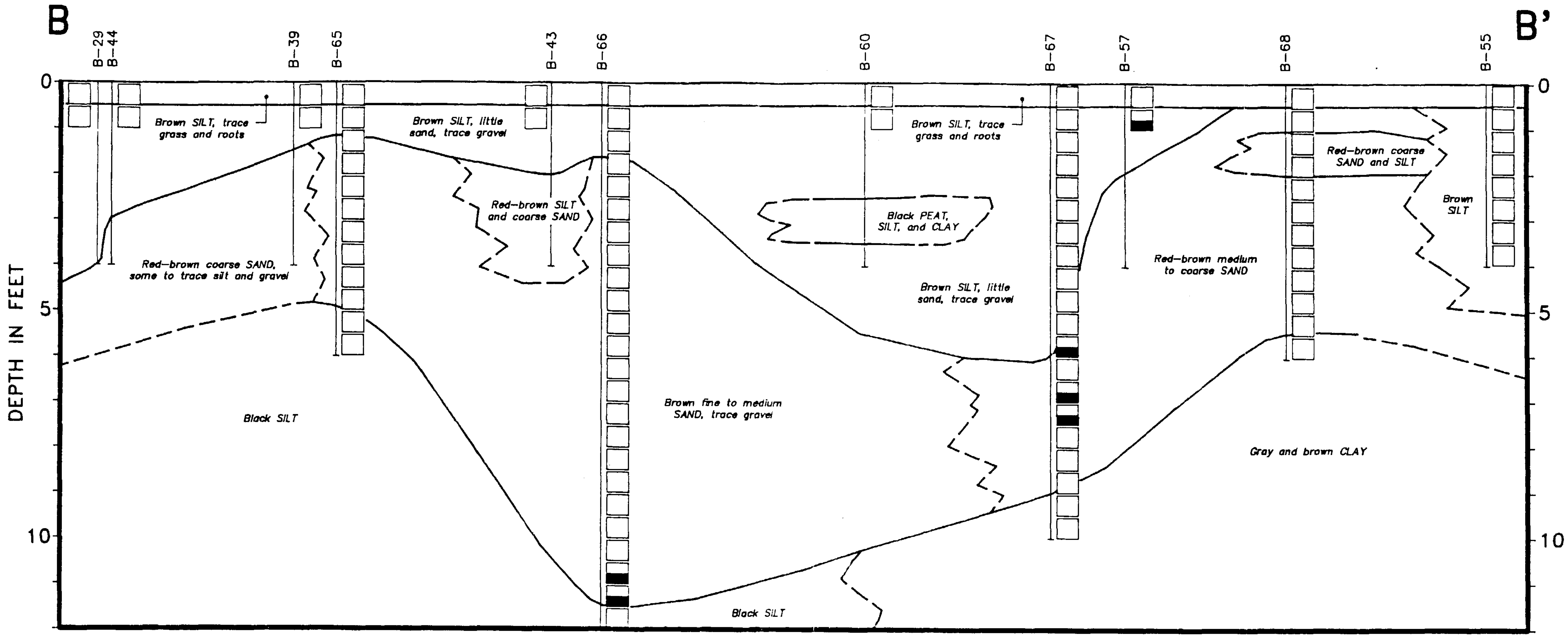
MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

CROSS SECTION A-A'

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

12/21/92 DMW 80
1019401\10194CS1

FIGURE 3–3



LEGEND:

B–66 — SOIL BORING NUMBER

SOIL BORING

PCB CONCENTRATION:

3 INCH SAMPLE:
- LESS THAN 2.0 ppm
- 2.0 ppm TO LESS THAN 50.0 ppm

6 INCH SAMPLE:
- LESS THAN 2.0 ppm
- 2.0 ppm TO LESS THAN 50.0 ppm
- GREATER THAN OR EQUAL TO 50 ppm

18 INCH SAMPLE:
- LESS THAN 2.0 ppm

BOTTOM OF BORING

50' 0 50'

HORIZONTAL SCALE: 1" = 50' (APPROX.)

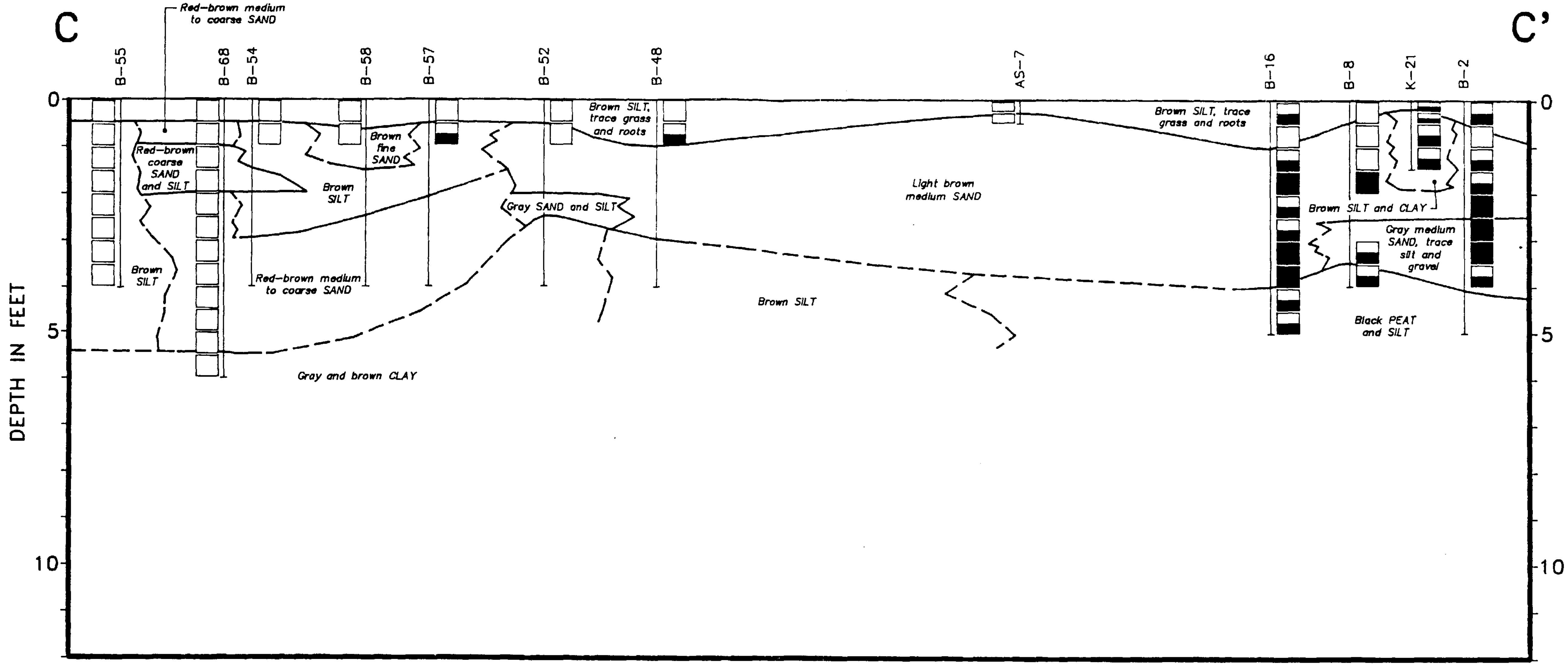
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

CROSS SECTION B–B'

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

12/21/92 DMW 60
1019401\10194CS2



LEGEND:

B-16 — SOIL BORING NUMBER

SOIL BORING

PCB CONCENTRATION:

3 INCH SAMPLE:
- LESS THAN 2.0 ppm
- 2.0 ppm TO LESS THAN 50.0 ppm

6 INCH SAMPLE:
- LESS THAN 2.0 ppm
- 2.0 ppm TO LESS THAN 50.0 ppm
- GREATER THAN OR EQUAL TO 50 ppm

18 INCH SAMPLE:
- LESS THAN 2.0 ppm

BOTTOM OF BORING

50' 0 50'

HORIZONTAL SCALE: 1" = 50' (APPROX.)

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

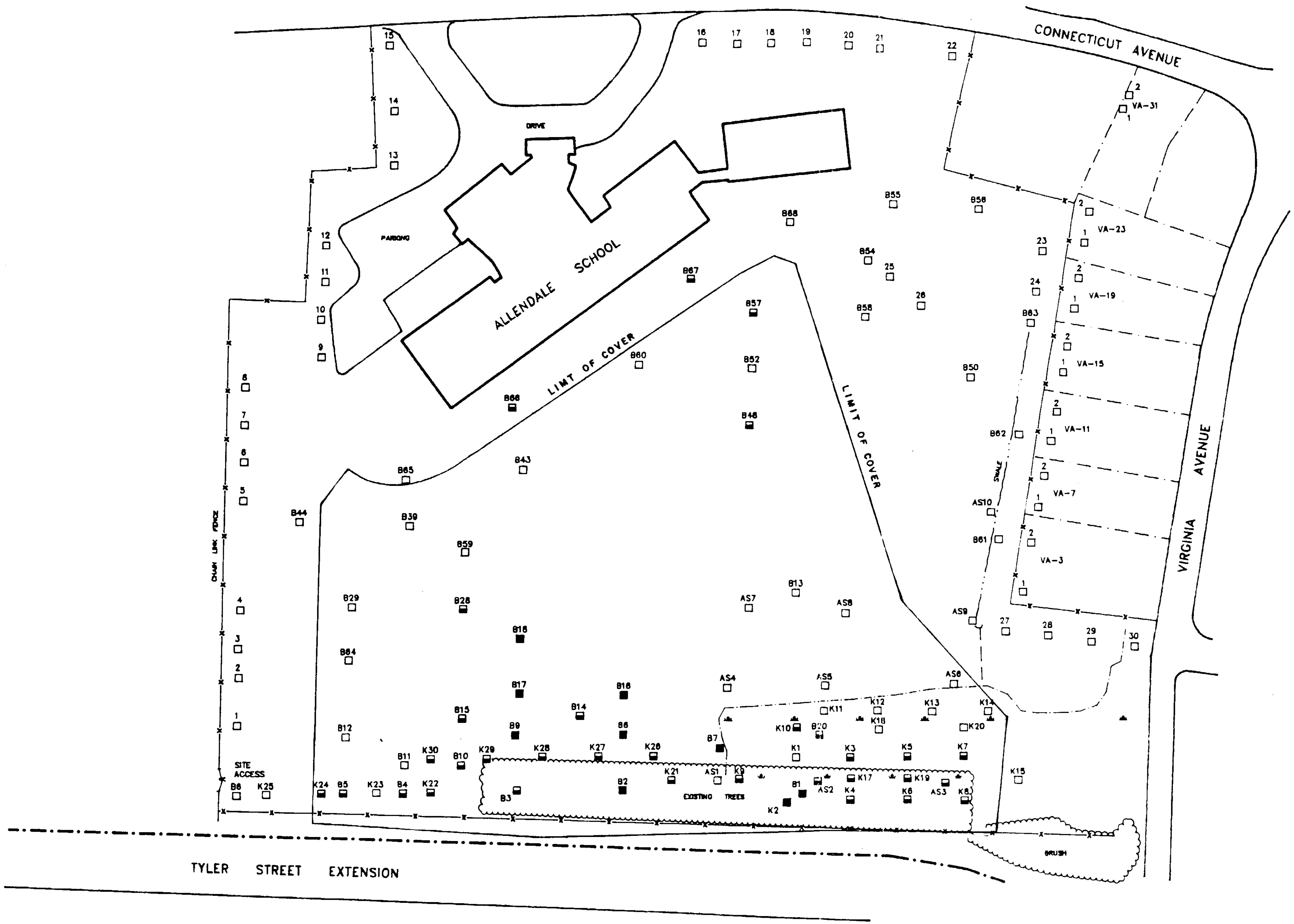
MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

CROSS SECTION C-C'

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

12/21/92 DMW 60
1019401\10194CS3

FIGURE 3–5



LEGEND:

NORTHERN BOUNDARY OF HILL 78 AREA

EXISTING CHAIN LINK FENCE

APPROXIMATE LOWLAND BOUNDARY

EXISTING DRAINAGE SWALE

EXISTING TREES AND BRUSH

HIGHEST PCB CONCENTRATION OF ALL SAMPLES COLLECTED AT BORING LOCATION:

- LESS THAN 2.0 ppm
- 2.0 ppm TO LESS THAN 50.0 ppm
- GREATER THAN OR EQUAL TO 50 ppm

100' 0 100'

APPROXIMATE SCALE: 1" = 100'

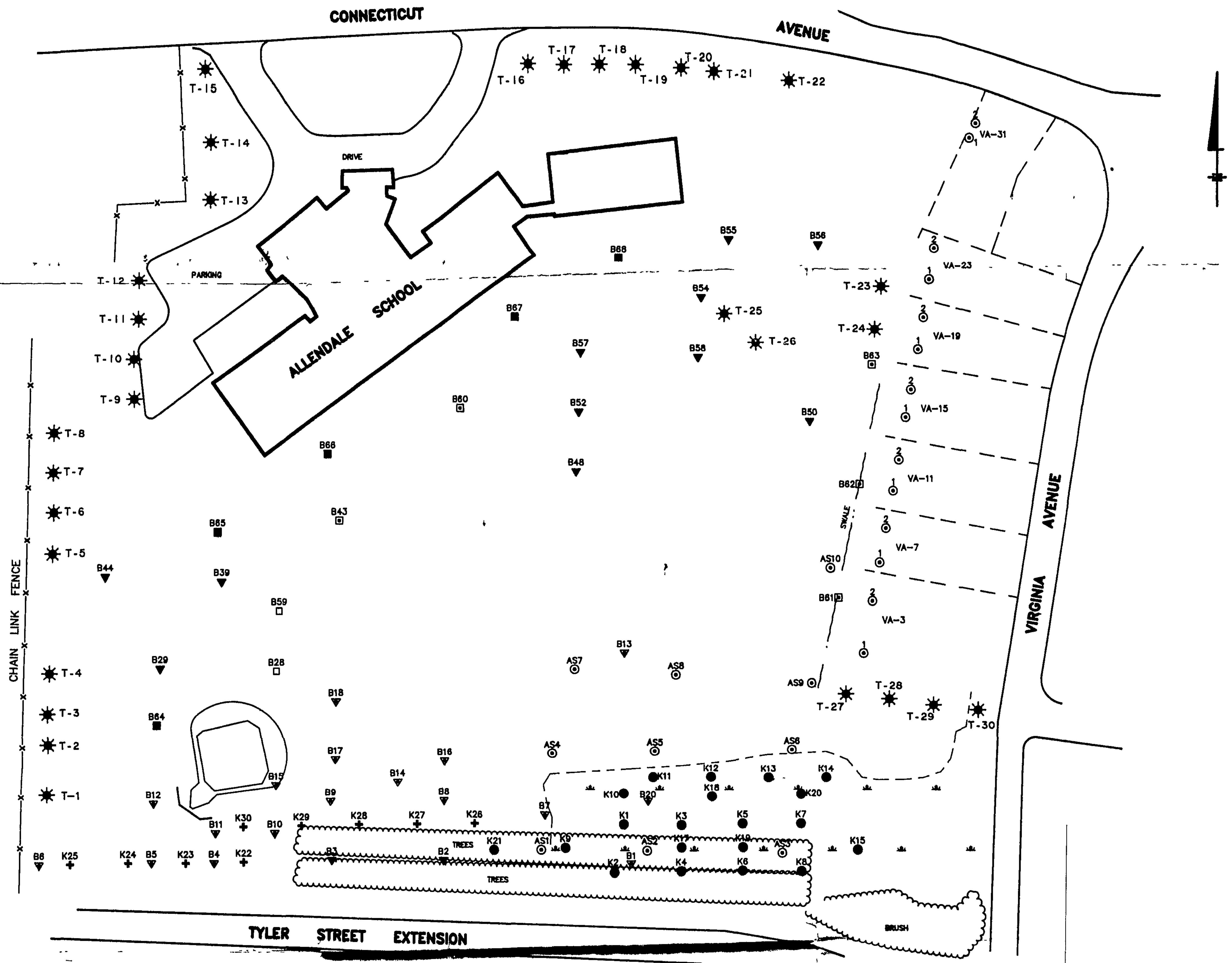
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

SUMMARY OF HORIZONTAL EXTENT OF PCB's IN SOIL

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

PCB
12/21/92 DMW 80
1019470N\10194AR1



LEGEND

- ⊙ APRIL 1990 – SAMPLING LOCATIONS
- ● JULY 1990 – SAMPLING LOCATIONS
- ✚ AUGUST 1990 – SAMPLING LOCATIONS
- AUGUST 17, 1990 – SAMPLING LOCATIONS
- ▼ AUGUST 23, 1990 – SAMPLING LOCATIONS
- ⊡ AUGUST 24, 1990 – SAMPLING LOCATIONS
- ■ AUGUST 27, 1990 – SAMPLING LOCATIONS
- ✱ 1991 SAMPLING LOCATIONS RELATED TO TREE PLANTING

NR NO RECOVERY

* SAMPLES WERE ANALYZED FOR THE EPA APPENDIX IX LIST PLUS THREE ADDITIONAL CONSTITUENTS

AS1

DEPTH(in)	PCBs(ppm)
0-3	1.22
3-6	0.60

AS2

DEPTH(in)	PCBs(ppm)
0-3	1 37
3-6	4.24

AS3

DEPTH(in)	PCBs(ppm)
0-3	2.95
3-6	1.33

AS4

DEPTH(in)	PCBs(ppm)
0-3	0.13
3-6	0.35

AS5

DEPTH(in)	PCBs(ppm)
0-3	0 15
3-6	0.90

AS6

DEPTH(in)	PCBs(ppm)
0-3	0.12
3-6	0.11

AS7

DEPTH(in)	PCBs(ppm)
0-3	1.11
3-6	1 14

AS8

DEPTH(in)	PCBs(ppm)
0-3	1 42
3-6	1 54

AS9

DEPTH(in)	PCBs(ppm)
0-3	0.23
3-6	0 39

AS10

DEPTH(in)	PCBs(ppm)
0-3	0 29
3-6	0 29

VA3-1

DEPTH(in)	PCBs(ppm)
0-3	<0 05

VA3-2

DEPTH(in)	PCBs(ppm)
0-3	<0.05

VA7-1

DEPTH(in)	PCBs(ppm)
0-3	<0 05

VA7-2

DEPTH(in)	PCBs(ppm)
0-3	[illegible]

VA11-1

DEPTH(in)	PCBs(ppm)
0-3	0 05

VA11-2

DEPTH(in)	PCBs(ppm)
0-3	0 11

VA15-1

DEPTH(in)	PCBs(ppm)
0-3	0.10

VA15-2

DEPTH(in)	PCBs(ppm)
0-3	0.08

VA19-1

DEPTH(in)	PCBs(ppm)
0-3	0.10

VA19-2

DEPTH(in)	PCBs(ppm)
0-3	0 12

VA23-1

DEPTH(in)	PCBs(ppm)
0-3	0 19

VA23-2

DEPTH(in)	PCBs(ppm)
0-3	0 20

VA31-1

DEPTH(in)	PCBs(ppm)
0-3	0.05

VA31-2

DEPTH(in)	PCBs(ppm)
0-3	0.09

B1

DEPTH(in)	PCBs(ppm)
0-6	5.7
6-12	26.0
12-18	7.9
18-24	3.9
24-30	10.0
30-36	45.0
36-42	103.0
42-48	54.0
48-54	37.0
54-60	76.0
60-66	98.0
66-72	<1 0

B2

DEPTH(in)	PCBs(ppm)
0-6	2.8
6-12	1.9
12-18	4.6
18-24	35.0
24-30	310 0
30-36	330.0
36-42	69.0
42-48	24.0

B3

DEPTH(in)	PCBs(ppm)
0-6	6.8
6-12	8.9
12-18	4.3
18-24	2 8
24-30	<0 6
30-36	NR
36-42	<0.6
42-48	<0.9

B4

DEPTH(in)	PCBs(ppm)
0-6	1 3
6-12	4 4
12-18	2 1
18-24	1.6
24-30	7.7
30-36	NR
36-42	NR
42-48	1 4
48-54	<0.6

B5

DEPTH(in)	PCBs(ppm)
0-6	1 9
6-12	2.7
12-18	1 2
18-24	<1.0
24-30	<1.0
30-36	<1 0

B6

DEPTH(in)	PCBs(ppm)
0-6	<0.7
6-12	<0.6
12-18	<0.6
18-24	<0 6
24-30	<0.6
30-36	<0.6
36-42	<0.6
42-48	<0.6
48-54	<0 6

B7

DEPTH(in)	PCBs(ppm)
0-6	1.9
6-12	0.6
12-18	10 0
18-24	21 0
24-30	27 0
30-36	62 0
36-42	17.0
42-48	96 0

B8

DEPTH(in)	PCBs(ppm)
0-6	1.4
6-12	1.4
12-18	1.3
18-24	80.0
24-30	NR
30-36	NR
36-42	21.0
42-48	2 9

B9

DEPTH(in)	PCBs(ppm)
0-6	1.5
6-12	1.0
12-18	6.1
18-24	130.0
24-30	24.0
30-36	93.0
36-42	26.0
42-48	23.0

B10

DEPTH(in)	PCBs(ppm)
0-6	6.1
6-12	7 7
12-18	3.2
18-24	11.0
24-30	30.0
30-36	1.5
36-42	2 0
42-48	<1 0

B11

DEPTH(in)	PCBs(ppm)
0-6	<1.0
6-12	<1.0
12-18	<1.0
18-24	<1.0
24-30	<1.0
30-36	<1.0

B12

DEPTH(in)	PCBs(ppm)
0-6	<1.0
6-12	<1.0
12-18	<1.0
18-24	<1.0
24-30	<1.0
30-36	<1 0

B13

DEPTH(in)	PCBs(ppm)
0-6	<0 7

B14

DEPTH(in)	PCBs(ppm)
0-6	5 8
6-12	18.0
12-18	9 2
18-24	19 0
24-30	6.5
30-36	4 4
36-42	4.1
42-48	0 8

B15

DEPTH(in)	PCBs(ppm)
0-6	<0.7
6-12	4.1
12-18	19.0
18-24	20.0

B16

DEPTH(in)	PCBs(ppm)
0-6	3.6
6-12	0 8
12-18	33.0
18-24	105 0
24-30	39.0
30-36	49 0
36-42	106 0
42-48	93.0
48-54	43.0
54-60	3 6

B17

DEPTH(in)	PCBs(ppm)
0-6	2.3
6-12	1 0
12-18	70.0
18-24	62.0
24-30	35.0
30-36	47.0
36-42	30 0
42-48	20 0

B18

DEPTH(in)	PCBs(ppm)
0-6	3.6
6-12	9.0
12-18	97.0
18-24	1100.0
24-30	34.0
30-36	68.0
36-42	3.7
42-48	<0.8

B20

DEPTH(in)	PCBs(ppm)
0-6	<0.7
6-12	1.0
12-18	8 6
18-24	18.0
24-30	36.0
30-36	8.7
36-42	14.0
42-48	12.0
48-54	2.6

B28

DEPTH(in)	PCBs(ppm)
0-6	0 6
6-12	6.8

B29

DEPTH(in)	PCBs(ppm)
0-6	<0 7
6-12	<0.7

B39

DEPTH(in)	PCBs(ppm)
0-6	<0 6
6-12	<0.6

B43

DEPTH(in)	PCBs(ppm)
0-6	<0.7
6-12	<0 7

B44

DEPTH(in)	PCBs(ppm)
0-6	<0.7
6-12	<0.6

B48

DEPTH(in)	PCBs(ppm)
0-6	<0.6
6-12	4.1

B50

DEPTH(in)	PCBs(ppm)
0-6	<0 8
6-12	<0.6
12-18	<0.6
18-24	1.9
24-30	<0.6
[illegible]	[illegible]
36-42	<0.6
42-48	<0.6
48-54	<0.6
54-60	<0 6
60-66	<0.6
66-72	<0 6

B52

DEPTH(in)	PCBs(ppm)
0-6	<0.7
6-12	1 2

B54

DEPTH(in)	PCBs(ppm)
0-6	<0.8
[illegible]	<0 6

B55

DEPTH(in)	PCBs(ppm)
0-6	<0 8
6-12	<0.7
12-18	<0.7
18-24	<0.6
24-30	<0 6
30-36	<0 6
36-42	<0.6
42-48	<0.6

B56

DEPTH(in)	PCBs(ppm)
0-6	<0.6
6-12	<0.6
12-18	<0.6
18-24	<0 6
24-30	<0.6
30-36	<0 6
36-42	<0.6
42-48	<0.6

B57

DEPTH(in)	PCBs(ppm)
0-6	1.8
6-12	11 0

B58

DEPTH(in)	PCBs(ppm)
0-6	<0 7
6-12	<0 6

B59

DEPTH(in)	PCBs(ppm)
0-6	<0.8
6-12	<0.7

B60

DEPTH(in)	PCBs(ppm)
0-6	<0.9
6-12	<0 7

B61

DEPTH(in)	PCBs(ppm)
0-6	<0.8
6-12	<0.7
12-18	<0.7
18-24	<0.7
24-30	<0.6
30-36	<0.6
36-42	<0 6
42-48	<0 6

B62

DEPTH(in)	PCBs(ppm)
0-6	<0 7
6-12	<0 6
12-18	<0 6
18-24	<0 6
24-30	<0 6
30-36	<0.6
36-42	<0.6
42-48	<0 6

B63

DEPTH(in)	PCBs(ppm)
0-6	<0.7
6-12	<0.6
12-18	<0.6
18-24	<0.6
24-30	<0.6
30-36	<0.6
36-42	<0.6
42-48	<0.6

B64

DEPTH(in)	PCBs(ppm)
0-6	<0.7
6-12	<0 6

B65

DEPTH(in)	PCBs(ppm)
0-6	<0.6
6-12	<0.6
12-18	<0.6
18-24	<0.5
24-30	<0.6
30-36	<0.6
36-42	<0.6
42-48	<0.6
48-54	<0.6
54-60	<0.6
60-66	<0 7
66-72	<0 7

B66

DEPTH(in)	PCBs(ppm)
0-6	<0.6
6-12	<0 6
12-18	<0.6
18-24	<0 6
24-30	<0.6
30-36	<0.6
36-42	<0.6
42-48	<0.6
48-54	<0.6
54-60	<0.6
60-66	<0.6
66-72	<0 6
72-78	1 3
78-84	<0 6
84-90	1 2
90-96	1.1
96-102	<0 6
102-108	<0 6
108-114	1 0
114-120	0 8
120-126	<0.6
126-132	4.1
132-138	2 2
138-144	<0 6

B67

DEPTH(in)	PCBs(ppm)
0-6	<0.6
6-12	<0.6
12-18	<0.6
18-24	<0.6
24-30	<0.6
30-36	<0.6
36-42	<0.6
42-48	<0.6
48-54	<0.6
54-60	<0.6
60-66	<0.6
66-72	4.0
72-78	<0.6
78-84	11 0
84-90	3.0
90-96	1.5
96-102	<0.6
102-108	<0.6
108-114	<0.6
114-120	<0 7

B68

DEPTH(in)	PCBs(ppm)
0-6	<0.6
6-12	<0.6
12-18	<0.6
18-24	<0.6
24-30	<0.6
30-36	<0.6
36-42	<0.6
42-48	<0.6
48-54	<0.6
54-60	<0.6
60-66	<0 6
66-72	<0.7

T-1

DEPTH(in)	PCBs(ppm)
0-12	0.019
12-24	0.019
24-36	<0.011
36-48	<0.011

T-6

DEPTH(in)	PCBs(ppm)
0-12	0.018
12-24	<0.013
24-36	0.02
36-48	<0.010

T-11

DEPTH(in)	PCBs(ppm)
0-12	0.012
12-24	0.097
24-36	<0.010
36-48	<0.011

T-16

DEPTH(in)	PCBs(ppm)
0-12	0.018
12-24	<0.009
24-36	<0.086
36-48	<0.011

T-21

DEPTH(in)	PCBs(ppm)
0-12	0.025
12-24	<0.010
24-36	<0.010
36-48	<0.009

T-26

DEPTH(in)	PCBs(ppm)
0-12	0.37
12-24	0.76
24-36	0.024
36-48	<0.096

T-2

DEPTH(in)	PCBs(ppm)
0-12	0.05
12-24	<0.013
24-36	<0.011
36-48	<0.011

T-7

DEPTH(in)	PCBs(ppm)
0-12	0.021
24-36	<0.012
36-48	0.018

T-12

DEPTH(in)	PCBs(ppm)
0-12	0.022
12-24	<0.010
24-36	<0.010
36-48	<0.009

T-17 T-17

DEPTH(in)	PCBs(ppm)
0-12	<0.011
12-24	0.015
24-36	<0.011
36-48	<0.010

T-22

DEPTH(in)	PCBs(ppm)
0-12	0.085
12-24	0.018
24-36	0.014
36-48	<0.010

T-27

DEPTH(in)	PCBs(ppm)
0-12	0.42
12-24	0.13
24-36	0.14
36-48	0.016

T-3

DEPTH(in)	PCBs(ppm)
0-12	<0.014
12-24	<0.012
24-36	<0.012
36-48	<0.013

T-8

DEPTH(in)	PCBs(ppm)
0-12	0.022
12-24	<0.012
24-36	<0.011
36-48	<0.011

T-13

DEPTH(in)	PCBs(ppm)
0-12	0.027
12-24	<0.010
24-36	<0.009
36-48	<0.010

T-18

DEPTH(in)	PCBs(ppm)
0-12	0.025
12-24	<0.010
24-36	<0.010
36-48	<0.010

T-23

DEPTH(in)	PCBs(ppm)
0-12	0.017
12-24	0.01
24-36	<0.012
36-48	<0.009

T-28

DEPTH(in)	PCBs(ppm)
0-12	0.32
12-24	<0.115
24-36	<0.12
36-48	<0.12

T-4

DEPTH(in)	PCBs(ppm)
0-12	0.037
12-24	<0.011
24-36	<0.012
36-48	<0.010

T-9

DEPTH(in)	PCBs(ppm)
0-12	0.095
12-24	0.027
24-36	<0.010
36-48	<0.010

T-14

DEPTH(in)	PCBs(ppm)
0-12	0.016
12-24	<0.011
24-36	<0.009
36-48	<0.010

T-19

DEPTH(in)	PCBs(ppm)
0-12	<0.010
12-24	<0.010
24-36	<0.010
36-48	<0.010

T-24

DEPTH(in)	PCBs(ppm)
0-12	0.015
12-24	<0.009
24-36	<0.009
36-48	<0.009

T-29

DEPTH(in)	PCBs(ppm)
0-12	1.2
12-24	0.114
24-36	<0.11
36-48	<0.12

T-5

DEPTH(in)	PCBs(ppm)
0-12	0.015
12-24	<0.010
24-36	<0.011
36-48	<0.010

T-10

DEPTH(in)	PCBs(ppm)
0-12	0.104
12-24	0.012
24-36	<0.010
36-48	<0.010

T-15

DEPTH(in)	PCBs(ppm)
0-12	<0.012
12-24	<0.010
24-36	0.008
36-48	<0.010

T-20

DEPTH(in)	PCBs(ppm)
0-12	0.014
12-24	<0.010
24-36	<0.010
36-48	<0.009

T-25

DEPTH(in)	PCBs(ppm)
0-12	0.042
12-24	0.05
24-36	<0.010
36-48	<0.010

T-30

DEPTH(in)	PCBs(ppm)
0-12	0.29
12-24	1.59
24-36	<0.011
36-48	<0.013

K1

DEPTH(in)	PCBs(ppm)
0-3	1.2
3-6	0.76
6-12	1.1
12-18	0.6

K2

DEPTH(in)	PCBs(ppm)
0-3	25.0
3-6	250.0
6-12	45.0
12-18	50.0

K3

DEPTH(in)	PCBs(ppm)
0-3	1.8
3-6	1.5
6-12	1.4
12-18	3.8

K4

DEPTH(in)	PCBs(ppm)
0-3	2.1
3-6	0.55
6-12	7.3
12-18	15.0

K5

DEPTH(in)	PCBs(ppm)
0-3	2.2
3-6	0.8
6-12	2.9
12-18	13.0

K6

DEPTH(in)	PCBs(ppm)
0-3	12.0
3-6	23.0
6-12	1.3
12-18	8.9

K7

DEPTH(in)	PCBs(ppm)
0-3	1.3
3-6	0.78
6-12	0.56
12-18	2.5

K8

DEPTH(in)	PCBs(ppm)
0-3	8.8
3-6	13.0
6-12	10.0
12-18	18.0

K9

DEPTH(in)	PCBs(ppm)
0-3	4.8
3-6	3.2
6-12	2.8
12-18	1.3

K10

DEPTH(in)	PCBs(ppm)
0-3	1.1
3-6	0.99
6-12	1.3
12-18	2.3

K11

DEPTH(in)	PCBs(ppm)
0-3	0.44
3-6	0.72
6-12	0.51
12-18	0.56

K12

DEPTH(in)	PCBs(ppm)
0-3	0.26
3-6	0.07
6-12	0.65
12-18	0.69

K13

DEPTH(in)	PCBs(ppm)
0-3	0.40
3-6	0.15
6-12	0.17
12-18	0.12

K14

DEPTH(in)	PCBs(ppm)
0-3	0.38
3-6	0.29
6-12	0.53
12-18	0.78

K15

DEPTH(in)	PCBs(ppm)
0-3	0.52
3-6	0.11
6-12	0.25
12-18	0.28

K16*

DEPTH(in)	PCBs(ppm)
0-18	<0.8

K17*

DEPTH(in)	PCBs(ppm)
0-18	3.6

K18*

DEPTH(in)	PCBs(ppm)
0-18	0.98

K19*

DEPTH(in)	PCBs(ppm)
0-18	4.5

K20*

DEPTH(in)	PCBs(ppm)
0-18	1.7

K21

DEPTH(in)	PCBs(ppm)
0-3	6.2
3-6	5.8
6-12	30.0
12-18	42.0

K22

DEPTH(in)	PCBs(ppm)
0-6	7.0
6-12	14.0

K23

DEPTH(in)	PCBs(ppm)
0-6	<2.0
6-12	<2.0

K24

DEPTH(in)	PCBs(ppm)
0-6	3.0
6-12	3.4

K25

DEPTH(in)	PCBs(ppm)
0-6	<2.0
6-12	<2.0

K26

DEPTH(in)	PCBs(ppm)
0-6	2.6
6-12	2.0

K27

DEPTH(in)	PCBs(ppm)
0-6	2.4
6-12	39.0

K28

DEPTH(in)	PCBs(ppm)
0-6	3.5
6-12	15.0

K29

DEPTH(in)	PCBs(ppm)
0-6	16.0
6-12	22.0

K30

DEPTH(in)	PCBs(ppm)
0-6	<2.0
6-12	7.7

12/22/92 NRC
\10194701\10194013

1" = 60'

NO ALTERATIONS PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW

No	Date	Revisions	Init

In charge of ________
Designed by ________
Drawn by ________
Checked by ________

BLASLAND & BOUCK ENGINEERS, P.C.
Syracuse, New York
White Plains, New York

GENERAL ELECTRIC COMPANY• PITTSFIELD, MASSACHUSETTS

MCP INTERIM PHASE II REPORT FOR THE ALLENDALE SCHOOL PROPERTY

SUMMARY OF SOILS PCB DATA

File Number 101.94 70

Date DECEMBER 1992

4-1

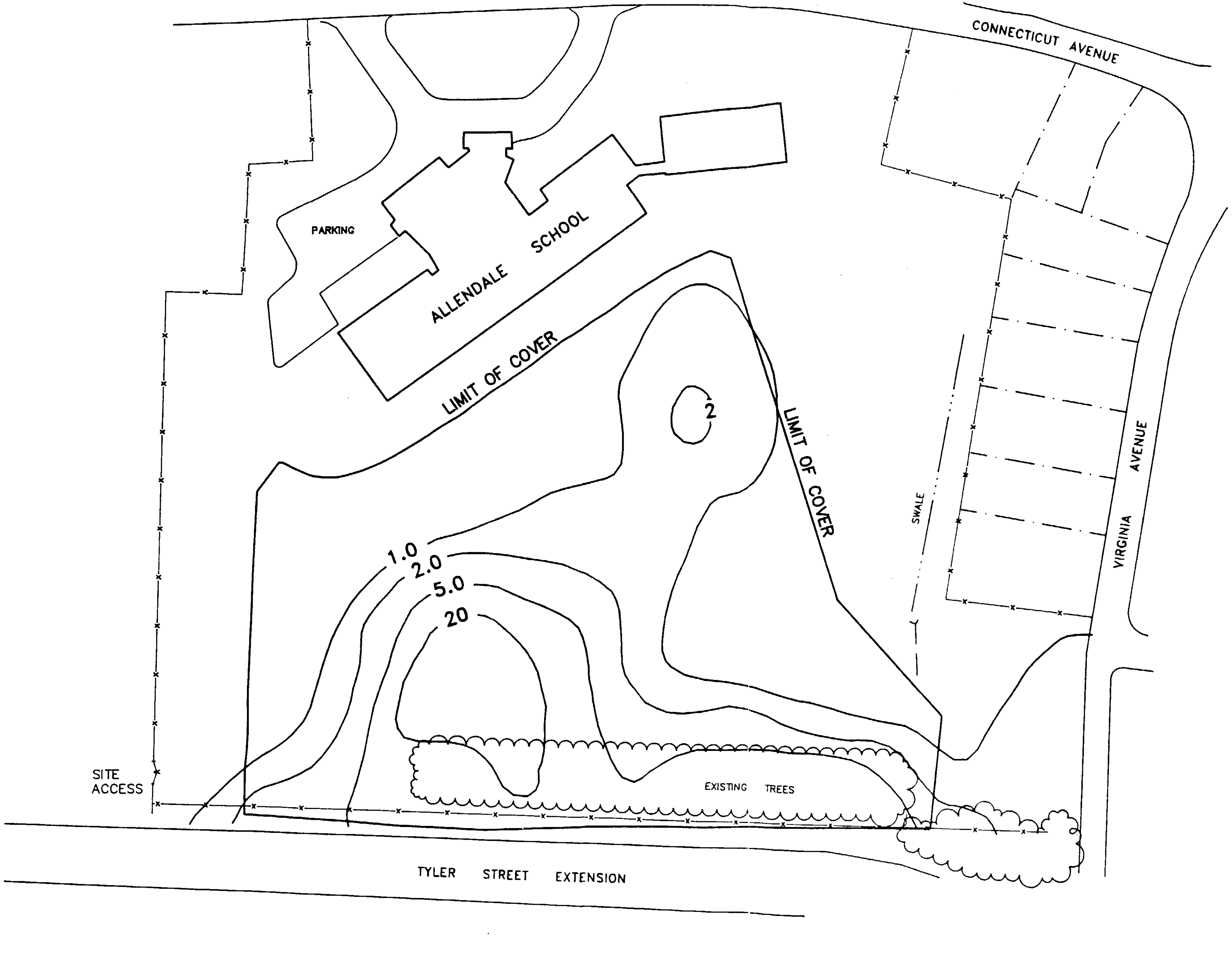


FIGURE 5-1

LEGEND:

- —0.1— ESTIMATED PCB CONCENTRATION IN PARTS PER MILLION DRY WEIGHT (ppm)
- LIMIT OF COVER MATERIAL
- EXISTING CHAIN LINK FENCE
- EXISTING DRAINAGE SWALE
- EXISTING TREES AND BRUSH

100' 0 100'

APPROXIMATE SCALE: 1" = 100'

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ALLENDALE SCHOOL PROPERTY

ESTIMATE OF SOIL PCB CONCENTRATION BASED ON KRIGING OF RANKED DATA

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

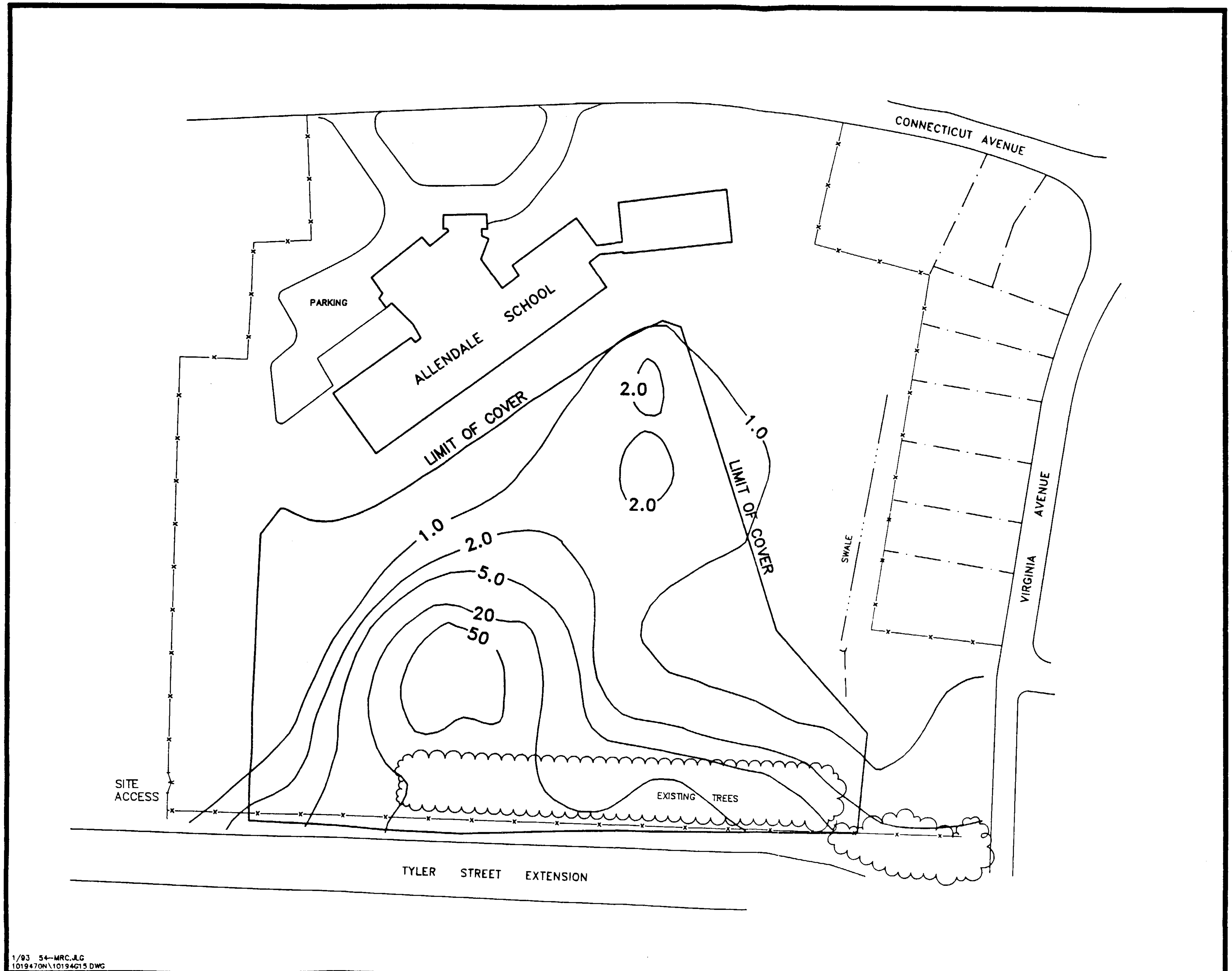


FIGURE 5-2

LEGEND:

—0.1— ESTIMATED PCB CONCENTRATION IN PARTS PER MILLION DRY WEIGHT (ppm)

LIMIT OF COVER MATERIAL

EXISTING CHAIN LINK FENCE

EXISTING DRAINAGE SWALE

EXISTING TREES AND BRUSH

100' 0 100'

APPROXIMATE SCALE: 1" = 100'

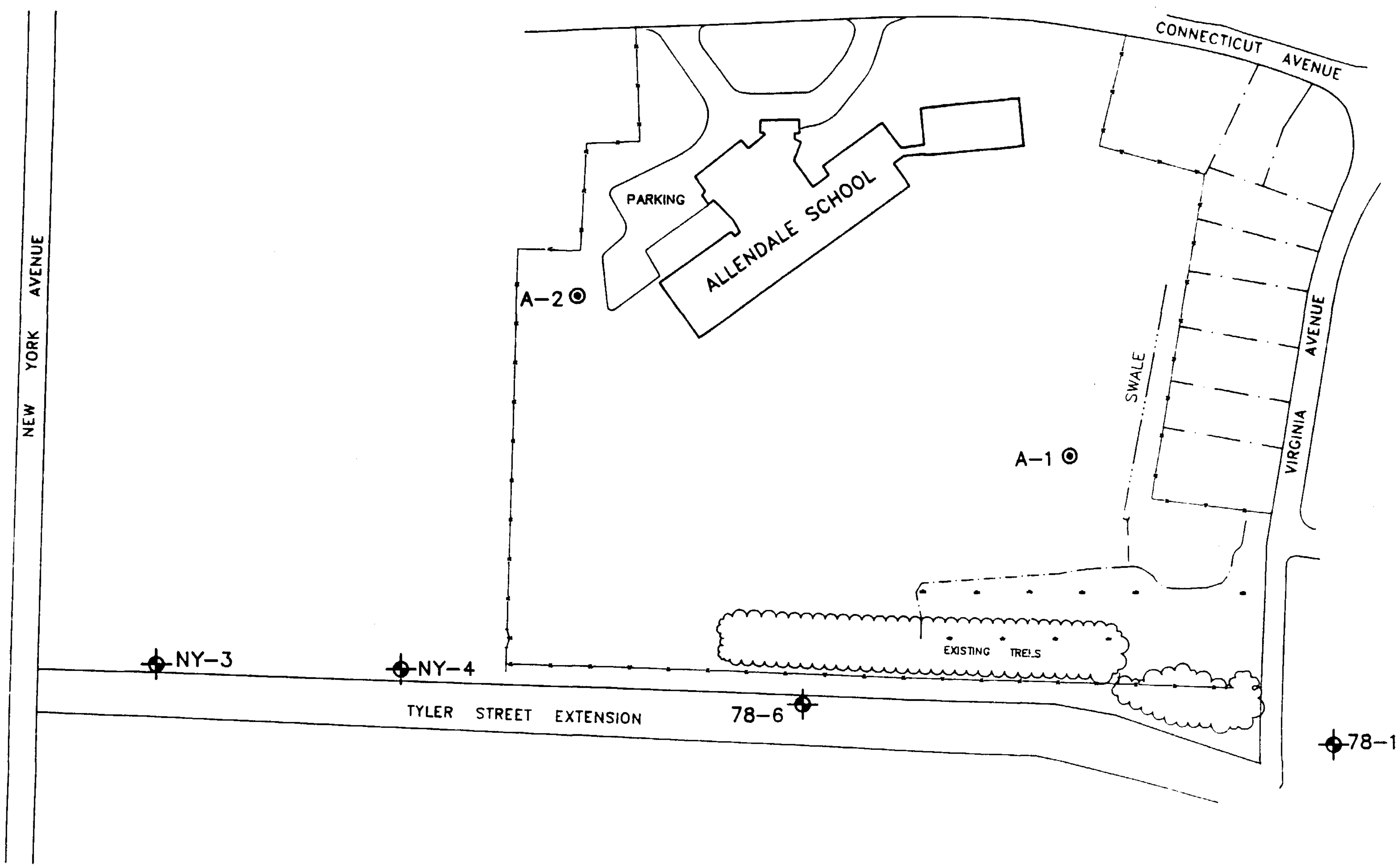
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ALLENDALE SCHOOL PROPERTY

ESTIMATE OF SOIL PCB CONCENTRATION BASED ON KRIGING OF LOG TRANSFORMED DATA

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

FIGURE 5-3



LEGEND:

- A-1 APPROXIMATE LOCATION OF TEMPORARY PIEZOMETER
- NY-4 APPROXIMATE LOCATION OF EXISTING GROUNDWATER MONITORING WELL
- EXISTING CHAIN LINK FENCE
- APPROXIMATE LOWLAND BOUNDARY
- EXISTING DRAINAGE SWALE
- EXISTING TREES AND BRUSH

150' 0 150'

APPROXIMATE SCALE: 1" = 150'

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ALLENDALE SCHOOL PROPERTY

LOCATIONS OF PIEZOMETERS AND EXISTING GROUNDWATER MONITORING WELLS

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

1/93 54-MRC.JLC
1019470N\10194G16.DWG

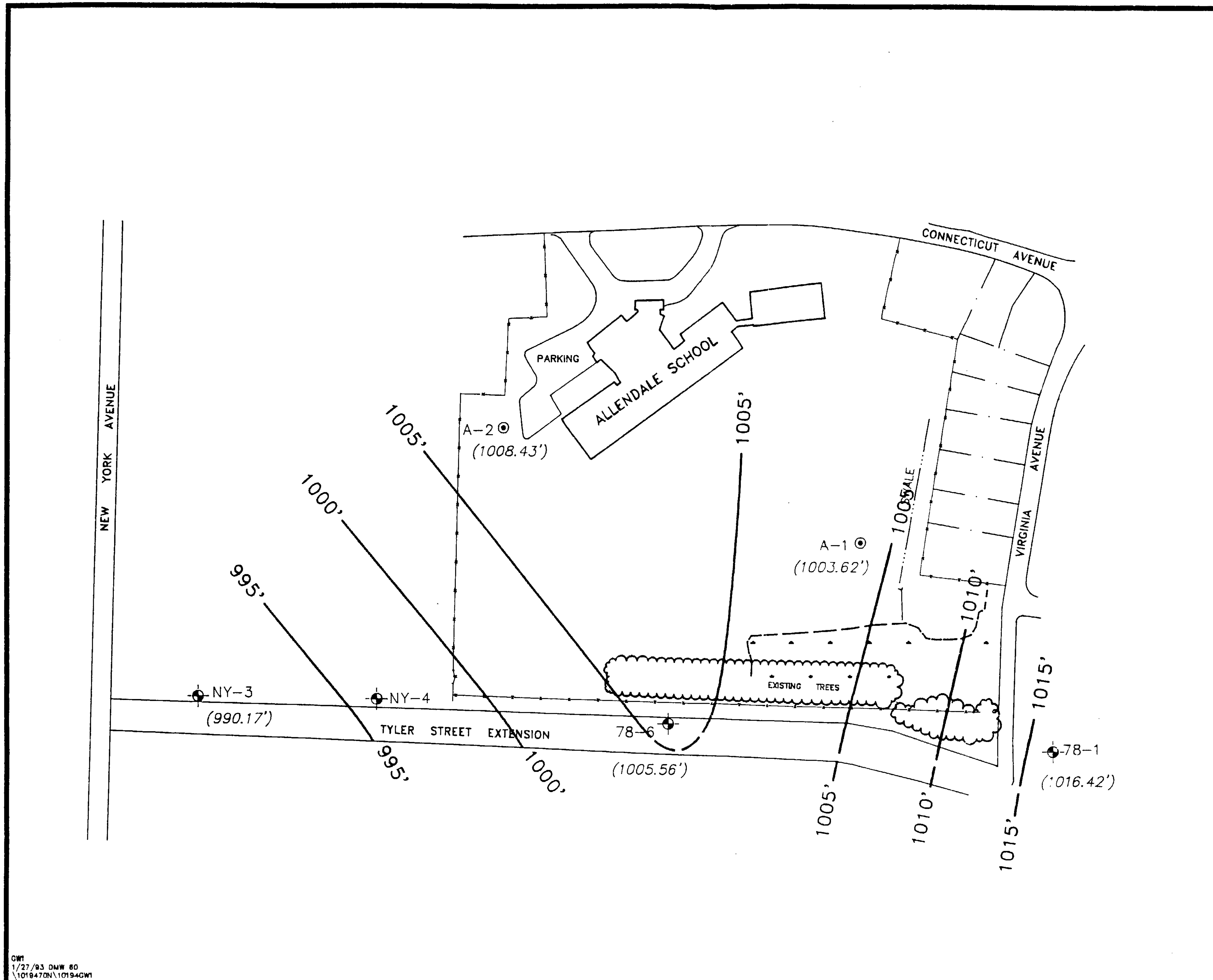


FIGURE 5-4

LEGEND:

A-1	APPROXIMATE LOCATION OF TEMPORARY PIEZOMETER
NY-4	APPROXIMATE LOCATION OF EXISTING GROUNDWATER MONITORING WELL
—x—x—	EXISTING CHAIN LINK FENCE
—·—	APPROXIMATE LOWLAND BOUNDARY
—···—	EXISTING DRAINAGE SWALE
	EXISTING TREES AND BRUSH
(990.17')	GROUND-WATER ELEVATION ABOVE MEAN SEA LEVEL (NGVD 1929)
995' ——	GROUND-WATER ELEVATION CONTOUR LINE, DASHED WHERE INFERRED

150' 0 150'

APPROXIMATE SCALE: 1" = 150'

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ALLENDALE SCHOOL PROPERTY

POTENTIOMETRIC SURFACE MAP DECEMBER 30, 1992

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

APPENDIX A

MDEP CONDITIONAL APPROVAL LETTER

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection
Western Region
436 Dwight Street. Springfield. Mass. 01103
(413) 784-1100

DANIEL S. GREENBAUM
Commissioner
JOHN J. HIGGINS
Regional Director

June 30, 1992

RECEIVED
JUL 6 1992
ENVIRONMENTAL ...

General Electric Company
Area Environmental & Facility Programs
100 Woodlawn Ave.
Pittsfield, MA 01201

Attention: G. Grant Bowman

Re: Pittsfield 1-0960-92336
Allendale School Phase II
Scope of Work

REVIEW OF PHASE II SCOPE OF WORK

Dear Mr. Bowman:

The Department of Environmental Protection (the Department) has received on May 5, 1992, a Phase II Scope of Work (SOW) for the Allendale School site, dated May 1992. This SOW was submitted on behalf of General Electric (GE), by Blasland and Bouck Engineers, P.C. (B & B) of Syracuse, New York. This document was submitted in compliance with the requirements for a Phase II SOW as stated in 310 CMR 40.545 (2) of the Massachusetts Contingency Plan (MCP).

Prior to March 1992, the Department considered this site to be a portion of the GE Hill 78 Landfill Area site. GE proposed in a letter to the Department dated December 19, 1991, that this site be considered a separate site, since the source of contamination at the schoolyard is contaminated fill not continuous to the Hill 78 site and that the Department's inclusion of the school yard as part of the Hill 78 site would potentially pose problems with coordination between the Department and the US EPA. By letter dated March 6, 1992, the Department informed GE that it will consider the Allendale School Yard a separate site. The Department also informed GE that the Department considers the Allendale School yard a priority site, and the Department required the submittal of a Scope of Work for completion of a Phase II Comprehensive Site Assessment in accordance with 310 CMR 40.545 of the MCP. Pursuant to M.G.L. Ch. 21E and the MCP, the site consists of any contaminated area of the Allendale School yard and any like contaminated contiguous properties.

In June through August 1991, GE completed a Short Term Measure (STM) to cap PCB contaminated soils within the Allendale School yard. As approved by the Department, GE constructed a cap consisting of a geotextile layer over the initial ground surface, an eighteen inch layer of clean fill and a six inch layer of seeded loam over all areas of the school yard where soil contained polychlorinated biphenyls (PCBs) at concentrations greater than 2 parts per million (ppm) within the top three feet of soil. The capped area consists of approximately 5 acres. Along with the installation of the cap, GE installed new surface water drainage lines to improve the drainage within the school yard.

Prior to constructing the cap, between April and August 1990, as approved by the Department, GE collected soil samples from at least 72 borings within the school yard and had them analyzed primarily for PCBs. Select soil samples were analyzed for all compounds listed in Appendix IX of Part 264, 40 CFR Ch. 1 and the three additional compounds 2-chloroethyl vinyl ether, benzidine, and 1,2-diphenylhydrazine (Appendix IX + 3). GE's sampling objective was to define all areas of the school yard where soil contained PCBs at concentrations greater than 2 ppm. The presence of PCBs in the school yard was initially identified during soil sampling conducted by Department personnel and the Department's Site Assessment and Remedial Support Services contractor in January 1990. Results for soil sampling conducted by the Department's contractor in January of 1990 and GE's consultant in April 1990 and July through August 1990 indicated the presence of PCBs within the school yard at concentrations up to 1,100 ppm for subsurface soil (sample collected from 1.5 feet to 2 feet interval). PCBs were also detected at concentrations up to 250 ppm in a sample collected from 3 to 6 inches in the far southeast corner of the school yard. Details of the sampling events and the Short Term Measure are discussed in GE's STM proposal entitled "Study of Potential Remedial Options for PCB Contaminated Soils at the Allendale School Yard" revised April 1991, the Department's approval letters for the STM dated March 15, 1991, and June 19, 1991; and GE's "Allendale School Sampling Report" dated October 1990 and submitted with the STM proposal. The Department considers GE's sampling activities and summary reports completed as part of the STM as fulfilling the requirements for a Phase I Limited Site Investigation (310 CMR 40.543 of the MCP).

One of the Department's conditions for approving the STM to cap the school yard was biannual cap inspections. GE conducted the first cap inspection on April 7, 1992, and reported their findings to the Department by letter dated April 14, 1992. During their inspection, GE noted that the geotextile layers covering the catch basins need replacing or cleaning and that grass was not growing in some scattered areas of the cap. GE stated that during school summer vacation, areas of the cap will be reseeded and the geotextile material on the catch basins will be replaced. Small wet areas within the school yard were also noted. Department personnel also inspected the site on April 9, 1992, and noted that fill near the catch basin located in the southeast corner of the school yard had collapsed. Additionally, fill near the manhole which ties the school yard drains in with the municipal 48 inch main was slightly eroded. GE personnel stated that these areas would be re-filled and graded during summer vacation.

PROPOSED PHASE II ACTIVITIES

The Department required GE to include proposals in their Phase II SOW for, at a minimum: a description of the past uses of the property; the installation, sampling and gauging of at least two groundwater monitoring wells at the site; and an evaluation of the soil and groundwater data to verify that the extent of contamination is defined at the site. As requested, GE proposed to complete the above tasks during Phase II activities at the site.

Background Research

GE proposes to summarize past land use information in the Phase II report. B & B states that research for historic land use for the site will include a review of historic aerial photographs, tax assessor's maps, zoning maps, historic newspapers and other records. GE states in the SOW that during construction of the school in 1950, the company gave the city permission to remove soil from GE property for use as fill in the school yard.

Groundwater Studies

GE proposes to install two temporary piezometers (A-1 and A-2) at the site--one would be installed in the southeast corner of the school yard near the residences on Virginia Avenue and one would be installed in the northwest corner of the school yard near the west end of the parking lot. Proposed piezometer A-2 is expected to be upgradient of the contaminated soils within the school yard, and results for samples collected from this piezometer are expected to provide background data. The piezometer is also located near residences located to the west of the school yard. Proposed piezometer A-1 is located near the residences to the east of the school yard and nearest the contaminated soil areas of the school yard. Results for samples collected from this piezometer are expected to determine if groundwater in this area is contaminated. These two piezometers will also be used to obtain water level readings to more accurately determine groundwater flow direction at the site.

The piezometers will consist of two inch steel casing or pipe coupled to two feet of 0.020 slotted stainless steel screen. Piezometers will be installed to a depth of six feet manually or using a tripod type driver. The area around the piezometers will be fenced to prevent unauthorized access.

One week after installation, groundwater samples will be collected from the piezometers and analyzed for PCBs, using EPA Method 8080 and for VOCs, using EPA Method 8240 and including the compound 1,2,4-trichlorobenzene. Groundwater samples will be collected using teflon bailers. Prior to sampling, piezometers will be purged in accordance with B & B's Sampling and Analysis Plan as approved by the Department. Purge water will be contained in drums for proper disposal.

During groundwater sampling, GE's consultant will obtain water level measurements from the two piezometers and nearby wells 78-6 and NY-4. GE installed well NY-4 in 1988 in order to evaluate groundwater conditions in this area. GE installed well 78-6 as part of Phase I investigations for the GE Hill 78 site. Well 78-6 is expected to be downgradient from the school yard. Proposed water level measurements from the on-site piezometers and nearby wells NY-4 and 78-6 are expected to provide better data to determine groundwater flow direction.

B & B states that if groundwater sampling data indicate that the on-site groundwater is free of contaminants, GE will recommend that the piezometers be abandoned. To abandon the piezometers, GE would remove the steel casing and attached screen and seal the borehole with a bentonite grout slurry. Topsoil would be placed on the seal and the area would be re-seeded.

<u>Soil Sampling Studies</u>

As previously stated, GE has conducted surface and subsurface soil sampling within the school yard. All samples were screened for the presence of VOCs, by conducting a headspace analysis using a photoionization detector (PID) and analyzed for PCBs. Samples were collected from borings at six inch intervals at depths up to 12 feet. Results indicated the presence of PCBs at concentrations up to 1,100 ppm, primarily in subsurface soil. Additionally, select soil samples were analyzed for all compounds listed in Appendix IX + 3. Results for the Appendix IX + 3 analysis indicated the presence of low concentrations of chlorinated herbicides (less than 10 ppb), S-VOCs (less than 270 ppb) and furans (less than 20 ppb) in addition to PCBs. GE's laboratory stated that the presence of furans may be attributable to interference from chlorinated diphenyl ethers. Concentrations for metals listed in Appendix IX found in soil samples were considered to be at or below typical background concentrations.

For the Phase II investigation, GE proposes to evaluate existing soil sampling data to determine if the extent of PCB contamination in soil has been defined. B & B proposes using geostatistical analyses to evaluate the data to determine if the extent of PCB contamination has been defined. The statistical analysis involves using the PCB sampling data to develop a mean concentration and an estimate of variance of that mean over an area that has been sampled.

Air Sampling Studies

GE is currently conducting year long air sampling at several locations in and around the GE Facility in partial completion of Phase II investigations at the GE Facility sites. Air samples have been collected every 12 days since August 1991 and analyzed for PCBs. Air sampling will end in August 1992. The air sampling station nearest to the Allendale School Yard site is located at the GE Hill 78 site. GE proposes to use air modeling to extrapolate the data from this sampling station to obtain representative data for ambient air at the school yard. The air sampling data and the calculations used in the model would be included in the Phase II report.

Risk Assessment and Phase II Reporting

GE will compile all data obtained from proposed Phase II investigations and all relevant data from prior investigations and present and interpret the data in an Interim Phase II report for Department review and approval. If the Department approves the Phase II report and requires no additional Phase II work, GE will submit a Scope of Work (SOW) for the completion of a site Risk Assessment. The SOW will propose completion of a risk assessment for the site in accordance with Department's "Guidance for Disposal Site Risk Characterization". If upon review of the Interim Phase II report, the Department requires additional Phase II work, GE will submit a Supplemental Phase II Scope of Work, proposing completion of any necessary Phase II investigations. Following completion of any supplemental Phase II activities, GE would submit a final Phase II report and a Risk Assessment SOW.

According to the schedule submitted with the Phase II SOW, GE proposes to complete Phase II activities and submit the Interim Phase II report within seven months of Department approval of the SOW.

DEPARTMENT DETERMINATIONS

Based on a review of the Phase II SOW, the Department approves of the proposed Phase II activities, pursuant to 310 CMR 40.545 (2), and subject to the conditions as listed below.

1. GE should include a copy of the document in which GE grants permission to the City of Pittsfield to remove fill for use in the school yard in the Interim Phase II Report. Additionally, for the Phase II report, GE should determine, as well as possible, which portion (s) of the facility the fill originated from, and estimates of amount of fill removed.

2. According to the well log, well construction summary table (Table 4 of the Phase I Report) presented in the Phase I report for the GE Hill 78 site, and water level measurements obtained on January 1991 and July 1991, the water table was at least six feet above the top of the screen for well NY-4 during both well gauging rounds; therefore, water level measurements from this well may not accurately reflect the true water table elevation. If the measured water table is above the top of the screen and the data are used to construct a water table map, either the measurement from this well should not be used to construct the map or this fact should be noted on the map.

3. Piezometers should be installed so that the screen bridges the water table as much as possible; the top of the screen should be installed at least six inches above the water table, and preferably more if screens longer than the proposed two feet are used.

4. In addition to the wells and piezometers proposed for water level measurements (AS-1, AS-2, NY-4 and 78-6), water level measurements should also be obtained from wells NY-3 and 78-1 at the same time the water levels are measured in the proposed wells.

5. The Department reserves the right to require the installation of permanent wells in the school yard if the piezometers do not yield sufficient volume for a sample, the results for groundwater samples collected from the piezometers indicate the presence of contamination, or the piezometers do not yield an accurate water table measurement (relative to measurements from appropriate surrounding wells).

6. GE should specify in the Phase II report, which types of air models are used, assumptions made and calculations used to extrapolate data from the air sampling station at the Hill 78 site to data representing ambient air conditions at the school yard.

7. Details and calculations used for the statistical analysis used to evaluate the soil sample data within the school yard should be provided in the Phase II report.

8. For the Phase II report, in addition to PCBs, GE should evaluate the presence of low level contaminants found in the soil within the school yard (herbicides and S-VOCs). GE should determine the site specific background for the contaminants and compare sample data to background. Contaminants above background must be evaluated in the Risk Assessment.

9. GE must clearly identify the extent of the fill and the contaminated soil areas within the school yard. PCB contaminated soil generally coincides with the filled areas within the school yard. GE should construct maps indicating the horizontal extent of fill and/or PCB contaminated soil areas. GE should also construct cross sections showing the vertical extent of PCB contaminated soils and/or fill.

10. The Department hereby approves the schedule for Phase II activities at the Allendale School Yard site, as proposed in the Phase II SOW and considers the proposed deadline of <u>seven months from the date of this letter</u> for the submittal of the Interim Phase II report an interim deadline as set forth in 310 CMR 40.534 (5).

If you have any questions regarding this matter, please contact Anthony Kurpaska of this office.

Very truly yours,

Alan Weinberg
Acting Regional Engineer
Bureau of Waste Site Cleanup

AW:AFK:afk
wsc40:all.p2

cc: Mayor Edward Riley, City of Pittsfield
George Crane, Chairman, Pittsfield Public School Committee
Dr. Robert L. La Frankie, Superintendent, Pittsfield Schools
Edward Basinski, Principal, Allendale School
Parent Teacher Organization, Allendale School
Pittsfield Board of Health
Robert Mellace, City of Pittsfield
Public Information Repository
Mary Garren, EPA I
State Rep. Shaun Kelly
State Rep. Peter Larkin
State Senator Jane Swift
Stephen Winslow, Esq., counsel for DEP
Ronald Desgroseilliers, GE
James R. Bieke, Esq., counsel for GE

APPENDIX B

SHORT-TERM MEASURE (STM) COVER PLAN - FIGURE 5

APPENDIX C

AMBIENT CONCENTRATIONS OF PCBs AT THE ALLENDALE SCHOOL PROPERTY

Ambient Concentrations of PCBs at the Allendale School Property

Zorex Environmental Engineers, Inc.
247 South Street
Pittsfield, MA 01201
(413) 447-7585

January 26, 1993

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Tables

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SUMMARY

A year long ambient air monitoring program for polychlorinated biphenyls (PCBs) at and near the General Electric Company (GE) facility in Pittsfield was completed between August 20 1991 and August 19, 1992. A Final Report summarizing the results of this program was submitted to the Massachusetts Department of Environmental Protection (MADEP) in November 13, 1992.

As part of this monitoring program, an ambient air monitoring station was operated at the GE Hill 78 Landfill Site. In its Allendale School Phase II Scope of Work, GE proposed to extrapolate the ambient monitoring data from the GE Hill 78 monitoring site to estimate representative data for ambient air at the Allendale School.

The ambient air monitoring data from the Hill 78 monitoring station were compared with meteorological parameters measured during the monitoring program and the ambient PCB concentrations measured at other stations in the monitoring network. The analysis was intended to identify potential source areas for the PCB concentrations measured at the Hill 78 station and to provide a basis for estimating source emissions.

Since the Hill 78 Landfill is the nearest potential source area to the Hill 78 monitor and the Allendale School property, it is considered the most likely source of PCBs present in the ambient air in those areas, apart from the general ambient background PCB concentrations (as indicated by concentrations measured at a background monitoring station). Based on this assumption, the ISCLT air dispersion model and one year of data from GE's on-site meteorological station (in East Street Area 2) were used to estimate the emission rate of PCBs from the Hill 78 Landfill and to estimate off-site contributions to ambient PCBs, including at the Allendale School property. Modeling predictions were made both for annual average concentrations and for seasonal average concentrations for the season showing the highest seasonal average (summer).

Based on the analysis conducted, the following conclusions have been drawn:

1. The average annual PCB concentration at the Hill 78 monitoring site is 0.0007 $\mu g/m^3$.

2. The average annual PCB concentration at the Hill 78 monitoring site is not statistically significantly above the project detection limit, 0.0005 $\mu g/m^3$.

3. The estimated annual PCB contribution from the Hill 78 Landfill to the Allendale School property ranges from approximately 0.00008 $\mu g/m^3$ or less on the north side of the Allendale property to approximately 0.00048 $\mu g/m^3$ on the southern edge.

4. The estimated Hill 78 Landfill contribution to ambient PCB concentrations in summer on the Allendale School property ranges from 0.0001 $\mu g/m^3$ on the northern edge of the property to 0.0011 $\mu g/m^3$ on the southern side.

5. When assumed background concentrations are added in, the estimated average annual ambient concentration of PCBs on the Allendale School property ranges from 0.00033 $\mu g/m^3$ to 0.00073 $\mu g/m^3$.

6. The estimated average summer concentration of PCBs on the Allendale School property ranges from 0.00035 $\mu g/m^3$ to 0.00135 $\mu g/m^3$.

Due to uncertainties about the source(s) of the PCBs measured at the Hill 78 monitor, a sensitivity analysis has been performed based on the assumption that the PCB concentrations measured at the Hill 78 monitor are representative of those on the school property. This approach would indicate that the average concentrations on the school property including background are 0.0007 $\mu g/m^3$ on an annual basis and 0.0011 $\mu g/m^3$ for the summer. These values fall within the range of modeled PCB concentrations on the school property after background is added in, thus lending support to the modeling results.

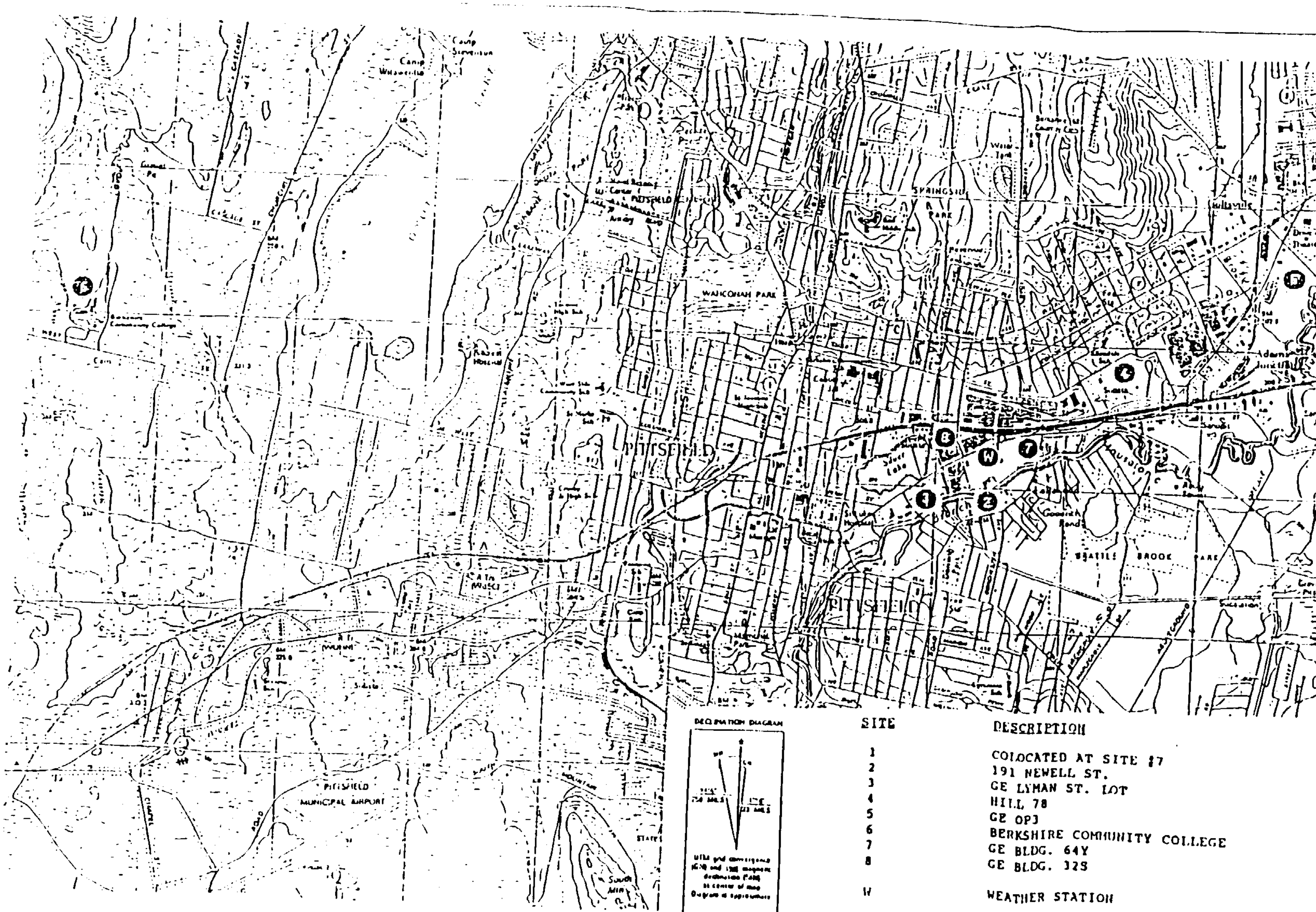
1.0 INTRODUCTION

General Electric Company completed on August 14, 1992 a year long ambient air monitoring program for polychlorinated biphenyls (PCBs) at and near the General Electric Company (GE) facility in Pittsfield, Massachusetts. The PCB ambient sampling was conducted, as part of continuing investigations under the Massachusetts Contingency Plan (MCP), to address potential air pathway exposures to PCBs. A Final Report titled Ambient Air Monitoring for PCB, August 20, 1991 - August 14, 1992; General Electric Co., Pittsfield, MA., summarizing the results of the monitoring program, was submitted to the Massachusetts Department of Environmental Protection (MADEP) on November 13, 1992.

The objective of the monitoring program was to provide valid and representative data on ambient air levels of total PCBs in order to evaluate air pathway exposures for populations at and around the GE Pittsfield Plant. The monitoring program was conducted in accordance with a Scope of Work (SOW) approved by the Massachusetts Department of Environmental Protection (MADEP) in December 1990 and in accordance with the Quality Assurance Project Plan (QAPP) submitted to MADEP in August 1991.

The sampling network included a monitoring station at the GE Hill 78 Landfill Area site. Figures 1 and 2 identify the sampling network and a detail of the Hill 78 monitoring site. In its Allendale School property MCP Phase II Scope of Work, GE proposed to extrapolate the ambient monitoring data from this station to obtain representative data for ambient air at the Allendale School property.

This report provides a summary of the sampling program and a detailed analysis of the monitoring results from the Hill 78 Area site including, to the degree practical, an extrapolation of those results to represent ambient PCB concentrations at the Allendale School property.



SITE	DESCRIPTION
1	COLOCATED AT SITE #7
2	191 NEWELL ST.
3	GE LYMAN ST. LOT
4	HILL 78
5	GE OPJ
6	BERKSHIRE COMMUNITY COLLEGE
7	GE BLDG. 64Y
8	GE BLDG. 32S
W	WEATHER STATION

FIGURE 1 - MONITOR LOCATIONS

HILL 78 LANDFILL AREA
& ALLENDALE SCHOOL PROPERTY

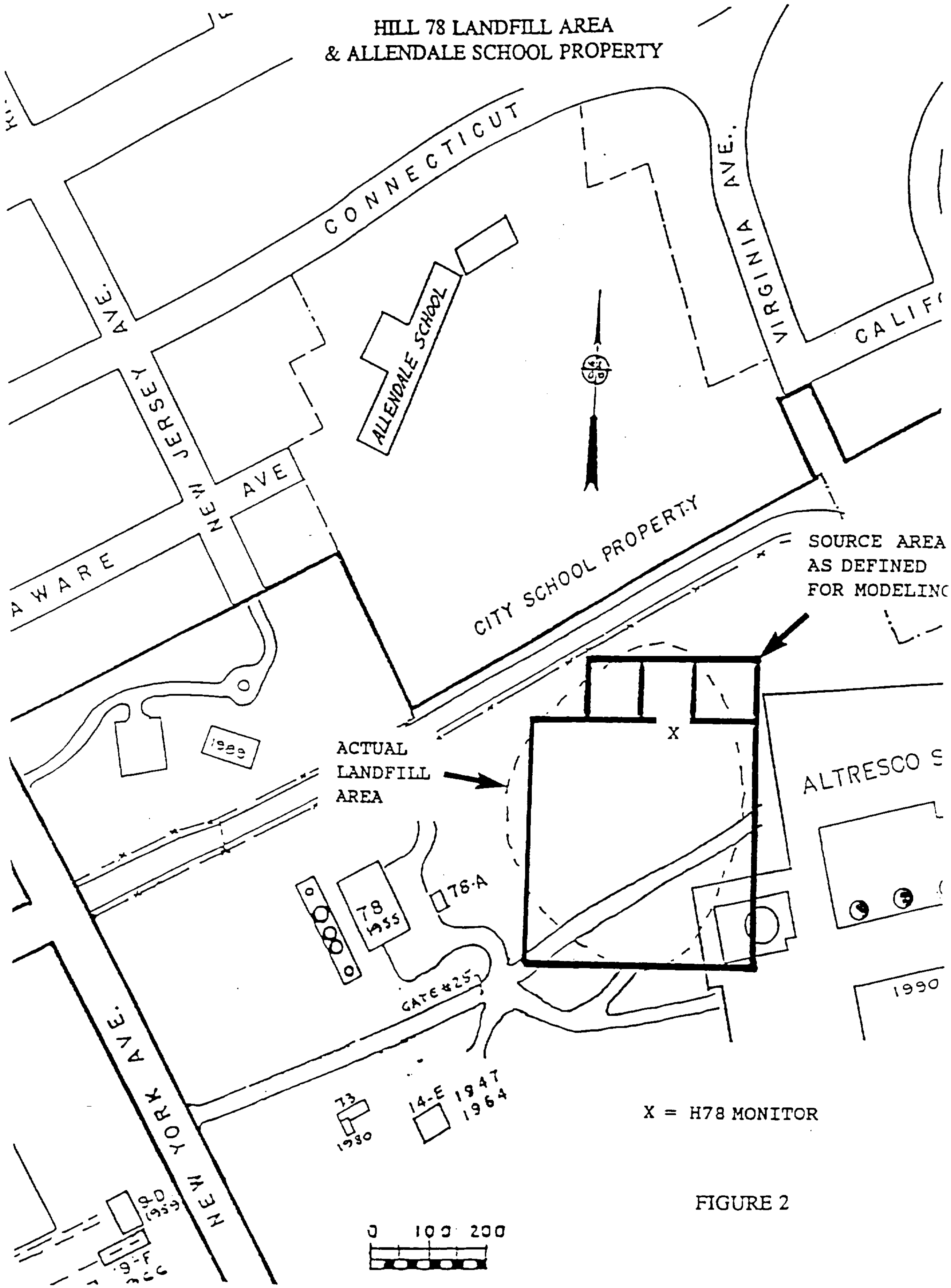


FIGURE 2

2.0 MONITORING PROGRAM

PCB ambient monitoring began on August 20, 1991 and ended on August 14, 1992. Meteorological data from an on-site weather station were collected concurrently with the ambient PCB data. All field work, sample collection, sample shipment and record keeping were completed by Zorex Environmental Engineers, Inc., Pittsfield, Massachusetts. The samples were analyzed by IT Analytical Services in Cincinnati, Ohio.

2.1 Sample Collection and Analysis

The PCB ambient monitoring program was operated for 31 sampling events from August 20, 1991 through August 14, 1992. The sampling network consisted of eight PCB air samplers operated at locations approved by the MADEP in May 1991. One of the downwind samplers in the network was located on the GE Hill 78 Landfill Area. A background sampling station, designated as the upwind site, was located on the grounds of Berkshire Community College (BCC) approximately 3.5 miles west of the GE plant. The sampling network is shown on Figure 1.

A 24 hour sample was collected every 12th day from 7 a.m. to 7 a.m. at each of the monitoring stations. The ambient PCB samples were collected using the EPA Compendium Method TO-4. This method employs a General Metal Works Model PS-1 modified high volume sampler consisting of a glass fiber filter with a polyurethane foam (PUF) backup absorbent cartridge.

The PCBs in the samples were recovered by Soxhlet extraction with 5% ether in hexane. The extracts were reduced in volume using Kuderna-Danish (K-D) concentration techniques and subjected to column chromatographic cleanup. The extracts were analyzed for seven PCB Aroclors PCBs using gas chromatography with electron capture detection (GC-ECD), as described in EPA Method 608. To confirm the analytical results of Method 608, one sample from each batch of 21 was confirmed by high resolution GC/mass spectrometry (GC/MS). The PCB detection limit (DL) for the project, based on a typical collected sample volume of 370 m^3, was approximately 0.0005 $\mu g/m^3$.

2.2 Meteorological Station

An on-site weather station was installed in the area known as East Street Area 2 at the GE Facility in July 1991 to continuously record meteorological data concurrently with sampling. A Climatronics Electronic Weather Station (EWS) measures and records, every 15 minutes, wind speed, wind direction, wind direction standard deviation, precipitation, temperature, relative humidity and integrated solar radiation. The location of the weather station is identified on Figure 1.

This station was installed and continues to operate in accordance with EPA guidance contained in On-Site Meteorological Program Guidance for Regulatory Modeling Applications, U.S. EPA, June, 1987. The siting of the meteorological station was approved by MADEP in May 1991.

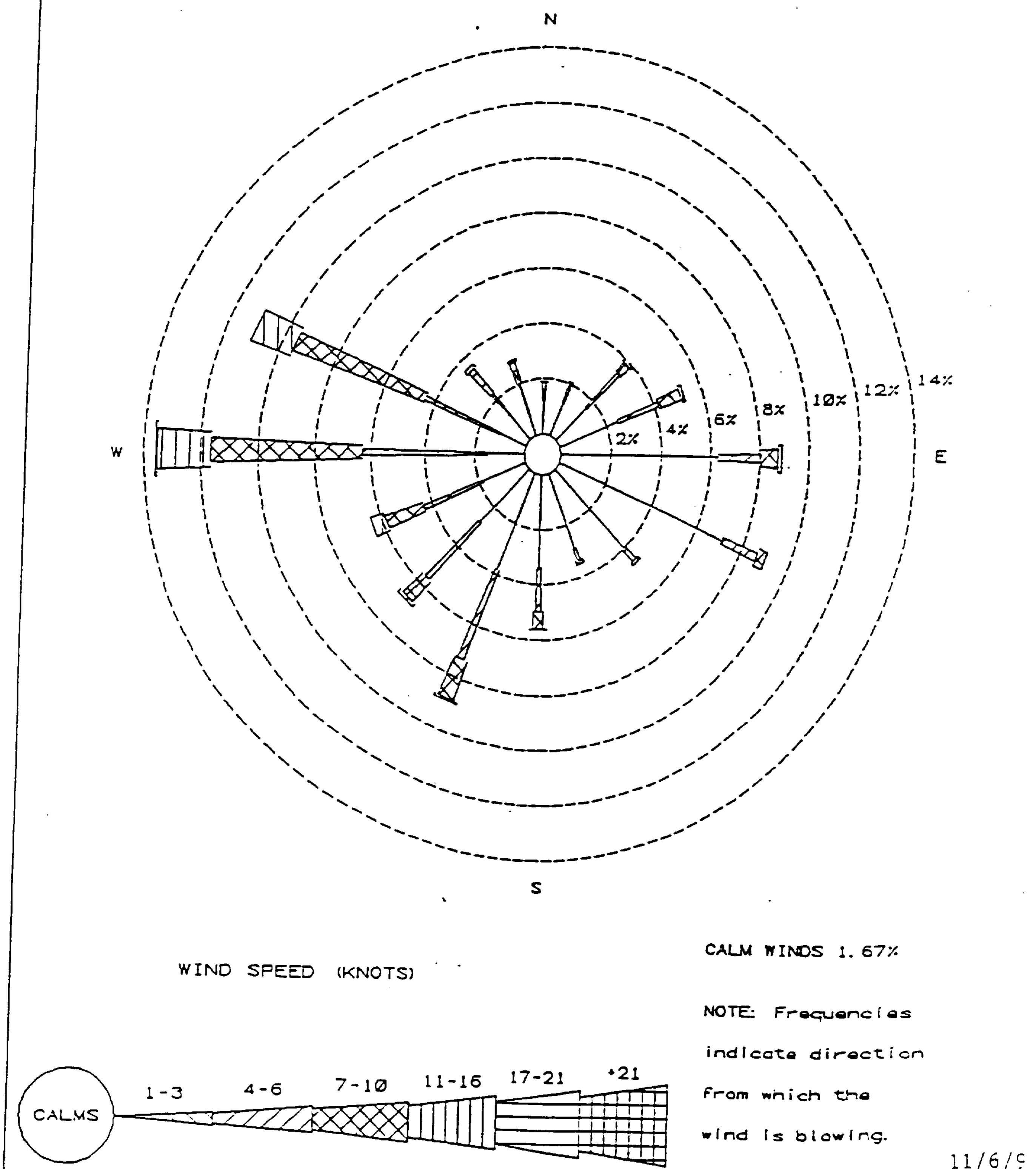
2.2.1 Meteorological Data Summaries

Data from the on-site weather station were summarized and tabulated for each of the sampling days. A complete summary of the meteorological data is provided in the Final Report titled Ambient Air Monitoring for PCB, August 20, 1991 - August 14, 1992; General Electric Co., Pittsfield, MA. In addition, the wind speed and wind direction data were combined to produce wind roses for each sampling day. The 31 wind roses representing the sampling days and four seasonal wind roses are included for reference in Attachment I of this report. An annual wind rose representing the period from September 1, 1991 to August 31, 1992 is presented as Figure 3.

The predominant wind direction during this one year period was from the west. This westerly wind direction is evident in the annual as well as each of the seasonal wind roses. Also noticeable is the frequency of an easterly wind. An east - west pattern seems particularly strong during the spring and summer. The annual wind rose from the on-site station contrasts with the decided north-south pattern observed at the Albany National Weather Service station over the last five years. The Albany weather data were used for the initial siting analysis for the monitors.

Joint frequency distributions of wind direction versus wind speed categories and Pasquill-Gifford (P-G) stability class frequencies were generated on an hourly basis for the one year of data from September 1, 1991 to August 31, 1992. The appendices to the Final Report contain the frequency distribution of wind speed and direction for each stability class. The most frequently occurring stability class during the one year monitoring was P-G class F (fanning). This class was distinguished by the greatest number of calm hours and the lowest average wind speeds for the one year period.

September 1, 1991 - August 31, 1992



11/6/9

3.0 GE Hill 78 LANDFILL AREA AMBIENT PCB CONCENTRATIONS

3.1 24 Hour Ambient PCB Concentrations

Ambient 24 hour concentrations of total PCBs in $\mu g/m^3$ measured between August 20, 1991 and August 14, 1992 at the GE Hill 78 sampling station are presented in Table 1. Except for the concentration reported on May 10, 1992 which was identified as Aroclor 1260, all reported concentrations represent Aroclor 1254 as identified by IT Analytical.

Of the 31 sampling events, there were 30 valid samples collected at Hill 78. The one invalid sample, collected on 9/25/91, was the result of a timer problem. Twenty-three or 76.7% of the 30 valid samples were less than the project detection limit (DL) of 0.0005 $\mu g/m^3$. There were just seven samples (23.3%) with measurable quantities of PCB above the DL.

Measured 24 hour concentrations of PCBs at the Hill 78 site ranged from a low of 0.00086 $\mu g/m^3$ on 5/10/92 to a high of 0.0035 $\mu g/m^3$ recorded on 6/5/92.

3.2 Annual and Seasonal PCB Concentrations

The annual and seasonal concentrations of total PCBs measured at Hill 78 are presented in Table 2. For averaging purposes, non-detect (ND) measurements were assumed to be one half the detection limit (EPA Guidance in Air/Superfund National Technical Guidance Study Series. Volume 4. Procedures for Dispersion Modeling and Air Monitoring for Superfund Air Pathway Analysis. U.S. EPA, July 1989). (As indicated in the Section 2.1 above, the project detection limit was 0.0005 $\mu g/m^3$. However, there were two samples from Hill 78 collected on 3/23/92 and 4/4/92 where the detection limits were higher, 0.002 and 0.0008 $\mu g/m^3$, respectively. IT Analytical has indicated that the these samples had a "dirty" matrix which made it difficult to interpret the chromatograms.)

The average annual PCB concentration at the Hill 78 site based on the 30 valid sampling events was 0.0007 $\mu g/m^3$. The highest average seasonal concentration was 0.0011 $\mu g/m^3$ representing the summer months of June - September. Six of the seven measured concentrations occurred during the spring and summer months. There was only one measurable ambient PCB concentration (sample collected on 2/28/92) for the eighteen sampling events between 10/7/91 and 4/28/92.

3.3 Data Anomalies

As part of the data validation procedures, all of the sampling results were reviewed for trends and characteristic values. Data that appeared to be unusually high, low or otherwise irregular was flagged for further evaluation. The sample collected at Hill 78 on February 28, 1992 was flagged during the validation process because it appeared to be uncharacteristically high

TABLE 1

24 hr. Ambient PCB Concentrations (ug/m^3)

DATE	002 NWL	003 LYM	004 H78	005 OP3	006 Background	007 64Y	001 64YC[1]	008 32S
08/20/91	.026	NA[2]	ND (<.0005[3])	ND (<.0005)	ND (<.0005)	.00061	ND (<.0005)	-
09/01/91	.0097	.0018	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	-
09/13/91	.0070	.0024	.00096	ND (<.0005)	ND (<.0005)	NA	NA	-
09/25/91	.011	.0016	NA	ND (<.0005)	ND (<.0005)	.00097	.0016	-
10/07/91	.0016	.00064	ND (<.0005)	ND (<.0005)	ND (<.0005)	.0011	.0010	-
10/19/91	.0018	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	.00073	.00067	-
10/31/91	.0060	.00093	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	-
11/12/91	.00084	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	.00087	.00084	-
11/24/91	.00070	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	.00061	-
12/06/91	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	-

[1] Co-located with Sampler 7
[2] NA = Invalid Sample
[3] ND(DL) = Not detected (detection limit)
[4] Aroclor 1260
[5] Aroclor 1248

TABLE 1 (con't)

24 hr. Ambient PCB Concentrations (ug/m³)

DATE	002 NWL	003 LYM	004 H78	005 OP3	006 Background	007 64Y	001 64YC[1]	008 32S
12/18/91	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	.00084	ND (<.0005)	ND (<.0005)	-
12/30/91	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	-
01/11/92	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	.0024	-
01/23/92	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	-
02/04/92	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	-
02/16/92	.0011	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	.0010	-
02/28/92	.00089	ND (<.0005)	.0011	ND (<.0005)	.00070	.00071	ND (<.0005)	-
03/11/92	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	NA	NA	-
03/23/92	.00084	.00062	ND (<.002)	.00076	.0013	.00086	.00078	-
04/04/92	.0012	ND (<.0005)	ND (<.0008)	ND (<.0005)	ND (<.0005)	.0012	.0014	-

[1] Co-located with Sampler 7
[2] NA = Invalid Sample
[3] ND(DL) = Not detected (detection limit)
[4] Aroclor 1260
[5] Aroclor 1248

TABLE 1 (con't)

24 hr. Ambient PCB Concentrations (ug/m^3)

DATE	002 NWL	003 LYM	004 H78	005 OP3	006 Background	007 64Y	001 64YC[1]	008 32S
04/16/92	.00060	.00062	ND (<.0005)	ND (<.0005)	ND (<.0005)	ND (<.0005)	.00076	-
04/28/92	.00097	.0014	ND (<.0005)	ND (<.0005)	ND (<.0005)	.00073[4]	.00071[4]	-
05/10/92	.014	.0030[4]	.00086[4]	ND (<.0005)	ND (<.0005)	.00099[4]	.0013[4]	-
06/03/92	.014	.0038	ND (<.0005)	.0017	.00077	.0025	ND (<.0005)	-
06/05/92	.016	ND (<.0005)	.0035	.0011	ND (<.0005)	.0010	.00068	-
06/15/92	.030	.0027	ND (<.0005)	.00062	ND (<.0005)	.0020	.0014	.0054
06/27/92	.011	.0023	ND (<.0005)	ND (<.0005)	ND (<.0005)	.0021	.0026	.0043
07/09/92	.012	.0020	ND (<.0005)	.0019	ND (<.0005)	.0027	.0033	.0035
07/21/92	NA	.0032	.0020	.0015	ND (<.0005)	.0037	.0035	.0043
08/02/92	.016	.0059	.0030	.0016	ND (<.0005)	.0032	.0041	.0071
08/14/92	ND (<.0005)	.0025	.0018	.0016	.0015[5]	.0025	ND (<.0005)	.0057

[1] Co-located with Sampler 7
[2] NA = Invalid Sample
[3] ND(DL) = Not detected (detection limit)
[4] Aroclor 1260
[5] Aroclor 1248

TABLE 2

Ambient PCB Concentrations (ug/m^3) Summary Table

	002 NWL	003 LYM	004 H78	005 OP3	006 BCC	007 64Y	001[1] 64YC	008 32S
Mean Concentration[2]	.0062	.0013	.0007	<.0005	<.0005	.0011	.0011	.0050[3]
Mean Spring[2]	.0097	.0016	.0008	.0006	<.0005	.0012	.0009	-
Mean Summer[2,4]	.0117	.0029	.0011	.0010	<.0005	.0022	.0020	-
Mean Fall[2]	.0028	.0006	<.0005	<.0005	<.0005	.0006	.0007	-
Mean Winter[2]	.0005	<.0005	<.0005	<.0005	<.0005	<.0005	.0007	-
Max. 24 hr Concentration Date of Occurrence	.030 06/15/92	.0059 08/02/92	.0035 06/05/92	.0019 07/19/92	.0015 08/14/92	.0037 07/21/92	.0041 08/02/92	.0071 08/02/92
Min. 24 hr Concentration[5] Date of Occurrence	ND[6] -[7]	ND -	ND -	ND -	ND -	ND -	ND -	.0035 07/09/92
Total # of Valid Samples % Below the DL	30 26.7	30 46.7	30 76.7	31 74.2	31 83.9	29 37.9	29 37.9	6 0

[1] Co-located at Monitor 007

[2] Averages are calculated using one-half the detection limit (DL) for ND events.

[3] Based on six sampling events between June 15, 1992 and August 14, 1992.

[4] Observations from summer 1991 and 1992 were combined to produce summer averages.

[5] Sampling Stations 001 through 007 had several observations of ND. See Table 1.

[6] ND = Below the detection limit of 0.0005 ug/m^3.

[7] (-) Indicates that an ND was recorded on several occasions.

for the season and in relation to the several sampling periods before and after. A review of the data has not provided any explanation or reason for the apparent anomaly. Therefore, this sample result is included in the analysis of ambient PCB concentrations at Hill 78.

3.4 Vapor Versus Particulate Phase PCBs

As described in the Final Report of the PCB ambient monitoring project in Pittsfield, the PUF and filter portions of several samples were split and analyzed separately to determine what portions of the total PCBs collected in the ambient air were in the particulate and vapor phases. Although none of these samples was collected at the Hill 78 site, GE and Zorex Environmental Engineers, Inc. have assumed that the vapor and particulate fractions measured in the samples are also representative of samples collected at the Hill 78 monitoring site.

In all eight sets of split sample results, there were no PCBs detectable on the filter portions of the samples. Also, the total PCBs measured from the PUF portion of the samples were consistent with the totals from sampling events when the filter and PUF were not analyzed separately. The filter and PUF analyses each had an analytical detection limit of 0.2 ug/PUF.

As further described in the Final Report, it is not clear whether these vapor/particulate results reflect the actual fractioning of PCBs in the ambient air. There is evidence in the literature to suggest that the sampling process may strip PCBs off of the particle filter (conversation with Gary Evans of EPA at Research Triangle Park regarding the results of ambient air studies in the lower Lake Michigan Basin, November 2, 1992). There is other evidence in the literature suggesting a typical 90%/10% fractioning of vapor and particulate phase PCBs in ambient air.[1]

3.5 Statistical Significance of Ambient PCB Concentrations Above the Detection Limit

A one tailed, large sample, test of significance was performed to determine if the average annual concentration recorded at Hill 78 (0.0007 $\mu g/m^3$) was significantly higher than the project DL of 0.0005 $\mu g/m^3$ [2]. The calculations for the test are included in Attachment II.

The Null Hypothesis for the test stated that the average annual concentration at Hill 78

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[1]Manchester-Nessvig, J. B. and Andren, A. W. Seasonal Variation in the Atmospheric Concentration of Polychlorinated Biphenyl Congeners, Environmental Science and Technology, 23(9): 1138-1148, 1989.

[2]Statistical Analysis was performed by Frank Deane, Professor of Mathematics and Mathematics Department Chairman, Berkshire Community College, Pittsfield, MA, and Adjunct Professor at Williams College, Williamstown, MA.

is 0.0005 (mean value, $\mu = 0.0005$). The Alternative Hypothesis stated that the average annual PCB concentration at Hill 78 is greater than 0.0005.

The Hill 78 sampling data produced a sample mean of 0.0007 $\mu g/m^3$ (sample mean, $x = 0.0007$). The difference of $x - \mu$ (0.0007 - 0.0005) would be significant at the .05 level if the standard error of measurement were greater than 1.96. The difference (0.0002) yields a standardized measurement of $z = 1.05$. Therefore, because $1.05 < 1.96$, the data do not support rejecting the null hypothesis.

This test indicates that there is no statistically significant difference between the detection limit and the ambient concentration measured at Hill 78. Likewise, the data sampled do not support a conclusion that the true mean (i.e. actual average ambient air concentration) is larger than 0.0005 $\mu g/m^3$.

4.0 AMBIENT AIR CONCENTRATIONS: COMPARISON WITH METEOROLOGICAL PARAMETERS

The ambient data were compared with various meteorological parameters to identify any apparent relationships and to indicate potential source areas. The 24 hour ambient concentrations for each of the 30 valid sampling days were compared with the temperature, wind direction, wind speed, and wind direction recorded on each day at the on site weather station.

4.1 Temperature

An obvious association between temperature and ambient concentration became apparent during sampling. Almost all (six out of seven) of the measurable concentrations ("hits") occurred during the spring and summer, while only one hit appeared in winter. This phenomenon was similarly observed at the other monitoring stations in the network, and implied a direct relationship between ambient concentrations of PCB and ambient temperature. Ambient concentration of PCBs tended to increase with ambient temperature and vice versa.

It was also obvious, however, that it was not appropriate to conclude that a higher temperature on any particular day would yield a higher PCB concentration. In fact, on the sampling day with the highest recorded ambient temperature (7/09/92 at 72°F) an ND was recorded at Hill 78 and on one of the coldest days (2/28/92 at 31°F) a relatively high concentration (0.0011 $\mu g/m^3$) was measured.

An effort was made to demonstrate a statistical correlation of temperature and ambient concentration. The correlation coefficient of ambient concentration on temperature was calculated at 0.31, which is considerably less than the 0.9 - 1.0 needed to demonstrate a correlation. The peculiarities of the data, particularly the warm days when no hits were recorded and the one very cold day when a hit was recorded, proved to be too variable to demonstrate a correlation. There was similarly no correlation of temperature with the groups of summer or winter months when evaluated separately.

The data show an apparent association between temperature and ambient concentration, but clearly there are other factors (which may include wind direction, wind speed, source strength, background concentrations etc.) that influence the ambient PCB concentration at Hill 78.

4.2 Wind Direction and Wind Direction

Wind roses depicting wind speed and direction for each sampling day were constructed (Attachment I). In addition, the frequency of wind directions was converted to percentages and tabulated for reference (Tables 3 and 4). In an effort to identify trends and or patterns, the 24 hour ambient PCB concentration for each of the 30 valid sampling days was compared with the associated 24 hour wind rose and tabulated wind direction frequencies. In addition, the group

TABLE 3

HILL 78 HIT DAYS
WIND DIRECTION OCCURRENCES

	9-13-91	2-28-92	5-10-92	6-5-92	7-21-92	8-2-92	8-14-92	TOTAL PERCENTAGE
N			1/24					1/168 = 0.595
NNE	1/24		2/24	1/24				4/168 = 2.381
NE	1/24		6/24	2/24				9/168 = 5.357
ENE	3/24			2/24			1/24	6/168 = 3.571
E	7/24		13/24	18/24	2/24	1/24	7/24	48/168 = 28.571
ESE	1/24			1/24	2/24	3/24	9/24	16/168 = 9.523
SE	1/24						3/24	4/168 = 2.381
SSE	1/24	1/24				4/24	2/24	8/168 = 4.762
S	1/24	7/24				4/24		12/168 = 7.143
SSW		6/24				8/24	1/24	15/168 = 8.928
SW	4/24	1/24			2/24	4/24	1/24	12/168 = 7.143
WSW		1/24			2/24			3/168 = 1.788
W	4/24	5/24	1/24		8/24			18/168 = 10.714
WNW		2/24			6/24			8/168 = 4.762
NW		1/24			1/24			2/168 = 1.190
NNW			1/24		1/24			2/168 = 1.190

TABLE 4

HILL 78 WIND DIRECTION OCCURRENCE SUMMARY

	TOTAL WIND DIRECTION OCCURRENCES	NON-HIT DAY WIND DIRECTION OCCURRENCES	HIT DAY WIND DIRECTION OCCURRENCES
N	20/744 = 2.688 %	19/576 = 3.299%	1/168 = 0.595%
NNE	34/744 = 4.570 %	30/576 = 5.208%	4/168 = 2.381
NE	38/744 = 5.107 %	29/576 = 5.035%	9/168 = 5.357
ENE	28/744 = 3.763 %	22/576 = 3.819%	6/168 = 3.571%
E	80/744 = 10.753 %	32/576 = 5.562%	48/168 = 28.571%
ESE	58/744 = 7.796 %	42/576 = 7.292%	16/168 = 9.523
SE	31/744 = 4.167 %	27/576 = 4.687%	4/168 = 2.381%
SSE	23/774 = 3.091 %	15/576 = 2.604%	8/168 = 4.762%
S	26/744 = 3.495 %	14/576 = 2.431%	12/168 = 7.143%
SSW	45/744 = 6.048 %	30/576 = 5.208%	15/168 = 8.928%
SW	42/744 = 5.645 %	30/576 = 5.208%	12/168 = 7.143%
WSW	48/744 = 6.452 %	45/576 = 7.813%	3/168 = 1.788%
W	102/744 = 13.710%	84/576 = 14.583%	18/168 = 10.714%
WNW	114/744 = 15.323%	106/576 = 18.403%	8/168 = 4.762%
NW	24/744 = 3.226 %	22/576 = 3.819%	2/168 = 1.190%
NNW	31/744 = 4.167 %	29/576 = 5.035%	1/168 = 1.190%

of seven days when a measurable concentration was observed was examined separately from the group of 23 days when an ND was recorded.

For all sampling days as a group, the wind showed a strong east-west pattern similar to the annual wind rose for this meteorological station. For the group of seven sampling events when a measurable concentration was recorded, the wind came from the east and east-southeast for the largest percentage of the time (39%), but also came fairly often from the west and southwest. For the 23 ND events, the wind came most often from the west and west-northwest (33% of the time). There was no strong easterly component for ND sampling days.

The average wind speed on sampling days when a measurable concentration occurred at Hill 78 was lower (5.3 miles per hour(mph)) than the average wind speed on sampling days with an ND sample (6.4 mph). Nevertheless, there were sampling days such as 6/5/92 and 2/16/92 when the wind speed was relatively high (9.5 mph and 7.8 mph, respectively) and a measurable concentration was recorded. Conversely, there were several days such as 4/28/92 and 6/27/92 when the wind speed was relatively low (3.6 and 3.7 mph, respectively) and an ND was recorded.

4.3 Stability Class

Stability Class is a function of temperature, wind speed and cloud cover and is identified by a letter of A through F (or 1 through 6). The stability classes are typically described as follows:

Stability Class	
A	Looping
B	Looping
C	Coning, Trapping
D	Coning
E	Fanning
F	Fanning

The stability classes for each of the sampling days were reviewed for trends to see if there was an apparent difference in stability between hit and non-hit days. Stability class also has a diurnal variation reflecting the differences in temperature and convective air currents. It was observed, not surprisingly, that the stability class during the daytime typically fell into the A-D classes and during the nighttime in the D-F classes. There was no apparent difference in either the day or night stability classes between the two groups of sampling days.

It is not possible to determine from the sampling data the diurnal variation in ambient PCB concentration (i.e. whether there are higher concentrations in the daytime or the nighttime). There is clear evidence that ambient PCB concentrations react to temperature, but it is not clear how proportional that relationship is. It is possible that PCB ambient concentrations are dependent on evaporation rates during the day time and/or the presence of temperature inversions and/or more stable meteorological conditions during the nighttime.

4.4 Meteorological Summary

With the exception of the noted seasonal association between temperature and ambient air concentration of PCBs, it is very difficult to draw any definitive conclusions about the relationship between ambient concentrations of PCB and the meteorological parameters of wind speed, wind direction and stability class.

Unfortunately, the summaries of wind direction frequencies are not very helpful for drawing any conclusions about the source of PCBs. The wind direction on any given sampling day is quite variable and there are too few days with measurable PCB concentrations to observe any patterns. It is very difficult to determine if any specific wind direction or even range of wind direction produces the likelihood of a high PCB measurement. For example, it appears from the wind direction frequencies that a "hit" is more likely on a day when the wind is coming from the east, but for two of the seven days with detectable PCB concentrations, the wind did not come from the east at all.

It is quite possible that a combination of some or all of the meteorological parameters may affect the ambient PCB concentration. A complete statistical analysis may or may not identify such a relationship.

5.0 AMBIENT PCB SOURCE AREAS

There are several potential sources of ambient PCBs in the Pittsfield area including parts of the GE facility. The GE Hill 78 Landfill Area is the nearest potential source area and is the most likely contributor to ambient PCB concentrations at the Hill 78 monitoring site and the Allendale School property.

5.1 Hill 78 Landfill Area

The GE Hill 78 Landfill site was formerly used for the disposal of PCB contaminated construction debris. PCB concentrations in the soil range from 100 ppm at 0-2' depth to >47,000 ppm at 12-14' depth. No liquid PCB product has been found at the site. A complete description of the site is included in GE's Phase I - Limited Site Investigation Report for the Hill 78 Area.

A Short Term Measure (STM) to cover the surface of the Hill 78 Landfill was completed in 1991. The STM consisted of surface compaction and smoothing, the placement of a geotextile layer and 12 inches of compacted crushed stone over the upper portion of the landfill, placement and compaction of a minimum of 6 inches of clean fill on the side slopes, and revegetation of the side slopes.

The Hill 78 sampling station was located on the eastern edge of the former GE Hill 78 Landfill Area. A detail of the sampling site in relation to the landfill and filled/graded area is provided in Figure 2.

5.2 Background PCB Concentrations

As part of the PCB sampling network, a background monitor was operated on the campus of Berkshire Community College (BCC), 3.5 miles west of the GE facility. The location of this sampling station is identified on Figure 1. The ambient concentrations measured at BCC are included in Tables 1 and 2 under Station 006 - Background.

There were 31 valid samples collected at BCC. Twenty-six of these samples were ND; five were above the detection limit. The annual and seasonal average ambient concentrations of PCB are all less than the DL (0.0005 $\mu g/m^3$). The highest concentration was 0.0015 $\mu g/m^3$ recorded on 8/14/92. For further comparison and interpretation in Section 6, the background concentration at BCC was assumed to be one-half the detection limit, or 0.00025 $\mu g/m^3$, on both the annual average basis and for the highest seasonal average (summer).

6.0 AIR DISPERSION MODELING METHODOLOGY AND RESULTS

The objective of conducting air dispersion modeling (ADM) procedures was to estimate ambient concentrations of PCB on the Allendale School property. The methodology for the ADM was based in general on EPA guidelines contained in U.S. EPA Air/Superfund National Technical Guidance, Vol. IV - Procedures for Dispersion Modeling and Air Monitoring for Superfund Air Pathway Analysis (EPA -450/1-89-004, July 1989).

There is no defined EPA methodology for extrapolating ambient air concentrations monitored at on-site locations to off-site receptors. There is, however, reference in EPA Superfund Technical Guidance to the need for such procedures to be conducted. EPA Air/Superfund National Technical Guidance states, "Frequently it may not be practical to place air monitoring stations at off-site receptor locations of interest. However it may be necessary to characterize concentrations at these locations as input to site-specific risk assessments. In these cases, dispersion patterns based on modeling results can be used to extrapolate concentrations monitored on-site to off-site locations" (pg. 3-111).

6.1 Modeling Assumptions

EPA technical guidance suggests some general guidelines to follow in applying dispersion modeling procedures to hazardous waste sites, but does not provide any specific methodology. Therefore, prior to conducting the dispersion modeling procedures for the Hill 78 site, a number of assumptions, which would provide a basis for modeling, had to be made. The modeling program was developed in accordance with EPA guidelines and is addressed in the following sections. The Allendale modeling program was based on the following specific assumptions:

1. A background PCB concentration of 0.00025 $\mu g/m^3$ is assumed for the Pittsfield area on both an annual average basis and for the higher seasonal average (summer). As noted above, this value represents one-half the detection limit and is based on the assumed ambient PCB concentration as derived from measurements at the background monitoring station at BCC.

2. The source of all ambient PCBs measured at the Hill 78 monitoring station, less the assumed background, is the Hill 78 Landfill.

3. The source of all ambient PCBs at the Allendale School property, less the assumed background, is the Hill 78 Landfill.

4. The Hill 78 Landfill source area is an irregularly shaped area located on GE property south of the Allendale School. The landfill area has been defined by GE as part of the MCP process and represents an area of approximately 17,600 m^2. The landfill source area is depicted in Figure 2.

5. The emission rate across the landfill is uniform.

6. The emission rate from the landfill is constant over time for each period modeled.

7. The emission rate from the landfill for the purposes of this evaluation can be adequately estimated from the one year of data from the ambient monitoring station collected at Hill 78.

8. Meteorological conditions monitored at the on-site meteorological station in East Street Area 2 beginning July 1, 1991 are representative of the Hill 78 and Allendale School areas.

9. The modeling procedures are not proven for this type of application and there are several limitations to their use. It is assumed that the modeling procedures are adequate to indicate average concentration and concentration gradients away from the source.

6.2 Air Quality Model Selection

The U.S. EPA Air/Superfund National Technical Guidance, Vol. IV - Procedures for Dispersion Modeling and Air Monitoring for Superfund Air Pathway Analysis (EPA -450/1-89-004, July 1989), identifies the Industrial Source Complex (ISC) as the preferred dispersion model for most (Superfund Air Pathway Analysis) applications and should be given first consideration as the model of choice. The guidance further indicates that the "ISC dispersion model can be considered the default air dispersion model for Air Pathway Analysis (APA) Modeling."

The Industrial Source Complex Long Term (ISCLT) Version 92062 was used for estimating the average PCB concentrations at the Allendale School property on an annual basis and for the summer season (the season with the highest seasonal average). ISCLT is a steady state Guassian Plume model which will calculate monthly, seasonal and annual concentrations at specified receptor locations. The algorithm used to model area sources is a virtual point source approach and the concentration calculations are based on a 22.5° sector-average plume width. A complete description of ISCLT is provided in U.S. EPA Guideline on Air Quality Models (Revised), EPA-450/2-78-027R, July 1986. Additional resources consulted in applying ISCLT include the Review and Evaluation of Area Source Dispersion Algorithms for Emission Sources at Superfund Sites, EPA-450/4-89-020, July 1989; User's Guide for the Industrial Source Complex (ISC2) Dispersion Models, Volume I and 2, EPA-450/4-92-008a, March 1992; and Air/Superfund National Technical Guidance Study Series, Vol. IV - Procedures for Dispersion Modeling and Air Monitoring for Superfund Air Pathway Analysis, EPA-450/1-89-004, July 1989.

There are some inherent limitations to the use of this model (and others) which affect the concentration predictions. ISCLT, like many models, does not incorporate a source algorithm capable of estimating evaporative emission rates. Therefore, the variation of emission rates from a landfill or similar area as a function of environmental conditions such as ambient temperature or wind speed is uncertain. ISCLT has also been shown to inaccurately predict concentrations for different hazardous waste site scenarios. Nevertheless, a review and evaluation of the ISCLT concludes that long-term average results predicted by ISCLT "generally provide adequate treatment of area source dispersion" (EPA-450/4-89-200, 1989).

The ISCLT model was run using urban dispersion coefficients and regulatory default options for plume rise, buoyancy induced dispersion, wind profile exponents and vertical potential temperature gradients. Although the stack-tip downwash was selected in several early runs of the model, it was not used in the final analysis. Stack-tip downwash was determined to have virtually no impact on concentration predictions. A summary of the model set-up options and the specific input files are included with in Attachments III and IV for the annual average and summer calculations, respectively.

6.3 Source Area

The assumed source area for PCBs is the GE Hill 78 Landfill Area as identified in Figure 2. The irregular shaped landfill area was subdivided into four square shaped areas to accommodate the ISCLT model input requirements (Figure 2). The input source area measured approximately 17,600 m^2. Subdivision of the source area into smaller squares on the north side had the benefits of more closely approximating the shape of the source area and of allowing ISC to calculate concentration estimates nearer to the boundary of the source area.

6.4 Receptor Grid

A network of 196 receptors around the landfill and encompassing the Allendale School property was selected. A 396 meter (m) x 396 m square grid of equally spaced receptors 30 m apart was used. The receptors were assumed to be at ground level. The receptor grid was designed to resolve concentration gradients on the Allendale School property.

6.5 Meteorological Data

Surface meteorological data input into ISCLT were taken from an on-site weather station at GE's East Street Area 2 site. The annual data for the period September 1, 1991 through August 30, 1992 were used to calculate annual averages. The summer season calculations were made using data from July 1, 1992 through September 30, 1992. Five years of twice daily mixing height data from the Albany National Weather Station were used with the on-site surface meteorological data. The meteorological data were preprocessed into four quarterly STAR summaries for input into ISCLT.

6.6 Landfill Emission Rate

The actual PCB emission rate from the landfill is unknown. A review of the literature found no algorithm to adequately estimate the emission rate of PCBs from this source. The PCB evaporation and emission rate is difficult to estimate because of the low vapor pressure of PCB compounded by the variability and depth of soil concentrations and the unknown impact of the soil cap on diffusion. Nevertheless, an estimate of the PCB emission rate from the source was necessary to calculate off-site concentrations.

The ambient PCB concentrations measured at the Hill 78 monitoring station are the only "real" data on PCB emission rates that are available for this source. These data have some inherent limitations including, notably, that the annual average concentration is not significantly different from the detection limit as discussed in Section 3.5 of this Report. In addition, use of these data required acceptance of the assumption that it is possible to back-calculate from the monitoring station to the landfill to estimate emission rates. Although this assumption has not been proven, it was necessary for calculations made herein.

The ISCLT model was used to back-calculate annual and summer season emission rates from the Hill 78 Landfill. A list of assumptions was made, outlined in Section 6.1 above, as the basis for the implementation of the modeling approach. ISCLT was applied repeatedly, with the monitoring station as a receptor point and varying the emission rate with each run, until the model predicted, as close as possible, the known concentration (less background) at the monitoring station. Using this procedure, the average annual PCB emission rate for the Hill 78 Landfill was estimated to be 0.667×10^{-9} grams per second per square meter. The average summer PCB emission rate for the Hill 78 Landfill was estimated at 0.132×10^{-10} grams per second per square meter. As noted in Section 6.1 above, the emission rate for each period modeled was assumed to be uniform across the landfill and constant over time.

6.7 Dispersion Modeling Results

The ISCLT model was run using the input options and parameters described above. The results (presented in Attachments III and IV) represent the annual and summer seasonal contributions from the Hill 78 landfill to ambient PCB concentrations around the site. The tabular concentrations were converted to concentration isopleth plots using the SURFER software package. The isopleths are presented as Figures 4 and 5. Estimated total annual and seasonal ambient PCB concentrations can be calculated by adding the assumed background concentration of 0.00025 $\mu g/m^3$ to the isolines.

As Figures 4 and 5 indicate, the highest average annual and seasonal PCB concentrations contributed by the Hill 78 Landfill are on the northern edge of the source area. The highest contribution was 0.000793 $\mu g/m^3$ at grid intersection X244.0, Y152.5, which corresponds with the northern edge of the source area. The PCB concentration gradient falls off steeply to the north to just inside the Allendale School property and then gradually. A similar pattern is seen

ESTIMATED MAXIMUM HILL 78 LANDFILL CONTRIBUTION
TO ANNUAL AVERAGE AMBIENT PCB CONCENTRATIONS (ug/m3)

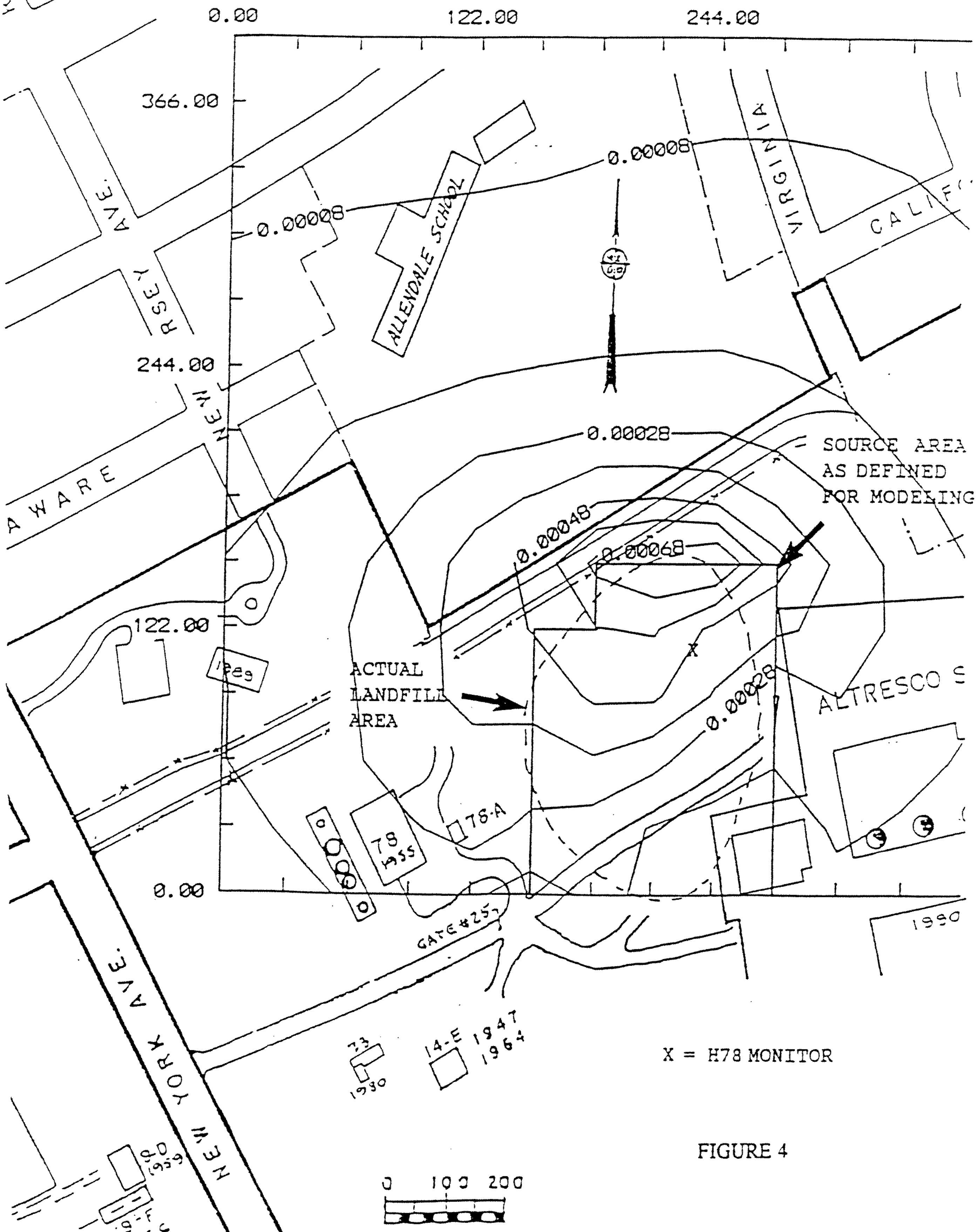


FIGURE 4

ESTIMATED MAXIMUM HILL 78 LANDFILL CONTRIBUTION
TO AVERAGE SUMMER AMBIENT PCB CONCENTRATIONS (ug/m3)
(JULY 1 - SEPT. 30)

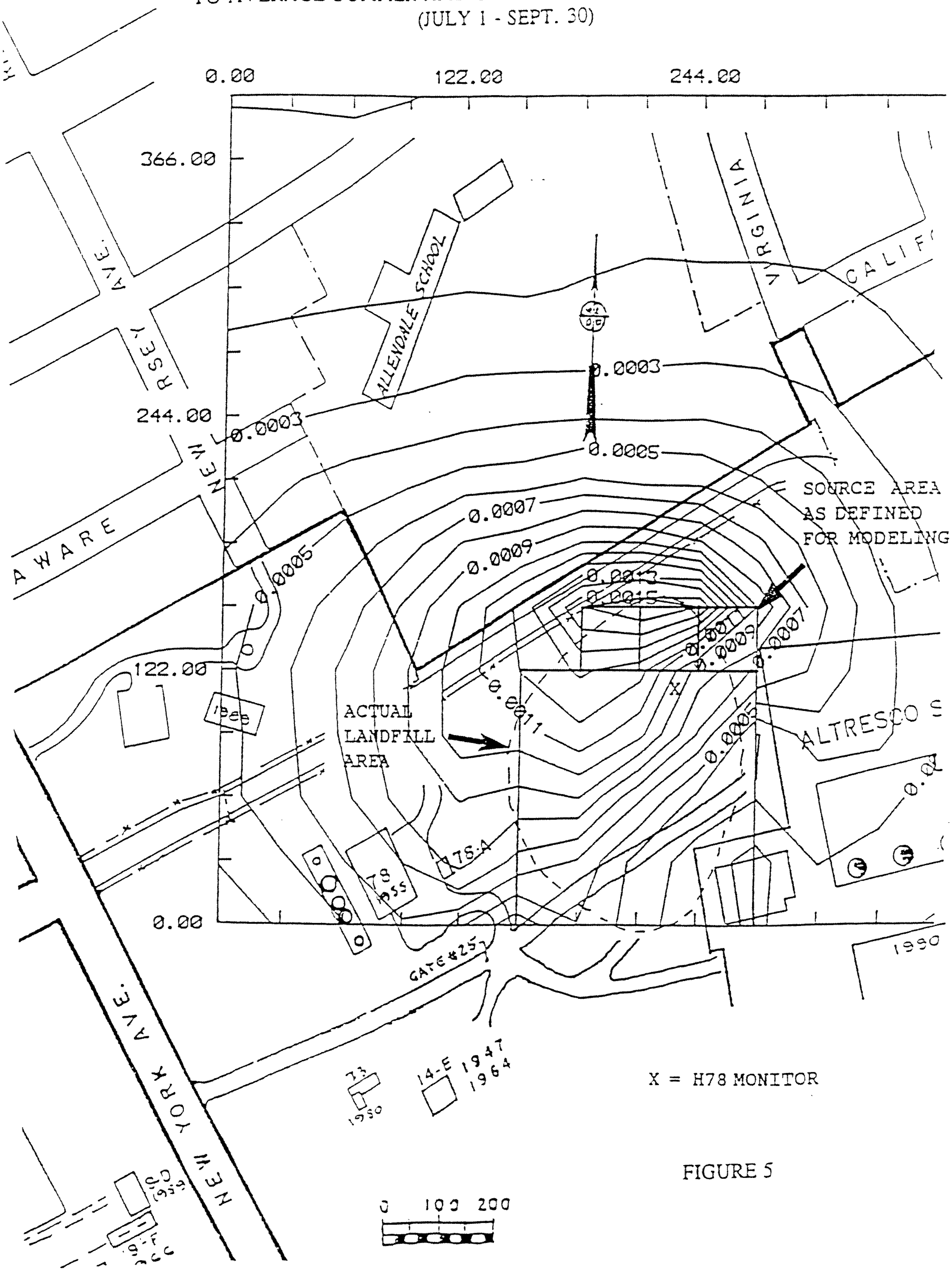


FIGURE 5

for the average summer contribution.

Figures 4 and 5 show that the estimated average annual PCB contribution from the Hill 78 Landfill to the Allendale School property ranges from approximately 0.00008 $\mu g/m^3$ or less on the north side of the school property to approximately 0.00048 $\mu g/m^3$ on the southern edge. The estimated Hill 78 contribution to average ambient PCB concentrations in summer ranges from 0.0001 $\mu g/m^3$ on the northern side of the school property to 0.0011 $\mu g/m^3$ on the southern edge.

Adding in background (0.00025 $\mu g/m^3$), the estimated average annual ambient concentration of PCBs on the Allendale School property ranges from 0.00033 $\mu g/m^3$ on the north side to 0.00073 $\mu g/m^3$ on the southern edge. The estimated average ambient summer PCB concentration on the Allendale School property ranges from 0.00035 $\mu g/m^3$ on the north side to 0.00135 $\mu g/m^3$, on the southern edge.

6.8 Sensitivity Analysis

As noted in Section 6.1, the air dispersion modeling presented above relies on a number of assumptions that appear reasonable for the purpose but cannot be proved. Notably, it is assumed that the source of all ambient PCBs at the Hill 78 monitoring station and at the Allendale School property, less the estimated background, is the Hill 78 Landfill. This assumption was based on the fact that the Hill 78 Landfill is the nearest potential source area to the monitoring site and the school property. However, due to uncertainties about the source(s) of the PCBs at the Hill 78 monitor and the Allendale School property, it is useful, as a sensitivity analysis, to examine an alternative approach based on the simple assumption that the PCBs measured at the Hill 78 monitor are representative of concentrations present at the Allendale School property, due to their proximity. Under this approach, the estimated average PCB concentrations (including background) at the Allendale School property would be approximately 0.0007 $\mu g/m^3$ on an annual basis and approximately 0.0011 $\mu g/m^3$ for the summer season. These values fall within the range of modeled PCB concentrations at the school property after the assumed background is added in, thus lending support to the modeling results.

References

Brode, R.W. and Wang, J.F., User's Guide for the Industrial Source Complex (ISC2) Dispersion Models, Volume I - User Instructions, EPA-450/4-92-008a, March 1992.

Brode, R.W. and Wang, J.F., User's Guide for the Industrial Source Complex (ISC2) Dispersion Models, Volume II - Description of Model Algorithms, EPA-450/4-92-008b, March 1992.

Guideline on Air Quality Models (Revised), EPA-450/2-78-027R, July 1986.

Roffman, A. and Stoner, R., Air Superfund National Technical Guidance Study Series, Volume 4, Procedures for Dispersion Modeling and Air Monitoring for Superfund Air Pathway Analysis, EPA/450/1-89/004, July 1989.

Technical Assistance Document for Sampling and Analysis of Toxic Organic Compounds in Ambient Air, EPA-800/4-83-027, June 1983.

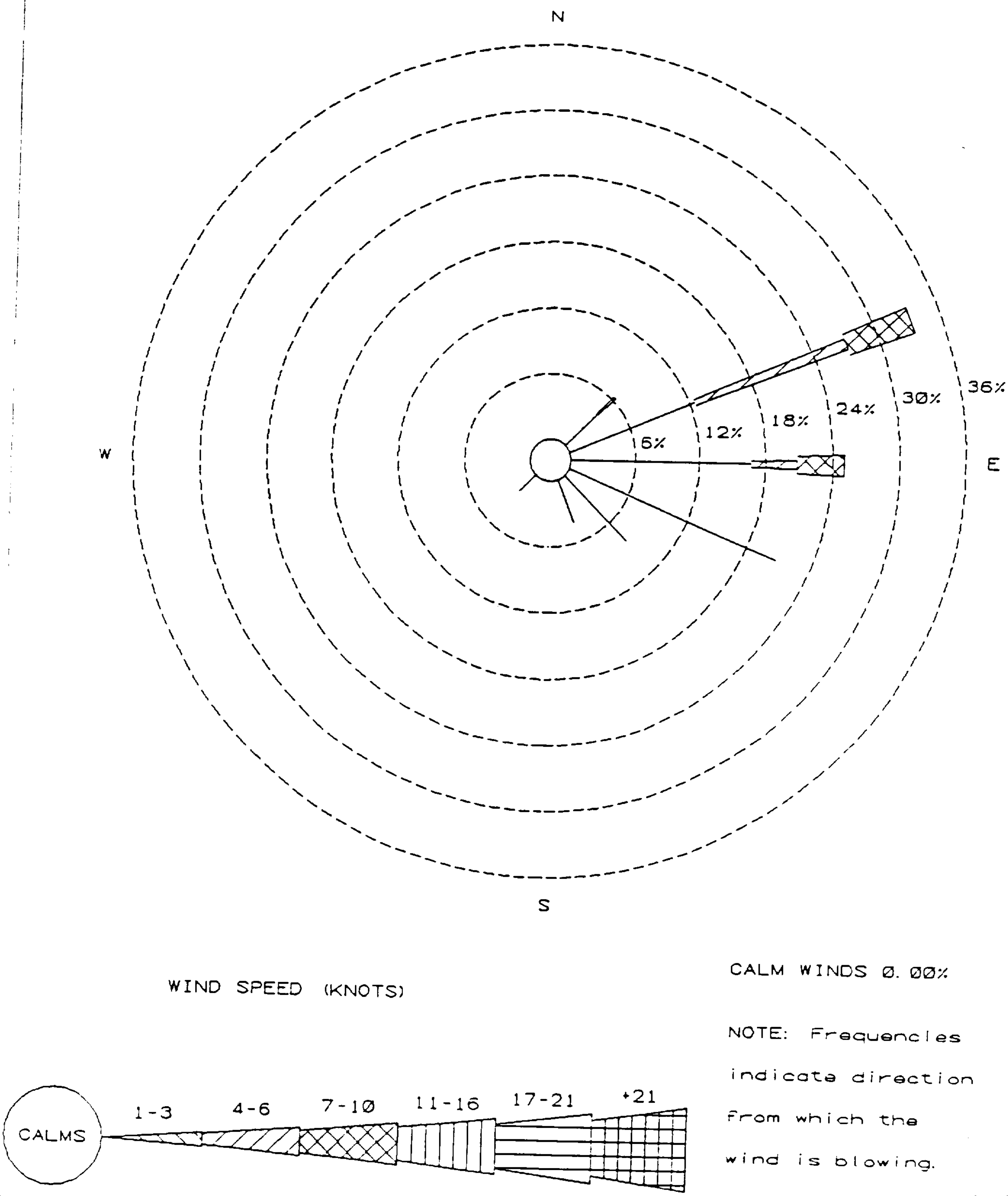
TRC Environmental Consultants, Review and Evaluation of Area Source Dispersion Algorithms for Emission Sources at Superfund Sites, EPA-450/4-89-020, November 1989.

Zorex Environmental Engineers, Ambient Air Monitoring for PCB; August 20, 1991 - August 14, 1992; General Electric Company, Pittsfield, MA., November 1992.

ATTACHMENT I

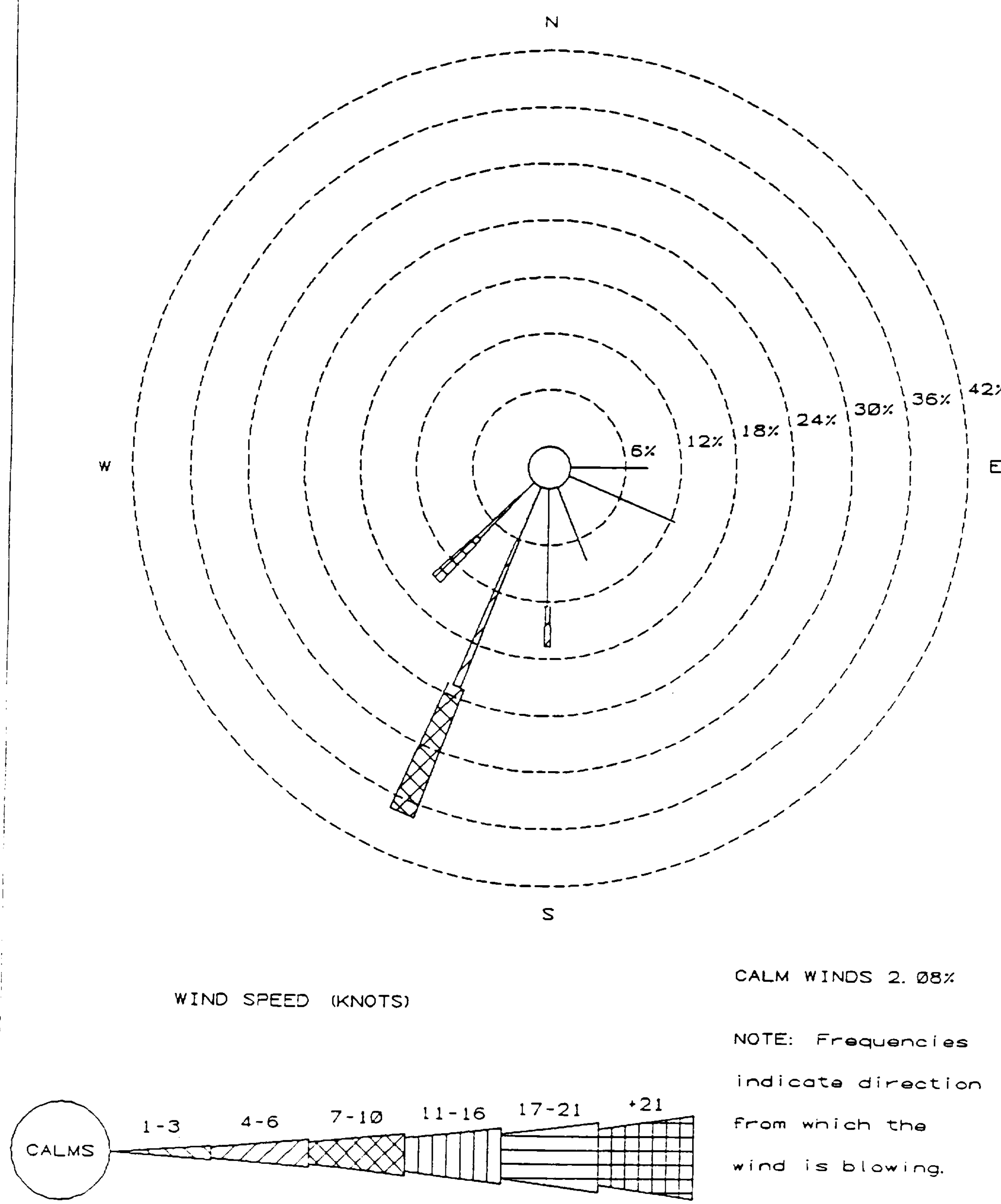
Sampling Days Wind Roses

August 14-August 15; 7 AM-6 AM



11/6/92

August 2-August 3: 7 AM-6 AM

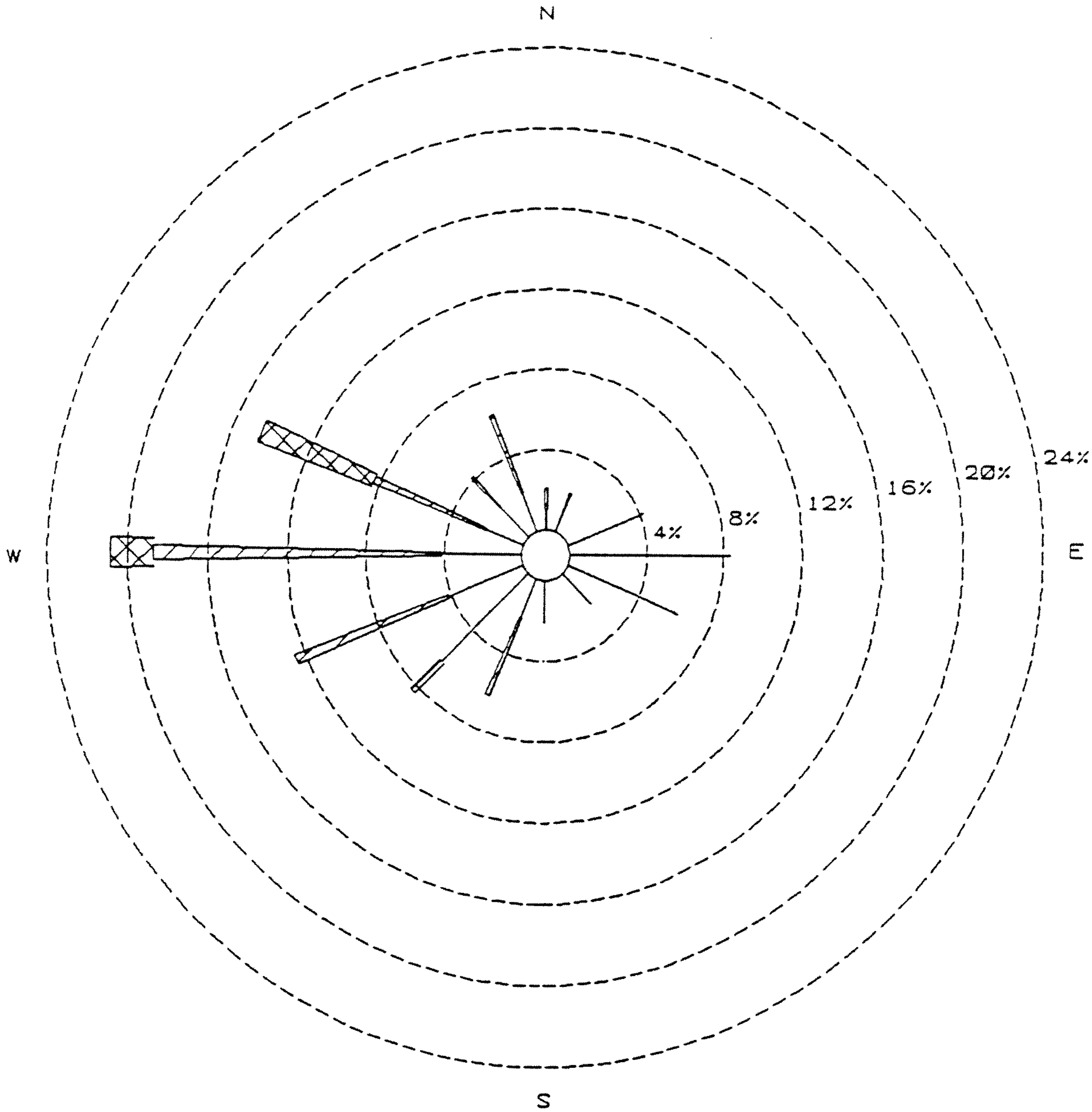


CALM WINDS 2.08%

NOTE: Frequencies indicate direction from which the wind is blowing.

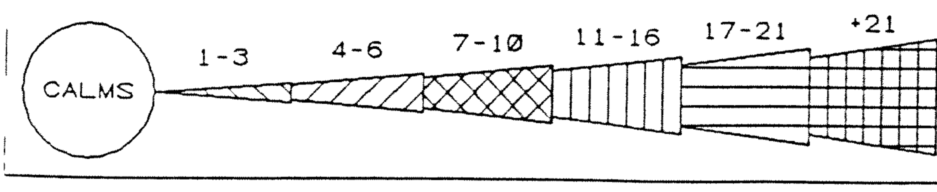
11/6/92

July 21-July 22; 7 AM-6 AM



CALM WINDS 0.00%

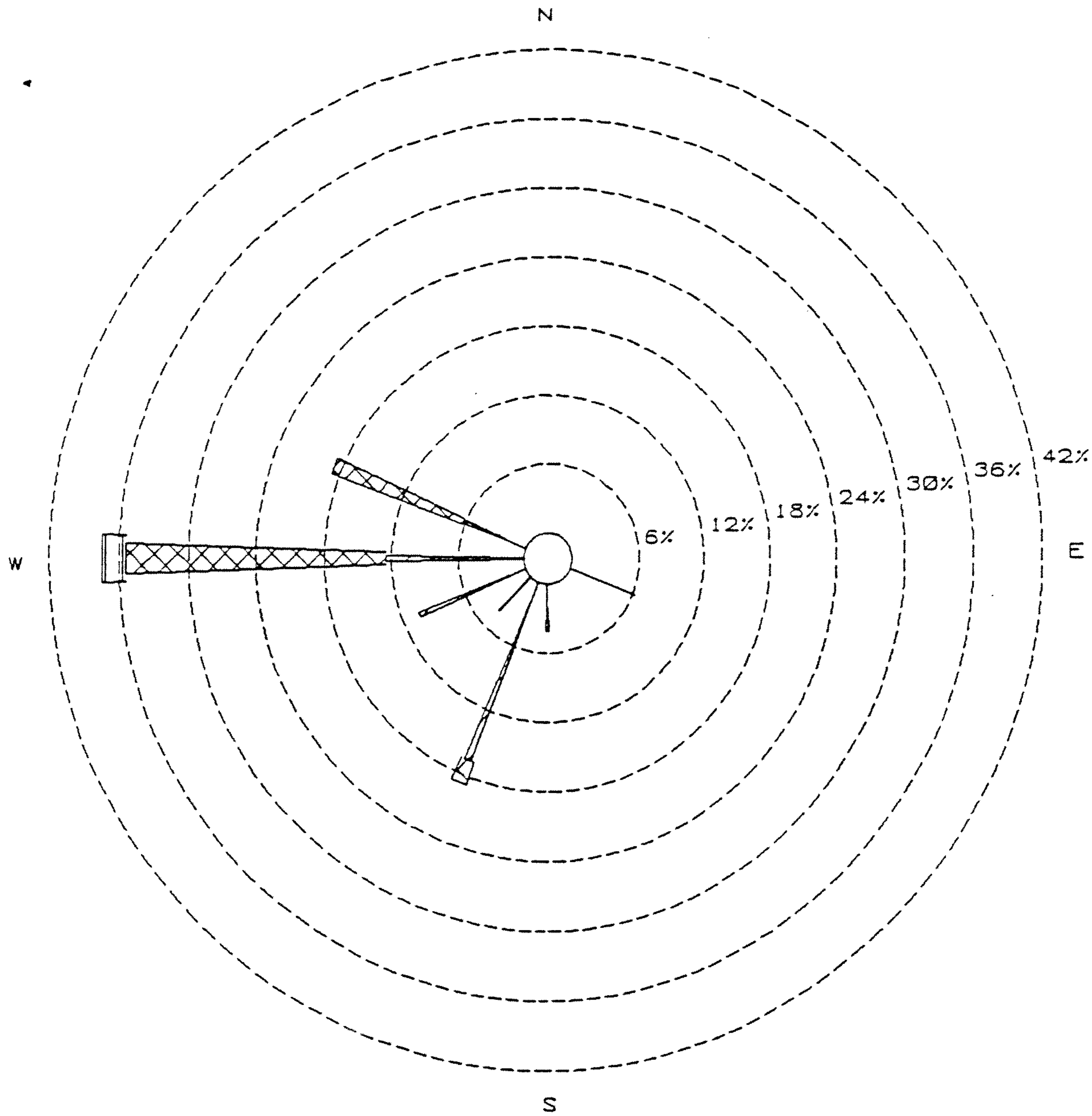
WIND SPEED (KNOTS)

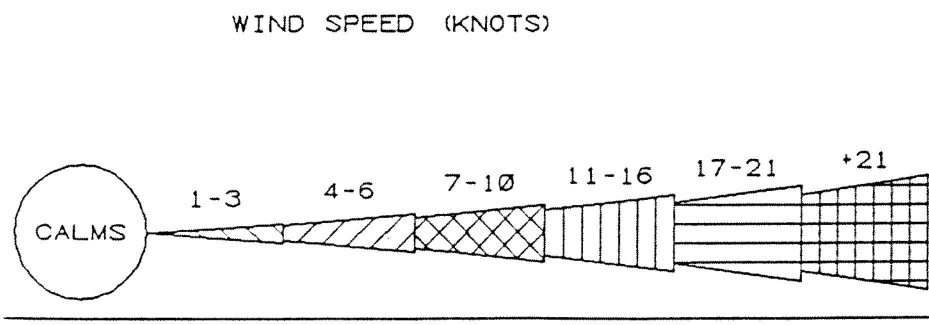


NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

July 9-July 10; 7 AM-6 AM



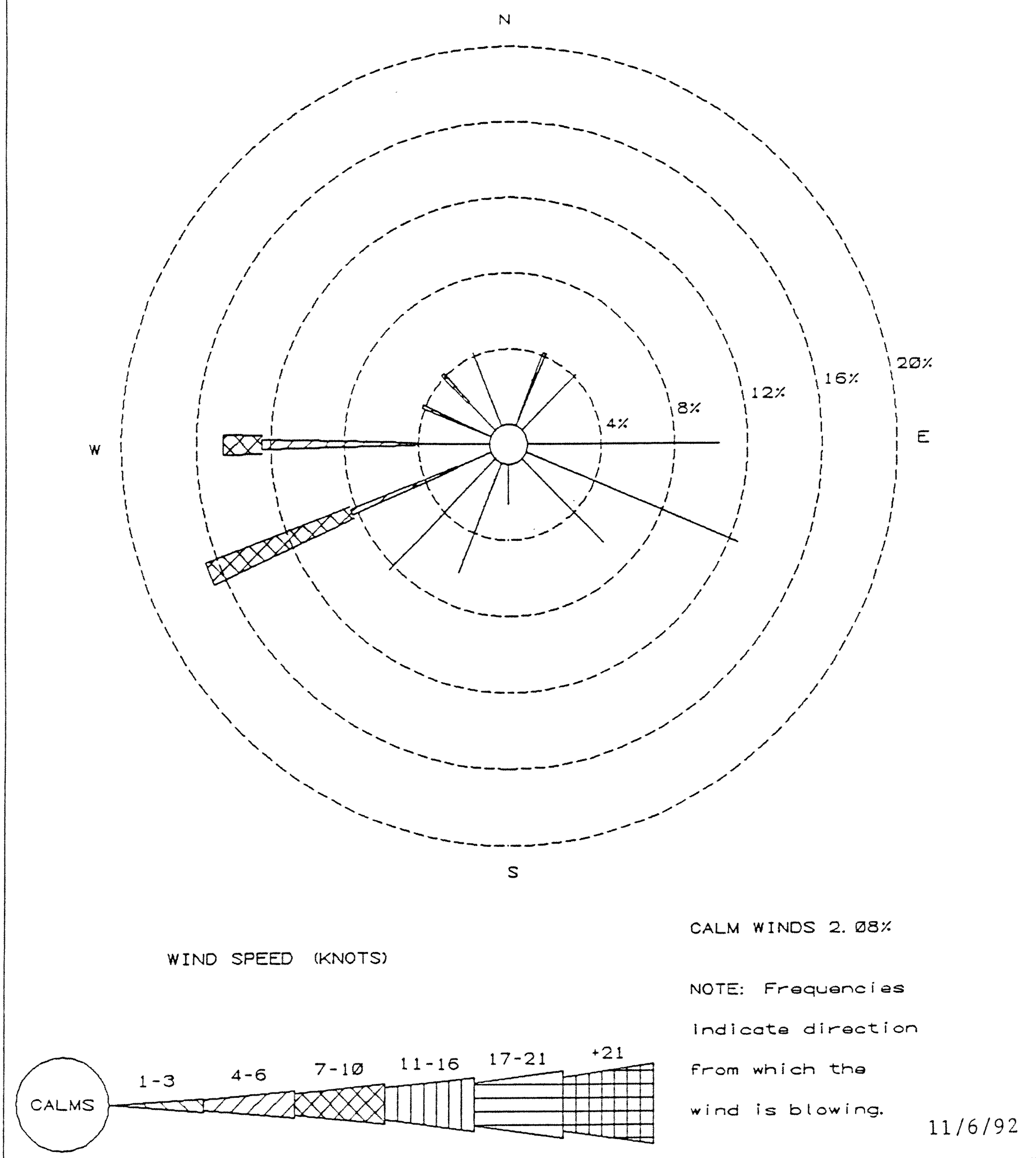


CALM WINDS 0.00%

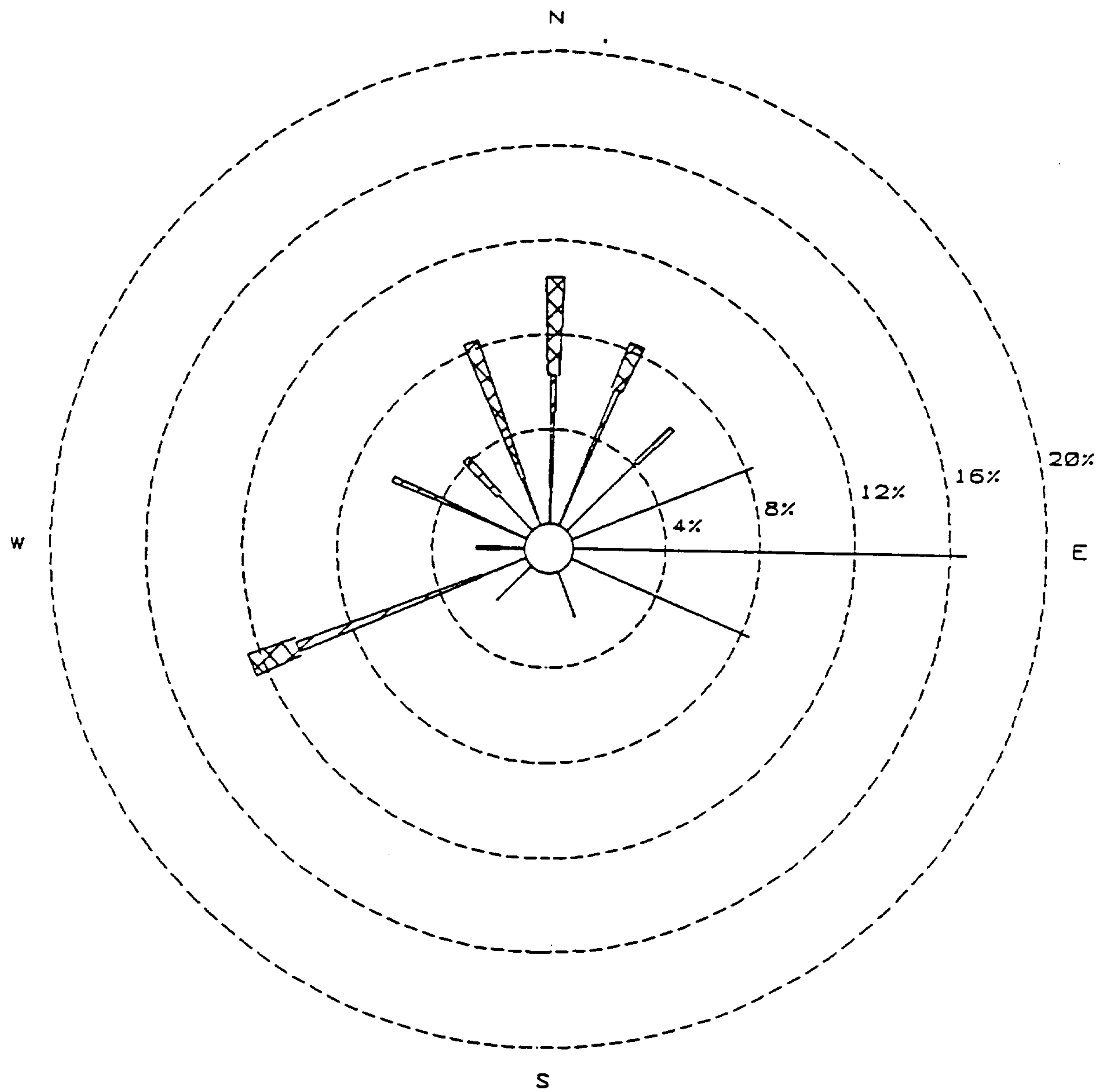
NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

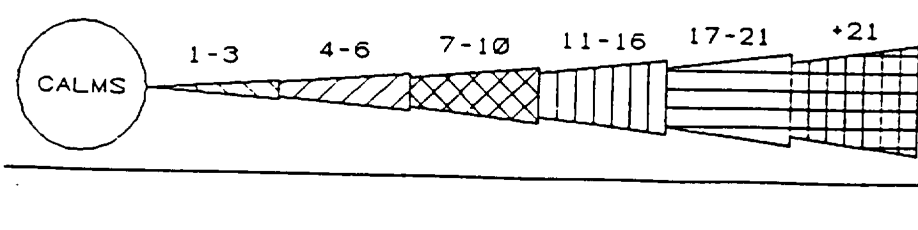
June 27-June 28; 7 AM-6 AM



June 15-June 16; 7 AM-6 AM



WIND SPEED (KNOTS)

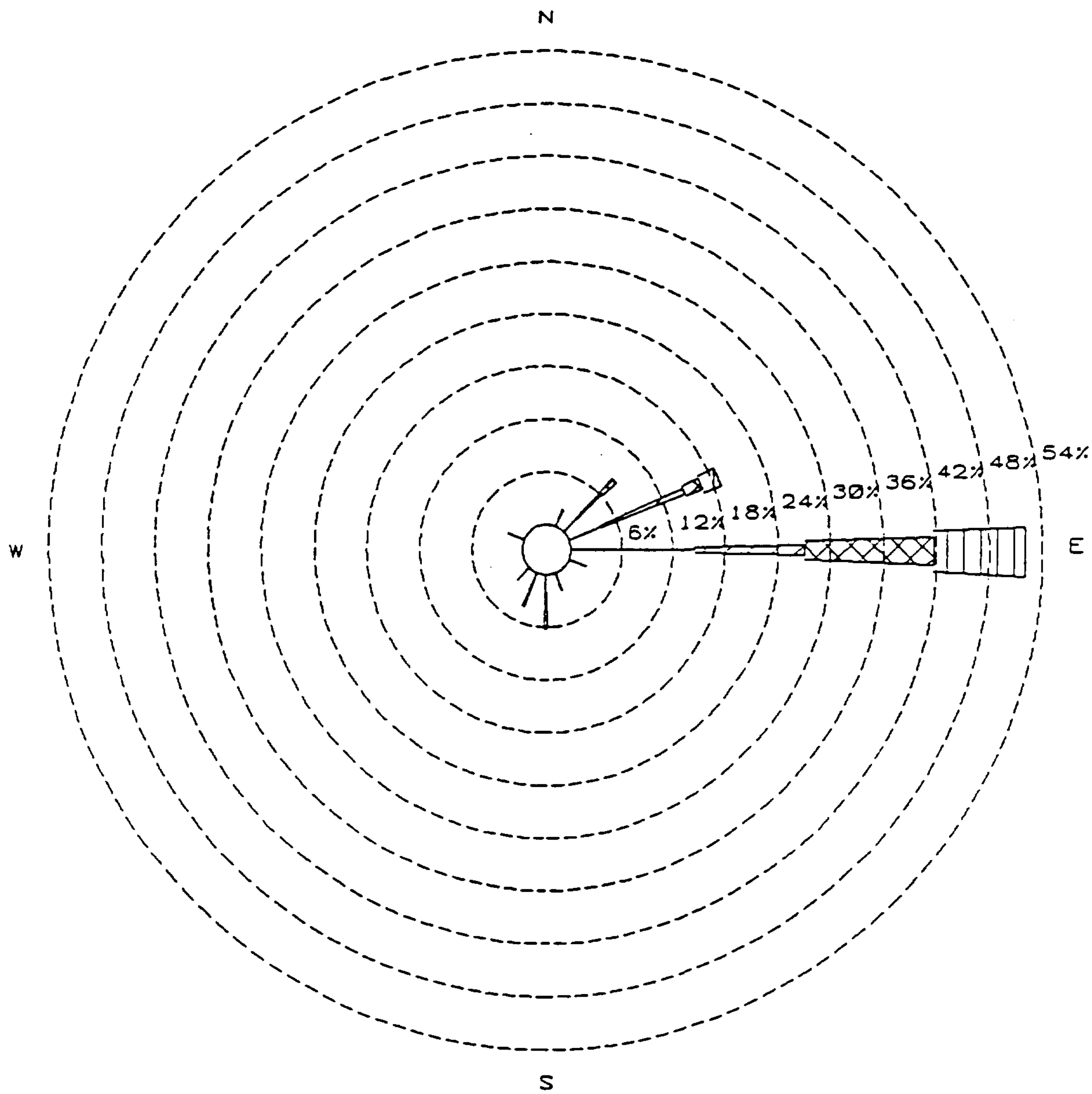


CALM WINDS 4.17%

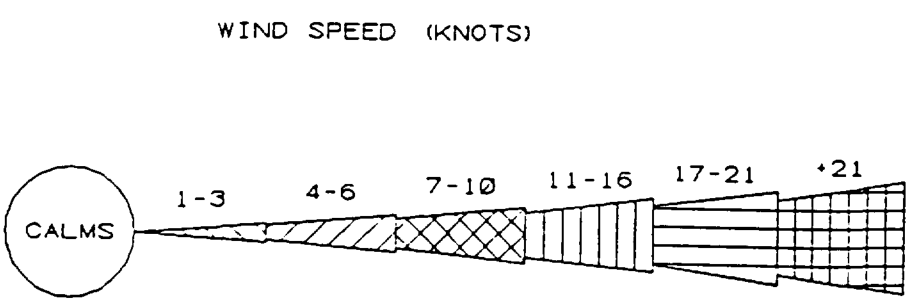
NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

June 5-June 6; 7 AM-6 AM



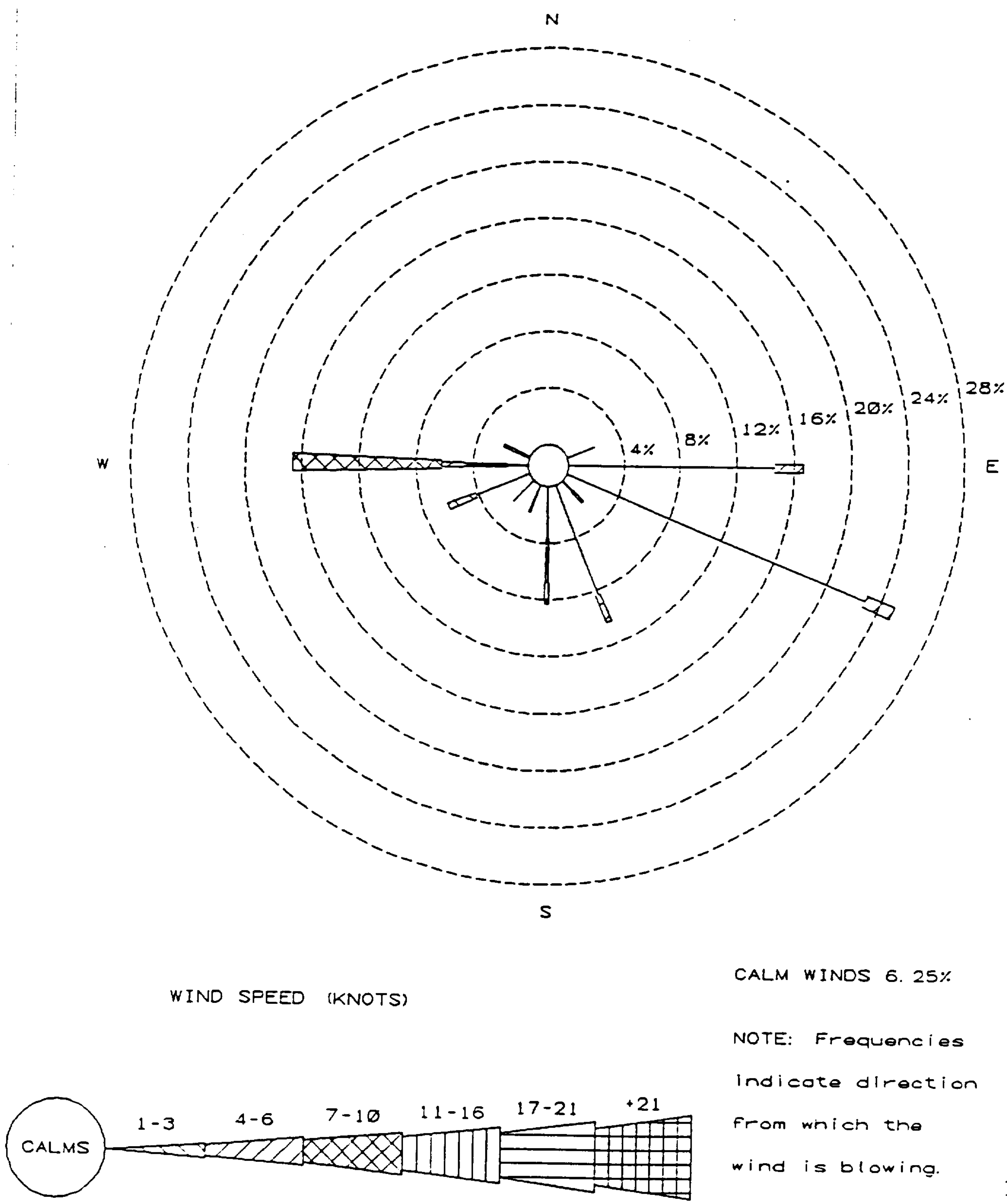
CALM WINDS 0.00%



NOTE: Frequencies indicate direction from which the wind is blowing.

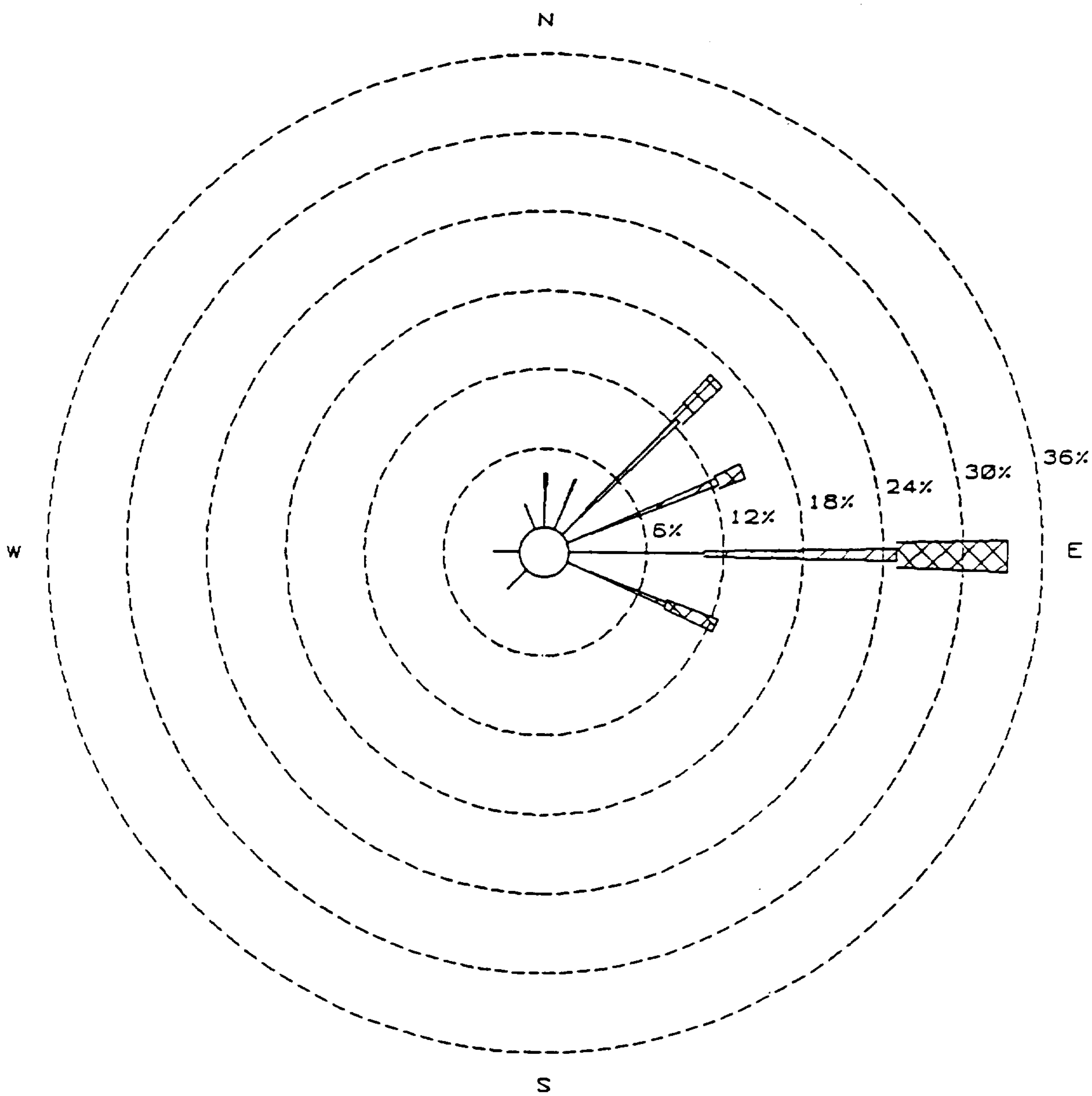
11/6/92

June 3-June 4; 7 AM-6 AM



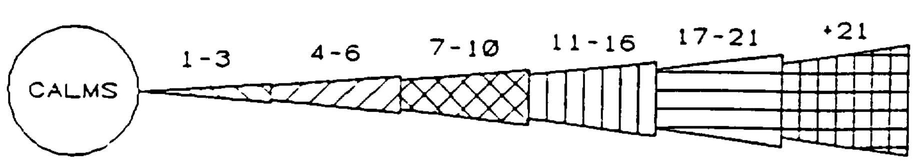
11/6/92

May 10-May 11: 7 AM-6 AM



CALM WINDS 8.33%

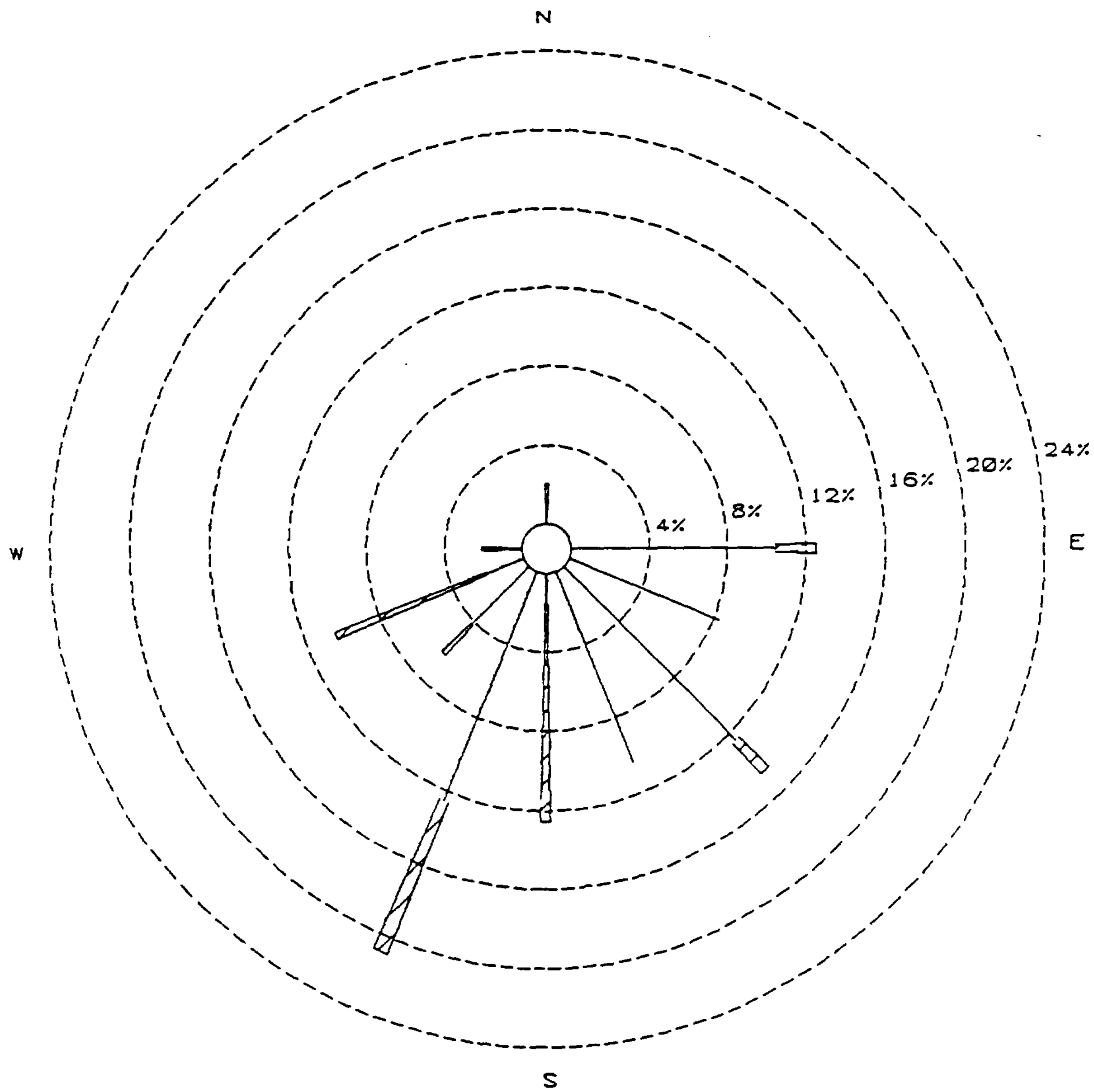
WIND SPEED (KNOTS)



NOTE: Frequencies indicate direction from which the wind is blowing.

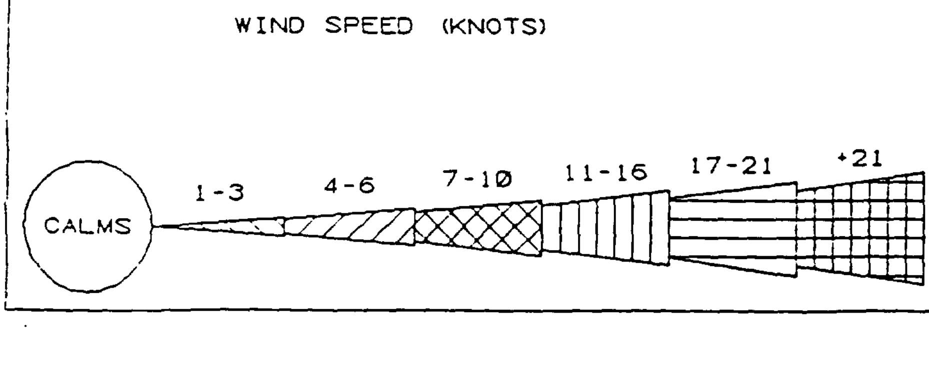
11/6/92

April 28-April 29: 7 AM-6 AM



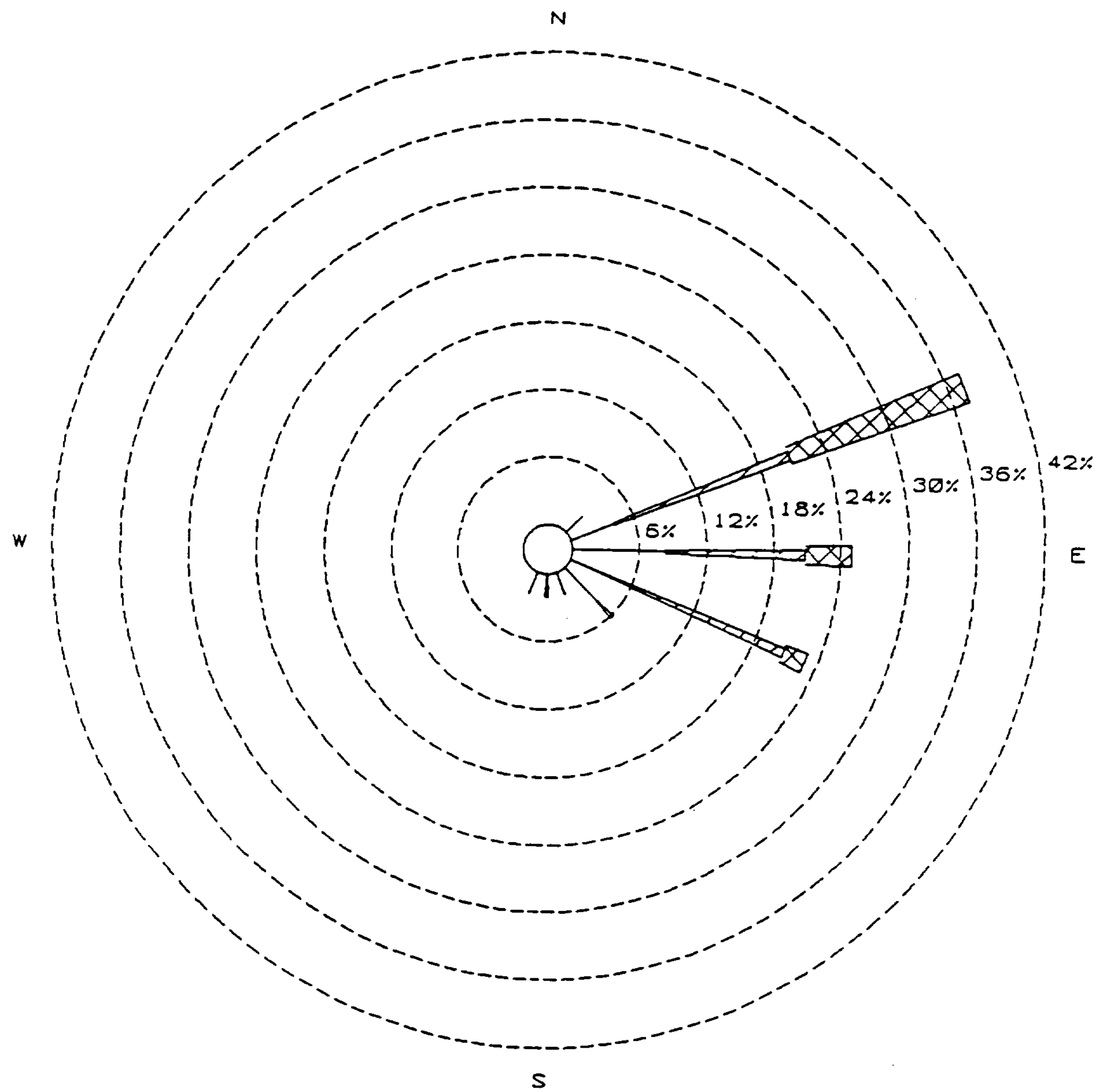
CALM WINDS 0.00%

NOTE: Frequencies indicate direction from which the wind is blowing.

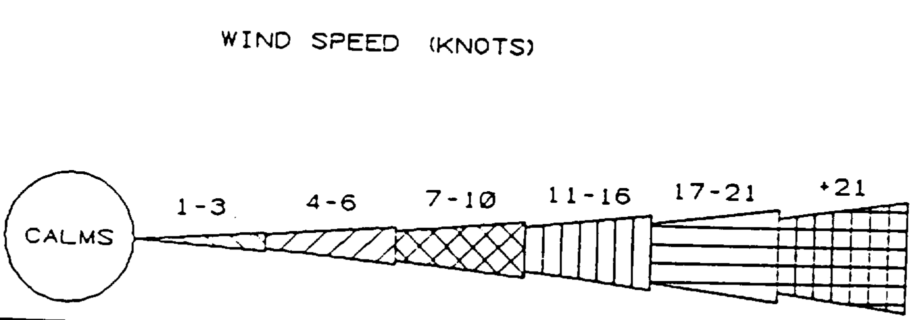


11/6/92

April 16-April 17; 7 AM-6 AM



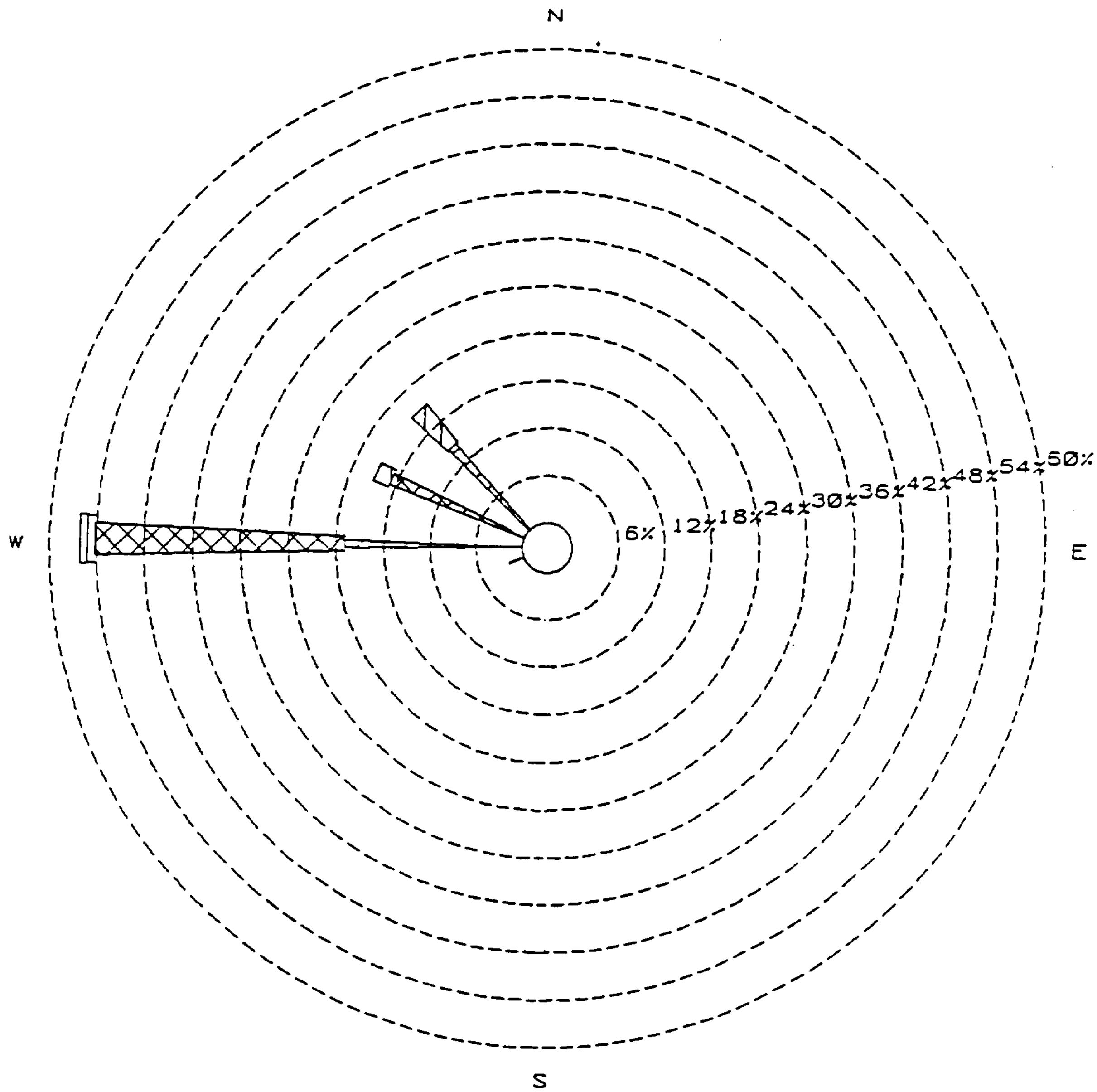
CALM WINDS 0.00%



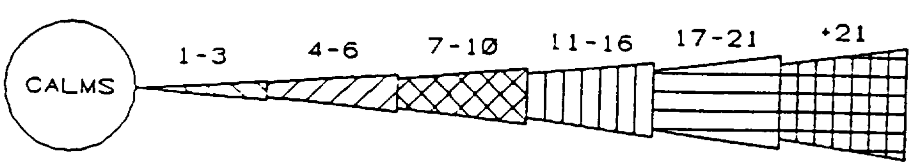
NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

April 4-April 5; 7 AM-6 AM



WIND SPEED (KNOTS)

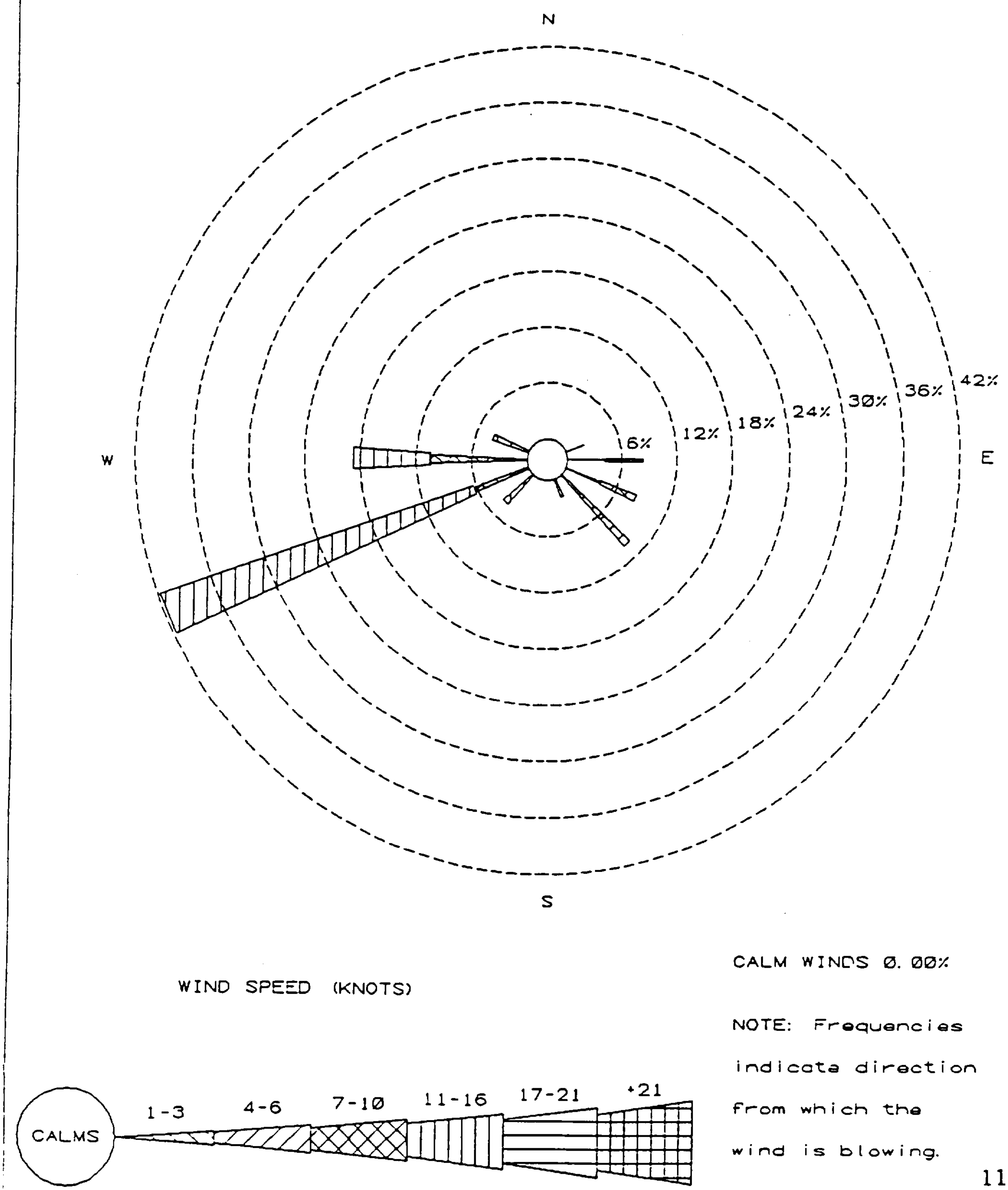


CALM WINDS 0.00%

NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

March 11-March 12; 7 AM-6 AM

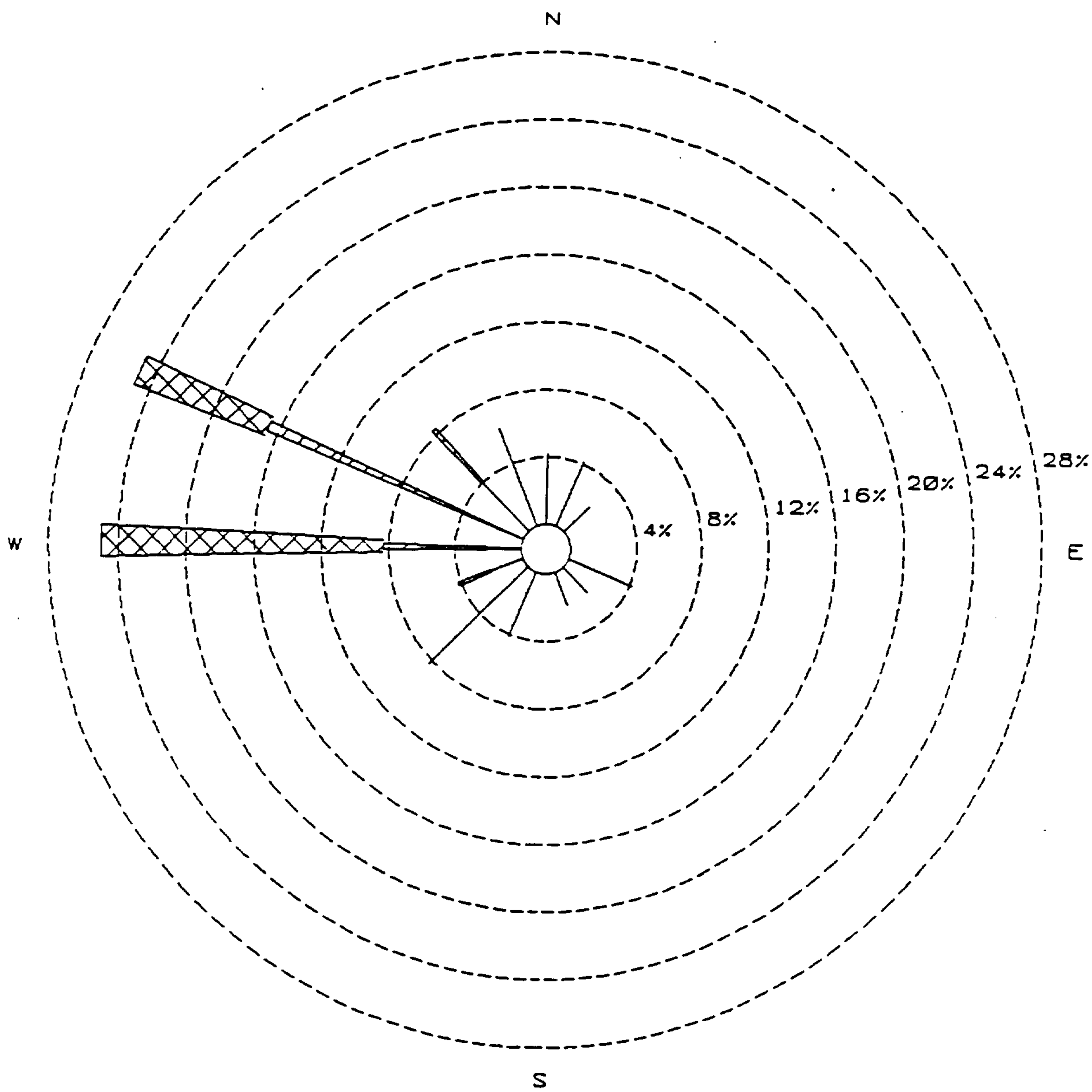


CALM WINDS 0.00%

NOTE: Frequencies indicate direction from which the wind is blowing.

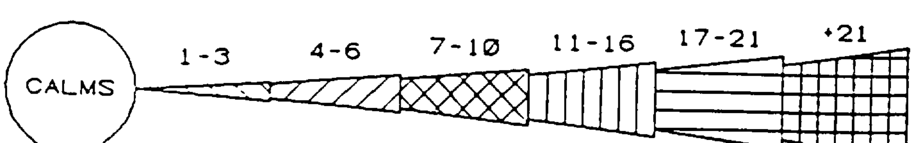
11/6/92

March 23-March 24: 7 AM-6 AM



CALM WINDS 0.00%

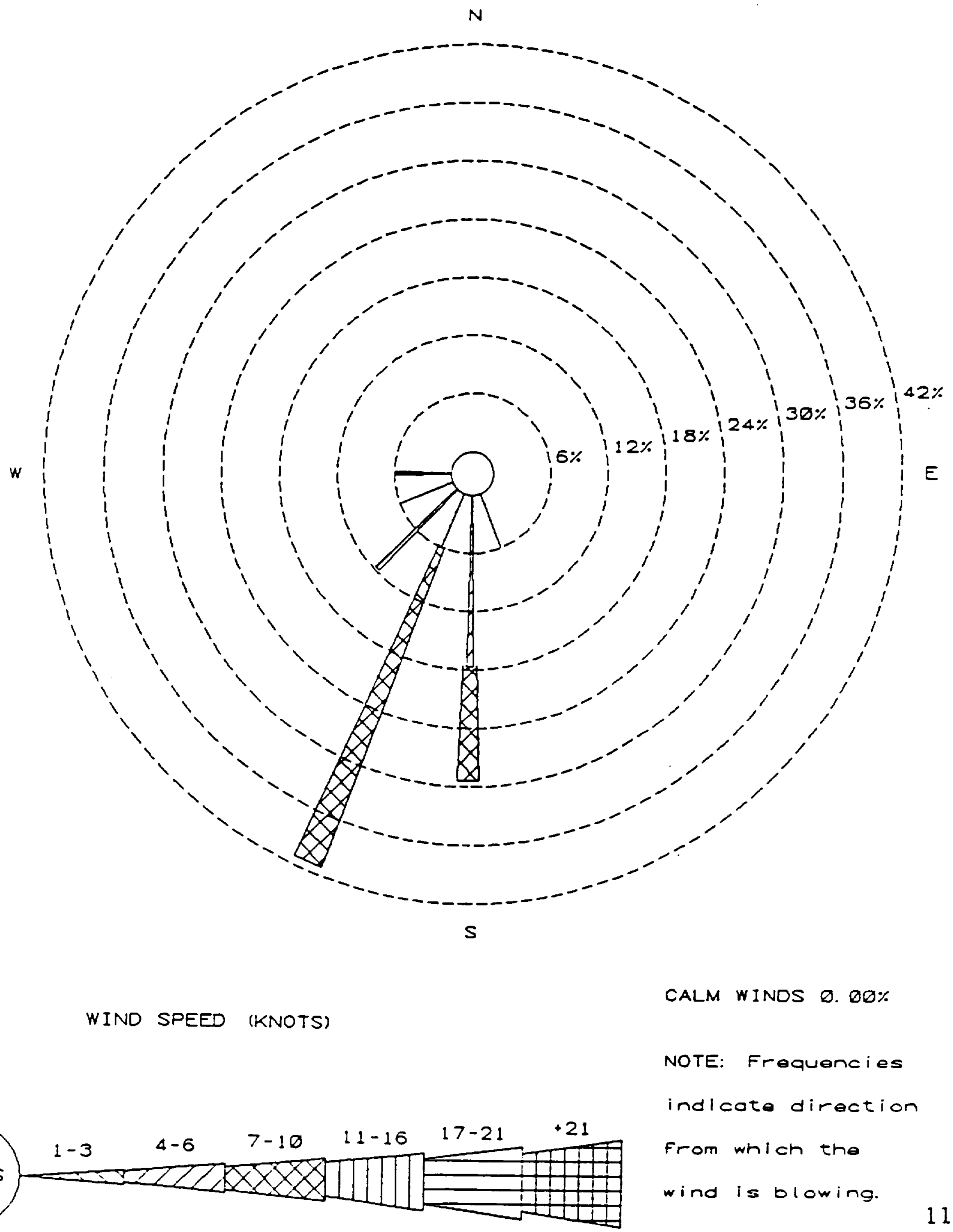
WIND SPEED (KNOTS)



NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

February 28-February 28: 7 AM-11 PM

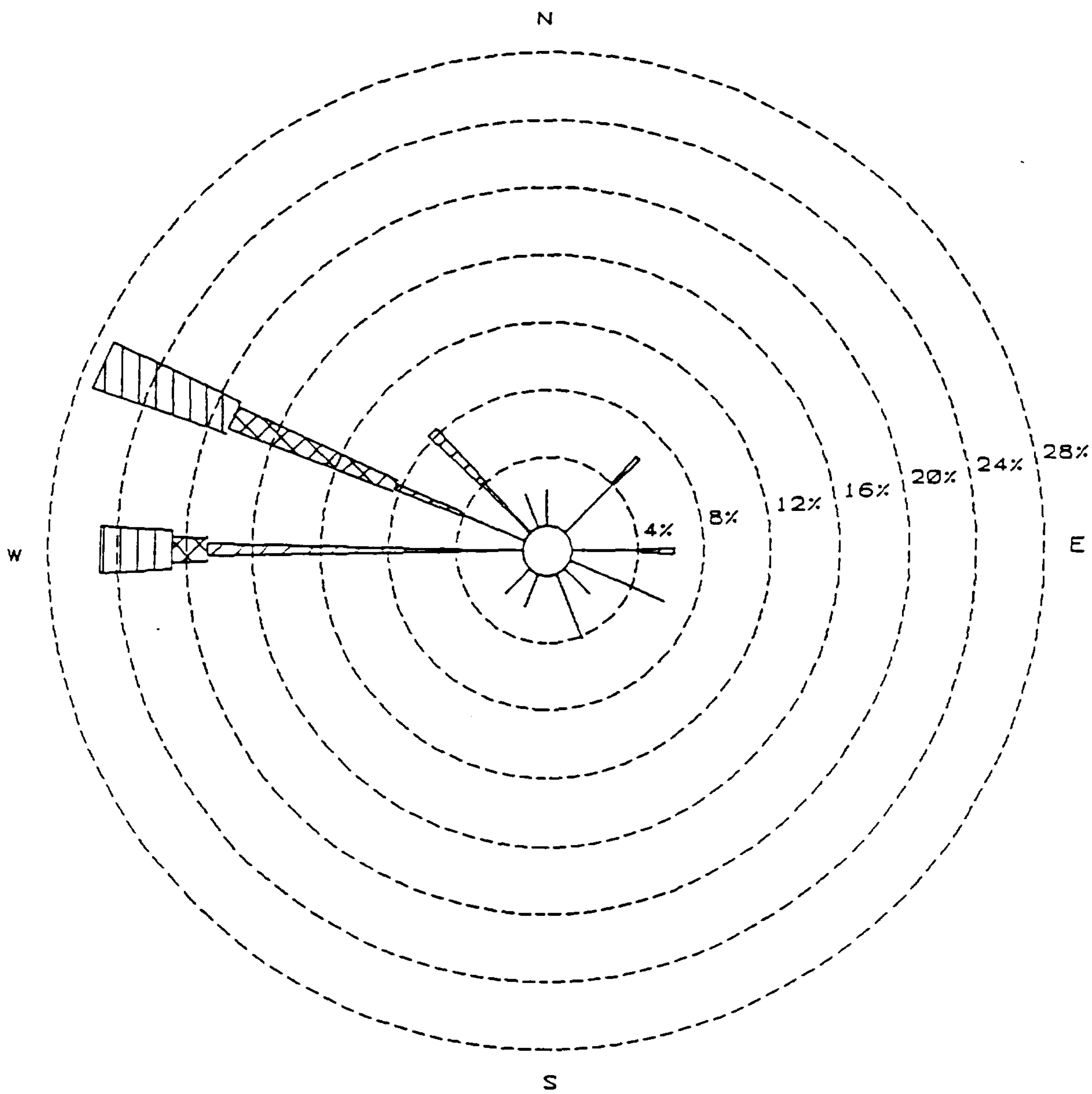


CALM WINDS 0.00%

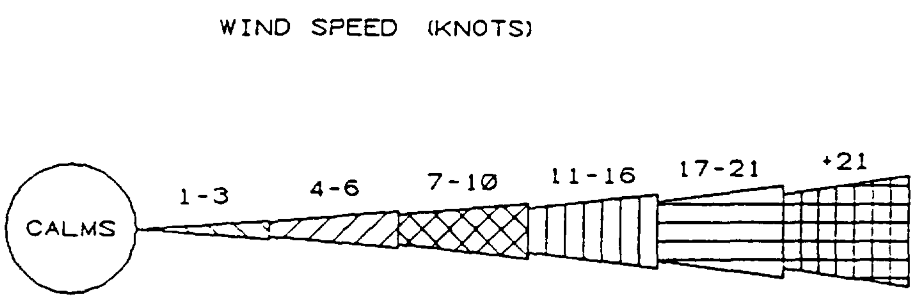
NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

February 16-February 17; 7 AM-6 AM



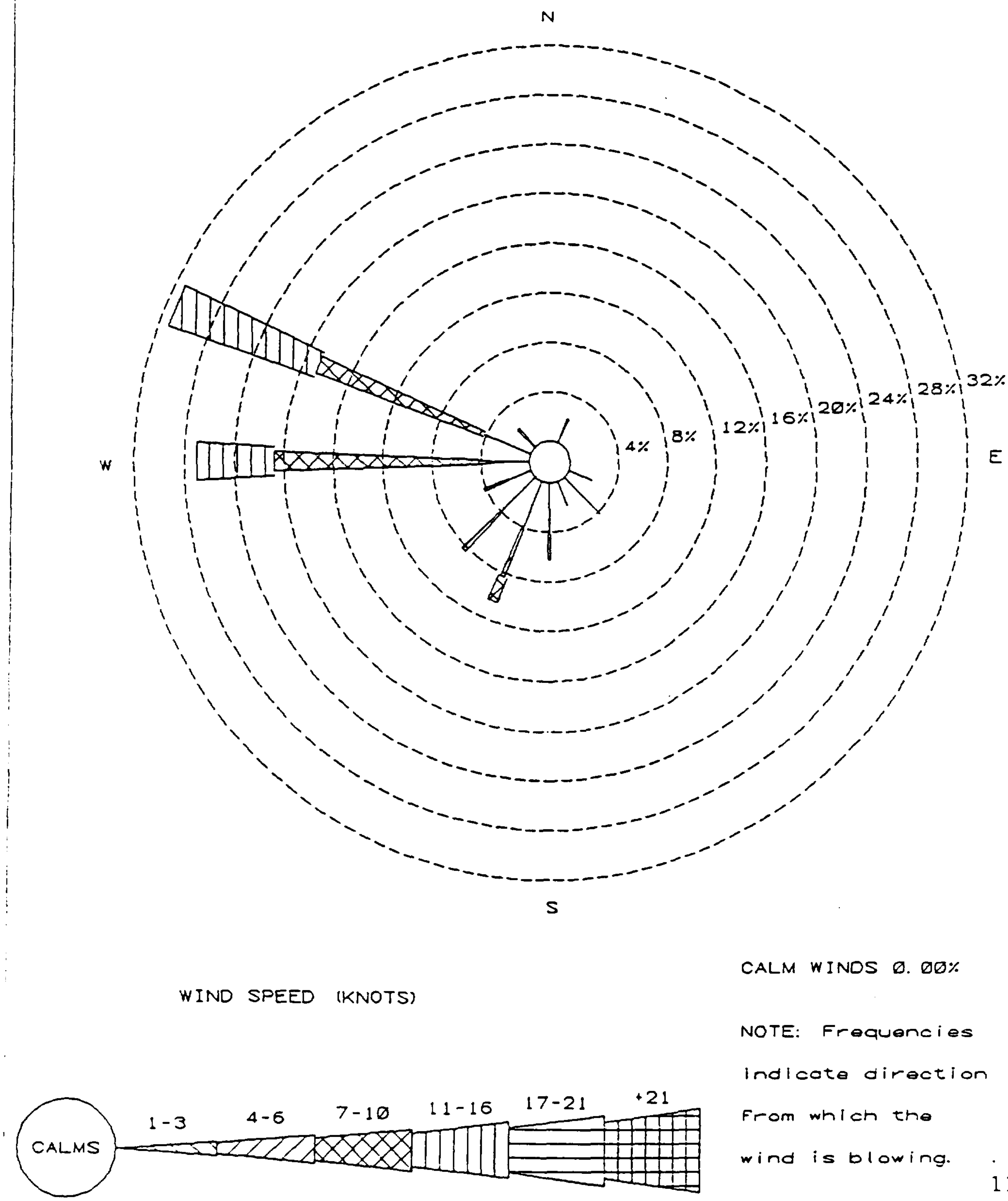
CALM WINDS 6.25%



NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

February 4-February 5; 7 AM-6 AM

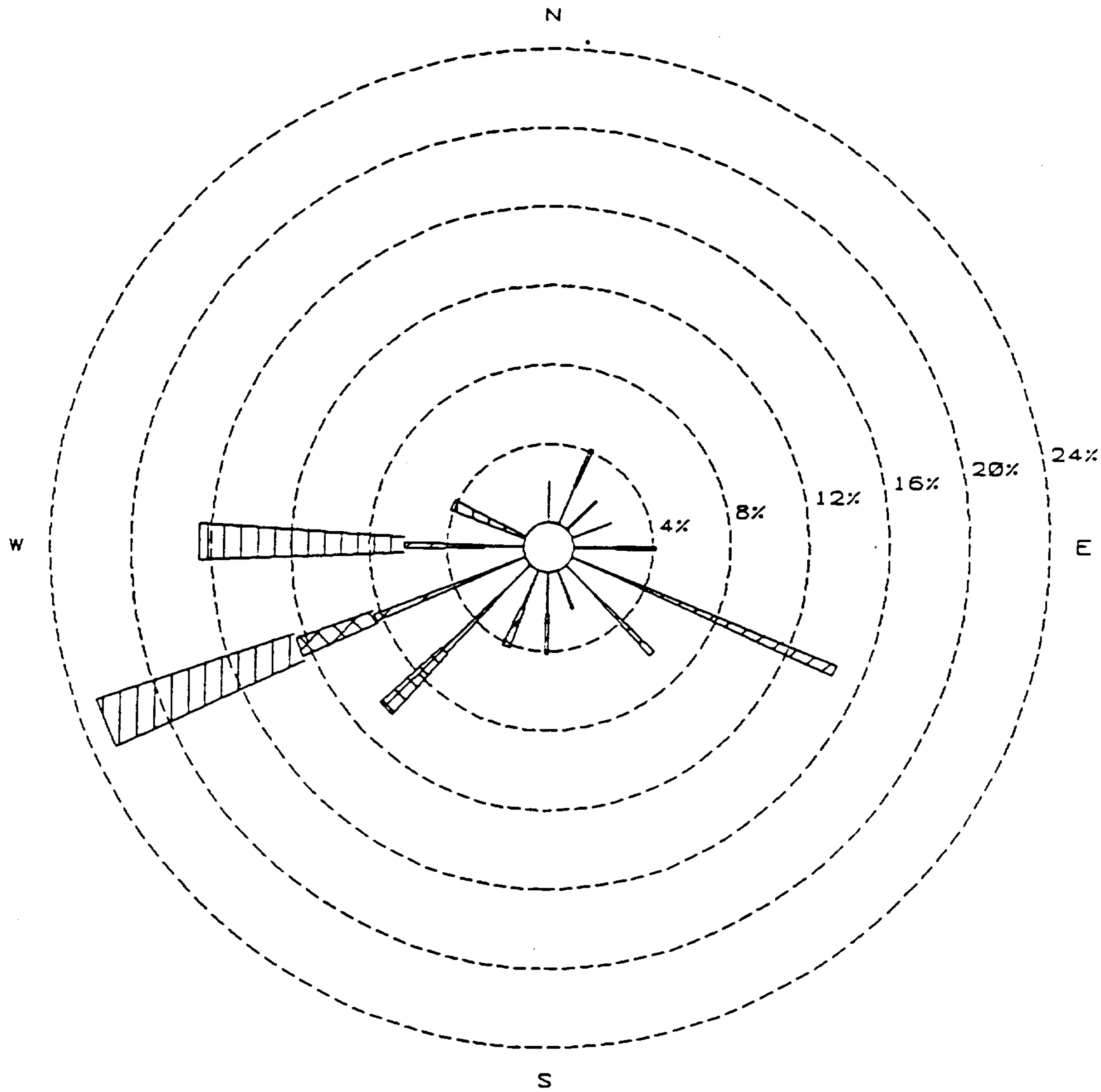


CALM WINDS 0.00%

NOTE: Frequencies indicate direction from which the wind is blowing.

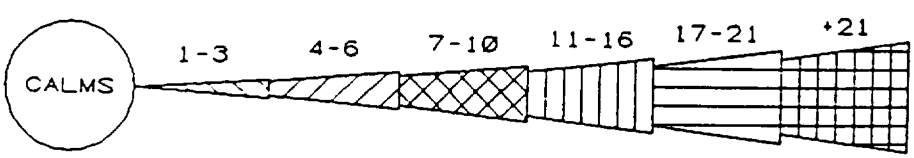
11/6/92

January 23-January 24: 7 AM-6 AM



CALM WINDS 0.00%

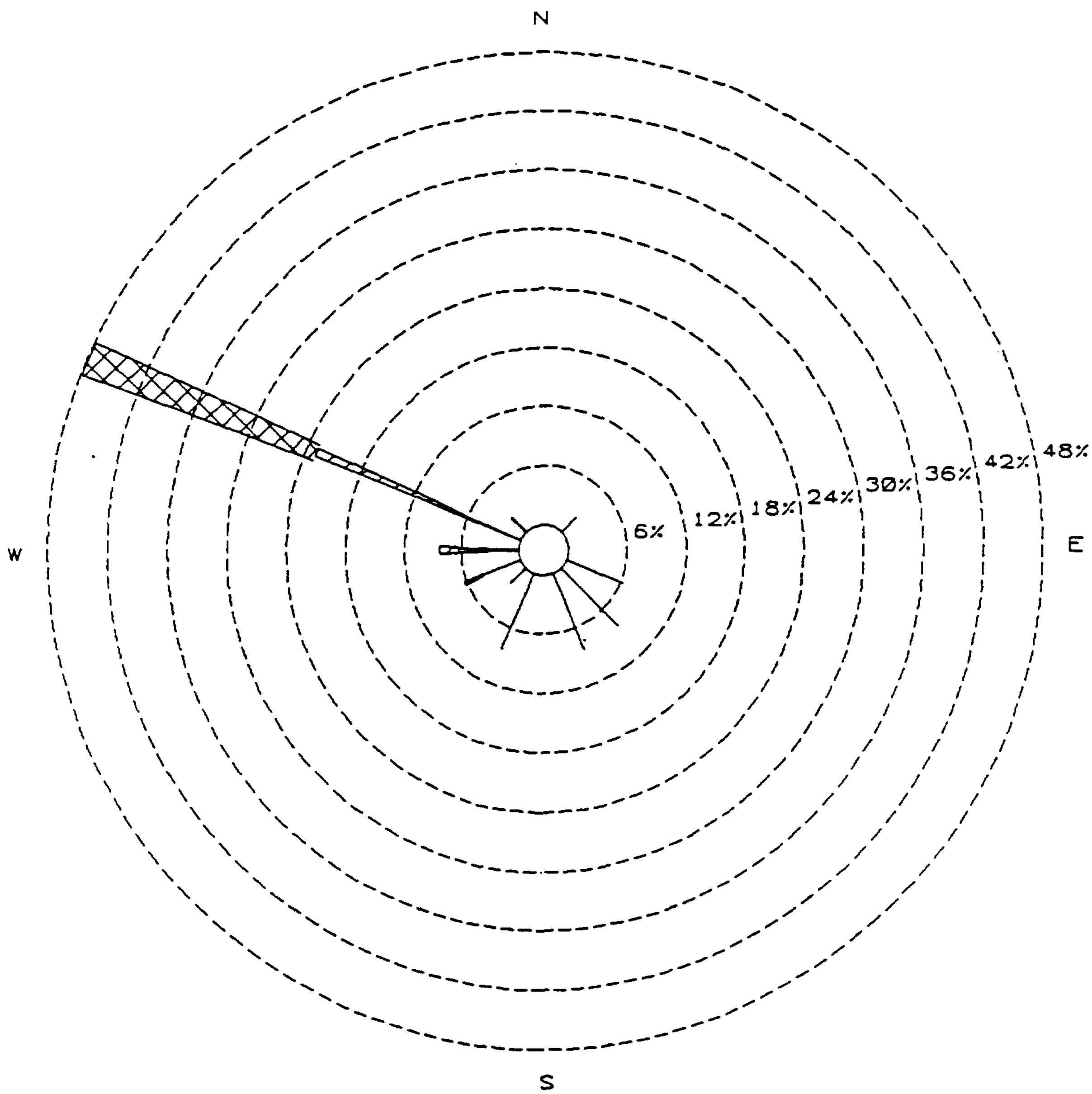
WIND SPEED (KNOTS)



NOTE: Frequencies indicate direction from which the wind is blowing.

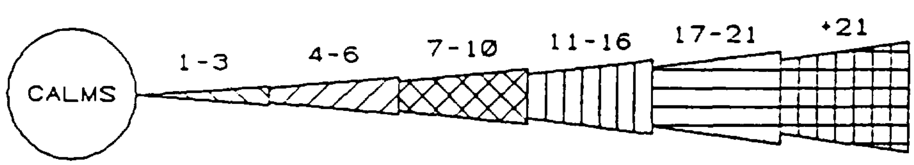
11/6/92

January 11-January 12; 7 AM-6 AM



CALM WINDS 0.00%

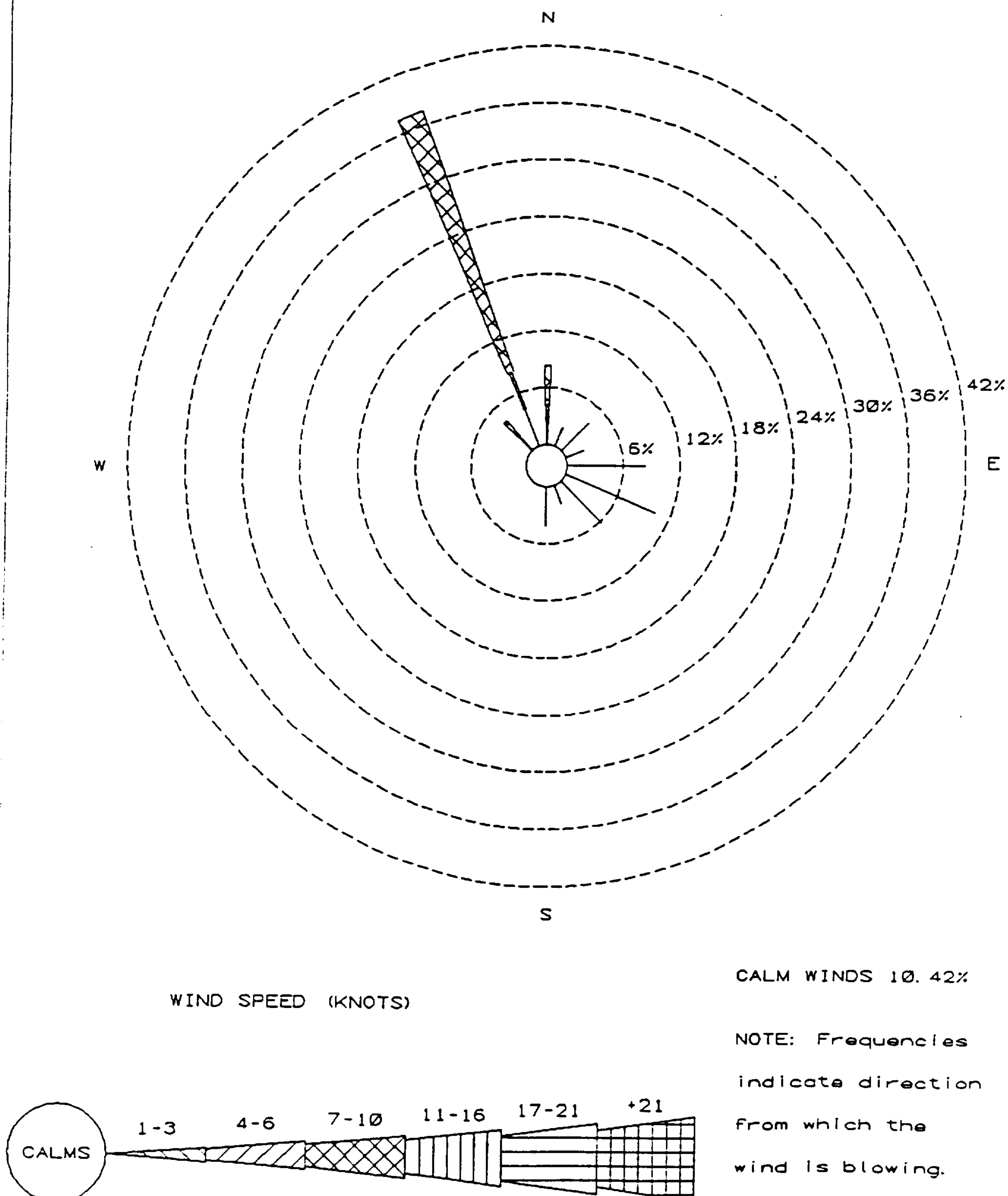
WIND SPEED (KNOTS)



NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

December 30-December 31; 7 AM-6 AM

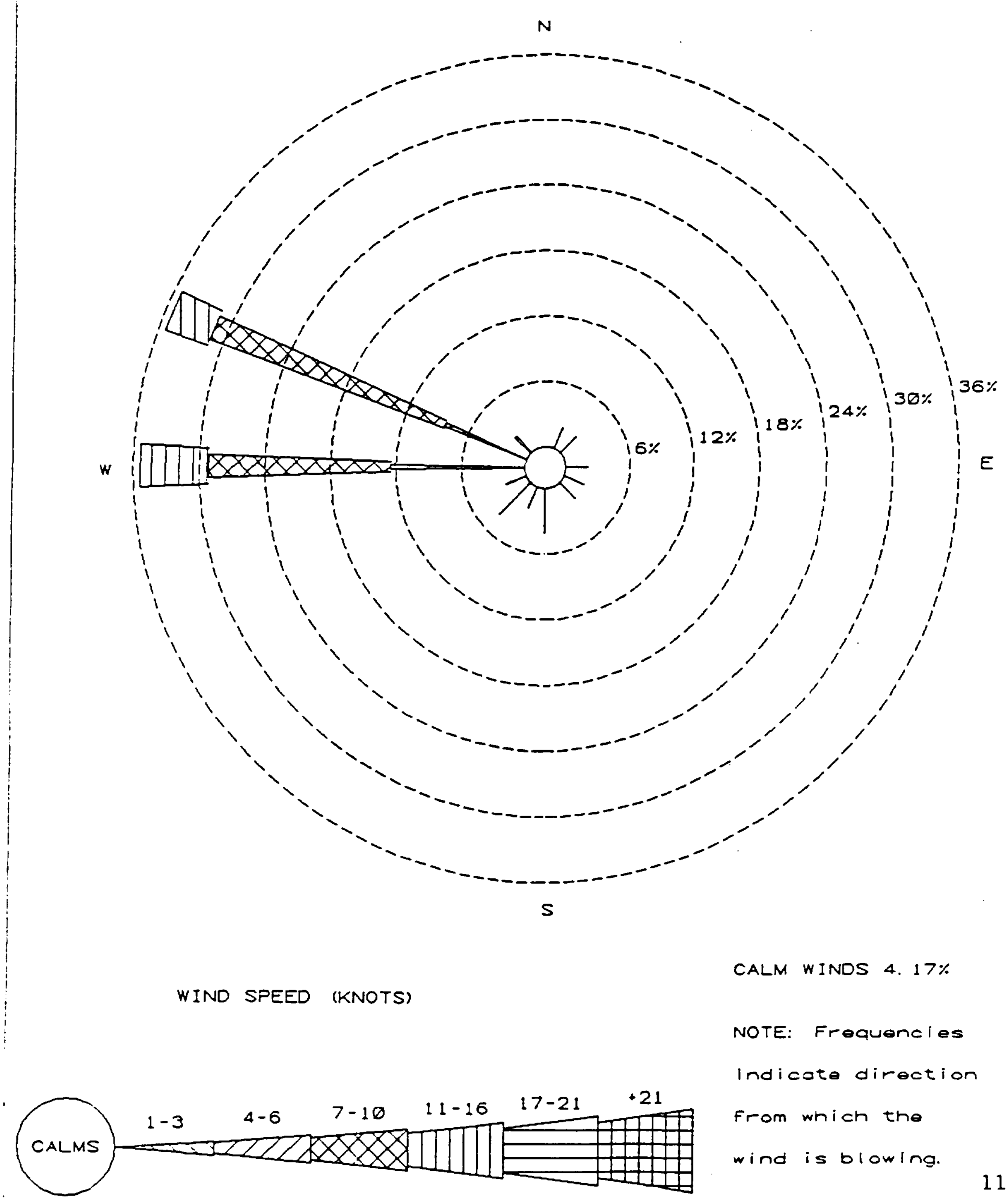


CALM WINDS 10.42%

NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

December 18-December 19; 7 AM-6 AM

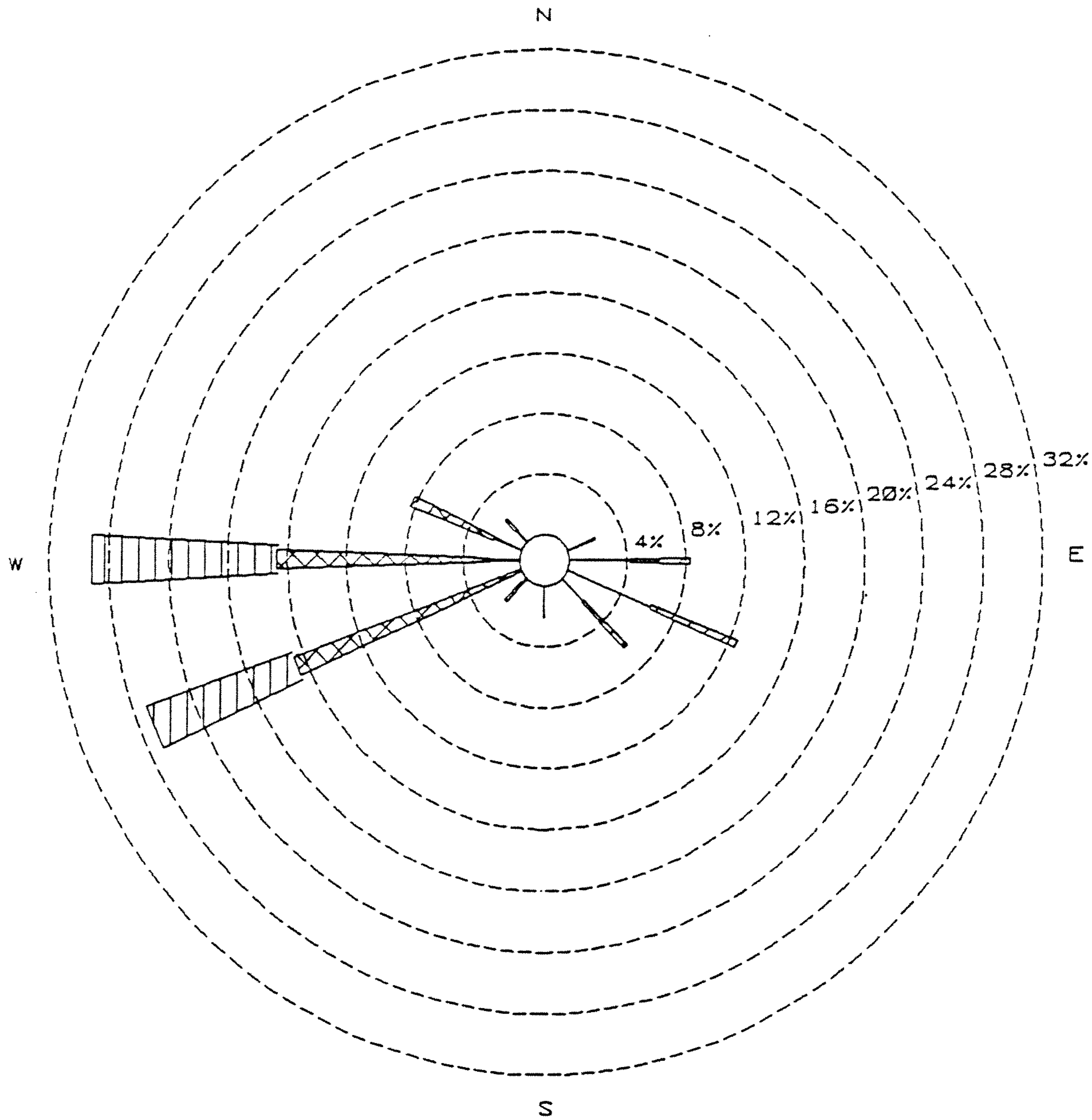


CALM WINDS 4.17%

NOTE: Frequencies indicate direction from which the wind is blowing.

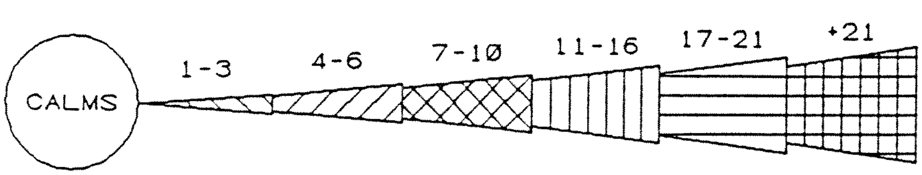
11/6/92

November 24-November 25; 7 AM-6 AM



CALM WINDS 0.00%

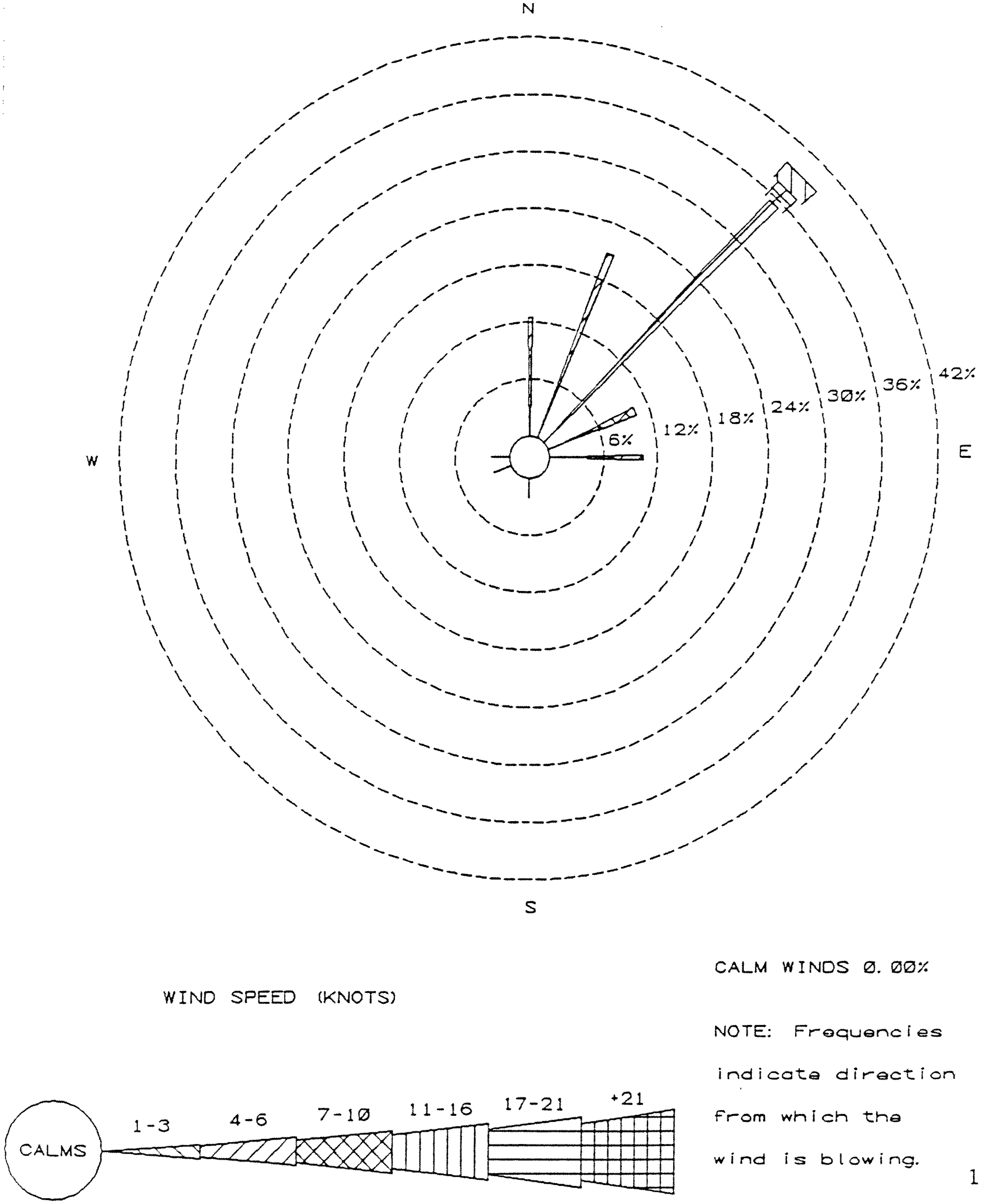
WIND SPEED (KNOTS)



NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

October 31-November 1; 7 AM-6 AM

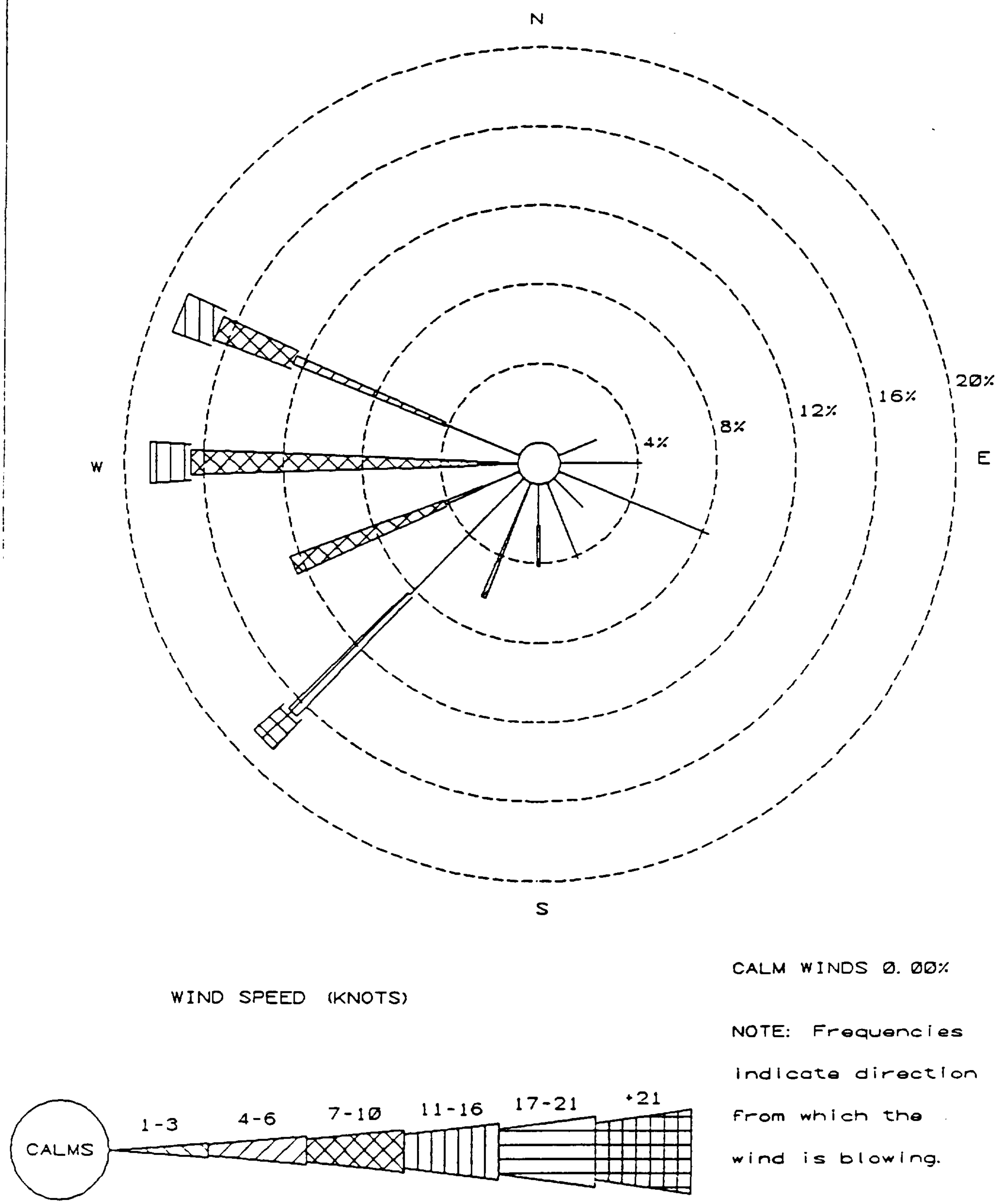


CALM WINDS 0.00%

NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

October 7-October 8; 7 AM-6 AM

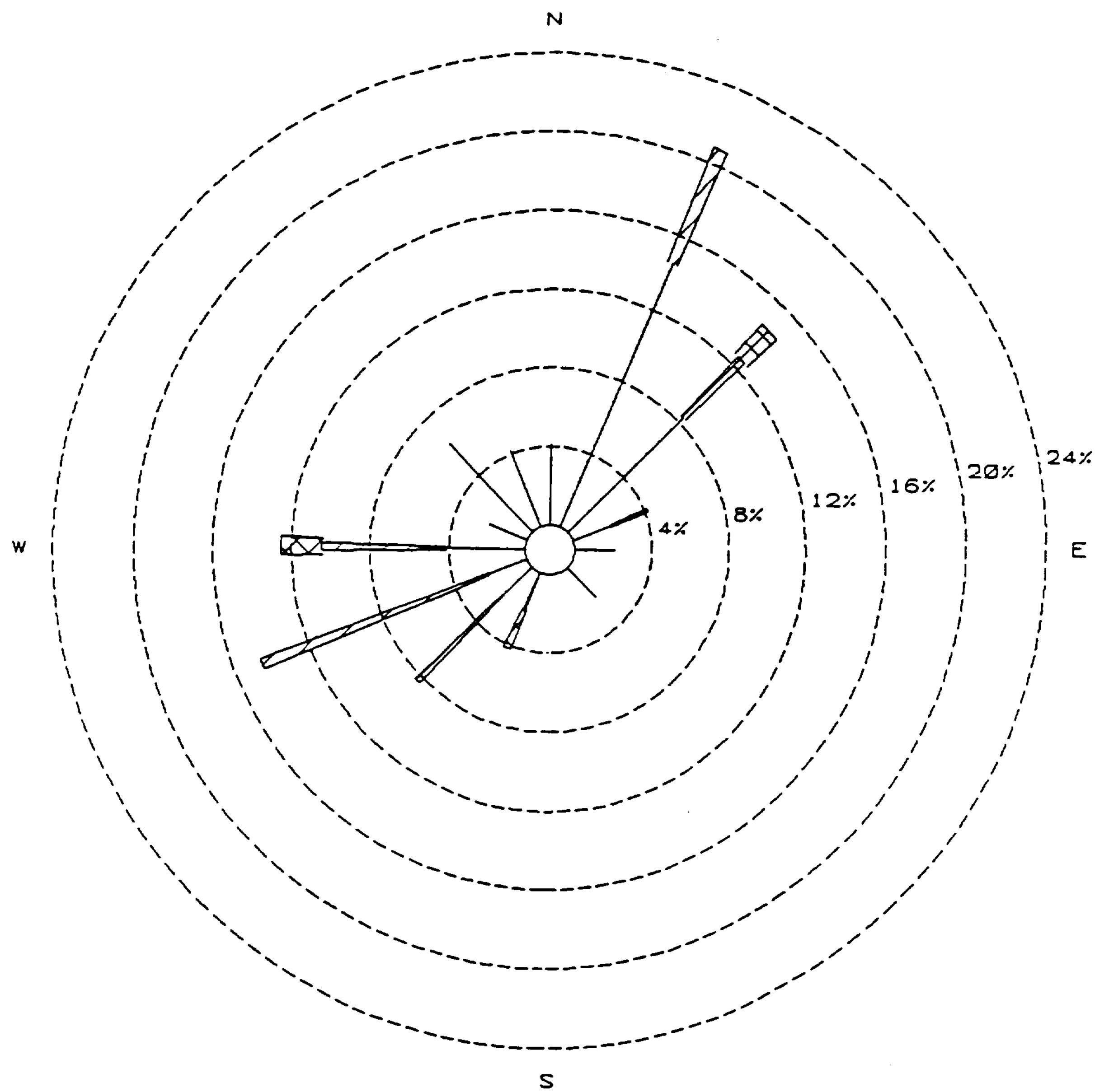


CALM WINDS 0.00%

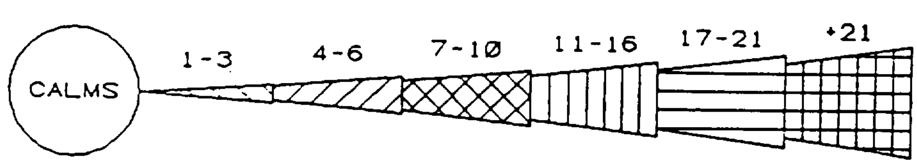
NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

September 25-September 26; 7 AM-6 AM



WIND SPEED (KNOTS)

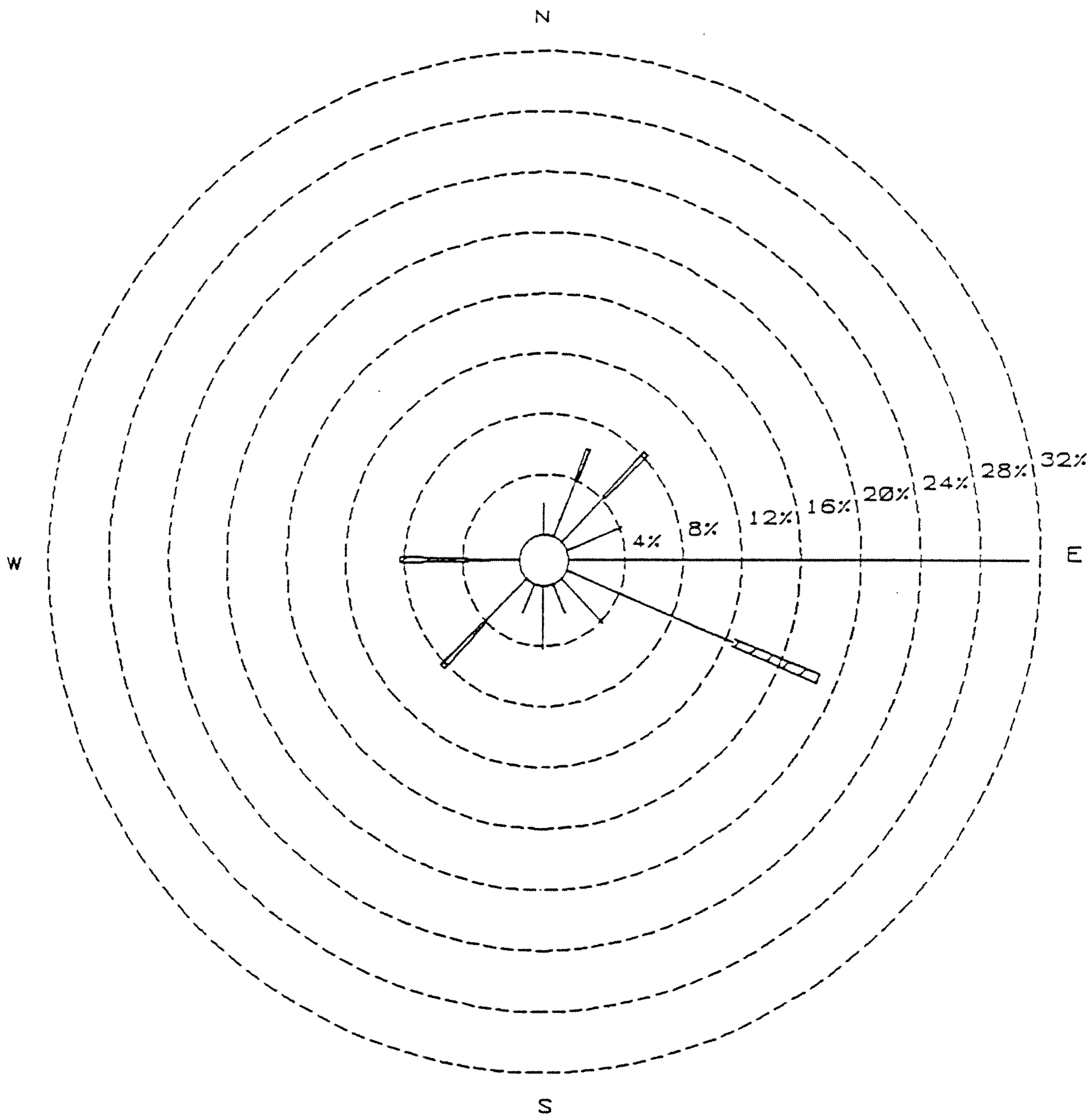


CALM WINDS 0.00%

NOTE: Frequencies indicate direction from which the wind is blowing.

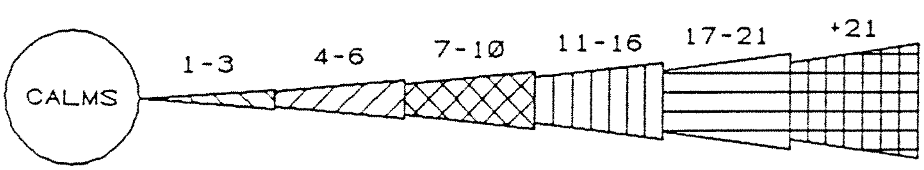
11/6/92

September 13-September 14; 7 AM-6 AM



CALM WINDS 0.00%

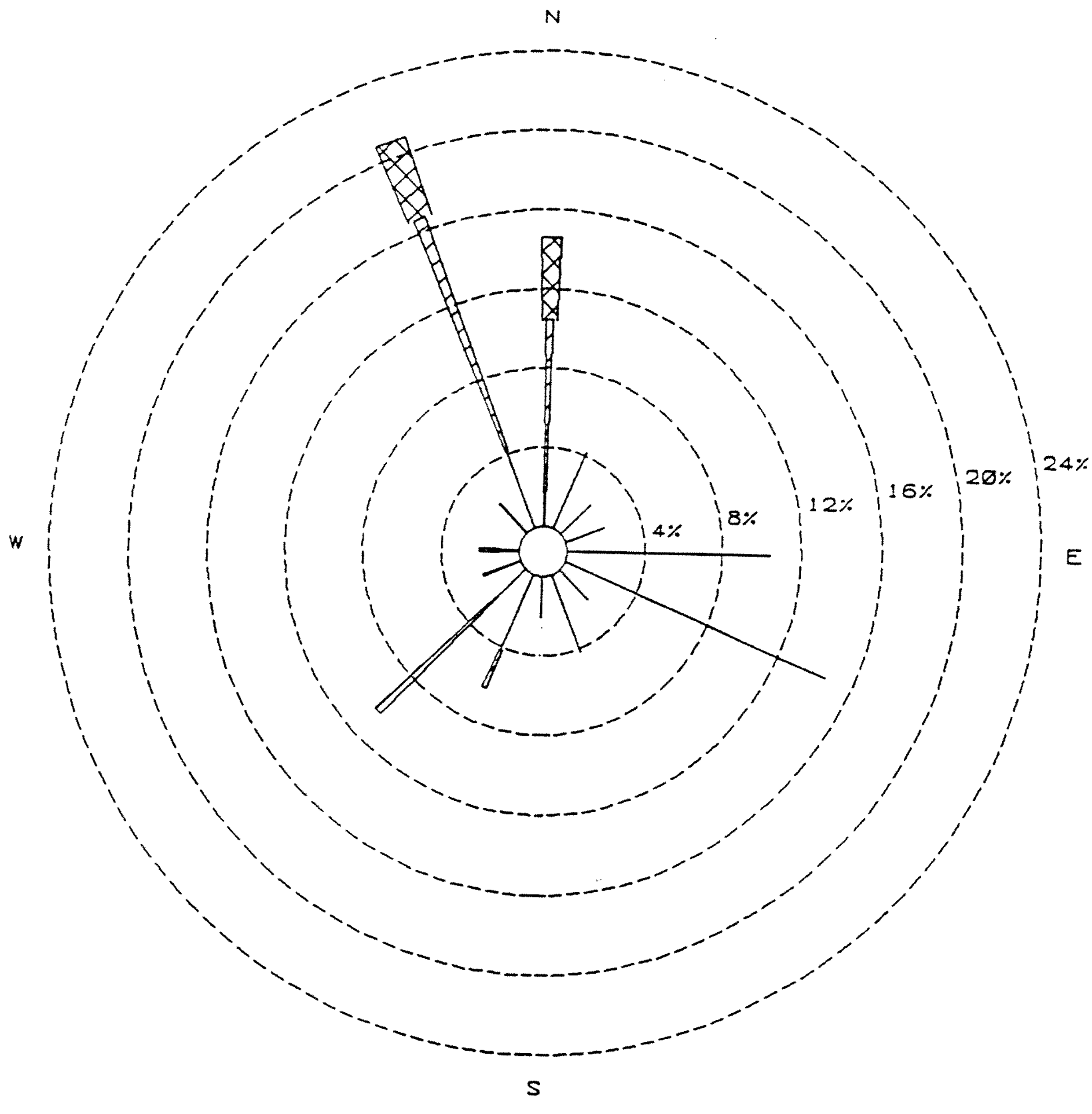
WIND SPEED (KNOTS)



NOTE: Frequencies indicate direction from which the wind is blowing.

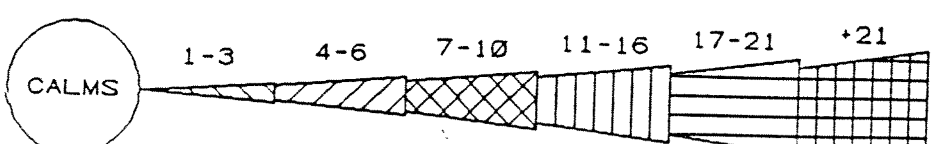
11/6/92

September 1-September 2; 7 AM-6 AM



WIND SPEED (KNOTS)

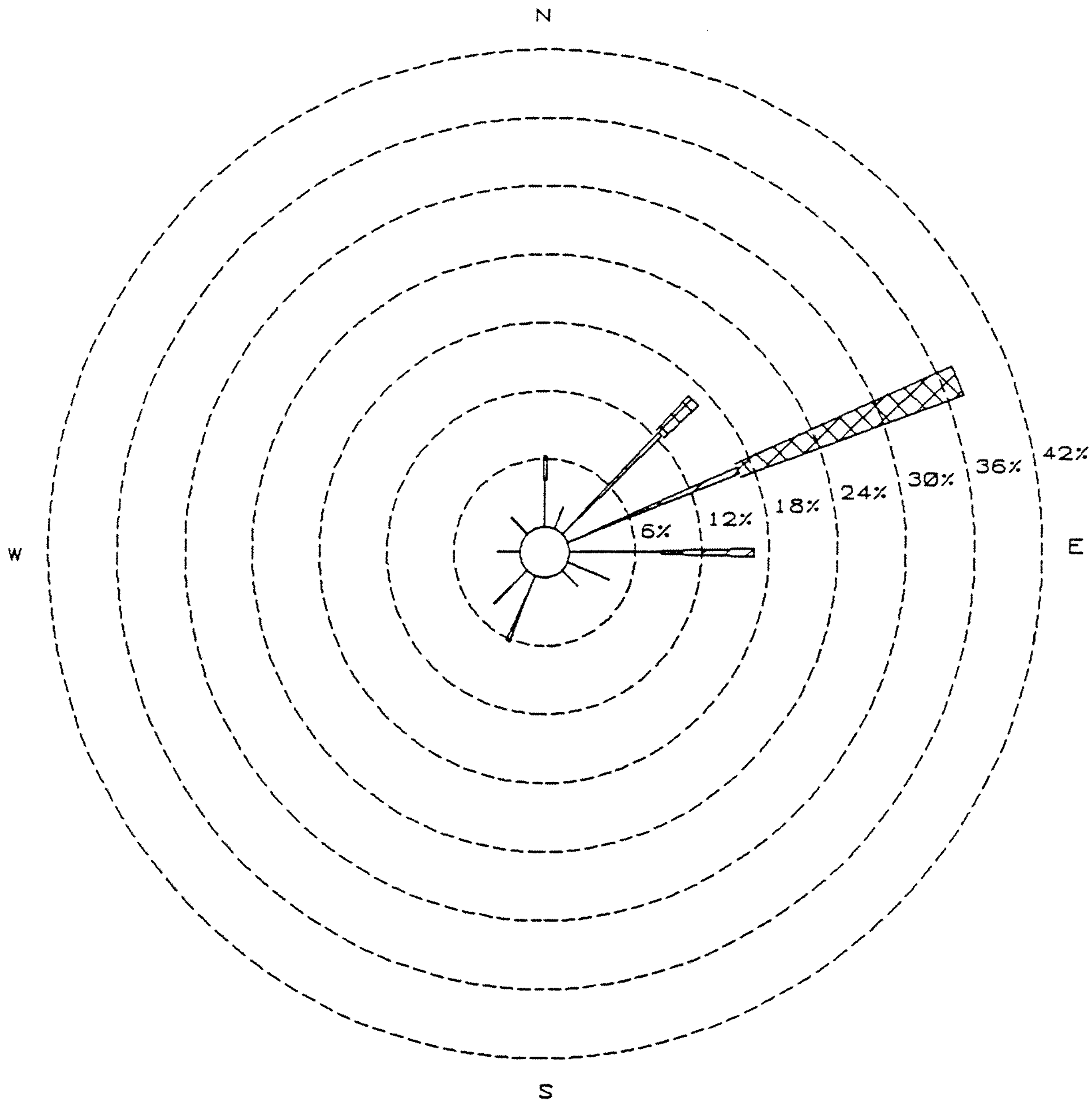
CALM WINDS 0.00%



NOTE: Frequencies indicate direction from which the wind is blowing.

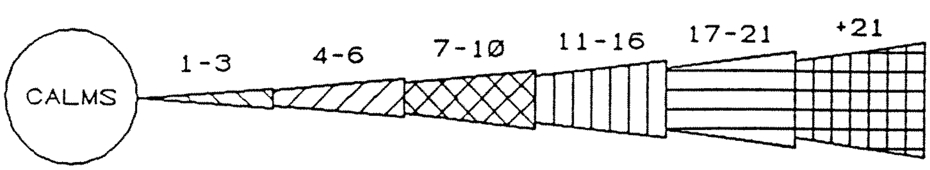
11/6/92

August 20-August 21; 7 AM-6 AM



CALM WINDS 0.00%

WIND SPEED (KNOTS)



NOTE: Frequencies indicate direction from which the wind is blowing.

11/6/92

ATTACHMENT II

Statistical Test Data

30 DAYS for 004
31 DAYS for 006
30 MATCHED PAIRS

$* = .00025 = \frac{.0005}{2}$

(1)

	(4)	(6)	d
1	*	*	0
2	*	*	0
3	.00096	*	.00071
4	—	*	
5	*	*	0
6	*	*	0
7	*	*	0
8	*	*	0
9	*	*	0
10	*	*	0
11	*	.00084	-.00059
12	*	*	0
13	*	*	0
14	*	*	0
15	*	*	0
16	*	*	0
17	.0011	.0007	.0004
18	*	*	0
3.23.92 19	.001	.0013	-.0003
4.4.92 20	.0004	*	.00015
21	*	*	0
22	*	*	0
23	.00086	*	.00061
24	*	.00077	-.00052
25	.0035	*	.00325
26	*	*	0
27	*	*	0
28	*	*	0
29	.002	*	.00175
30	.003	*	.00275
31	.0018	.0015	.00030
	$n = 30$	$n = 31$	$n = 30$
	$\Sigma x = .019870$	$\Sigma x = .011610$	$\Sigma d = .008510$
	$\Sigma x^2 = .000034$	$\Sigma x^2 = .000007$	$\Sigma d^2 = .000023$
	$\bar{x} = .000662$	$\bar{x} = .000375$	$\bar{d} = .000284$
	$s = .000844$	$s = .000317$	$s = .000843$

004	006	diff
$n = 28$	$n = 29$	$n = 28$
$\Sigma x = .018470$	$\Sigma x = .010006$	$\Sigma d = .00866$
$\Sigma x^2 = .000033$	$\Sigma x^2 = .000006$	$\Sigma d^2 = .000023$
$\bar{x} = .000660$	$\bar{x} = .000347$	$\bar{d} = .000309$
$s = .000871$	$s = .000275$	$s = .000866$

(2

Questions

1) Are the values recorded at 004 significant? (Above .00

0 — Normal — 004

.000025 — .000662 = $\bar{x}$, .000844 = s } n=30

← diff →

.000660 = $\bar{x}$, .000871 = s } n=28

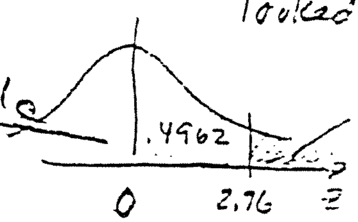
a) n = 30

$$z^* = \frac{.000662 - .000025}{\frac{.000844}{\sqrt{30}}} = \frac{.000412}{.000154} = 2.67$$

looked up in z Tbl

Std error of measurement $= \frac{s}{\sqrt{n}}$

From table

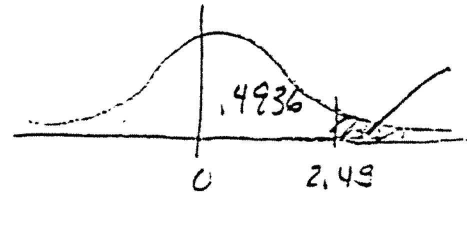


p = probability that this occurred at random = .004

4 chances out of 1000 very small.

b) n = 28

$$z = \frac{.000660 - .00025}{\frac{.000871}{\sqrt{28}}} = \frac{.00041}{.000165} = 2.49$$

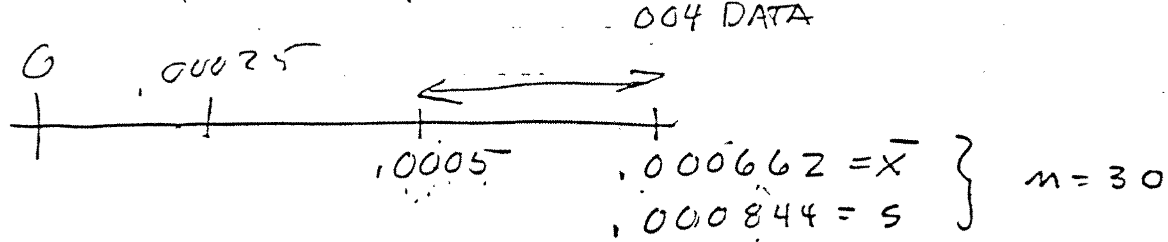


p = .006

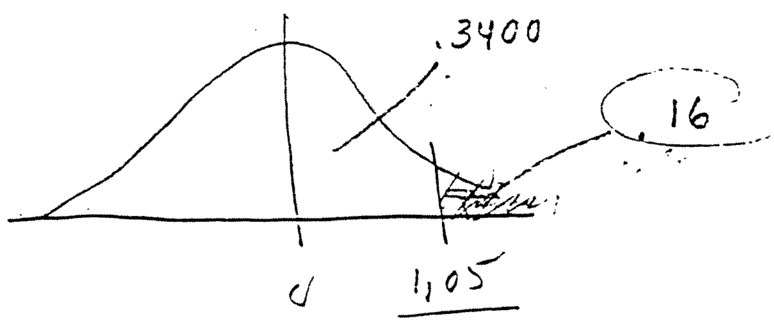
probability that this occurred at random is 6 chances out of 1000

very small.

1) Are the values recorded at 004 significantly larger than .0005 ?



$$Z^* = \frac{.000662 - .0005}{\frac{.000844}{\sqrt{30}}} = \frac{.000162}{.000154} = 1.05$$



$p = .16$

Conf - 1 - .16 = .84

not significant at .1

This will happen 16 out of 100 times "at random".

Question 2 is there a significant difference between 004 and 006

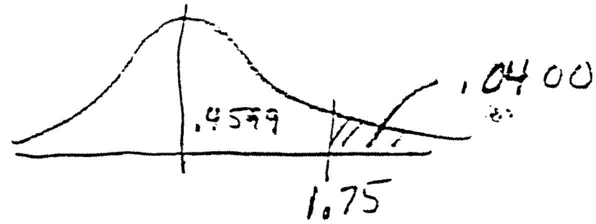
Is $\bar{x}_{006} < \bar{x}_{004}$

$n = 30$
$n = 31$

$\bar{x}_{004} - \bar{x}_{006} = .000662 - .000375 = .000287$

Is the difference $\bar{x}_{004} - \bar{x}_{006} = .000287$ significant

$$z^* = \frac{.000287 - 0}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{.000287}{\sqrt{\frac{.000844^2}{30} + \frac{.000317^2}{31}}} = 1.75$$



p = .04

There are 4 chances out of 100 that this occurred at random.

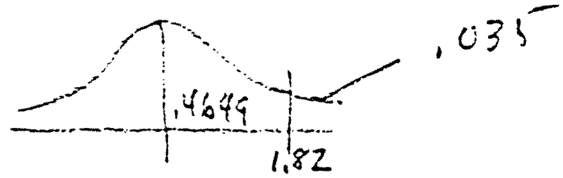
---

reduced data

$n = 28$
$n = 29$

$\bar{x}_{004} - \bar{x}_{006} = .000660 - .000347 = .000313$

$$z = \frac{.000313}{\sqrt{\frac{.000271^2}{28} + \frac{.000275^2}{29}}} = 1.816$$



p = .035

essentially the same.

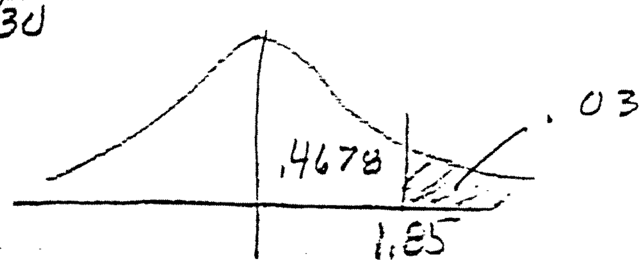
Questum 2

Matched pairs

$n = 30$ $\bar{d} = .000284$

Is $\bar{d}$ significantly larger than zero?

$$Z = \frac{\bar{d} - 0}{\frac{s}{\sqrt{n}}} = \frac{.000284}{\frac{.000843}{\sqrt{30}}} = 1.85$$



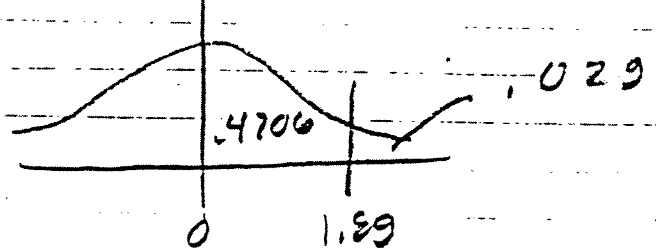
$p = .03$

3 out of 100 That this happened at random.

$n = 28$

$\bar{d} = .000309$ $s = .000866$

$$Z = \frac{\bar{d} - 0}{\frac{s}{\sqrt{n}}} = \frac{.000309}{\frac{.000866}{\sqrt{28}}} = 1.89$$



$p = .029$

essentially the same

ATTACHMENT III

Modeling Input and Results - Annual

```
CO STARTING
CO TITLEONE ALLENDALE SITE
CO TITLETWO SOURCE = H78 LANDFILL
CO MODELOPT NOSTD URBAN CONC
CO AVERTIME QUARTR PERIOD
CO POLLUTID CO
CO RUNORNOT RUN
CO FINISHED

SO STARTING
SO LOCATION H78 AREA 152 0
SO SRCPARAM H78 6.67E-10 0 120
SO LOCATION A78 AREA 182 120
SO SRCPARAM A78 6.67E-10 0 30
SO LOCATION B78 AREA 212 120
SO SRCPARAM B78 6.67E-10 0 30
SO LOCATION C78 AREA 244 120
SO SRCPARAM C78 6.67E-10 0 30
SO SRCGROUP ALL
SO FINISHED

RE STARTING
RE GRIDCART CG1 STA
RE GRIDCART CG1 XYINC 0 14 30.5 0 14 30.5
RE GRIDCART CG1 END
RE FINISHED

ME STARTING
ME INPUTFIL 4QRTS.STR (7X,6F7.5)
ME ANEMHGHT 10 METERS
ME SURFDATA 10317 1991 PITTSFIELD
ME UAIRDATA 10317 1991 PITTSFIELD
ME AVETEMPS QUART1 6*270.3
ME AVETEMPS QUART2 6*283.5
ME AVETEMPS QUART3 6*291.3
ME AVETEMPS QUART4 6*279.3
ME AVEMIXHT QUART1 A 6*1427
ME AVEMIXHT QUART1 B 6*951
ME AVEMIXHT QUART1 C 6*951
ME AVEMIXHT QUART1 D 6*834
ME AVEMIXHT QUART1 E 6*718
ME AVEMIXHT QUART1 F 6*718
ME AVEMIXHT QUART2 A 6*2420
ME AVEMIXHT QUART2 B 6*1613
ME AVEMIXHT QUART2 C 6*1613
ME AVEMIXHT QUART2 D 6*1137
ME AVEMIXHT QUART2 E 6*661
ME AVEMIXHT QUART2 F 6*661
ME AVEMIXHT QUART3 A 6*2304
ME AVEMIXHT QUART3 B 6*1536
ME AVEMIXHT QUART3 C 6*1536
ME AVEMIXHT QUART3 D 6*1019
ME AVEMIXHT QUART3 E 6*502
ME AVEMIXHT QUART3 F 6*502
ME AVEMIXHT QUART4 A 6*1380
ME AVEMIXHT QUART4 B 6*920
ME AVEMIXHT QUART4 C 6*920
ME AVEMIXHT QUART4 D 6*810
ME AVEMIXHT QUART4 E 6*699
ME AVEMIXHT QUART4 F 6*699
```

```
ME FINISHED

OU STARTING
OU RECTABLE SRCGRP
OU MAXTABLE 10 SRCGRP
OU PLOTFILE QUART1 ALL 478QRT1.OUT
OU PLOTFILE QUART2 ALL 478QRT2.OUT
OU PLOTFILE QUART3 ALL 478QRT3.OUT
OU PLOTFILE QUART4 ALL 478QRT4.OUT
OU PLOTFILE PERIOD ALL 478YEAR.OUT
OU FINISHED

************************************
*** SETUP Finishes Successfully ***
************************************
```

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** MODEL SETUP OPTIONS SUMMARY ***

- -

**Model Is Setup For Calculation of Average CONCentration Values.

**Model Uses URBAN Dispersion.

**Model Uses User-Specified Options:
1. Final Plume Rise.
2. Not Use Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Default Wind Profile Exponents.
5. Default Vertical Potential Temperature Gradients.

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 4 STAR Average(s) for the Following Months: 0 0 0 0 0 0 0 0 0 0 0 0
Seasons/Quarters: 1 1 1 1
and Annual: 0

**Model Also Calculates PERIOD Averages.

**Model Assumes 4 STAR Summaries In Data File for the Averaging Periods Identified Above

**This Run Includes: 4 Source(s); 1 Source Group(s); and 196 Receptor(s)

**The Model Assumes A Pollutant Type of: CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Long Term Values by Receptor (RECTABLE Keyword)
Model Outputs Tables of Maximum Long Term Values (MAXTABLE Keyword)
Model Outputs External File(s) of Long Term Values for Plotting (PLOTFILE Keyword)

**Misc. Inputs: Anem. Hgt. (m) = 10.00 ; Decay Coef. = .0000 ; Rot. Angle = .0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = .10000E+07
Output Units = MICROGRAMS/M**3

**Input Runstream File: 4H78LT.IN ; **Output Print File: 4H78LT.OUT

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	WIDTH OF AREA (METERS)	EMISSION RATE SCALAR VARY BY
H78	0	.66700E-09	152.0	.0	.0	.00	120.00	
A78	0	.66700E-09	182.0	120.0	.0	.00	30.00	
B78	0	.66700E-09	212.0	120.0	.0	.00	30.00	
C78	0	.66700E-09	244.0	120.0	.0	.00	30.00	

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	H78 , A78 , B78 , C78 ,

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***
(METERS)

.0, 30.5, 61.0, 91.5, 122.0, 152.5, 183.0, 213.5, 244.0, 274.5,
305.0, 335.5, 366.0, 396.5,

*** Y-COORDINATES OF GRID ***
(METERS)

.0, 30.5, 61.0, 91.5, 122.0, 152.5, 183.0, 213.5, 244.0, 274.5,
305.0, 335.5, 366.0, 396.5,

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

* SOURCE-RECEPTOR COMBINATIONS LESS THAN 1.0 METER OR 3*ZLB *
IN DISTANCE. CALCULATIONS MAY NOT BE PERFORMED.

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
H78	183.0	.0	-1.06
H78	213.5	.0	-7.68
H78	244.0	.0	.30
H78	152.5	30.5	-1.29
H78	183.0	30.5	-26.34
H78	213.5	30.5	-38.16
H78	244.0	30.5	-24.18
H78	152.5	61.0	-8.19
H78	183.0	61.0	-38.69
H78	213.5	61.0	-65.90
H78	244.0	61.0	-35.69
H78	274.5	61.0	-5.19
H78	152.5	91.5	-.38
H78	183.0	91.5	-24.89
H78	213.5	91.5	-36.17
H78	244.0	91.5	-22.80
H78	183.0	122.0	.74
H78	213.5	122.0	-5.68

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** AVERAGE SPEED FOR EACH WIND SPEED CATEGORY ***
(METERS/SEC)

1.50, 2.50, 4.30, 6.80, 9.50, 12.50,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** AVERAGE AMBIENT AIR TEMPERATURE (KELVIN) ***

	STABILITY CATEGORY A	STABILITY CATEGORY B	STABILITY CATEGORY C	STABILITY CATEGORY D	STABILITY CATEGORY E	STABILITY CATEGORY F
QUART1	270.3000	270.3000	270.3000	270.3000	270.3000	270.3000
QUART2	283.5000	283.5000	283.5000	283.5000	283.5000	283.5000
QUART3	291.3000	291.3000	291.3000	291.3000	291.3000	291.3000
QUART4	279.3000	279.3000	279.3000	279.3000	279.3000	279.3000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE MAXIMUM 10 QUART2 AVERAGE CONCENTRATION VALUES FOR GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

** CONC OF CO IN MICROGRAMS/M**3 **

RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE			RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE		
1.	.000704	AT (	213.50,	152.50)	GC	6.	.000480	AT (	122.00,	91.50)	GC
2.	.000688	AT (	183.00,	152.50)	GC	7.	.000476	AT (	122.00,	122.00)	GC
3.	.000639	AT (	244.00,	152.50)	GC	8.	.000456	AT (	122.00,	152.50)	GC
4.	.000550	AT (	152.50,	152.50)	GC	9.	.000429	AT (	183.00,	183.00)	GC
5.	.000538	AT (	152.50,	122.00)	GC	10.	.000427	AT (	183.00,	122.00)	GC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART3: STABILITY CATEGORY A

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00186000	.00136000	.00000000	.00000000	.00000000	.00000000
22.500	.00280000	.00226000	.00000000	.00000000	.00000000	.00000000
45.000	.00511000	.00272000	.00000000	.00000000	.00000000	.00000000
67.500	.00787000	.00272000	.00000000	.00000000	.00000000	.00000000
90.000	.01154000	.00226000	.00000000	.00000000	.00000000	.00000000
112.500	.01893000	.00362000	.00000000	.00000000	.00000000	.00000000
135.000	.01294000	.00317000	.00000000	.00000000	.00000000	.00000000
157.500	.01339000	.00272000	.00000000	.00000000	.00000000	.00000000
180.000	.01432000	.00317000	.00000000	.00000000	.00000000	.00000000
202.500	.01028000	.00951000	.00000000	.00000000	.00000000	.00000000
225.000	.00937000	.00996000	.00000000	.00000000	.00000000	.00000000
247.500	.00658000	.00861000	.00000000	.00000000	.00000000	.00000000
270.000	.00430000	.00951000	.00000000	.00000000	.00000000	.00000000
292.500	.00465000	.00272000	.00000000	.00000000	.00000000	.00000000
315.000	.00144000	.00362000	.00000000	.00000000	.00000000	.00000000
337.500	.00235000	.00317000	.00000000	.00000000	.00000000	.00000000

QUART3: STABILITY CATEGORY B

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00001000	.00226000	.00181000	.00000000	.00000000	.00000000
22.500	.00183000	.00181000	.00000000	.00000000	.00000000	.00000000
45.000	.00138000	.00136000	.00000000	.00000000	.00000000	.00000000
67.500	.00138000	.00226000	.00000000	.00000000	.00000000	.00000000
90.000	.00320000	.00226000	.00000000	.00000000	.00000000	.00000000
112.500	.00229000	.00181000	.00000000	.00000000	.00000000	.00000000
135.000	.00091000	.00000000	.00000000	.00000000	.00000000	.00000000
157.500	.00183000	.00136000	.00091000	.00000000	.00000000	.00000000
180.000	.00138000	.00272000	.00136000	.00000000	.00000000	.00000000
202.500	.00280000	.01042000	.00136000	.00000000	.00000000	.00000000
225.000	.00094000	.00498000	.00272000	.00000000	.00000000	.00000000
247.500	.00139000	.00408000	.00136000	.00000000	.00000000	.00000000
270.000	.00005000	.00770000	.00589000	.00000000	.00000000	.00000000
292.500	.00003000	.00408000	.00498000	.00000000	.00000000	.00000000
315.000	.00047000	.00181000	.00362000	.00000000	.00000000	.00000000
337.500	.00002000	.00272000	.00091000	.00000000	.00000000	.00000000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART3: STABILITY CATEGORY E

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00136000	.00000000	.00000000	.00000000	.00000000
22.500	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
45.000	.00000000	.00272000	.00045000	.00000000	.00000000	.00000000
67.500	.00000000	.00181000	.00000000	.00000000	.00000000	.00000000
90.000	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
112.500	.00000000	.00091000	.00000000	.00000000	.00000000	.00000000
135.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
180.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
202.500	.00000000	.00589000	.00000000	.00000000	.00000000	.00000000
225.000	.00000000	.00408000	.00000000	.00000000	.00000000	.00000000
247.500	.00000000	.00181000	.00000000	.00000000	.00000000	.00000000
270.000	.00000000	.00226000	.00000000	.00000000	.00000000	.00000000
292.500	.00000000	.00362000	.00000000	.00000000	.00000000	.00000000
315.000	.00000000	.00136000	.00000000	.00000000	.00000000	.00000000
337.500	.00000000	.00136000	.00000000	.00000000	.00000000	.00000000

QUART3: STABILITY CATEGORY F

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00903000	.00091000	.00000000	.00000000	.00000000	.00000000
22.500	.01335000	.00226000	.00000000	.00000000	.00000000	.00000000
45.000	.01428000	.00181000	.00000000	.00000000	.00000000	.00000000
67.500	.03219000	.00045000	.00000000	.00000000	.00000000	.00000000
90.000	.08045000	.00045000	.00000000	.00000000	.00000000	.00000000
112.500	.07809000	.00045000	.00000000	.00000000	.00000000	.00000000
135.000	.02518000	.00226000	.00000000	.00000000	.00000000	.00000000
157.500	.02470000	.00226000	.00000000	.00000000	.00000000	.00000000
180.000	.01849000	.00091000	.00000000	.00000000	.00000000	.00000000
202.500	.02180000	.00091000	.00000000	.00000000	.00000000	.00000000
225.000	.01757000	.00136000	.00000000	.00000000	.00000000	.00000000
247.500	.00627000	.00272000	.00000000	.00000000	.00000000	.00000000
270.000	.00578000	.00226000	.00000000	.00000000	.00000000	.00000000
292.500	.00956000	.00226000	.00000000	.00000000	.00000000	.00000000
315.000	.00621000	.00136000	.00000000	.00000000	.00000000	.00000000
337.500	.00479000	.00136000	.00000000	.00000000	.00000000	.00000000

SUM OF FREQUENCIES, FTOTAL = .99996

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART3 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 274.50	305.00	335.50	366.00	396.50
396.50	.000061	.000062	.000060	.000057	.000051
366.00	.000073	.000073	.000070	.000064	.000057
335.50	.000089	.000087	.000082	.000072	.000064
305.00	.000110	.000107	.000095	.000082	.000072
274.50	.000140	.000132	.000111	.000094	.000079
244.00	.000185	.000164	.000131	.000108	.000089
213.50	.000253	.000207	.000157	.000124	.000097
183.00	.000365	.000267	.000184	.000137	.000102
152.50	.000496	.000315	.000214	.000153	.000113
122.00	.000358	.000289	.000216	.000160	.000120
91.50	.000148	.000233	.000212	.000162	.000117
61.00	.000043	.000160	.000172	.000136	.000109
30.50	.000082	.000154	.000131	.000121	.000095
.00	.000098	.000114	.000114	.000096	.000080

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE MAXIMUM 10 QUART3 AVERAGE CONCENTRATION VALUES FOR GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

** CONC OF CO IN MICROGRAMS/M**3 **

RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE	RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE
1.	.000859	AT	(213.50, 152.50) GC	6.	.000535	AT	(122.00, 122.00) GC
2.	.000806	AT	(183.00, 152.50) GC	7.	.000534	AT	(122.00, 91.50) GC
3.	.000805	AT	(244.00, 152.50) GC	8.	.000512	AT	(183.00, 183.00) GC
4.	.000622	AT	(152.50, 152.50) GC	9.	.000512	AT	(122.00, 152.50) GC
5.	.000607	AT	(152.50, 122.00) GC	10.	.000509	AT	(213.50, 183.00) GC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART4: STABILITY CATEGORY C

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00136000	.00045000	.00000000	.00000000	.00000000
22.500	.00045000	.00000000	.00000000	.00000000	.00000000	.00000000
45.000	.00000000	.00181000	.00272000	.00000000	.00000000	.00000000
67.500	.00000000	.00181000	.00091000	.00045000	.00000000	.00000000
90.000	.00136000	.00045000	.00000000	.00000000	.00000000	.00000000
112.500	.00136000	.00091000	.00091000	.00000000	.00000000	.00000000
135.000	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
180.000	.00000000	.00226000	.00362000	.00000000	.00000000	.00000000
202.500	.00181000	.01404000	.00634000	.00181000	.00000000	.00000000
225.000	.00136000	.00408000	.00091000	.00000000	.00000000	.00000000
247.500	.00091000	.00317000	.00272000	.00000000	.00000000	.00000000
270.000	.00000000	.00362000	.01223000	.00045000	.00000000	.00000000
292.500	.00000000	.00181000	.00861000	.00091000	.00000000	.00000000
315.000	.00045000	.00045000	.00317000	.00000000	.00000000	.00000000
337.500	.00000000	.00091000	.00498000	.00000000	.00000000	.00000000

QUART4: STABILITY CATEGORY D

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00226000	.00091000	.00000000	.00000000	.00000000
22.500	.00000000	.00045000	.00091000	.00000000	.00000000	.00000000
45.000	.00000000	.00453000	.00226000	.00091000	.00000000	.00000000
67.500	.00000000	.00543000	.01042000	.00226000	.00000000	.00000000
90.000	.00317000	.00272000	.00226000	.00000000	.00000000	.00000000
112.500	.00181000	.00362000	.00226000	.00000000	.00000000	.00000000
135.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
180.000	.00091000	.00226000	.00091000	.00000000	.00000000	.00000000
202.500	.00453000	.02174000	.01223000	.00226000	.00000000	.00000000
225.000	.00272000	.01268000	.00815000	.00181000	.00000000	.00000000
247.500	.00317000	.00634000	.01087000	.00725000	.00000000	.00000000
270.000	.00317000	.02219000	.03170000	.01676000	.00000000	.00000000
292.500	.00091000	.01857000	.04121000	.01359000	.00000000	.00000000
315.000	.00000000	.00317000	.00498000	.00091000	.00000000	.00000000
337.500	.00000000	.00634000	.00906000	.00136000	.00000000	.00000000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART4: STABILITY CATEGORY E

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
22.500	.00000000	.00317000	.00000000	.00000000	.00000000	.00000000
45.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
67.500	.00000000	.00091000	.00000000	.00000000	.00000000	.00000000
90.000	.00000000	.00272000	.00045000	.00000000	.00000000	.00000000
112.500	.00000000	.00181000	.00045000	.00000000	.00000000	.00000000
135.000	.00000000	.00181000	.00091000	.00000000	.00000000	.00000000
157.500	.00000000	.00181000	.00000000	.00000000	.00000000	.00000000
180.000	.00000000	.00226000	.00000000	.00000000	.00000000	.00000000
202.500	.00000000	.00362000	.00000000	.00000000	.00000000	.00000000
225.000	.00000000	.00091000	.00000000	.00000000	.00000000	.00000000
247.500	.00000000	.00136000	.00091000	.00000000	.00000000	.00000000
270.000	.00000000	.00861000	.00136000	.00000000	.00000000	.00000000
292.500	.00000000	.00634000	.00136000	.00000000	.00000000	.00000000
315.000	.00000000	.00317000	.00045000	.00000000	.00000000	.00000000
337.500	.00000000	.00317000	.00000000	.00000000	.00000000	.00000000

QUART4: STABILITY CATEGORY F

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00804000	.00136000	.00000000	.00000000	.00000000	.00000000
22.500	.01147000	.00498000	.00000000	.00000000	.00000000	.00000000
45.000	.01002000	.00408000	.00000000	.00000000	.00000000	.00000000
67.500	.01037000	.00091000	.00000000	.00000000	.00000000	.00000000
90.000	.03618000	.00000000	.00000000	.00000000	.00000000	.00000000
112.500	.05126000	.00091000	.00000000	.00000000	.00000000	.00000000
135.000	.03763000	.00091000	.00000000	.00000000	.00000000	.00000000
157.500	.03155000	.00181000	.00000000	.00000000	.00000000	.00000000
180.000	.02778000	.00136000	.00000000	.00000000	.00000000	.00000000
202.500	.02924000	.00272000	.00000000	.00000000	.00000000	.00000000
225.000	.01705000	.00362000	.00000000	.00000000	.00000000	.00000000
247.500	.01568000	.00453000	.00000000	.00000000	.00000000	.00000000
270.000	.01754000	.00408000	.00000000	.00000000	.00000000	.00000000
292.500	.01239000	.00453000	.00000000	.00000000	.00000000	.00000000
315.000	.01044000	.00272000	.00000000	.00000000	.00000000	.00000000
337.500	.00715000	.00272000	.00000000	.00000000	.00000000	.00000000

SUM OF FREQUENCIES, FTOTAL = 1.00000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART4 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) .00	30.50	61.00	91.50	122.00	152.50	183.00	213.50	244.00
396.50	.000056	.000057	.000059	.000063	.000067	.000070	.000073	.000074	.000076
366.00	.000065	.000068	.000070	.000073	.000079	.000083	.000087	.000090	.000090
335.50	.000076	.000080	.000084	.000089	.000094	.000099	.000105	.000111	.000109
305.00	.000086	.000095	.000102	.000109	.000119	.000121	.000131	.000140	.000136
274.50	.000101	.000110	.000122	.000135	.000154	.000159	.000167	.000180	.000176
244.00	.000117	.000135	.000149	.000169	.000195	.000218	.000234	.000241	.000242
213.50	.000131	.000157	.000187	.000216	.000261	.000295	.000344	.000346	.000349
183.00	.000141	.000169	.000213	.000266	.000348	.000419	.000525	.000579	.000542
152.50	.000155	.000185	.000233	.000299	.000385	.000496	.000754	.000870	.000932
122.00	.000151	.000190	.000240	.000298	.000364	.000442	.000338	.000332	.000523
91.50	.000139	.000179	.000232	.000290	.000334	.000084	.000124	.000162	.000171
61.00	.000135	.000168	.000208	.000263	.000253	.000044	.000057	.000064	.000067
30.50	.000115	.000145	.000185	.000207	.000242	.000030	.000034	.000036	.000036
.00	.000094	.000118	.000144	.000177	.000154	.000120	.000022	.000023	.000022

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART4 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 274.50	305.00	335.50	366.00	396.50
396.50	.000076	.000076	.000073	.000068	.000060
366.00	.000091	.000088	.000084	.000075	.000067
335.50	.000109	.000104	.000097	.000085	.000075
305.00	.000133	.000128	.000112	.000096	.000083
274.50	.000169	.000157	.000130	.000109	.000092
244.00	.000222	.000193	.000154	.000128	.000107
213.50	.000300	.000248	.000190	.000153	.000123
183.00	.000436	.000333	.000237	.000182	.000139
152.50	.000618	.000425	.000297	.000216	.000163
122.00	.000497	.000416	.000314	.000234	.000179
91.50	.000218	.000347	.000309	.000240	.000178
61.00	.000063	.000262	.000261	.000209	.000171
30.50	.000124	.000251	.000217	.000190	.000151
.00	.000155	.000192	.000188	.000158	.000132

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE MAXIMUM 10 QUART4 AVERAGE CONCENTRATION VALUES FOR GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

** CONC OF CO IN MICROGRAMS/M**3 **

RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE			RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE		
1.	.000932	AT (	244.00,	152.50)	GC	6.	.000542	AT (	244.00,	183.00)	GC
2.	.000870	AT (	213.50,	152.50)	GC	7.	.000525	AT (	183.00,	183.00)	GC
3.	.000754	AT (	183.00,	152.50)	GC	8.	.000523	AT (	244.00,	122.00)	GC
4.	.000618	AT (	274.50,	152.50)	GC	9.	.000497	AT (	274.50,	122.00)	GC
5.	.000579	AT (	213.50,	183.00)	GC	10.	.000496	AT (	152.50,	152.50)	GC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE PERIOD AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) .00	30.50	61.00	91.50	122.00	152.50	183.00	213.50	244.00
396.50	.000046	.000045	.000045	.000048	.000052	.000055	.000057	.000059	.000061
366.00	.000055	.000056	.000055	.000056	.000061	.000065	.000068	.000071	.000072
335.50	.000066	.000068	.000069	.000071	.000072	.000077	.000082	.000088	.000087
305.00	.000078	.000084	.000087	.000090	.000095	.000094	.000103	.000111	.000108
274.50	.000096	.000100	.000108	.000116	.000127	.000128	.000131	.000143	.000141
244.00	.000118	.000131	.000140	.000152	.000168	.000181	.000190	.000192	.000195
213.50	.000140	.000163	.000188	.000209	.000241	.000256	.000289	.000278	.000282
183.00	.000157	.000185	.000226	.000275	.000348	.000389	.000466	.000483	.000447
152.50	.000182	.000213	.000263	.000332	.000416	.000516	.000708	.000784	.000793
122.00	.000184	.000227	.000283	.000349	.000418	.000488	.000389	.000354	.000450
91.50	.000176	.000221	.000280	.000346	.000412	.000112	.000141	.000154	.000143
61.00	.000177	.000216	.000265	.000329	.000340	.000051	.000056	.000056	.000053
30.50	.000153	.000187	.000233	.000269	.000321	.000031	.000031	.000030	.000028
.00	.000129	.000156	.000188	.000227	.000198	.000137	.000019	.000018	.000017

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE MAXIMUM 10 PERIOD AVERAGE CONCENTRATION VALUES FOR GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

** CONC OF CO IN MICROGRAMS/M**3 **

RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE			RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE		
1.	.000793	AT (	244.00,	152.50)	GC	6.	.000488	AT (	152.50,	122.00)	GC
2.	.000784	AT (	213.50,	152.50)	GC	7.	.000483	AT (	213.50,	183.00)	GC
3.	.000708	AT (	183.00,	152.50)	GC	8.	.000466	AT (	183.00,	183.00)	GC
4.	.000516	AT (	152.50,	152.50)	GC	9.	.000450	AT (	244.00,	122.00)	GC
5.	.000515	AT (	274.50,	152.50)	GC	10.	.000447	AT (	244.00,	183.00)	GC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC   URBAN FLAT   NOSTD

*** Message Summary For ISC2 Model Execution ***

--------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   0 Warning Message(s)
A Total of   0 Informational Message(s)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCLT2 Finishes Successfully ***
****

ATTACHMENT IV

Modeling Input and Results - Seasonal

```
CO STARTING
CO TITLEONE ALLENDALE SITE (SUMMER)
CO TITLETWO SOURCE = H78 LANDFILL
CO MODELOPT NOSTD URBAN CONC
CO AVERTIME QUARTR PERIOD
CO POLLUTID CO
CO RUNORNOT RUN
CO FINISHED

SO STARTING
SO LOCATION H78 AREA 152 0
SO SRCPARAM H78 1.32E-9 0 120
SO LOCATION A78 AREA 182 120
SO SRCPARAM A78 1.32E-9 0 30
SO LOCATION B78 AREA 212 120
SO SRCPARAM B78 1.32E-9 0 30
SO LOCATION C78 AREA 244 120
SO SRCPARAM C78 1.32E-9 0 30
SO SRCGROUP ALL
SO FINISHED

RE STARTING
RE GRIDCART CG1 STA
RE GRIDCART CG1 XYINC 0 14 30.5 0 14 30.5
RE GRIDCART CG1 END
RE FINISHED

ME STARTING
ME INPUTFIL 4QRTS.STR (7X,6F7.5)
ME ANEMHGHT 10 METERS
ME SURFDATA 10317 1991 PITTSFIELD
ME UAIRDATA 10317 1991 PITTSFIELD
ME AVETEMPS QUART1 6*270.3
ME AVETEMPS QUART2 6*283.5
ME AVETEMPS QUART3 6*291.3
ME AVETEMPS QUART4 6*279.3
ME AVEMIXHT QUART1 A 6*1427
ME AVEMIXHT QUART1 B 6*951
ME AVEMIXHT QUART1 C 6*951
ME AVEMIXHT QUART1 D 6*834
ME AVEMIXHT QUART1 E 6*718
ME AVEMIXHT QUART1 F 6*718
ME AVEMIXHT QUART2 A 6*2420
ME AVEMIXHT QUART2 B 6*1613
ME AVEMIXHT QUART2 C 6*1613
ME AVEMIXHT QUART2 D 6*1137
ME AVEMIXHT QUART2 E 6*661
ME AVEMIXHT QUART2 F 6*661
ME AVEMIXHT QUART3 A 6*2304
ME AVEMIXHT QUART3 B 6*1536
ME AVEMIXHT QUART3 C 6*1536
ME AVEMIXHT QUART3 D 6*1019
ME AVEMIXHT QUART3 E 6*502
ME AVEMIXHT QUART3 F 6*502
ME AVEMIXHT QUART4 A 6*1380
ME AVEMIXHT QUART4 B 6*920
ME AVEMIXHT QUART4 C 6*920
ME AVEMIXHT QUART4 D 6*810
ME AVEMIXHT QUART4 E 6*699
ME AVEMIXHT QUART4 F 6*699
```

```
ME FINISHED

OU STARTING
OU RECTABLE SRCGRP
OU MAXTABLE 10 SRCGRP
OU PLOTFILE QUART1 ALL 378QRT1.OUT
OU PLOTFILE QUART2 ALL 378QRT2.OUT
OU PLOTFILE QUART3 ALL 378QRT3.OUT
OU PLOTFILE QUART4 ALL 378QRT4.OUT
OU PLOTFILE PERIOD ALL 378YEAR.OUT
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
***********************************
```

*** MODELING OPTIONS USED: CONC   URBAN   FLAT   NOSTD

*** MODEL SETUP OPTIONS SUMMARY ***

- -

**Model Is Setup For Calculation of Average CONCentration Values.

**Model Uses URBAN Dispersion.

**Model Uses User-Specified Options:
1. Final Plume Rise.
2. Not Use Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Default Wind Profile Exponents.
5. Default Vertical Potential Temperature Gradients.

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 4 STAR Average(s) for the Following Months: 0 0 0 0 0 0 0 0 0 0 0 0
Seasons/Quarters: 1 1 1 1
and Annual: 0

**Model Also Calculates PERIOD Averages.

**Model Assumes 4 STAR Summaries In Data File for the Averaging Periods Identified Above

**This Run Includes: 4 Source(s); 1 Source Group(s); and 196 Receptor(s)

**The Model Assumes A Pollutant Type of: CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Long Term Values by Receptor (RECTABLE Keyword)
Model Outputs Tables of Maximum Long Term Values (MAXTABLE Keyword)
Model Outputs External File(s) of Long Term Values for Plotting (PLOTFILE Keyword)

**Misc. Inputs: Anem. Hgt. (m) = 10.00 ;   Decay Coef. = .0000 ;   Rot. Angle = .0
Emission Units = GRAMS/SEC ;   Emission Rate Unit Factor = .10000E+07
Output Units = MICROGRAMS/M**3

**Input Runstream File: 2H78LT.IN ;   **Output Print File: 3H78LT.OUT

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	COORD (SW CORNER) Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	WIDTH OF AREA (METERS)	EMISSION RATE SCALAR VARY BY
H78	0	.13200E-08	152.0	.0	.0	.00	120.00	
A78	0	.13200E-08	182.0	120.0	.0	.00	30.00	
B78	0	.13200E-08	212.0	120.0	.0	.00	30.00	
C78	0	.13200E-08	244.0	120.0	.0	.00	30.00	

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	H78 , A78 , B78 , C78 ,

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***
(METERS)

.0, 30.5, 61.0, 91.5, 122.0, 152.5, 183.0, 213.5, 244.0, 274.5,
305.0, 335.5, 366.0, 396.5,

*** Y-COORDINATES OF GRID ***
(METERS)

.0, 30.5, 61.0, 91.5, 122.0, 152.5, 183.0, 213.5, 244.0, 274.5,
305.0, 335.5, 366.0, 396.5,

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

* SOURCE-RECEPTOR COMBINATIONS LESS THAN 1.0 METER OR 3*ZLB *
IN DISTANCE. CALCULATIONS MAY NOT BE PERFORMED.

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
H78	183.0	.0	-1.06
H78	213.5	.0	-7.68
H78	244.0	.0	.30
H78	152.5	30.5	-1.29
H78	183.0	30.5	-26.34
H78	213.5	30.5	-38.16
H78	244.0	30.5	-24.18
H78	152.5	61.0	-8.19
H78	183.0	61.0	-38.69
H78	213.5	61.0	-65.90
H78	244.0	61.0	-35.69
H78	274.5	61.0	-5.19
H78	152.5	91.5	-.38
H78	183.0	91.5	-24.89
H78	213.5	91.5	-36.17
H78	244.0	91.5	-22.80
H78	183.0	122.0	.74
H78	213.5	122.0	-5.68

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** AVERAGE SPEED FOR EACH WIND SPEED CATEGORY ***
(METERS/SEC)

1.50, 2.50, 4.30, 6.80, 9.50, 12.50,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** AVERAGE AMBIENT AIR TEMPERATURE (KELVIN) ***

	STABILITY CATEGORY A	STABILITY CATEGORY B	STABILITY CATEGORY C	STABILITY CATEGORY D	STABILITY CATEGORY E	STABILITY CATEGORY F
QUART1	270.3000	270.3000	270.3000	270.3000	270.3000	270.3000
QUART2	283.5000	283.5000	283.5000	283.5000	283.5000	283.5000
QUART3	291.3000	291.3000	291.3000	291.3000	291.3000	291.3000
QUART4	279.3000	279.3000	279.3000	279.3000	279.3000	279.3000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** AVERAGE MIXING LAYER HEIGHT (METERS) ***

QUART1

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY A	1427.0000	1427.0000	1427.0000	1427.0000	1427.0000	1427.0000
STABILITY CATEGORY B	951.0000	951.0000	951.0000	951.0000	951.0000	951.0000
STABILITY CATEGORY C	951.0000	951.0000	951.0000	951.0000	951.0000	951.0000
STABILITY CATEGORY D	834.0000	834.0000	834.0000	834.0000	834.0000	834.0000
STABILITY CATEGORY E	718.0000	718.0000	718.0000	718.0000	718.0000	718.0000
STABILITY CATEGORY F	718.0000	718.0000	718.0000	718.0000	718.0000	718.0000

QUART2

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY A	2420.0000	2420.0000	2420.0000	2420.0000	2420.0000	2420.0000
STABILITY CATEGORY B	1613.0000	1613.0000	1613.0000	1613.0000	1613.0000	1613.0000
STABILITY CATEGORY C	1613.0000	1613.0000	1613.0000	1613.0000	1613.0000	1613.0000
STABILITY CATEGORY D	1137.0000	1137.0000	1137.0000	1137.0000	1137.0000	1137.0000
STABILITY CATEGORY E	661.0000	661.0000	661.0000	661.0000	661.0000	661.0000
STABILITY CATEGORY F	661.0000	661.0000	661.0000	661.0000	661.0000	661.0000

QUART3

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY A	2304.0000	2304.0000	2304.0000	2304.0000	2304.0000	2304.0000
STABILITY CATEGORY B	1536.0000	1536.0000	1536.0000	1536.0000	1536.0000	1536.0000
STABILITY CATEGORY C	1536.0000	1536.0000	1536.0000	1536.0000	1536.0000	1536.0000
STABILITY CATEGORY D	1019.0000	1019.0000	1019.0000	1019.0000	1019.0000	1019.0000
STABILITY CATEGORY E	502.0000	502.0000	502.0000	502.0000	502.0000	502.0000
STABILITY CATEGORY F	502.0000	502.0000	502.0000	502.0000	502.0000	502.0000

QUART4

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY A	1380.0000	1380.0000	1380.0000	1380.0000	1380.0000	1380.0000
STABILITY CATEGORY B	920.0000	920.0000	920.0000	920.0000	920.0000	920.0000
STABILITY CATEGORY C	920.0000	920.0000	920.0000	920.0000	920.0000	920.0000
STABILITY CATEGORY D	810.0000	810.0000	810.0000	810.0000	810.0000	810.0000
STABILITY CATEGORY E	699.0000	699.0000	699.0000	699.0000	699.0000	699.0000
STABILITY CATEGORY F	699.0000	699.0000	699.0000	699.0000	699.0000	699.0000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART1: STABILITY CATEGORY A

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00282000	.00000000	.00000000	.00000000	.00000000	.00000000
22.500	.00282000	.00000000	.00000000	.00000000	.00000000	.00000000
45.000	.00190000	.00139000	.00000000	.00000000	.00000000	.00000000
67.500	.00142000	.00093000	.0000000C	.00000000	.00000000	.00000000
90.000	.00236000	.00046000	.00000000	.00000000	.00000000	.00000000
112.500	.00756000	.00231000	.00000000	.00000000	.00000000	.00000000
135.000	.00753000	.00093000	.00000000	.00000000	.00000000	.00000000
157.500	.00474000	.00231000	.00000000	.00000000	.00000000	.00000000
180.000	.00757000	.00324000	.00000000	.00000000	.00000000	.00000000
202.500	.00707000	.00139000	.00000000	.00000000	.00000000	.00000000
225.000	.00754000	.00139000	.00000000	.00000000	.00000000	.00000000
247.500	.00615000	.00231000	.00000000	.00000000	.00000000	.00000000
270.000	.00333000	.00278000	.00000000	.00000000	.00000000	.00000000
292.500	.00145000	.00231000	.00000000	.00000000	.00000000	.00000000
315.000	.00239000	.00231000	.00000000	.00000000	.00000000	.00000000
337.500	.00002000	.00139000	.00000000	.00000000	.00000000	.00000000

QUART1: STABILITY CATEGORY B

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00047000	.00000000	.00000000	.00000000	.00000000	.00000000
22.500	.00047000	.00000000	.00000000	.00000000	.00000000	.00000000
45.000	.00001000	.00046000	.00000000	.00000000	.00000000	.00000000
67.500	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
90.000	.00096000	.00139000	.00000000	.00000000	.00000000	.00000000
112.500	.00190000	.00185000	.00000000	.00000000	.00000000	.00000000
135.000	.00048000	.00093000	.00046000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00185000	.00000000	.00000000	.00000000
180.000	.00144000	.00231000	.00046000	.00000000	.00000000	.00000000
202.500	.00238000	.00231000	.00046000	.00000000	.00000000	.00000000
225.000	.00048000	.00093000	.00000000	.00000000	.00000000	.00000000
247.500	.00004000	.00278000	.00000000	.00000000	.00000000	.00000000
270.000	.00099000	.00370000	.00000000	.00000000	.00000000	.00000000
292.500	.00005000	.00324000	.00278000	.00000000	.00000000	.00000000
315.000	.00005000	.00324000	.00046000	.00000000	.00000000	.00000000
337.500	.00001000	.00093000	.00046000	.00000000	.00000000	.00000000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART1: STABILITY CATEGORY C

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
22.500	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
45.000	.00046000	.00046000	.00185000	.00000000	.00000000	.00000000
67.500	.00046000	.00185000	.00093000	.00000000	.00000000	.00000000
90.000	.00000000	.00417000	.00093000	.00000000	.00000000	.00000000
112.500	.00139000	.00324000	.00231000	.00000000	.00000000	.00000000
135.000	.00046000	.00000000	.00185000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00139000	.00000000	.00000000	.00000000
180.000	.00093000	.00324000	.00185000	.00000000	.00000000	.00000000
202.500	.00046000	.00741000	.00463000	.00000000	.00000000	.00000000
225.000	.00046000	.00231000	.00139000	.00000000	.00000000	.00000000
247.500	.00046000	.00231000	.00231000	.00000000	.00000000	.00000000
270.000	.00185000	.00463000	.01898000	.00370000	.00000000	.00000000
292.500	.00000000	.00417000	.01574000	.00093000	.00000000	.00000000
315.000	.00000000	.00093000	.00556000	.00093000	.00000000	.00000000
337.500	.00000000	.00000000	.00046000	.00000000	.00000000	.00000000

QUART1: STABILITY CATEGORY D

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00093000	.00046000	.00000000	.00000000	.00000000
22.500	.00001000	.00185000	.00000000	.00000000	.00000000	.00000000
45.000	.00095000	.00787000	.00463000	.00000000	.00000000	.00000000
67.500	.00099000	.02037000	.00463000	.00046000	.00000000	.00000000
90.000	.00282000	.01019000	.00602000	.00463000	.00000000	.00000000
112.500	.00234000	.00648000	.00185000	.00000000	.00000000	.00000000
135.000	.00000000	.00000000	.00046000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
180.000	.00140000	.00185000	.00093000	.00000000	.00000000	.00000000
202.500	.00652000	.00741000	.00463000	.00046000	.00000000	.00000000
225.000	.00189000	.01250000	.00556000	.00231000	.00000000	.00000000
247.500	.00283000	.01574000	.01019000	.01481000	.00000000	.00000000
270.000	.00193000	.02546000	.05370000	.04398000	.00231000	.00000000
292.500	.00006000	.02130000	.05509000	.03472000	.00000000	.00000000
315.000	.00001000	.00324000	.00648000	.00324000	.00000000	.00000000
337.500	.00001000	.00231000	.00139000	.00139000	.00000000	.00000000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART1: STABILITY CATEGORY E

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00093000	.00000000	.00000000	.00000000	.00000000
22.500	.00000000	.00139000	.00000000	.00000000	.00000000	.00000000
45.000	.00000000	.00185000	.00046000	.00000000	.00000000	.00000000
67.500	.00000000	.00278000	.00046000	.00000000	.00000000	.00000000
90.000	.00000000	.00231000	.00139000	.00000000	.00000000	.00000000
112.500	.00000000	.00278000	.00000000	.00000000	.00000000	.00000000
135.000	.00000000	.00046000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
180.000	.00000000	.00278000	.00000000	.00000000	.00000000	.00000000
202.500	.00000000	.00417000	.00000000	.00000000	.00000000	.00000000
225.000	.00000000	.00324000	.00000000	.00000000	.00000000	.00000000
247.500	.00000000	.00602000	.00093000	.00000000	.00000000	.00000000
270.000	.00000000	.01250000	.00093000	.00000000	.00000000	.00000000
292.500	.00000000	.00463000	.00231000	.00000000	.00000000	.00000000
315.000	.00000000	.00139000	.00046000	.00000000	.00000000	.00000000
337.500	.00000000	.00046000	.00000000	.00000000	.00000000	.00000000

QUART1: STABILITY CATEGORY F

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00635000	.00000000	.00000000	.00000000	.00000000	.00000000
22.500	.00455000	.00278000	.00000000	.00000000	.00000000	.00000000
45.000	.01129000	.00093000	.00000000	.00000000	.00000000	.00000000
67.500	.01276000	.00093000	.00000000	.00000000	.00000000	.00000000
90.000	.02359000	.00231000	.00000000	.00000000	.00000000	.00000000
112.500	.04069000	.00231000	.00000000	.00000000	.00000000	.00000000
135.000	.02603000	.00231000	.00000000	.00000000	.00000000	.00000000
157.500	.01860000	.00046000	.00000000	.00000000	.00000000	.00000000
180.000	.02348000	.00046000	.00000000	.00000000	.00000000	.00000000
202.500	.02305000	.00139000	.00000000	.00000000	.00000000	.00000000
225.000	.01628000	.00278000	.00000000	.00000000	.00000000	.00000000
247.500	.01633000	.00370000	.00000000	.00000000	.00000000	.00000000
270.000	.00728000	.00787000	.00000000	.00000000	.00000000	.00000000
292.500	.00561000	.00417000	.00000000	.00000000	.00000000	.00000000
315.000	.00401000	.00185000	.00000000	.00000000	.00000000	.00000000
337.500	.00548000	.00185000	.00000000	.00000000	.00000000	.00000000

SUM OF FREQUENCIES, FTOTAL = .99994

*** ISCLT2 - VERSION 92062 *** *** ALLENDALE SITE (SUMMER) *** 01/08/93
*** SOURCE = H78 LANDFILL *** 15:31:59
PAGE 11

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART1 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) .00	30.50	61.00	91.50	122.00	152.50	183.00	213.50	244.00
396.50	.000078	.000079	.000079	.000086	.000094	.000100	.000106	.000112	.000116
366.00	.000093	.000096	.000096	.000099	.000110	.000118	.000126	.000135	.000138
335.50	.000110	.000116	.000119	.000123	.000129	.000140	.000152	.000166	.000165
305.00	.000128	.000139	.000147	.000155	.000167	.000170	.000189	.000208	.000206
274.50	.000152	.000164	.000180	.000196	.000219	.000227	.000241	.000268	.000267
244.00	.000180	.000206	.000225	.000251	.000285	.000315	.000342	.000359	.000374
213.50	.000205	.000244	.000289	.000330	.000391	.000434	.000510	.000515	.000545
183.00	.000223	.000267	.000334	.000414	.000536	.000633	.000785	.000879	.000872
152.50	.000254	.000300	.000378	.000485	.000612	.000788	.001154	.001387	.001574
122.00	.000255	.000318	.000399	.000495	.000589	.000725	.000580	.000587	.000922
91.50	.000244	.000310	.000400	.000496	.000595	.000167	.000215	.000248	.000254
61.00	.000244	.000304	.000378	.000476	.000471	.000083	.000089	.000086	.000084
30.50	.000216	.000267	.000336	.000381	.000460	.000049	.000046	.000044	.000041
.00	.000183	.000224	.000270	.000325	.000281	.000222	.000028	.000027	.000025

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART1 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 274.50	305.00	335.50	366.00	396.50
396.50	.000117	.000117	.000113	.000106	.000098
366.00	.000139	.000137	.000131	.000121	.000111
335.50	.000167	.000162	.000155	.000140	.000127
305.00	.000205	.000202	.000183	.000163	.000146
274.50	.000265	.000253	.000219	.000191	.000167
244.00	.000353	.000319	.000269	.000234	.000202
213.50	.000490	.000429	.000349	.000292	.000243
183.00	.000741	.000610	.000459	.000360	.000280
152.50	.001139	.000830	.000587	.000432	.000330
122.00	.000892	.000812	.000621	.000470	.000362
91.50	.000396	.000682	.000596	.000467	.000355
61.00	.000083	.000519	.000506	.000411	.000339
30.50	.000209	.000476	.000402	.000358	.000290
.00	.000227	.000326	.000340	.000290	.000246

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE MAXIMUM 10 QUART1 AVERAGE CONCENTRATION VALUES FOR GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

** CONC OF CO IN MICROGRAMS/M**3 **

RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE			RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE		
1.	.001574	AT (	244.00,	152.50)	GC	6.	.000892	AT (	274.50,	122.00)	GC
2.	.001387	AT (	213.50,	152.50)	GC	7.	.000879	AT (	213.50,	183.00)	GC
3.	.001154	AT (	183.00,	152.50)	GC	8.	.000872	AT (	244.00,	183.00)	GC
4.	.001139	AT (	274.50,	152.50)	GC	9.	.000830	AT (	305.00,	152.50)	GC
5.	.000922	AT (	244.00,	122.00)	GC	10.	.000812	AT (	305.00,	122.00)	GC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART2: STABILITY CATEGORY A

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00147000	.00229000	.00000000	.00000000	.00000000	.00000000
22.500	.00244000	.00321000	.00000000	.00000000	.00000000	.00000000
45.000	.00290000	.00275000	.00000000	.00000000	.00000000	.00000000
67.500	.00433000	.00366000	.00000000	.00000000	.00000000	.00000000
90.000	.00957000	.00595000	.00000000	.00000000	.00000000	.00000000
112.500	.01195000	.00687000	.00000000	.00000000	.00000000	.00000000
135.000	.01092000	.00366000	.00000000	.00000000	.00000000	.00000000
157.500	.00759000	.00229000	.00000000	.00000000	.00000000	.00000000
180.000	.01290000	.00733000	.00000000	.00000000	.00000000	.00000000
202.500	.01047000	.00458000	.00000000	.00000000	.00000000	.00000000
225.000	.01094000	.00458000	.00000000	.00000000	.00000000	.00000000
247.500	.00818000	.00687000	.00000000	.00000000	.00000000	.00000000
270.000	.00405000	.01053000	.00000000	.00000000	.00000000	.00000000
292.500	.00440000	.00595000	.00000000	.00000000	.00000000	.00000000
315.000	.00253000	.00641000	.00000000	.00000000	.00000000	.00000000
337.500	.00251000	.00595000	.00000000	.00000000	.00000000	.00000000

QUART2: STABILITY CATEGORY B

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00049000	.00183000	.00046000	.00000000	.00000000	.00000000
22.500	.00048000	.00092000	.00000000	.00000000	.00000000	.00000000
45.000	.00002000	.00183000	.00000000	.00000000	.00000000	.00000000
67.500	.00143000	.00321000	.00000000	.00000000	.00000000	.00000000
90.000	.00191000	.00412000	.00092000	.00000000	.00000000	.00000000
112.500	.00332000	.00549000	.00229000	.00000000	.00000000	.00000000
135.000	.00139000	.00000000	.00000000	.00000000	.00000000	.00000000
157.500	.00048000	.00137000	.00046000	.00000000	.00000000	.00000000
180.000	.00053000	.00504000	.00275000	.00000000	.00000000	.00000000
202.500	.00055000	.00687000	.00092000	.00000000	.00000000	.00000000
225.000	.00188000	.00183000	.00092000	.00000000	.00000000	.00000000
247.500	.00054000	.00549000	.00137000	.00000000	.00000000	.00000000
270.000	.00052000	.00458000	.00687000	.00000000	.00000000	.00000000
292.500	.00148000	.00687000	.00641000	.00000000	.00000000	.00000000
315.000	.00006000	.00458000	.00366000	.00000000	.00000000	.00000000
337.500	.00002000	.00137000	.00366000	.00000000	.00000000	.00000000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART2: STABILITY CATEGORY C

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00046000	.00366000	.00046000	.00000000	.00000000
22.500	.00000000	.00046000	.00046000	.00000000	.00000000	.00000000
45.000	.00050000	.00412000	.00046000	.00000000	.00000000	.00000000
67.500	.00050000	.00412000	.00275000	.00000000	.00000000	.00000000
90.000	.00236000	.00595000	.00412000	.00046000	.00000000	.00000000
112.500	.00234000	.00321000	.00000000	.00000000	.00000000	.00000000
135.000	.00000000	.00046000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00046000	.00000000	.00000000	.00000000
180.000	.00049000	.00321000	.00641000	.00000000	.00000000	.00000000
202.500	.00142000	.00366000	.01007000	.00046000	.00000000	.00000000
225.000	.00094000	.00229000	.00595000	.00000000	.00000000	.00000000
247.500	.00003000	.00321000	.00824000	.00000000	.00000000	.00000000
270.000	.00006000	.00733000	.01419000	.00092000	.00000000	.00000000
292.500	.00002000	.00275000	.02152000	.00229000	.00000000	.00000000
315.000	.00047000	.00137000	.00824000	.00000000	.00000000	.00000000
337.500	.00000000	.00046000	.00504000	.00000000	.00000000	.00000000

QUART2: STABILITY CATEGORY D

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00001000	.00137000	.00092000	.00000000	.00000000	.00000000
22.500	.00000000	.00092000	.00046000	.00000000	.00000000	.00000000
45.000	.00050000	.01099000	.00458000	.00000000	.00000000	.00000000
67.500	.00004000	.00962000	.01282000	.00183000	.00000000	.00000000
90.000	.01016000	.01099000	.01328000	.00229000	.00000000	.00000000
112.500	.00186000	.00595000	.00046000	.00000000	.00000000	.00000000
135.000	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00046000	.00000000	.00000000	.00000000	.00000000
180.000	.00140000	.00412000	.00549000	.00000000	.00000000	.00000000
202.500	.00324000	.00595000	.00229000	.00092000	.00000000	.00000000
225.000	.00049000	.00733000	.00183000	.00046000	.00000000	.00000000
247.500	.00047000	.00275000	.00229000	.00046000	.00000000	.00000000
270.000	.00097000	.01282000	.02015000	.00778000	.00046000	.00000000
292.500	.00005000	.01328000	.01694000	.00687000	.00000000	.00000000
315.000	.00001000	.00275000	.00321000	.00137000	.00000000	.00000000
337.500	.00094000	.00412000	.00366000	.00046000	.00000000	.00000000

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART2: STABILITY CATEGORY E

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00092000	.00000000	.00000000	.00000000	.00000000
22.500	.00000000	.00046000	.00000000	.00000000	.00000000	.00000000
45.000	.00000000	.00275000	.00000000	.00000000	.00000000	.00000000
67.500	.00000000	.00000000	.00046000	.00000000	.00000000	.00000000
90.000	.00000000	.00275000	.00000000	.00000000	.00000000	.00000000
112.500	.00000000	.00229000	.00000000	.00000000	.00000000	.00000000
135.000	.00000000	.00046000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00092000	.00000000	.00000000	.00000000	.00000000
180.000	.00000000	.00183000	.00000000	.00000000	.00000000	.00000000
202.500	.00000000	.00412000	.00000000	.00000000	.00000000	.00000000
225.000	.00000000	.00321000	.00000000	.00000000	.00000000	.00000000
247.500	.00000000	.00183000	.00000000	.00000000	.00000000	.00000000
270.000	.00000000	.00458000	.00183000	.00000000	.00000000	.00000000
292.500	.00000000	.00366000	.00092000	.00000000	.00000000	.00000000
315.000	.00000000	.00137000	.00000000	.00000000	.00000000	.00000000
337.500	.00000000	.00275000	.00000000	.00000000	.00000000	.00000000

QUART2: STABILITY CATEGORY F

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00389000	.00137000	.00000000	.00000000	.00000000	.00000000
22.500	.00541000	.00321000	.00000000	.00000000	.00000000	.00000000
45.000	.01495000	.00275000	.00000000	.00000000	.00000000	.00000000
67.500	.02022000	.00275000	.00000000	.00000000	.00000000	.00000000
90.000	.05945000	.00275000	.00000000	.00000000	.00000000	.00000000
112.500	.06858000	.00366000	.00000000	.00000000	.00000000	.00000000
135.000	.02205000	.00092000	.00000000	.00000000	.00000000	.00000000
157.500	.01631000	.00092000	.00000000	.00000000	.00000000	.00000000
180.000	.01061000	.00183000	.00000000	.00000000	.00000000	.00000000
202.500	.01731000	.00183000	.00000000	.00000000	.00000000	.00000000
225.000	.01009000	.00092000	.00000000	.00000000	.00000000	.00000000
247.500	.00435000	.00092000	.00000000	.00000000	.00000000	.00000000
270.000	.00343000	.00183000	.00000000	.00000000	.00000000	.00000000
292.500	.00293000	.00137000	.00000000	.00000000	.00000000	.00000000
315.000	.00437000	.00137000	.00000000	.00000000	.00000000	.00000000
337.500	.00530000	.00092000	.00000000	.00000000	.00000000	.00000000

SUM OF FREQUENCIES, FTOTAL = 1.00009

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUARTZ AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) .00	30.50	61.00	91.50	122.00	152.50	183.00	213.50	244.00
396.50	.000077	.000073	.000069	.000074	.000079	.000083	.000086	.000089	.000092
366.00	.000098	.000094	.000089	.000086	.000093	.000099	.000103	.000108	.000109
335.50	.000122	.000121	.000118	.000115	.000111	.000118	.000125	.000134	.000132
305.00	.000148	.000154	.000154	.000153	.000154	.000144	.000157	.000169	.000165
274.50	.000189	.000192	.000201	.000206	.000215	.000207	.000201	.000219	.000215
244.00	.000247	.000264	.000274	.000285	.000298	.000307	.000307	.000295	.000296
213.50	.000305	.000347	.000389	.000420	.000461	.000456	.000489	.000434	.000427
183.00	.000352	.000408	.000489	.000584	.000714	.000749	.000848	.000788	.000683
152.50	.000415	.000483	.000586	.000728	.000903	.001088	.001362	.001393	.001264
122.00	.000426	.000522	.000644	.000789	.000942	.001065	.000846	.000746	.000757
91.50	.000415	.000512	.000642	.000782	.000950	.000261	.000307	.000308	.000257
61.00	.000419	.000510	.000621	.000767	.000817	.000110	.000113	.000105	.000096
30.50	.000366	.000440	.000540	.000633	.000769	.000063	.000057	.000052	.000050
.00	.000307	.000369	.000444	.000531	.000462	.000290	.000033	.000031	.000030

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART2 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 274.50	305.00	335.50	366.00	396.50
396.50	.000092	.000092	.000089	.000083	.000074
366.00	.000110	.000108	.000103	.000093	.000082
335.50	.000133	.000128	.000119	.000104	.000091
305.00	.000163	.000156	.000137	.000117	.000101
274.50	.000207	.000192	.000159	.000132	.000111
244.00	.000271	.000236	.000186	.000153	.000125
213.50	.000366	.000298	.000225	.000178	.000139
183.00	.000526	.000391	.000272	.000204	.000153
152.50	.000734	.000484	.000333	.000238	.000176
122.00	.000596	.000469	.000347	.000256	.000193
91.50	.000255	.000392	.000346	.000266	.000194
61.00	.000085	.000286	.000294	.000231	.000185
30.50	.000149	.000280	.000245	.000215	.000166
.00	.000200	.000231	.000216	.000179	.000147

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE MAXIMUM 10 QUARTZ AVERAGE CONCENTRATION VALUES FOR GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

** CONC OF CO IN MICROGRAMS/M**3 **

RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE			RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE		
1.	.001393	AT (	213.50,	152.50)	GC	6.	.000950	AT (	122.00,	91.50)	GC
2.	.001362	AT (	183.00,	152.50)	GC	7.	.000942	AT (	122.00,	122.00)	GC
3.	.001264	AT (	244.00,	152.50)	GC	8.	.000903	AT (	122.00,	152.50)	GC
4.	.001088	AT (	152.50,	152.50)	GC	9.	.000848	AT (	183.00,	183.00)	GC
5.	.001065	AT (	152.50,	122.00)	GC	10.	.000846	AT (	183.00,	122.00)	GC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART3: STABILITY CATEGORY A

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00186000	.00136000	.00000000	.00000000	.00000000	.00000000
22.500	.00280000	.00226000	.00000000	.00000000	.00000000	.00000000
45.000	.00511000	.00272000	.00000000	.00000000	.00000000	.00000000
67.500	.00787000	.00272000	.00000000	.00000000	.00000000	.00000000
90.000	.01154000	.00226000	.00000000	.00000000	.00000000	.00000000
112.500	.01893000	.00362000	.00000000	.00000000	.00000000	.00000000
135.000	.01294000	.00317000	.00000000	.00000000	.00000000	.00000000
157.500	.01339000	.00272000	.00000000	.00000000	.00000000	.00000000
180.000	.01432000	.00317000	.00000000	.00000000	.00000000	.00000000
202.500	.01028000	.00951000	.00000000	.00000000	.00000000	.00000000
225.000	.00937000	.00996000	.00000000	.00000000	.00000000	.00000000
247.500	.00658000	.00861000	.00000000	.00000000	.00000000	.00000000
270.000	.00430000	.00951000	.00000000	.00000000	.00000000	.00000000
292.500	.00465000	.00272000	.00000000	.00000000	.00000000	.00000000
315.000	.00144000	.00362000	.00000000	.00000000	.00000000	.00000000
337.500	.00235000	.00317000	.00000000	.00000000	.00000000	.00000000

QUART3: STABILITY CATEGORY B

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00001000	.00226000	.00181000	.00000000	.00000000	.00000000
22.500	.00183000	.00181000	.00000000	.00000000	.00000000	.00000000
45.000	.00138000	.00136000	.00000000	.00000000	.00000000	.00000000
67.500	.00138000	.00226000	.00000000	.00000000	.00000000	.00000000
90.000	.00320000	.00226000	.00000000	.00000000	.00000000	.00000000
112.500	.00229000	.00181000	.00000000	.00000000	.00000000	.00000000
135.000	.00091000	.00000000	.00000000	.00000000	.00000000	.00000000
157.500	.00183000	.00136000	.00091000	.00000000	.00000000	.00000000
180.000	.00138000	.00272000	.00136000	.00000000	.00000000	.00000000
202.500	.00280000	.01042000	.00136000	.00000000	.00000000	.00000000
225.000	.00094000	.00498000	.00272000	.00000000	.00000000	.00000000
247.500	.00139000	.00408000	.00136000	.00000000	.00000000	.00000000
270.000	.00005000	.00770000	.00589000	.00000000	.00000000	.00000000
292.500	.00003000	.00408000	.00498000	.00000000	.00000000	.00000000
315.000	.00047000	.00181000	.00362000	.00000000	.00000000	.00000000
337.500	.00002000	.00272000	.00091000	.00000000	.00000000	.00000000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4ORTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART3: STABILITY CATEGORY C

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00001000	.00136000	.00181000	.00000000	.00000000	.00000000
22.500	.00091000	.00000000	.00000000	.00000000	.00000000	.00000000
45.000	.00048000	.00317000	.00000000	.00000000	.00000000	.00000000
67.500	.00139000	.00272000	.00136000	.00000000	.00000000	.00000000
90.000	.00184000	.00181000	.00091000	.00000000	.00000000	.00000000
112.500	.00228000	.00045000	.00000000	.00000000	.00000000	.00000000
135.000	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00045000	.00000000	.00000000	.00000000
180.000	.00094000	.00408000	.00136000	.00000000	.00000000	.00000000
202.500	.00238000	.01404000	.01721000	.00000000	.00000000	.00000000
225.000	.00005000	.00634000	.00498000	.00045000	.00000000	.00000000
247.500	.00094000	.00317000	.00770000	.00045000	.00000000	.00000000
270.000	.00051000	.00770000	.02989000	.00000000	.00000000	.00000000
292.500	.00003000	.00408000	.02038000	.00091000	.00000000	.00000000
315.000	.00001000	.00091000	.00634000	.00000000	.00000000	.00000000
337.500	.00000000	.00045000	.00136000	.00000000	.00000000	.00000000

QUART3: STABILITY CATEGORY D

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00001000	.00226000	.00000000	.00000000	.00000000	.00000000
22.500	.00046000	.00045000	.00000000	.00000000	.00000000	.00000000
45.000	.00000000	.00045000	.00136000	.00000000	.00000000	.00000000
67.500	.00138000	.00317000	.00136000	.00000000	.00000000	.00000000
90.000	.00502000	.00136000	.00045000	.00000000	.00000000	.00000000
112.500	.00319000	.00000000	.00136000	.00000000	.00000000	.00000000
135.000	.00000000	.00000000	.00045000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
180.000	.00047000	.00272000	.00000000	.00000000	.00000000	.00000000
202.500	.00143000	.01132000	.00362000	.00000000	.00000000	.00000000
225.000	.00096000	.00906000	.00317000	.00091000	.00000000	.00000000
247.500	.00052000	.01087000	.00770000	.00091000	.00000000	.00000000
270.000	.00008000	.01449000	.00951000	.00091000	.00000000	.00000000
292.500	.00142000	.00906000	.01178000	.00000000	.00000000	.00000000
315.000	.00091000	.00045000	.00045000	.00000000	.00000000	.00000000
337.500	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR   FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317   UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD   NAME: PITTSFIELD
YEAR: 1991   YEAR: 1991

QUART3: STABILITY CATEGORY E

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00136000	.00000000	.00000000	.00000000	.00000000
22.500	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
45.000	.00000000	.00272000	.00045000	.00000000	.00000000	.00000000
67.500	.00000000	.00181000	.00000000	.00000000	.00000000	.00000000
90.000	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
112.500	.00000000	.00091000	.00000000	.00000000	.00000000	.00000000
135.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
180.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
202.500	.00000000	.00589000	.00000000	.00000000	.00000000	.00000000
225.000	.00000000	.00408000	.00000000	.00000000	.00000000	.00000000
247.500	.00000000	.00181000	.00000000	.00000000	.00000000	.00000000
270.000	.00000000	.00226000	.00000000	.00000000	.00000000	.00000000
292.500	.00000000	.00362000	.00000000	.00000000	.00000000	.00000000
315.000	.00000000	.00136000	.00000000	.00000000	.00000000	.00000000
337.500	.00000000	.00136000	.00000000	.00000000	.00000000	.00000000

QUART3: STABILITY CATEGORY F

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00903000	.00091000	.00000000	.00000000	.00000000	.00000000
22.500	.01335000	.00226000	.00000000	.00000000	.00000000	.00000000
45.000	.01428000	.00181000	.00000000	.00000000	.00000000	.00000000
67.500	.03219000	.00045000	.00000000	.00000000	.00000000	.00000000
90.000	.08045000	.00045000	.00000000	.00000000	.00000000	.00000000
112.500	.07809000	.00045000	.00000000	.00000000	.00000000	.00000000
135.000	.02518000	.00226000	.00000000	.00000000	.00000000	.00000000
157.500	.02470000	.00226000	.00000000	.00000000	.00000000	.00000000
180.000	.01849000	.00091000	.00000000	.00000000	.00000000	.00000000
202.500	.02180000	.00091000	.00000000	.00000000	.00000000	.00000000
225.000	.01757000	.00136000	.00000000	.00000000	.00000000	.00000000
247.500	.00627000	.00272000	.00000000	.00000000	.00000000	.00000000
270.000	.00578000	.00226000	.00000000	.00000000	.00000000	.00000000
292.500	.00956000	.00226000	.00000000	.00000000	.00000000	.00000000
315.000	.00621000	.00136000	.00000000	.00000000	.00000000	.00000000
337.500	.00479000	.00136000	.00000000	.00000000	.00000000	.00000000

SUM OF FREQUENCIES, FTOTAL = .99996

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART3 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) .00	30.50	61.00	91.50	122.00	152.50	183.00	213.50	244.00
396.50	.000096	.000094	.000092	.000099	.000106	.000111	.000113	.000116	.000120
366.00	.000117	.000117	.000114	.000114	.000124	.000131	.000136	.000142	.000143
335.50	.000143	.000146	.000145	.000147	.000147	.000157	.000164	.000175	.000173
305.00	.000171	.000181	.000185	.000190	.000197	.000190	.000207	.000222	.000218
274.50	.000215	.000221	.000235	.000248	.000268	.000265	.000265	.000287	.000284
244.00	.000277	.000300	.000314	.000333	.000360	.000383	.000393	.000388	.000394
213.50	.000339	.000388	.000438	.000479	.000538	.000550	.000610	.000567	.000570
183.00	.000391	.000455	.000548	.000655	.000813	.000872	.001014	.001007	.000913
152.50	.000462	.000540	.000657	.000820	.001014	.001231	.001595	.001701	.001593
122.00	.000476	.000585	.000726	.000892	.001058	.001201	.000984	.000808	.000847
91.50	.000462	.000572	.000719	.000887	.001057	.000291	.000348	.000345	.000281
61.00	.000466	.000565	.000684	.000841	.000905	.000123	.000132	.000125	.000106
30.50	.000405	.000488	.000599	.000701	.000834	.000072	.000072	.000067	.000057
.00	.000341	.000410	.000493	.000589	.000520	.000337	.000045	.000042	.000036

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART3 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 274.50	305.00	335.50	366.00	396.50
396.50	.000121	.000122	.000119	.000112	.000102
366.00	.000145	.000144	.000138	.000126	.000113
335.50	.000176	.000171	.000162	.000143	.000127
305.00	.000217	.000211	.000188	.000163	.000142
274.50	.000278	.000261	.000220	.000185	.000157
244.00	.000367	.000324	.000259	.000213	.000176
213.50	.000501	.000409	.000311	.000245	.000191
183.00	.000721	.000528	.000365	.000272	.000203
152.50	.000982	.000624	.000423	.000303	.000223
122.00	.000708	.000572	.000428	.000317	.000238
91.50	.000292	.000461	.000420	.000320	.000232
61.00	.000085	.000317	.000341	.000268	.000215
30.50	.000162	.000305	.000259	.000240	.000188
.00	.000193	.000225	.000225	.000189	.000159

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE MAXIMUM 10 QUART3 AVERAGE CONCENTRATION VALUES FOR GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

** CONC OF CO IN MICROGRAMS/M**3 **

RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE	RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE
1.	.001701	AT (	213.50, 152.50) GC	6.	.001058	AT (	122.00, 122.00) GC
2.	.001595	AT (	183.00, 152.50) GC	7.	.001057	AT (	122.00, 91.50) GC
3.	.001593	AT (	244.00, 152.50) GC	8.	.001014	AT (	183.00, 183.00) GC
4.	.001231	AT (	152.50, 152.50) GC	9.	.001014	AT (	122.00, 152.50) GC
5.	.001201	AT (	152.50, 122.00) GC	10.	.001007	AT (	213.50, 183.00) GC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART4: STABILITY CATEGORY A

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00226000	.00045000	.00000000	.00000000	.00000000	.00000000
22.500	.00226000	.00091000	.00000000	.00000000	.00000000	.00000000
45.000	.00181000	.00362000	.00000000	.00000000	.00000000	.00000000
67.500	.00317000	.00091000	.00000000	.00000000	.00000000	.00000000
90.000	.00498000	.00000000	.00000000	.00000000	.00000000	.00000000
112.500	.01268000	.00045000	.00000000	.00000000	.00000000	.00000000
135.000	.00770000	.00091000	.00000000	.00000000	.00000000	.00000000
157.500	.00498000	.00045000	.00000000	.00000000	.00000000	.00000000
180.000	.01178000	.00091000	.00000000	.00000000	.00000000	.00000000
202.500	.00815000	.00091000	.00000000	.00000000	.00000000	.00000000
225.000	.00815000	.00317000	.00000000	.00000000	.00000000	.00000000
247.500	.00589000	.00091000	.00000000	.00000000	.00000000	.00000000
270.000	.00408000	.00543000	.00000000	.00000000	.00000000	.00000000
292.500	.00362000	.00317000	.00000000	.00000000	.00000000	.00000000
315.000	.00226000	.00000000	.00000000	.00000000	.00000000	.00000000
337.500	.00181000	.00091000	.00000000	.00000000	.00000000	.00000000

QUART4: STABILITY CATEGORY B

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00091000	.00226000	.00136000	.00000000	.00000000	.00000000
22.500	.00045000	.00136000	.00045000	.00000000	.00000000	.00000000
45.000	.00091000	.00317000	.00000000	.00000000	.00000000	.00000000
67.500	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
90.000	.00045000	.00000000	.00000000	.00000000	.00000000	.00000000
112.500	.00091000	.00136000	.00045000	.00000000	.00000000	.00000000
135.000	.00045000	.00045000	.00045000	.00000000	.00000000	.00000000
157.500	.00045000	.00000000	.00091000	.00000000	.00000000	.00000000
180.000	.00226000	.00272000	.00045000	.00000000	.00000000	.00000000
202.500	.00272000	.00362000	.00136000	.00000000	.00000000	.00000000
225.000	.00045000	.00136000	.00045000	.00000000	.00000000	.00000000
247.500	.00000000	.00181000	.00000000	.00000000	.00000000	.00000000
270.000	.00045000	.00408000	.00317000	.00000000	.00000000	.00000000
292.500	.00045000	.00317000	.00181000	.00000000	.00000000	.00000000
315.000	.00000000	.00181000	.00136000	.00000000	.00000000	.00000000
337.500	.00000000	.00091000	.00226000	.00000000	.00000000	.00000000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR   FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317   UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD   NAME: PITTSFIELD
YEAR: 1991   YEAR: 1991

QUART4: STABILITY CATEGORY C

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00136000	.00045000	.00000000	.00000000	.00000000
22.500	.00045000	.00000000	.00000000	.00000000	.00000000	.00000000
45.000	.00000000	.00181000	.00272000	.00000000	.00000000	.00000000
67.500	.00000000	.00181000	.00091000	.00045000	.00000000	.00000000
90.000	.00136000	.00045000	.00000000	.00000000	.00000000	.00000000
112.500	.00136000	.00091000	.00091000	.00000000	.00000000	.00000000
135.000	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
180.000	.00000000	.00226000	.00362000	.00000000	.00000000	.00000000
202.500	.00181000	.01404000	.00634000	.00181000	.00000000	.00000000
225.000	.00136000	.00408000	.00091000	.00000000	.00000000	.00000000
247.500	.00091000	.00317000	.00272000	.00000000	.00000000	.00000000
270.000	.00000000	.00362000	.01223000	.00045000	.00000000	.00000000
292.500	.00000000	.00181000	.00861000	.00091000	.00000000	.00000000
315.000	.00045000	.00045000	.00317000	.00000000	.00000000	.00000000
337.500	.00000000	.00091000	.00498000	.00000000	.00000000	.00000000

QUART4: STABILITY CATEGORY D

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00226000	.00091000	.00000000	.00000000	.00000000
22.500	.00000000	.00045000	.00091000	.00000000	.00000000	.00000000
45.000	.00000000	.00453000	.00226000	.00091000	.00000000	.00000000
67.500	.00000000	.00543000	.01042000	.00226000	.00000000	.00000000
90.000	.00317000	.00272000	.00226000	.00000000	.00000000	.00000000
112.500	.00181000	.00362000	.00226000	.00000000	.00000000	.00000000
135.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
157.500	.00000000	.00000000	.00000000	.00000000	.00000000	.00000000
180.000	.00091000	.00226000	.00091000	.00000000	.00000000	.00000000
202.500	.00453000	.02174000	.01223000	.00226000	.00000000	.00000000
225.000	.00272000	.01268000	.00815000	.00181000	.00000000	.00000000
247.500	.00317000	.00634000	.01087000	.00725000	.00000000	.00000000
270.000	.00317000	.02219000	.03170000	.01676000	.00000000	.00000000
292.500	.00091000	.01857000	.04121000	.01359000	.00000000	.00000000
315.000	.00000000	.00317000	.00498000	.00091000	.00000000	.00000000
337.500	.00000000	.00634000	.00906000	.00136000	.00000000	.00000000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY ***

FILE: 4QRTS.STR FORMAT: (7X,6F7.5)
SURFACE STATION NO.: 10317 UPPER AIR STATION NO.: 10317
NAME: PITTSFIELD NAME: PITTSFIELD
YEAR: 1991 YEAR: 1991

QUART4: STABILITY CATEGORY E

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
22.500	.00000000	.00317000	.00000000	.00000000	.00000000	.00000000
45.000	.00000000	.00045000	.00000000	.00000000	.00000000	.00000000
67.500	.00000000	.00091000	.00000000	.00000000	.00000000	.00000000
90.000	.00000000	.00272000	.00045000	.00000000	.00000000	.00000000
112.500	.00000000	.00181000	.00045000	.00000000	.00000000	.00000000
135.000	.00000000	.00181000	.00091000	.00000000	.00000000	.00000000
157.500	.00000000	.00181000	.00000000	.00000000	.00000000	.00000000
180.000	.00000000	.00226000	.00000000	.00000000	.00000000	.00000000
202.500	.00000000	.00362000	.00000000	.00000000	.00000000	.00000000
225.000	.00000000	.00091000	.00000000	.00000000	.00000000	.00000000
247.500	.00000000	.00136000	.00091000	.00000000	.00000000	.00000000
270.000	.00000000	.00861000	.00136000	.00000000	.00000000	.00000000
292.500	.00000000	.00634000	.00136000	.00000000	.00000000	.00000000
315.000	.00000000	.00317000	.00045000	.00000000	.00000000	.00000000
337.500	.00000000	.00317000	.00000000	.00000000	.00000000	.00000000

QUART4: STABILITY CATEGORY F

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (1.500 M/S)	WIND SPEED CATEGORY 2 (2.500 M/S)	WIND SPEED CATEGORY 3 (4.300 M/S)	WIND SPEED CATEGORY 4 (6.800 M/S)	WIND SPEED CATEGORY 5 (9.500 M/S)	WIND SPEED CATEGORY 6 (12.500 M/S)
.000	.00804000	.00136000	.00000000	.00000000	.00000000	.00000000
22.500	.01147000	.00498000	.00000000	.00000000	.00000000	.00000000
45.000	.01002000	.00408000	.00000000	.00000000	.00000000	.00000000
67.500	.01037000	.00091000	.00000000	.00000000	.00000000	.00000000
90.000	.03618000	.00000000	.00000000	.00000000	.00000000	.00000000
112.500	.05126000	.00091000	.00000000	.00000000	.00000000	.00000000
135.000	.03763000	.00091000	.00000000	.00000000	.00000000	.00000000
157.500	.03155000	.00181000	.00000000	.00000000	.00000000	.00000000
180.000	.02778000	.00136000	.00000000	.00000000	.00000000	.00000000
202.500	.02924000	.00272000	.00000000	.00000000	.00000000	.00000000
225.000	.01705000	.00362000	.00000000	.00000000	.00000000	.00000000
247.500	.01568000	.00453000	.00000000	.00000000	.00000000	.00000000
270.000	.01754000	.00408000	.00000000	.00000000	.00000000	.00000000
292.500	.01239000	.00453000	.00000000	.00000000	.00000000	.00000000
315.000	.01044000	.00272000	.00000000	.00000000	.00000000	.00000000
337.500	.00715000	.00272000	.00000000	.00000000	.00000000	.00000000

SUM OF FREQUENCIES, FTOTAL = 1.00000

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART4 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) .00	30.50	61.00	91.50	122.00	152.50	183.00	213.50	244.00
396.50	.000110	.000113	.000116	.000125	.000133	.000139	.000144	.000147	.000151
366.00	.000129	.000134	.000138	.000144	.000156	.000165	.000171	.000179	.000179
335.50	.000150	.000159	.000166	.000176	.000185	.000197	.000207	.000220	.000215
305.00	.000171	.000188	.000201	.000216	.000236	.000239	.000259	.000276	.000268
274.50	.000200	.000217	.000241	.000267	.000304	.000315	.000330	.000356	.000347
244.00	.000231	.000267	.000294	.000334	.000386	.000431	.000463	.000478	.000480
213.50	.000259	.000311	.000370	.000428	.000516	.000584	.000681	.000684	.000691
183.00	.000278	.000335	.000421	.000525	.000689	.000828	.001039	.001147	.001073
152.50	.000308	.000366	.000462	.000592	.000762	.000981	.001492	.001723	.001845
122.00	.000299	.000376	.000475	.000589	.000721	.000874	.000670	.000657	.001034
91.50	.000276	.000354	.000459	.000574	.000661	.000166	.000245	.000321	.000339
61.00	.000268	.000333	.000411	.000520	.000501	.000088	.000113	.000128	.000132
30.50	.000227	.000286	.000367	.000410	.000480	.000060	.000067	.000072	.000070
.00	.000187	.000233	.000284	.000350	.000305	.000237	.000044	.000045	.000044

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE QUART4 AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 274.50	305.00	335.50	366.00	396.50
396.50	.000151	.000150	.000144	.000134	.000119
366.00	.000179	.000175	.000166	.000149	.000132
335.50	.000215	.000207	.000192	.000168	.000148
305.00	.000263	.000253	.000222	.000190	.000164
274.50	.000335	.000311	.000258	.000216	.000182
244.00	.000439	.000382	.000305	.000253	.000212
213.50	.000595	.000490	.000377	.000303	.000244
183.00	.000863	.000659	.000469	.000361	.000276
152.50	.001222	.000841	.000588	.000428	.000322
122.00	.000983	.000824	.000622	.000464	.000354
91.50	.000431	.000686	.000611	.000475	.000353
61.00	.000124	.000518	.000517	.000414	.000337
30.50	.000244	.000496	.000429	.000376	.000298
.00	.000306	.000381	.000372	.000314	.000262

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE MAXIMUM 10 QUART4 AVERAGE CONCENTRATION VALUES FOR GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

** CONC OF CO IN MICROGRAMS/M**3 **

RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE			RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE		
1.	.001845	AT (	244.00,	152.50)	GC	6.	.001073	AT (	244.00,	183.00)	GC
2.	.001723	AT (	213.50,	152.50)	GC	7.	.001039	AT (	183.00,	183.00)	GC
3.	.001492	AT (	183.00,	152.50)	GC	8.	.001034	AT (	244.00,	122.00)	GC
4.	.001222	AT (	274.50,	152.50)	GC	9.	.000983	AT (	274.50,	122.00)	GC
5.	.001147	AT (	213.50,	183.00)	GC	10.	.000981	AT (	152.50,	152.50)	GC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE PERIOD AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) .00	30.50	61.00	91.50	122.00	152.50	183.00	213.50	244.00
396.50	.000090	.000090	.000089	.000096	.000103	.000108	.000112	.000116	.000120
366.00	.000109	.000110	.000109	.000111	.000121	.000128	.000134	.000141	.000142
335.50	.000131	.000136	.000137	.000140	.000143	.000153	.000162	.000174	.000171
305.00	.000155	.000165	.000172	.000178	.000188	.000186	.000203	.000219	.000215
274.50	.000189	.000199	.000214	.000230	.000251	.000254	.000259	.000282	.000278
244.00	.000234	.000259	.000277	.000301	.000332	.000359	.000376	.000380	.000386
213.50	.000277	.000323	.000371	.000414	.000476	.000506	.000573	.000550	.000558
183.00	.000311	.000366	.000448	.000545	.000688	.000771	.000921	.000955	.000885
152.50	.000360	.000422	.000521	.000656	.000823	.001022	.001401	.001551	.001569
122.00	.000364	.000450	.000561	.000691	.000828	.000966	.000770	.000700	.000890
91.50	.000349	.000437	.000555	.000685	.000816	.000221	.000279	.000305	.000283
61.00	.000349	.000428	.000523	.000651	.000673	.000101	.000112	.000111	.000104
30.50	.000304	.000370	.000460	.000531	.000636	.000061	.000061	.000059	.000055
.00	.000255	.000309	.000373	.000449	.000392	.000271	.000037	.000036	.000034

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE PERIOD AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

*** NETWORK ID: CG1 ; NETWORK TYPE: GRIDCART ***

** CONC OF CO IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 274.50	305.00	335.50	366.00	396.50
396.50	.000121	.000120	.000116	.000109	.000098
366.00	.000143	.000141	.000134	.000122	.000110
335.50	.000173	.000167	.000157	.000138	.000123
305.00	.000212	.000206	.000183	.000158	.000138
274.50	.000271	.000254	.000214	.000181	.000154
244.00	.000358	.000315	.000255	.000213	.000179
213.50	.000488	.000407	.000315	.000255	.000204
183.00	.000713	.000547	.000391	.000299	.000228
152.50	.001019	.000695	.000482	.000350	.000263
122.00	.000795	.000669	.000505	.000377	.000286
91.50	.000344	.000555	.000493	.000382	.000284
61.00	.000094	.000410	.000415	.000331	.000269
30.50	.000191	.000389	.000334	.000297	.000236
.00	.000232	.000291	.000288	.000243	.000204

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** THE MAXIMUM 10 PERIOD AVERAGE CONCENTRATION VALUES FOR GROUP: ALL ***
INCLUDING SOURCE(S): H78 , A78 , B78 , C78 ,

** CONC OF CO IN MICROGRAMS/M**3 **

RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE			RANK	CONC	AT	RECEPTOR (XR,YR) OF TYPE		
1.	.001569	AT (	244.00,	152.50)	GC	6.	.000966	AT (	152.50,	122.00)	GC
2.	.001551	AT (	213.50,	152.50)	GC	7.	.000955	AT (	213.50,	183.00)	GC
3.	.001401	AT (	183.00,	152.50)	GC	8.	.000921	AT (	183.00,	183.00)	GC
4.	.001022	AT (	152.50,	152.50)	GC	9.	.000890	AT (	244.00,	122.00)	GC
5.	.001019	AT (	274.50,	152.50)	GC	10.	.000885	AT (	244.00,	183.00)	GC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC URBAN FLAT NOSTD

*** Message Summary For ISC2 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 0 Informational Message(s)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

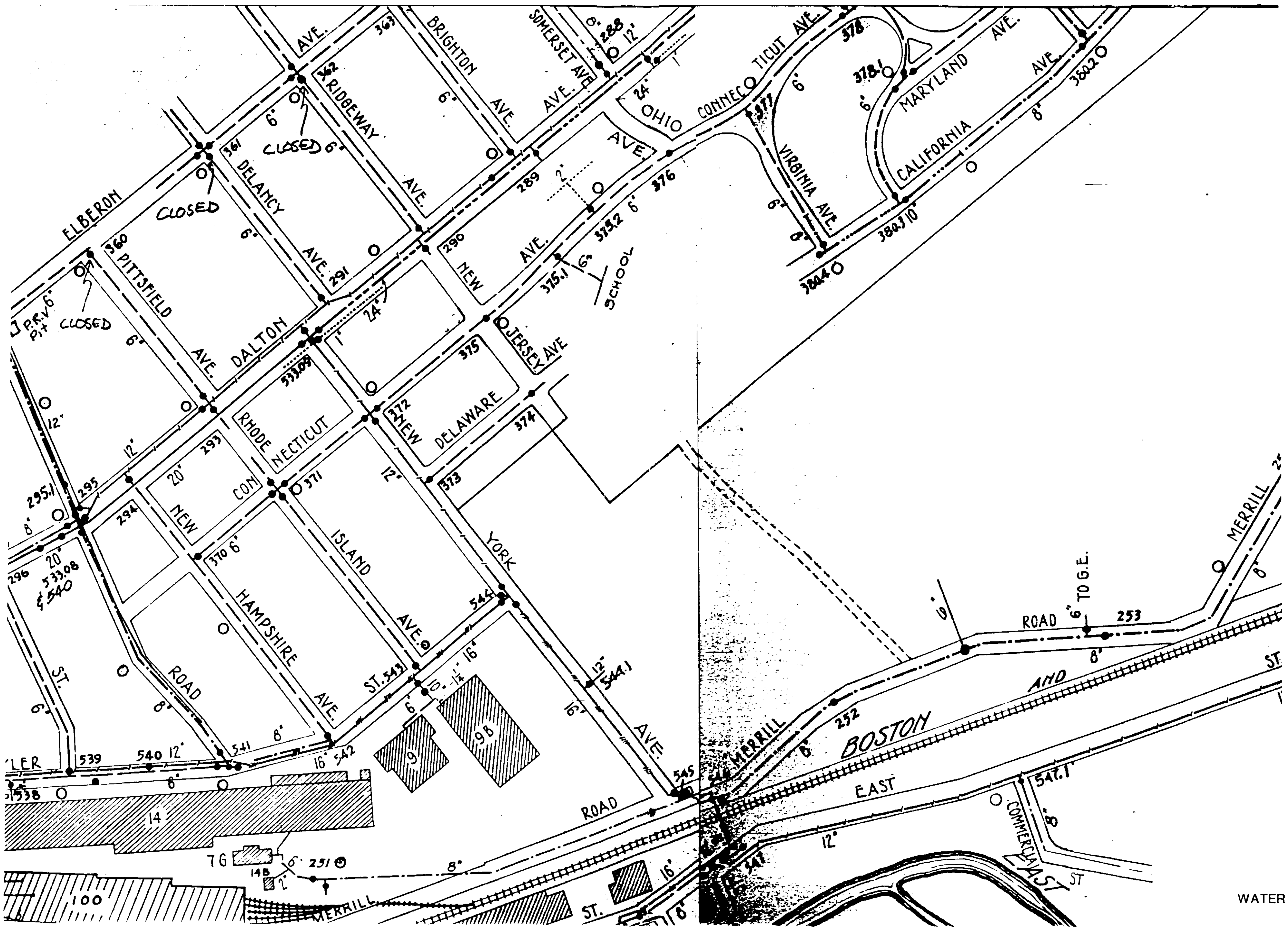
****
*** ISCLT2 Finishes Successfully ***
****

APPENDIX D

SITE UTILITY MAPS

APPENDIX D-1

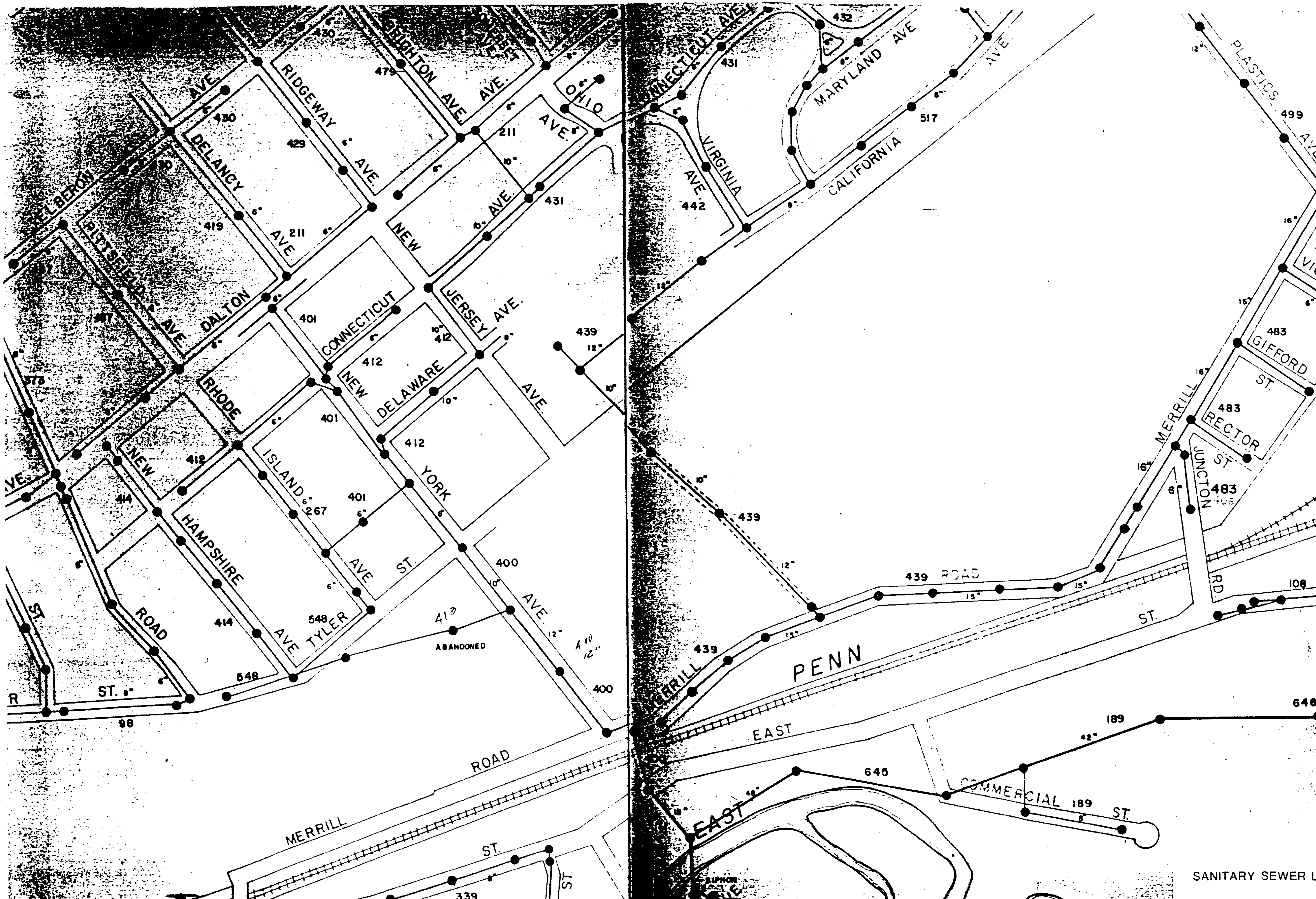
WATER DISTRIBUTION MAINS


ELBERON
DELANCY AVE.
PITTSFIELD AVE.
RIDGEWAY AVE.
BRIGHTON AVE.
SOMERSET AVE.
DALTON AVE.
OHIO AVE.
CONNECTICUT AVE.
VIRGINIA AVE.
MARYLAND AVE.
CALIFORNIA AVE.
NEW JERSEY AVE.
NEW DELAWARE
RHODE
NECTICUT
NEW CON
ISLAND AVE.
HAMPSHIRE AVE.
NEW YORK AVE.
ROAD
ST.
SCHOOL
CLOSED
P.R.V. Pit
MERRILL ROAD
TO G.E.
BOSTON AND
EAST ST.
COMMERCIAL
MERRILL
14
9
9B
100
7G
14B

WATER MAINS

APPENDIX D-2

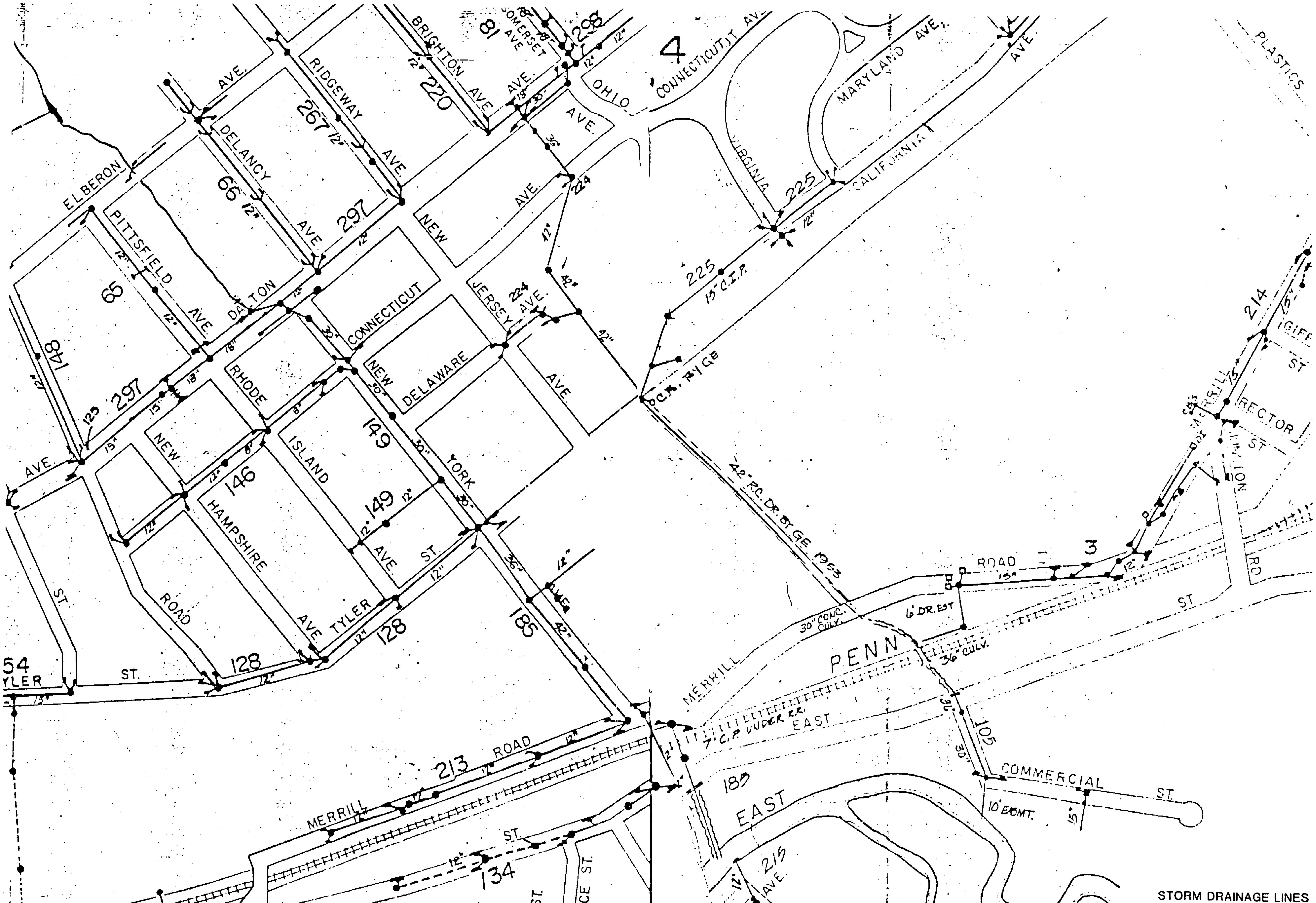
SANITARY SEWER LINES

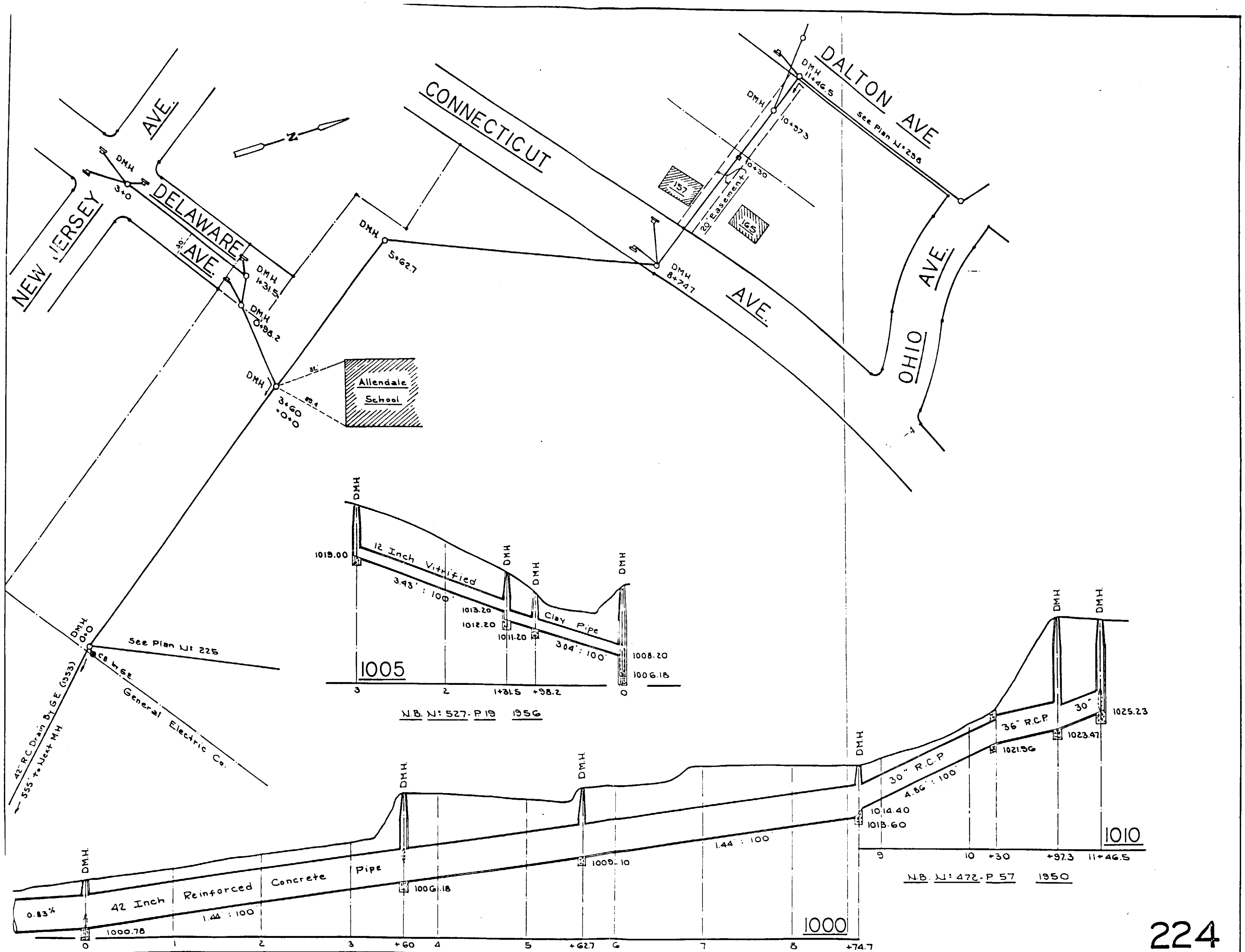


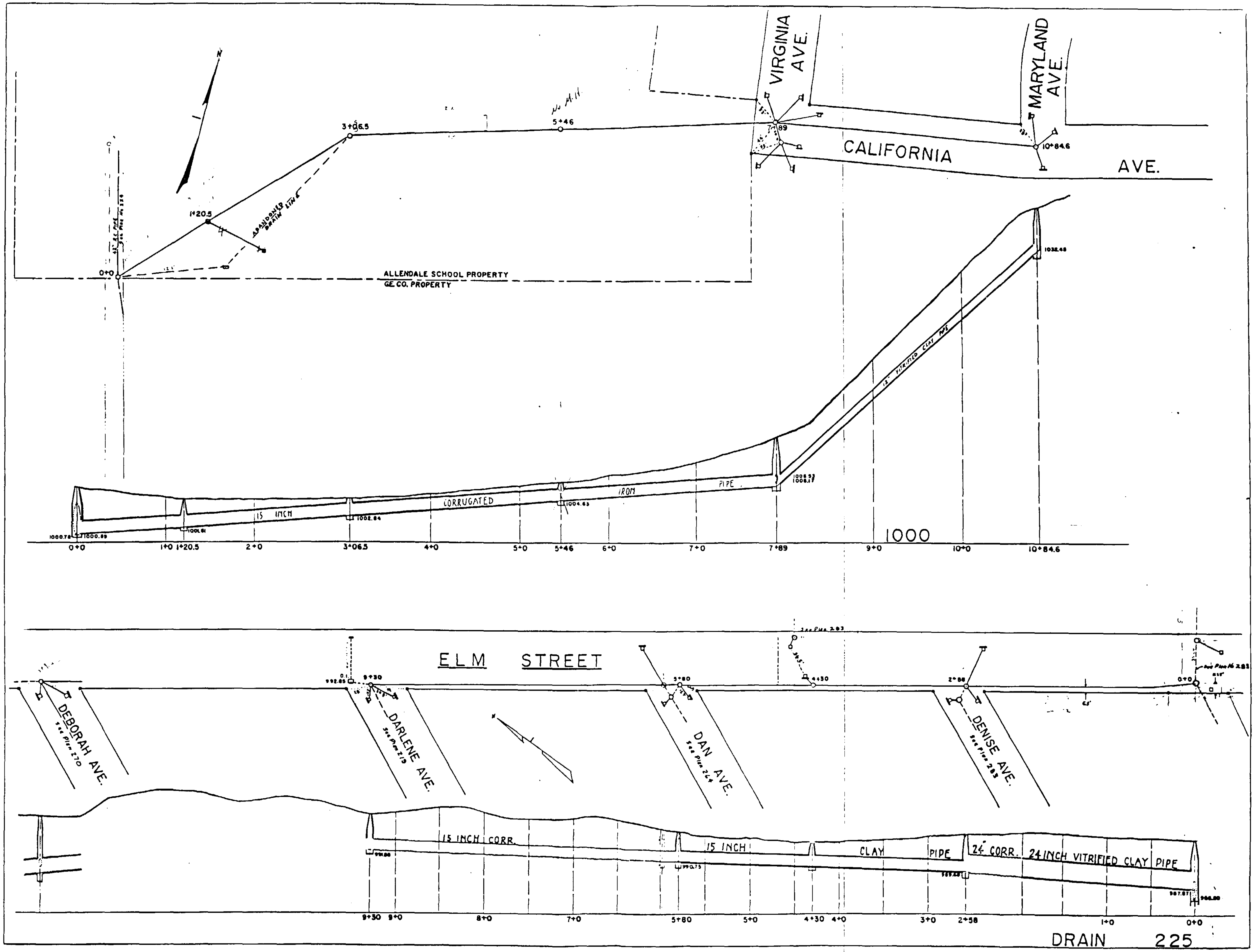
SANITARY SEWER LINES

APPENDIX D-3

STORM DRAINAGE LINES


BRIGHTON AVE
RIDGEWAY AVE
DELANCY AVE
PITTSFIELD AVE
ELBERON AVE
DALTON AVE
CONNECTICUT AVE
NEW JERSEY AVE
NEW YORK AVE
RHODE ISLAND AVE
NEW HAMPSHIRE AVE
DELAWARE AVE
OHIO AVE
MARYLAND AVE
VIRGINIA
CALIFORNIA
PLASTICS
RECTOR ST
MERRILL ROAD
PENN ST
EAST ST
COMMERCIAL ST
TYLER ST
42" R.C. DR. BY GE 1953
30" CONC. CULV.
6' DR. EST
36" CULV.
7' C.P. UNDER R.R.
10' ESMT.
STORM DRAINAGE LINES


NEW JERSEY AVE.
DELAWARE AVE.
CONNECTICUT AVE.
DALTON AVE
OHIO AVE.
N
DMH 3+0
DMH 1+31.5
DMH 0+98.2
DMH 3+60 =0+0
DMH 5+62.7
DMH 8+747
DMH 10+30
DMH 10+97.3
DMH 11+46.5
See Plan No 296
20' Easement
157
165
Allendale School
DMH 0+0
See Plan No 225
CB by G.E.
General Electric Co.
42" R.C. Drain By G.E. (1953)
555' to Next M.H.
DMH
12 Inch Vitrified Clay Pipe
3.43' : 100'
3.04' : 100'
1019.00
1013.20
1012.20
1011.20
1008.20
1006.18
1005
3
2
1+31.5
+98.2
0
N.B. No 527 - P.19 1956
42 Inch Reinforced Concrete Pipe
0.83%
1.44 : 100
1.44' : 100
1000.78
1006.18
1009.10
1014.40
1018.60
1000
0
1
2
3
+60
4
5
+62.7
6
7
8
+74.7
30" R.C.P.
4.86' : 100'
36" R.C.P.
30"
1021.96
1023.47
1025.23
1010
9
10
+30
+97.3
11+46.5
N.B. No 472 - P.57 1950


VIRGINIA AVE.
MARYLAND AVE.
CALIFORNIA AVE.
3+06.5
5+46
7+89
10+84.6
1+20.5
0+0
ABANDONED DRAIN LINE
ALLENDALE SCHOOL PROPERTY
GE CO. PROPERTY
15 INCH CORRUGATED IRON PIPE
12" VITRIFIED CLAY PIPE
1000
1032.48
1006.93
1006.17
1004.63
1002.84
1001.61
1000.78
1000.89
0+0
1+0
1+20.5
2+0
3+06.5
4+0
5+0
5+46
6+0
7+0
7+89
9+0
10+0
10+84.6
ELM STREET
DEBORAH AVE.
DARLENE AVE.
DAN AVE.
DENISE AVE.
9+30
5+80
4+30
2+58
0+0
15 INCH CORR.
15 INCH CLAY PIPE
24" CORR.
24 INCH VITRIFIED CLAY PIPE
9+30
9+0
8+0
7+0
5+80
5+0
4+30
4+0
3+0
2+58
1+0
0+0

DRAIN 225

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006

Laboratory Sample Number: 914283.2 **Date Received:** 07/05/91

Sample Matrix: Solid (results are reported on a dry weight basis) **Date Reported:** 07/19/91

Condition of Samples: Satisfactory **Field Prep:** None

Number & Type of Containers: Four glass jars and four VOA vials

Analysis Requested: Analysis as listed below (Organophosphorus Pesticides and 8280 analysis to follow)

CONTINUED

PARAMETER	RESULT	UNITS	MDL**	REF*	METHOD	DATES EXT/PREP	DATES ANALYSIS
Volatile Organics ***							
Tetrachloroethene	1.9	ug/Kg	**	1	8260	----	07/17/91
Trichloroethene	1.2	ug/Kg	**	1	8260	----	07/17/91

Volatile Organics	% Surrogate Recovery
1,2-Dichloroethane-d4	108%
Toluene-d8	101%
4-Bromofluorobenzene	80%

COMMENTS:
* Complete list of References found in Addendum I
** A list of volatile organics analyzed for and their detection limits accompanies this report.
*** All compounds were below the detection limits except those listed above.

APPENDIX E

1950 CORRESPONDENCE RELATED TO DONATION OF FILL MATERIAL

ATTORNEY/CLIENT
PRIVILEGE
INFORMATION

May 10, 1950

City of Pittsfield
County of Berkshire
Commonwealth of Massachusetts

Gentlemen:

In connection with the removal of fill from our land which you wish for your recently acquired school property, it would seem advisable to reach an understanding as to the terms of the removal of the fill.

Accordingly, General Electric hereby give the City of Pittsfield a license to enter upon the following described premises to remove approximately 40,000 yards of fill:

<u>Northerly</u> by a portion of the northerly line of land conveyed to the General Electric Company by the Pittsfield Industrial Development Company by deed dated February 13, 1927, and recorded in the Berkshire Middle District Registry of Deeds in Book 434, Page 573, said line being also the southerly line of the land of said City of Pittsfield;

<u>Easterly</u> by a line which is paralled to and about one thousand four hundred fifty (1450) feet easterly from the easterly line of New York Avenue;

<u>Southerly</u> by a line which is parallel to and two hundred fifty (250) feet southerly of the first line above described; and

<u>Westerly</u> by a line which is parallal to and about eight hundred (800) feet easterly from the easterly line of said New York Avenue.

The depth to which the property shall be excavated shall be specifically determined by General Electric prior to the time work is started, and, in addition, the above described premises shall be left substantially level at approximately the grade determined by General Electric.

ATTORNEY/CLIENT
PRIVILEGE

ATTORNEY/CLIENT
PRIVILEGE
INFORMATION

May 10, 1950

Mr. Francis J. Quirico
City Solicitor
43 East Street
Pittsfield, Massachusetts

Dear Sir:

We are returning herewith, as per our telephone conversation, the two copies of the proposed agreement relative to the General Electric Company furnishing the City of Pittsfield fill for the proposed school.

The copies of the letter form agreement, which we spoke to you about, you will receive in the near future.

Yours very truly,

H.G. Kenyon,
PLANT ENGINEERING SECTION

By: Paul W. Terry

PWT:SC

Enclosures (2)

cc: HGK - file

ATTORNEY/CLIENT
PRIVILEGE
INFORMATION

While removing the fill the City of Pittsfield or its officers, agents, servants, or independent contractors shall have the right to enter upon the above described premises and to use and operate thereon any and all vehicles, machinery and equipment necessary for the removal of said fill. Since no charge will be made by General Electric for the fill, it is agreed that the City of Pittsfield shall save harmless and indemnify General Electric from and against any and all damages, losses, claims, suits, costs and expenses, including injury or death to persons, which General Electric may suffer or be subject and which result from the operations of the City of Pittsfield on the above described premises.

The right of the City of Pittsfield to enter upon the above described premises shall cease when the removal operations have been completed, but in no event shall continue beyond the period of one year from the date of this letter.

If the understandings set forth herein are satisfactory to you, will you kindly have one copy of this letter signed in the spaces indicated and return it to me for our files.

Very truly yours,
Robert Parton
Robert Parton, Manager
TRANSFORMER & ALLIED PRODUCT DIVISIONS

Accepted this 1st day of June, 1950.

CITY OF PITTSFIELD

Robert T. Capeless
Mayor

R. M. Cellin
Commissioner of Public Works

Francis X. Bunyon
Chairman, School Building Commission

FROM THE OFFICE OF
RANCIS J. QUIRICO
CITY SOLICITOR

CITY OF PITTSFIELD
MASSACHUSETTS
LAW DEPARTMENT

April 20, 1950

ATTORNEY/CLIENT
PRIVILEGE

Mr. Paul Terry
General Electric Company
100 Woodlawn Avenue
Pittsfield, Massachusetts

Dear Sir:

I am enclosing herewith two duplicate originals of a contract which I have prepared at the request of the Commissioner of Public Works of the City of Pittsfield. This contract covers the contemplated removal of fill from land of the General Electric Company by the City of Pittsfield for use in grading the land recently acquired for the Allengate area elementary school.

Will you please examine the contract to see whether it conforms to the wishes of your company? If it does, I would appreciate its return to me duly executed so that I may have it executed by the City of Pittsfield. If it is not satisfactory in its present form, please communicate with me.

Very truly yours,

Francis J. Quirico

City Solicitor

FJQ/
Inc. 2 Contracts

April 13, 1950

Mr. Francis J. Quirico
City Solicitor
43 East Street
Pittsfield, Massachusetts

Dear Sir:

The copy of the proposed easement from the General Electric Company to the City of Pittsfield is being returned herewith.

The General Electric Company would like to have included the right to extend and to make connections to the existing drain. The right to fill and grade the area should also be included.

If and when the area is filled and graded the City of Pittsfield is to bear the cost of bringing their manholes to grade.

Yours very truly,

H.G. Kenyon,
PLANT ENGINEERING SECTION

By: Paul W. Terry

PWT:SC

cc: HG Kenyon - file

ATTORNEY/CLIENT
PRIVILEGE
INFORMATION

February 17, 1950

Mr. H. R. McKean
43 394

In reference to the fill that you spoke to us about that Mr. Brugger needs for the proposed Pittsfield grammar school, we estimate that we have placed in the past few years approximately 10,000 cubic yards of fill that could be easily removed. To obtain the balance it would be necessary to lower the present grade 2' to 3'. A 2-1/2' cut would give 45,000 cubic yards. This would not affect us at all, in fact, it would give us that much more area for disposing of fill in the future.

Before any letter is written to Mr. Brugger or the mayor will you please give us the opportunity of having it approved by Mr. Woods McCahill. The reason for asking this is that a few years ago we found approval had been written here in the plant that did not release the General Electric Company from responsibility, therefore, we would like to make sure that this is handled in the proper way.

H. G. Kenyon
Plant Engineering Section
43 - 282 Tel. 466

hgk/lbm

cc: [illegible] Terry

APPARATUS DEPARTMENT
GENERAL ELECTRIC

ATTORNEY/CLIENT
PRIVILEGE

SUBJECT Agreement between the City of Pittsfield and the General Electric Company

LOCATION

REFERENCE

RECEIVED
APR 2 . 1950
WOODS McCAHILL

Pittsfield, April 21, 1950

Mr. Woods McCahill
Law Department
SCHENECTADY

Enclosed please find a copy of a proposed agreement between the City of Pittsfield and the General Electric Company.

It is our belief a paragraph should be inserted that the City of Pittsfield shall assume all responsibility for and save harmless and indemnify the General Electric Company from and against any and all damages, losses, claims, suits, costs or expenses which the General Electric Company may suffer or be subject to, caused wholly or in part by or in any way referable to the use of said premises.

A clause automatically terminating the agreement on the acceptance of the school by the city is also suggested.

Your comments on any additions or omissions shall be appreciated.

Should the final agreement be signed by our manager, Mr. Robert Paxton.

Very truly yours,

H.G. Kenyon,
PLANT ENGINEERING SECTION

Paul W. Terry

By: Paul W. Terry

PWT:SC
Enclosure (1)

. ATTORNEY/CLIENT

APPARATUS DEPARTMENT

GENERAL ELECTRIC

SUBJECT

LOCATION

REFERENCE

~~Office [illegible]~~ Will you please have Mr. Paxton sign all three copies, Hoekenga

Schenectady, May 9, 1950

Mr. Paul W. Terry
Plant Engineering Section
Transformer & Allied Product Divs.
PITTSFIELD

Dear Mr. Terry:

I am enclosing a draft of the letter which you might send the City of Pittsfield with regard to the fill which they are going to get from us. As indicated in this letter, this letter should be signed on behalf of the Company by Mr. Paxton. When it has been signed, will you kindly send me a conformed copy.

I am enclosing the proposed agreement which you sent me which, because of its nature, would have to receive approval of the Board of Directors and it is felt that this letter agreement will be sufficient and will not require such formality.

Very truly yours,

Woods McCahill

Woods McCahill
LAW DIVISION

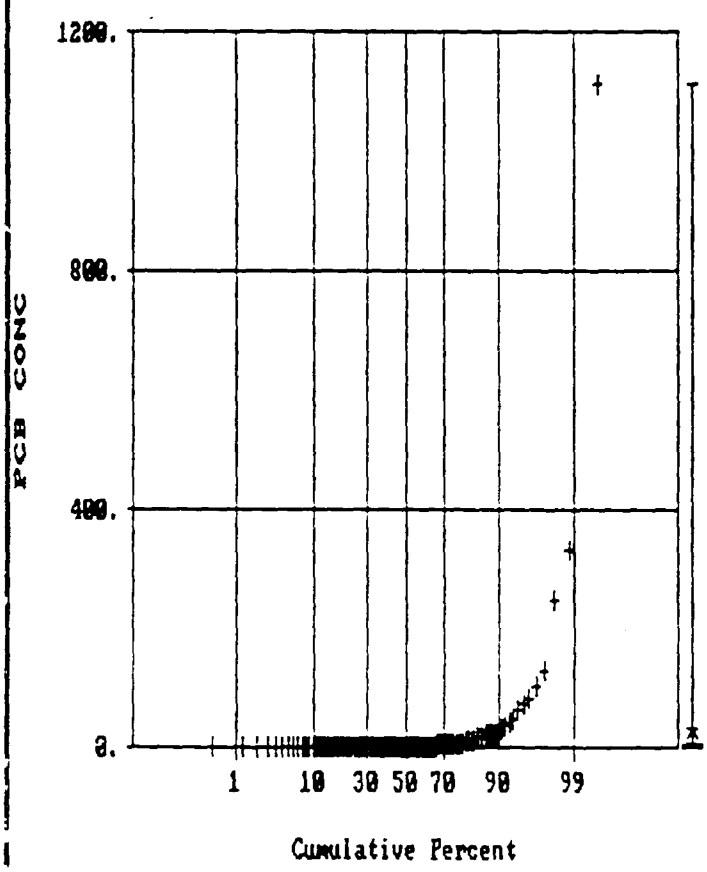
WMcC/b
encs.

BUILDING & GROUNDS RECEIVED MAY 10 1950 AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

APPENDIX F

SUMMARY GEOSTATISTICS USED IN EVALUATION OF EXTENT OF PCBs

Normal Probability Plot for PCB CONC
Data file: natlog.dat



Statistics

N Total :	125
N Miss :	0
N Used :	125
Mean :	20.535
Variance:	11315.110
Std. Dev:	106.373
% C.V. :	517.995
Skewness:	8.990
Kurtosis:	93.227
Minimum :	.012
25th % :	.100
Median :	.400
75th % :	3.750
Maximum :	1110.000

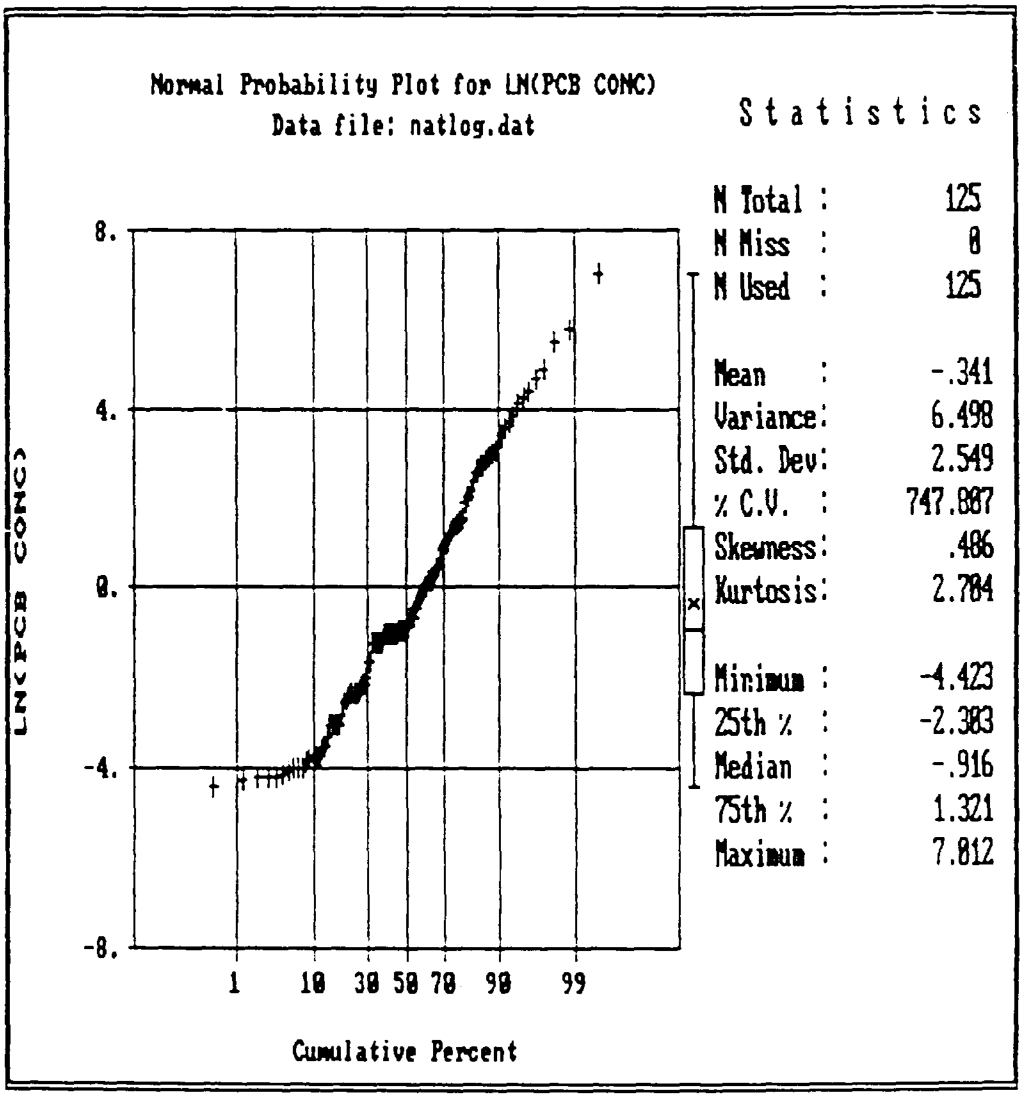
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ALLENDALE SCHOOL PROPERTY

APPENDIX F GEO-EAS OUTPUT OF NORMAL PROBABILITY PLOT & SUMMARY STATISTICS FOR SOIL PCB CONCENTRATIONS

DEC. 1992
101.94.70

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS



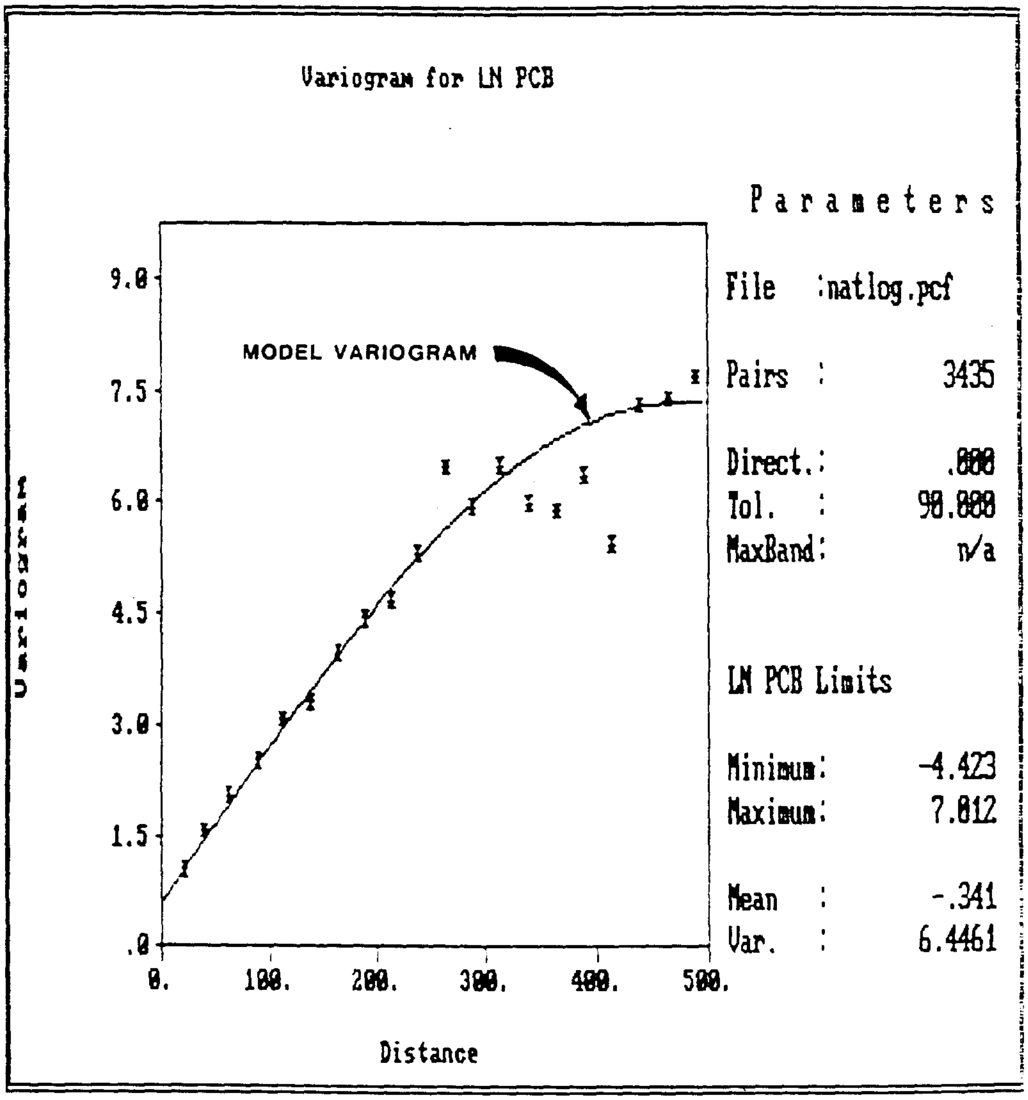
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ALLENDALE SCHOOL PROPERTY

APPENDIX F GEO-EAS OUTPUT OF NORMAL PROBABILITY PLOT & SUMMARY STATISTICS FOR LOG TRANSFORMED SOIL PCB CONCENTRATIONS

DEC. 1992
101.94.70

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS



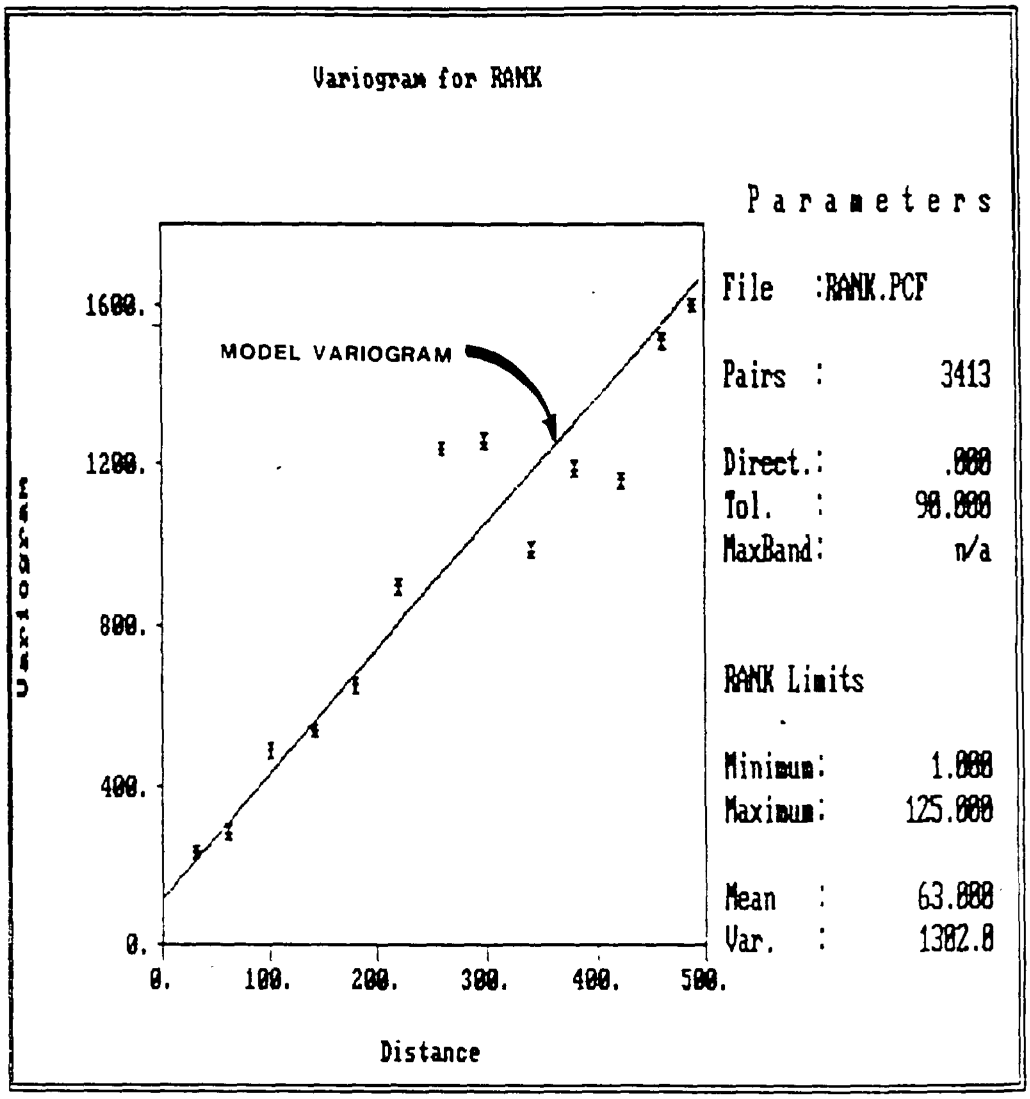
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ALLENDALE SCHOOL PROPERTY

APPENDIX F GEO - EAS OUTPUT OF MODEL VARIOGRAM DEVELOPED FOR LOG TRANSFORMED SOIL PCB CONCENTRATION DATA

JAN. 1993
101.9470

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS



GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ALLENDALE SCHOOL PROPERTY

APPENDIX F GEO-EAS OUTPUT OF MODEL VARIOGRAM DEVELOPED FOR RANKED SOIL PCB CONCENTRATION DATA

JAN. 1993
101.94.70

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

APPENDIX G

ANALYTICAL LABORATORY DATA SHEETS

GROUNDWATER VOLATILE ORGANIC AND PCB ANALYSIS

Sample ID.	Sample Description
AS-1-C1	Groundwater sample collected from temporary piezometer AS-1 on August 31, 1992.
AS-2-C2	Groundwater sample collected from temporary piezometer AS-2 on August 31, 1992.
AS-1	Groundwater sample collected from temporary piezometer AS-1 on December 30, 1992.
AS-2	Groundwater sample collected from temporary piezometer AS-2 on December 30, 1992.

Blasland & Bouck Engineers
September 22, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: GE-Allendale School Temporary Monitoring Well Installation Sampling 101.01.07

Job Number: BLB 52212

VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: AS-1-C1
Lab Sample ID: TT4958

Compound	Concentration		Compound	Concentration	
chloromethane	10	U	1,2-dichloropropane	5	U
bromomethane	10	U	cis-1,3-dichloropropene	5	U
vinyl chloride	10	U	trichloroethene	5	U
chloroethane	10	U	dibromochloromethane	5	U
methylene chloride	1	BJ	1,1,2-trichloroethane	5	U
acetone	53	B	benzene	5	U
carbon disulfide	5	U	trans-1,3-dichloropropene	5	U
1,1-dichloroethene	5	U	bromoform	5	U
1,1-dichloroethane	5	U	4-methyl-2-pentanone	10	U
1,2-dichloroethene (total)	5	U	2-hexanone	10	U
chloroform	5	U	tetrachloroethene	5	U
1,2-dichloroethane	5	U	1,1,2,2-tetrachloroethane	5	U
2-butanone	10	U	toluene	5	U
1,1,1-trichloroethane	5	U	chlorobenzene	5	U
carbon tetrachloride	5	U	ethylbenzene	5	U
vinyl acetate	10	U	styrene	5	U
bromodichloromethane	5	U	xylenes (total)	5	U
			1,2,4-trichlorobenzene	1	BJ

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 09/13/92

Blasland & Bouck Engineers
September 22, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: GE-Allendale School Temporary Monitoring Well Installation Sampling - 101.01.07

Job Number: BLB 52212

VOLATILE ORGANIC ANALYSIS

Results in μg/liter (ppb)

Sample Matrix: Water

Client Sample ID: AS-2-C2
Lab Sample ID: TT4961

Compound	Concentration		Compound	Concentration	
chloromethane	10	U	1,2-dichloropropane	5	U
bromomethane	10	U	cis-1,3-dichloropropene	5	U
vinyl chloride	10	U	trichloroethene	5	U
chloroethane	10	U	dibromochloromethane	5	U
methylene chloride	1	BJ	1,1,2-trichloroethane	5	U
acetone	49	B	benzene	5	U
carbon disulfide	5	U	trans-1,3-dichloropropene	5	U
1,1-dichloroethene	5	U	bromoform	5	U
1,1-dichloroethane	5	U	4-methyl-2-pentanone	10	U
1,2-dichloroethene (total)	5	U	2-hexanone	10	U
chloroform	5	U	tetrachloroethene	5	U
1,2-dichloroethane	5	U	1,1,2,2-tetrachloroethane	5	U
2-butanone	10	U	toluene	5	U
1,1,1-trichloroethane	5	U	chlorobenzene	5	U
carbon tetrachloride	5	U	ethylbenzene	5	U
vinyl acetate	10	U	styrene	5	U
bromodichloromethane	5	U	xylenes (total)	5	U
			1,2,4-trichlorobenzene	5	U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 09/14/92

Blasland & Bouck Engineers
September 22, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: GE-Allendale School Temporary Monitoring Well Installation Sampling 101.01.07

Job Number: BLB 52212

PCBs ANALYSIS

Results in μg/liter (ppb)

Sample Matrix: Water

Client Sample ID	Lab Sample ID	Aroclor 1016, 1232, †1242 and/or 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
AS-1-C1	TT4963	0.1 U	0.9 *	0.3 U	0.9
AS-2-C2	TT4964	0.1 U	4.2 *	0.3 U	4.2
Method Blank	BLH1487	0.1 U	0.3 U	0.3 U	0.3 U

Extraction Date: 09/04/92
Analysis Date: 09/09 and 09/10/92

† - Sample Aroclor pattern identified and/or calculated as Aroclor 1242.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
* - Sample exhibits alteration of standard Aroclor pattern.

Blasland & Bouck Engineers, P.C.
January 15, 1993

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Allendale School

Job Number: BLB 53140

PCBs ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID	Lab Sample ID	Aroclor 1016, 1232, †1242 and/or 1248		Aroclor 1254		Aroclor 1260		Total Aroclors	
AS-1	VV3538	0.03	U	0.46	*	0.14	*	0.60	
AS-2	VV3539	0.03	U **	0.98	*	0.30	*	1.3	
Duplicate	VV3540	0.03	U	0.83	*	0.23	*	1.1	
AS-1, Filtered	VV3541	0.03	U	0.065	U	0.065	U	0.065	U
A-2, Filtered	VV3542	0.03	U	0.19	*	0.065	U	0.19	
Duplicate, Filtered	VV3543	0.03	U	0.17	*	0.065	U	0.17	
Method Blank	BLH2849	0.03	U	0.065	U	0.065	U	0.065	U
Method Blank	BLH2847	0.03	U	0.065	U	0.065	U	0.065	U

Extraction Date: 01/04/93
Analysis Date: 01/12/93

† - Sample Aroclor pattern identified and/or calculated as Aroclor 1242.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
* - Sample exhibits alteration of standard Aroclor pattern.
** - Higher detection limit due to interference.

FILL SOIL APPENDIX IX+3 ANALYSIS

Sample ID.	Sample Description
MF-1	Soil grab sample collected from soil pile to be used for Short-Term Measure soil cap.
MF-2	Soil grab sample collected from soil pile to be used for Short-Term Measure soil cap.

RECEIVED
JUL 22 1991
ENVIRONMENTAL PROGRAMS

ALPHA ANALYTICAL LABORATORIES

Eight Walkup Drive
Westborough, Massachusetts 01581-1019
(508) 898-9220

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006

CERTIFICATE OF ANALYSIS

Client: GE Company

Address: 100 Woodlawn Avenue, Mail Code C23
Pittsfield, MA 01201

Attn: Mark Phillips

Client Designation: N/A

Laboratory Job Number: 914283

Invoice Number: 22667

Date Received: 07/05/91

Date Reported: 07/19/91

Delivery Method: Federal Express

ALPHA SAMPLE NUMBER	CLIENT IDENTIFICATION	SAMPLE LOCATION
914283.1	MF-1	N/A
914283.2	MF-2	N/A

Authorized by: James R. Roth
James R. Roth - Laboratory Manager

kmg

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006

Laboratory Sample Number: 914283.1

Date Received: 07/05/91

Sample Matrix: Solid (results are reported on a dry weight basis)

Date Reported: 07/19/91

Condition of Samples: Satisfactory

Field Prep: None

Number & Type of Containers: Two glass jars

Analysis Requested: Analysis as listed below (Organophosphorus Pesticides and 8280 analysis to follow)

PARAMETER	RESULT	UNITS	MDL**	REF*	METHOD	DATES EXT/PREP	DATES ANALYSIS
PCB's ***	ND	ug/Kg	250	1	8080	07/09/91	07/14/91
Pesticides ***	ND	ug/Kg	50	1	8080	07/09/91	07/14/91
Herbicides ***	ND	ug/Kg	50	1	8150	07/11/91	07/18/91
Total Solids	83.9	%	0.1	3	2540B	----	07/18/91

COMMENTS: * Complete list of References found in Addendum I
** Lists of PCB's, pesticides and herbicides analyzed for and their detection limits accompany this report.
*** All compounds were below the detection limits except those listed above.

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 **NH 198958-A** CT PH-0574 **NY 11148** **NC 320** SC 88006

Laboratory Sample Number: 914283.2 **Date Received:** 07/05/91

Sample Matrix: Solid (results are reported on a dry weight basis) **Date Reported:** 07/19/91

Condition of Samples: Satisfactory **Field Prep:** None

Number & Type of Containers: Four glass jars and four VOA vials

Analysis Requested: Analysis as listed below (Organophosphorus Pesticides and 8280 analysis to follow)

PARAMETER	RESULT	UNITS	MDL**	REF*	METHOD	DATES EXT/PREP	DATES ANALYSIS
Total Metals Preparation ...	-----		----	1	3050	07/10/91	------
Antimony	ND	mg/Kg	114	1	6010	----	07/16/91
Arsenic	3.0	mg/Kg	1.1	1	7060	----	07/16/91
Barium	25.0	mg/Kg	11.4	1	6010	----	07/16/91
Beryllium	ND	mg/Kg	2.3	1	6010	----	07/16/91
Cadmium	ND	mg/Kg	2.3	1	6010	----	07/16/91
Chromium	9.1	mg/Kg	4.6	1	6010	----	07/16/91
Cobalt	6.8	mg/Kg	4.6	1	6010	----	07/16/91
Copper	13.7	mg/Kg	4.6	1	6010	----	07/16/91
Lead	ND	mg/Kg	11.4	1	6010	----	07/16/91
Mercury	ND	mg/Kg	0.28	1	7470	----	07/16/91
Nickel	11.4	mg/Kg	11.4	1	6010	----	07/16/91
Selenium	ND	mg/Kg	1.1	1	7740	----	07/16/91
Silver	ND	mg/Kg	2.3	1	6010	----	07/16/91
Thallium	ND	mg/Kg	1.1	1	6010	----	07/16/91
Tin	ND	mg/Kg	11.4	1	6010	----	07/16/91
Zinc	61.5	mg/Kg	2.3	1	6010	----	07/16/91
Total Solids	85.8	%	0.1	3	2540B	----	07/18/91
Total Cyanide	ND	mg/Kg	0.25	3	4500CN-C,E	----	07/11/91
Sulfide	ND	mg/Kg	0.4	3	$4500S^2$-D	----	07/19/91
Acrolein	ND	ug/Kg	50	1	8030	07/10/91	07/11/91
Acrylonitrile	ND	ug/Kg	50	1	8030	07/10/91	07/11/91
Acetonitrile	ND	ug/Kg	50	1	8030	07/10/91	07/11/91

COMMENTS: * Complete list of References found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006

Laboratory Sample Number: 914283.2 **Date Received:** 07/05/91

Sample Matrix: Solid (results are reported on a dry weight basis) **Date Reported:** 07/19/91

Condition of Samples: Satisfactory **Field Prep:** None

Number & Type of Containers: Four glass jars and four VOA vials

Analysis Requested: Analysis as listed below (Organophosphorus Pesticides and 8280 analysis to follow)

CONTINUED

PARAMETER	RESULT	UNITS	MDL**	REF*	METHOD	DATES EXT/PREP	DATES ANALYSIS
Acid/Base/Neutral Extractables ***							
Fluoranthene	1,860	ug/Kg	**	1	8270	07/09/91	07/17/91
Benzo(a)anthracene	820	ug/Kg	**	1	8270	07/09/91	07/17/91
Benzo(a)pyrene	645	ug/Kg	**	1	8270	07/09/91	07/17/91
Benzo(b/k)fluoranthene	1,010	ug/Kg	**	1	8270	07/09/91	07/17/91
Chrysene	845	ug/Kg	**	1	8270	07/09/91	07/17/91
Acenaphthylene	171	ug/Kg	**	1	8270	07/09/91	07/17/91
Anthracene	360	ug/Kg	**	1	8270	07/09/91	07/17/91
Benzo(ghi)perylene	380	ug/Kg	**	1	8270	07/09/91	07/17/91
Fluorene	191	ug/Kg	**	1	8270	07/09/91	07/17/91
Phenanthrene	1,680	ug/Kg	**	1	8270	07/09/91	07/17/91
Indeno(1,2,3-cd)pyrene	403	ug/Kg	**	1	8270	07/09/91	07/17/91
Pyrene	1,660	ug/Kg	**	1	8270	07/09/91	07/17/91
PCB's ***	ND	ug/Kg	250	1	8080	07/09/91	07/14/91
Pesticides ***	ND	ug/Kg	50	1	8080	07/09/91	07/14/91
Herbicides ***	ND	ug/Kg	50	1	8150	07/11/91	07/18/91

Acid/Base/Neutral Extractables	% Surrogate Recovery
2-Fluorophenol	28%
Phenol-d6	39%
Nitrobenzene-d5	91%
2-Fluorobiphenyl	90%
2,4,6-Tribromophenol	109%
4-Terphenyl-d14	112%

COMMENTS:
* Complete list of References found in Addendum I
** Lists of acid/base/neutral extractables, PCB's, pesticides and herbicides analyzed for and their detection limits accompany this report.
*** All compounds were below the detection limits except those listed above.

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006

Laboratory Sample Number: 914283.2 **Date Received:** 07/05/91

Sample Matrix: Solid (results are reported on a dry weight basis) **Date Reported:** 07/19/91

Condition of Samples: Satisfactory **Field Prep:** None

Number & Type of Containers: Four glass jars and four VOA vials

Analysis Requested: Analysis as listed below (Organophosphorus Pesticides and 8280 analysis to follow)

CONTINUED

PARAMETER	RESULT	UNITS	MDL**	REF*	METHOD	DATES	
						EXT/PREP	ANALYSIS
Volatile Organics ***							
Tetrachloroethene	1.9	ug/Kg	**	1	8260	....	07/17/91
Trichloroethene	1.2	ug/Kg	**	1	8260	....	07/17/91

Volatile Organics	% Surrogate Recovery
1,2-Dichloroethane-d4	108%
Toluene-d8	101%
4-Bromofluorobenzene	80%

COMMENTS: * Complete list of References found in Addendum I
** A list of volatile organics analyzed for and their detection limits accompanies this report.
*** All compounds were below the detection limits except those listed above.

D. Application of fertilizer, lime, seed, and mulch shall only be performed during those periods within the seasons which are normal for such work as determined by the weather and locally accepted practice, as approved by the Owner. Seeding and fertilizing shall be conducted between August 15 and October 15, or as directed or permitted by the Owner. The Contractor shall hydroseed and hay mulch only on a calm day.

E. Schedules for seeding and fertilizing must be submitted to the Owner for approval prior to the work being performed.

F. Lime and fertilizer are to be spread hydraulically in one operation with the hydroseeding.

G. Seeding shall be done within 10 days following soil preparation. Seed shall be applied hydraulically at the rates and percentages indicated. The spraying equipment and mixture shall be so designed that when the mixture is sprayed over an area, the lime, fertilizer, and seed shall be equal in quantity to the specified rates. Prior to the start of work, the Owner shall be furnished with a certified statement for approval as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the hydroseeder.

1. Seed shall be applied uniformly over the area at the rate of 3 pounds per 1,000 square feet.
2. Fiber mulch shall be applied uniformly over the area at the rate of 75 pounds per 1,000 square feet minimum and 150 pounds per 1,000 square feet maximum.
3. The application of fertilizer and lime may be performed hydraulically in one operation with hydroseeding. If lime is applied in this manner, the Contractor will be responsible for cleaning all structures and paved areas of unwanted deposits.

H. When protection of newly graded areas is necessary at a time which is outside of the normal seeding season, the Contractor shall protect those areas by whatever means necessary (such as straw) or by other measures as approved by the Owner.

I. Maintenance and Provisional Acceptance

1. The Contractor shall keep all seeded areas watered and in good condition, reseeding, if and when necessary, until a good, healthy, uniform growth is established over the entire area

MATERIALS AND PERFORMANCE - SECTION 02200

COVER SYSTEM INSTALLATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Placement and compaction of fill to the lines and grades indicated on the Contract Drawings, as specified or directed.
2. Excavation, trenching, and backfilling of fill material, including the loosening, removing, refilling, transporting, storage, and disposal of all materials classified as "Earth" necessary for the construction of the drainage system.

B. Work Specified Under Other Sections

1. Drainage lateral installation

1.02 TESTING

A. All soil testing involving field and laboratory services shall be performed by an independent testing laboratory at the Contractor's expense under the observation of the Engineer.

1.03 SUBMITTALS

A. All soil testing results (grain size analysis).
B. Manufacturers specifications for geotextile.

PART 2 - PRODUCTS

2.01 BACKFILL

A. Glacial Till Cover

1. The glacial till cover soil provided by the Contractor shall be free of deleterious substances and shall have a maximum particle size of three inches.

B. Type B Granular Fill

1. Type B granular material shall be used to backfill the drainage pipe and shall be free from organic material or deleterious substances with a gradation by weight conforming to the following:

seeded, and shall maintain these areas in an approved condition until provisional acceptance.

2. On slopes, the Contractor shall protect against wash-outs by an approved method. Any wash-out which occurs shall be regraded and reseeded at the Contractor's expense until a good sod is established.

3. The Owner will inspect all work for provisional acceptance at the end of the 8-week grass maintenance period, upon the written request of the Contractor, received at least 10 days before the anticipated date of inspection.

4. A satisfactory stand will be defined as a section of grass of 10,000 square feet or larger that has:

   a. No bare spots larger than 3 square feet.

   b. No more than 10 percent of total area with bare spots larger than 6 inches square.

5. The Contractor shall furnish full and complete written instructions for maintenance of the seeded areas to the Owner at the time of provisional acceptance.

6. The inspection by the Owner will determine whether maintenance shall continue in any area or manner.

7. After all necessary corrective work and cleanup has been completed and maintenance instructions received by the Owner, the Owner will acknowledge the provisional acceptance of the seeded areas. The Contractor's responsibility for maintenance of seeded areas, or parts of seeded areas, shall cease on receipt of provisional acceptance.

J. Guarantee Period and Final Acceptance

1. All seeded areas shall be guaranteed by the Contractor for not less than one full year from the time of provisional acceptance.

2. At the end of the guarantee period, inspection will be made by the Owner upon written request submitted by the Contractor at least 10 days before the anticipated date. Seeded areas not demonstrating satisfactory stands as outlined above, as determined by the Owner, shall be renovated, reseeded, and maintained meeting all requirements as specified herein.

5. Minimum Grab Strength: 180 lbs. [illegible] support and protection of all structures or property in the
Minimum Puncture Strength: 40 lbs. [illegible] vicinity of the work, whether over or under ground, or which appear
Minimum Burst Strength: 200 psi [illegible] adjacent to the excavation and the restoration of the
Minimum Trapezoidal Tear Strength: 40 lbs. [illegible] same in case of settlement or other injury.
Minimum Apparent Opening Size: #100 sieve
6. All temporary bridging, fencing, and/or removing of the same.

B. Geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged to provide identification sufficient for inventory and quality control purposes. Rolls [illegible] stored in a manner which protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover.

B. Earth [illegible] materials such as sand, gravel, clay, loam, cobbles, pavements, stones, rock, [illegible] specifically excluding all ledge or bedrock and individual boulders or masonry larger than one-half cubic yard in volume.

PART 3 - EXECUTION

3.01 GENERAL

[illegible] Backfill

A. Dust Control

[illegible] The backfilling of areas to the lines indicated on the Contract Drawings or as otherwise directed using materials suitable for [illegible]

1. The Contractor shall provide dust control at all times during the performance of the work. The Contractor will be solely responsible for the proper handling of any dust which migrates from the work site during the performance of the work. The use of oils to control dust on surfaces is prohibited. The use of potable water must be pre-approved by the Owner.

D. Spoil

1. Surplus excavated material [illegible] backfill or embankments.

3.02 CONTROL OF WATER

3.03 DEFINITIONS

A. Excavation (or Trenching)

A. General

1. The Contractor shall at all times provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations, and shall remove all such water as fast as it may collect, in such a manner as shall not interfere with the prosecution of the work, or the proper placing of [illegible]

1. [illegible] Grubbing, stripping, excavating [illegible] materials [illegible]

2. All diking, ditching, sluicing, cofferdamming, pumping, bailing, draining, well pointing, or otherwise disposing of water.

B. Work Included

3. The removal and disposal of all surplus materials from the excavations [illegible]

1. The furnishing and operation of pumps and appliances needed to maintain thorough drainage of the work in a satisfactory manner.

4. The maintenance, accommodation, and protection of travel and the temporary paving of highways, roads, and driveways.

MATERIALS AND PERFORMANCE - SECTION 02200
COVER SYSTEM INSTALLATION

U.S. Standard Sieve Size	% Passing
1-1/2"	100
3/4"	0-25
1/2"	0-5

C. Topsoil

1. Topsoil placed above the glacial till cover shall be fertile, natural soil capable of sustaining vigorous plant growth, typical of the locality, free from stones greater than two inches, roots, sticks, clay, peat, weeds and sod and obtained from naturally well-drained areas. Topsoil shall not be excessively acid or alkaline nor contain toxic material harmful to plant growth.

D. Fertilizer shall be a complete commercial fertilizer 10-10-10 grade for grass areas. It shall be delivered to the site in the original unopened containers, each showing the manufacturer's guaranteed analysis. Fertilizer shall be stored so that when used it shall be dry and free flowing.

E. Lime shall be ground limestone containing not less than 85 percent of calcium and magnesium carbonates.

F. Grass seed shall be from the same or previous year's crop; each variety of seed shall have a percentage of germination not less than 90, a percentage of purity of not less than 85, and shall have no more than 1 percent weed content.

G. The seed shall be furnished and delivered premixed in the proportions specified above. A manufacturer's certificate of compliance to the specified mix shall be submitted by the manufacturer for each seed type. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates.

H. Hay mulch shall be dry hay or straw mulch free of mold.

2.02 GEOTEXTILE

A. Geotextile placed at the interface of the in-situ soil and the glacial till backfill will consist of non-woven polypropylene or polyester meeting or exceeding the following physical requirements:

MATERIALS AND PERFORMANCE - SECTION 02200
COVER SYSTEM INSTALLATION

3.04 INSTALLATION OF GEOTEXTILE LAYER

A. The geotextile layer will be placed directly on the existing ground surface within the area noted on the Contract Drawings. The Contractor will place the geotextile in such a manner that placement of the overlying materials will not excessively stretch or tear the fabric.

B. Exposure of geotextiles to the elements between lay down and cover shall be a maximum of 14 days to minimize damage potential.

C. The geotextile shall be joined by either seaming or overlapping. Overlapped seams shall have a minimum overlap of 12 inches. All seams shall be subject to the approval of the Owner.

3.05 INSTALLATION OF GLACIAL TILL COVER

A. The glacial till cover will be installed on top of the geotextile layer to a minimum compacted thickness of 18 inches. The glacial till cover soil will be placed in 8-inch thick compacted lifts at a moisture content within 2 percent of the optimum moisture content, and compacted to densities in excess of 85 percent of the maximum dry density as determined by testing in accordance with ASTM D-1557.

3.06 INSTALLATION OF TOPSOIL

A. The topsoil layer will be installed to a minimum thickness of six inches on top of the glacial till cover.

B. The subgrade of all areas to be covered with topsoil and seeded shall be raked and all rubbish, sticks, roots, and stones larger than 3 inches shall be removed. Subgrade surfaces shall be tracked immediately after the grading and raking has been completed. Tracking is to be performed with bulldozers operating in the direction of water flow. The tracks of the bulldozers are to have grousers of sufficient height to leave visible depressions in the subgrade. The depressions are to be perpendicular to the direction of water flow to reduce erosion potential.

C. After topsoil has been spread and fine graded, all large stiff clods, lumps, brush, roots, stumps, litter, and other foreign material shall be removed from the area, covered with topsoil, and disposed of by the Contractor at his expense. The entire area where topsoil has been placed shall then be tracked as indicated in Paragraph 3.06(B) above.

SAFETY PROVISIONS

This section presents the minimum safety provisions required for protection of all personnel potentially exposed to hazardous materials as a result of construction activities. It is understood that the Contractor shall be totally responsible for health and safety compliance.

SAFETY GUIDE FOR CONTRACTOR'S PERSONNEL

The contractor shall prepare and submit a safety guide for all site personnel. The safety guide should contain, as a minimum, the following:

1. Types of hazards present for construction personnel;
2. Required safety equipment, including its use and care;
3. Required procedures for entering and leaving the site, including a site map;
4. Required reporting procedures in cases of emergency;
5. Required equipment and personnel decontamination procedures;
6. Required procedures for eating and smoking within the work area;
7. Type of communication system to be implemented by the Contractor;
8. Safety regulations and recommendations;
9. Names of key personnel and alternates responsible for site safety; and
10. Site contingency plan for safe and effective response to emergencies.

MATERIALS AND PERFORMANCE - SECTION 02200

COVER SYSTEM INSTALLATION

3. After all necessary corrective work has been completed, the Owner shall acknowledge in writing the final acceptance of the seeded areas.

END OF SECTION

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MATERIALS AND PERFORMANCE - SECTION 02510

DRAINAGE LATERAL INSTALLATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. The Contractor shall furnish and install the drainage lateral system in compliance with this section. The drainage lateral components shall be furnished and installed in conformance with the materials, sizes, and classes designated on the Contract Drawings, or as otherwise specified, at the grades and location shown on the Contract Drawings. The drainage lateral is intended to collect and convey a percentage of the infiltrating storm water from the cover area. The construction method utilized by the Contractor to install the drainage system must not disturb existing soil beneath the geotextile layer to be installed as part of this Contract.

B. Related Work Specified Under Other Sections

1. Cover System Installation

1.02 TESTING

A. All soil testing services necessary for the Contractor to complete this project will be performed by an independent testing laboratory retained by the Contractor.

B. A minimum of one particle size analysis performed in accordance with ASTM D-422 will be required for every 50 cy of free-draining Type B backfill installed as part of the drainage system.

1.03 SUBMITTALS

A. Source of backfill materials
B. Laboratory test results (particle size analysis)
C. Manufacturer's specifications for drainage pipe

SITE ACCESS RESTRICTIONS

The following access restrictions shall be noted by the Contractor:

- The site shall be accessed from property owned by the General Electric Company at the locations approved by the Owner;
- No construction traffic upon the area to be covered prior to the placement of the geotextile layer is allowed; and
- No construction traffic directly on the geotextile is allowed. Backfill is to be placed on the geotextile by back-dumping and spreading.

Any damage to the aforementioned areas as a consequence of construction activities shall be the sole responsibility of the Contractor. Damage to the cover shall be promptly repaired to the satisfaction of the Owner.

EXISTING SITE CONDITIONS

Certain subsurface information may be shown on separate sheets or otherwise made available by the Owner, to the Contractor, and other interested parties. Neither such information nor the documents on which it may be shown shall be considered a part of the Contract Documents or Contract Drawings, it being understood that such information is made available only as a convenience, without express or implied representation, assurance, or guarantee that the information is adequate, complete or correct, or that it represents a true picture of the subsurface conditions to be encountered, or that all pertinent subsurface information in the possession of the Owner has been furnished.

Soil borings, ground-water elevations and characteristics of, and data on the concentrations of certain chemical compounds existing in soil at and near the site, can be obtained separately from the Owner.

EQUIPMENT CLEANING PROCEDURES

All equipment which comes in contact with soils from the schoolyard shall be thoroughly cleaned at a location to be designated by the Owner.

CHEMICAL ANALYSIS OF BACKFILL MATERIAL

The Contractor shall note that the Owner will collect and analyze samples of backfill material for the presence of contaminants. The Contractor is responsible for the proper disposal of any backfill material found to contain deleterious substances as a result of the Owner's analysis.

MATERIALS AND PERFORMANCE - SECTION 02510

DRAINAGE LATERAL INSTALLATION

PART 2 - PRODUCTS

2.01 BACKFILL

A. Type B free-draining granular material shall be used to backfill the drainage pipe and shall be free from organic matter or deleterious substances with a gradation by weight conforming to the following:

U.S. Standard Sieve	% Passing
1-1/2"	100
3/4"	0 - 25
1/2"	0 - 5

2.02 GEOTEXTILE

A. Geotextile placed around the Type B granular backfill shall consist of non-woven polypropylene conforming to the physical requirements listed in MP Section 02200 - Cover System - Section 2.02.

2.03 DRAINAGE PIPE

A. The drainage pipe shall consist of six-inch diameter, perforated, high-density polyethylene pipe. The drainage pipe shall be placed and backfilled in accordance with this specification and the Contract Drawings.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. The drainage laterals shall be placed to the lines and grades indicated on the Contract Drawings and shall provide positive drainage of water above the invert elevation of the drainage pipe.

3.02 LINES AND GRADES

A. Pipes shall be laid to the lines and grades shown on the Contract Drawings. The grade of the drainage pipe shall not vary from the design grade shown on the Contract Drawings unless a change in grade has been ordered by the Owner. In addition, invert elevations at any location shall not vary from the design elevations by unless a change in invert elevation has been ordered by the Owner. Any drainage pipe, grade, or invert elevation which differs from design evaluations shall be corrected by the Contractor at his own expense.

MATERIALS AND PERFORMANCE - SECTION 02510

DRAINAGE LATERAL INSTALLATION

The method used to install the drainage pipe snall be consistent with standard practice of establishing line and grade and sufficiently accurate to insure that the above requirements are met.

The Contractor shall furnish all labor, materials, surveying instruments, and tools to establish and maintain all lines and grades. The Contractor shall have personnel on duty, at all times, who are qualified to set and check grades of drainage pipe as it is installed. The responsibilities of the Owner to provide, and the Contractor to maintain, basic control points for line and grade are outlined in the section entitled "Special Conditions."

3.03 GEOTEXTILE PLACEMENT

A. Geotextile shall be placed at the interface of the Type "B" granular backfill with the in-situ soil in accordance with the manufacturer's placement requirements and as indicated by Contract Drawings.

3.04 BACKFILL PLACEMENT

A. Type B granular material shall be placed around the drainage pipe in accordance with Contract Drawings. The Type B fill placed below mid-height of the pipe, to a depth at least six inches below the pipe will, will serve as pipe bedding. The Type B filled used as pipe bedding below the pipe shall be placed in six-inch lifts and compacted to densities in excess of 90 percent of the maximum established in accordance with ASTM D-1557.

3.05 DRAINAGE PIPE PLACEMENT

A. All pipe, fittings, and specials shall be carefully lowered into the trench. Pipe which becomes cracked, broken, or otherwise damaged during or after installation, shall be marked and removed fromm the job site by the Contractor at his own expense. The cutting of pipe, if required, to make connections to new or existing work, shall be done with proper tools in a workman-like manner. Ends of pipe which terminate at existing catch basins shall be cut cleanly and trimmed to a neat, sheared edge which comes flush with the inside wall of the structure unless shown otherwise.

The pipe fittings and specials shall be installed to the required line and grade and shall be firmly embedded in the trench so that the pipe barrel is uniformly supported and cradled throughout its length, consistent with the requirements of the pipe foundation used. Blocking will not be permitted under the pipe. If necessary, holes and depressions in the pipe foundation shall be provided to receive bells, couplings, or similar projections to assure proper bedding of

SUPPLEMENTARY CONDITIONS

MATERIALS AND PERFORMANCE - SECTION 02510

GENERAL

The following supplements shall modify, change, delete from, and/or add to the Standard General Conditions of the Construction Contract (attached). Where any article, paragraph or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph, or subparagraph shall remain in effect and the supplementary provisions shall be considered as added thereto. Where any article, paragraph or subparagraph in the General Conditions is amended, voided or superseded by any of the following paragraphs, the provisions of such article, paragraph or subparagraph not so amended, voided or superseded shall remain in effect.

DRAINAGE LATERAL INSTALLATION

the pipe barrel. When the pipe is in proper position, it shall be joined or coupled to the mating end of the previously laid pipe using the manufacturer's recommended assembly procedure. The completed assembly of pipe sections shall form a drain with uniform slope. Manufactured pipe plugs or temporary bulkheads shall be placed in the open ends of drainage laterals whenever pipe laying is stopped overnight, over weekends, or whenever dirt or debris could enter the pipeline during construction.

- END OF SECTION -

WORK SCHEDULE

The Contractor shall submit to the Owner a completed detailed construction work schedule for approval. The work schedule shall include all elements of construction. This schedule shall be either typewritten or neatly prepared and labeled bar graph or critical path indicated start and completion dates of all anticipated construction elements.

The Contractor shall obtain written approval of the work schedule from the Owner prior to initiating work in the contract work area. The Contractor shall also submit work schedule updates to the Owner on a bi-weekly basis and as noted in the General Conditions.

HOURS OF WORK

Work shall be restricted to daylight hours between 7:00 a.m. to 6:00 p.m., Monday through Saturday, unless prior approval is obtained from the Owner.

LINES, GRADES, AND ELEVATIONS

The Engineer shall set control lines and elevations to include the baseline shown on the Contract Drawings, which includes a suitable number of bench marks. From the control lines and elevations provided, the Contractor shall verify bench marks and develop and make all detailed surveys needed for construction.

The accuracy of the Contractor's survey is the sole responsibility of the Contractor and the furnishing of the data to the Engineer does not constitute a transferral of responsibility.

PROTECTION OF EXISTING STRUCTURES

The Contractor shall be aware that all existing structures are to be protected during the performance of the work. In the event that any structure is damaged as a result of work activities, it shall be replaced in kind at the Contractor's expense. The Contractor shall note that existing playground fixtures must be removed, stored, and reinstalled by the Contractor as part of this work.