Archaeological Investigations and Landscape Reconstruction

at

Cameron Station Military Reservation

in

Alexandria, Virginia

Prepared for:

Greenvest L.C.
8614 Westwood Center Drive
Suite #900
Vienna, Virginia, 22182

Prepared by:

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Greenhorne & O'Mara, Inc.
11211 Waples Mill Road
Fairfax, Virginia 22030

Original August 1997
Revised November 1998

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Public Summary

Greenhorne & O'Mara, (G&O) conducted geomorphological and archaeological investigations as well as archaeological monitoring at Cameron Station in Alexandria, Virginia. Geomorphological investigations across the property have provided valuable information regarding the original landforms and environment in this area prior to the construction of the Cameron Station Military Base, as well as information on the effects of large-scale development of the original landscape. This information may be useful in augmenting current knowledge of the environmental conditions in Alexandria through time.

The methods were selected, in coordination with Alexandria Archaeology, to provide the fullest set of data on buried landforms within the project area in the safest and most efficient way. Three research goals were formulated to guide this investigation.

1. The first goal was to identify the presence or absence of the intact, buried historic landform. This was accomplished by the mechanical excavation of 51 soil cores at defined locations across the property. The depth of each soil core sample was dependent upon the amount of fill, the amount of water, and the nature of the natural soil column.

2. The second goal of the research was to recreate the pre-fill landscape using the information from the test bores. The depths of fill calculations of relative elevation before construction were overlaid on the Barnard 1865 map. This enabled a visual representation of the older contours of the landscape with the results of the soil test augers.

3. The third goal of the research was to complete an archaeological investigation of the areas within Cameron Station which were identified by the test bores as containing intact historic grade to document the presence or absence of potentially significant archaeological resources. The presence of a historic grade with a well-developed A horizon beneath the fill indicates the potential for archaeological resources.

Two areas within Cameron Station were subsurface tested with shovel test pits after the fill was mechanically removed. These areas were determined to be within the pathway of a proposed sewer line for the housing development. The results of the archaeological testing were varied. The first area tested was located in the northern portion of the station under the street between Buildings 6 and 7. The buried A horizon was encountered in only one of five shovel test pits. The other shovel tests revealed wetland soils and stripped surfaces. The buried A horizon contained one piece of metal and a cortical quartzite flake.

The second area to be archaeologically tested was located in the southern portion of Cameron Station between Buildings 9 and 20, in the parking lot. One section of the parking lot, encompassing an area approximately 80 x 100 feet, was a lawn with several mature trees. All six of the shovel test pits in this grassy area were positive for buried A horizon. Two of the shovel tests contained artifacts, including one historic (a piece of glass) and two small prehistoric debitage (quartz and chert). Despite the recovery of artifacts in these two areas, the limited corridors of impact and the non-diagnostic attributes of the artifacts did not justify additional archaeological investigation.

Interpretations of this investigation were reached through the synthesis of the archaeological and geomorphological information with the visual evidence on the 1865 Barnard map and the 1937 aerial photograph of the project area. It was determined that the presence of prehistoric lithics in two areas within the installation was indicative of a nearby Native American site. The location of the site is speculative, however the slope which once rose to the north and west of the station was probably the highest potential landform in this low stream convergence valley. The slope was cut back and used for fill during the construction of the station in the 1940s. The 1865 map demonstrates that the positive shovel test pits were once located along the same terrace above the wetlands. The 1937 aerial photograph shows that the slope to the northwest of that terrace was being used agriculturally. This evidence points to a well-drained gradual slope of probably less than 10% grade leading to a low-lying stream valley with associated wetlands. This environmental setting conforms to a predictive model that emphasizes those characteristics in assessing a high potential location for prehistoric sites.

As many archaeologists must necessarily deal with urban environments where massive impacts have been made on the original landscape, it is hoped that the methods and results from this investigation will be of use. Geomorphological investigation is invaluable to the archeologist because of the effective landscape and environmental reconstruction. The GeoProbe 5400 auger was efficient in reaching great depths in a short period of time, enabling the on-site interpretation of subsurface deposits by a geomorphologist. Reconstruction of the original landform under an urban landscape is a necessary tool for the prediction of remnant potential prehistoric and early historic site locations.

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I. Introduction

This report presents the result of a Phase I archaeological and geomorphological landscape reconstruction investigation at the Cameron Station Military Reservation in Alexandria, Virginia. Greenhorne & O'Mara, Inc. (G&O) of Greenbelt, Maryland conducted the investigation in compliance with the Alexandria Archaeological Protection Ordinance (No. 3413) relating to the development of Cameron Station by Greenvest L.C. of Tyson's Corner, Virginia.

The project was designed to investigate the preconstruction environment of the military installation at Cameron Station. The station was constructed on large amounts of fill in the early 1940s. Greenhorne & O'Mara's investigation was carried out in four stages. The first stage utilized hydraulic auguring to determine the potential for intact archaeological resources below the construction grade. The second stage involved the analysis of these auger results and the identification of historic surfaces which would be impacted by the proposed construction activities. The next stage utilized the results of the analysis to determine the amount of monitoring needed during the demolition activities prior to development. The last stage of the investigation involved the archaeological testing of two areas determined to possess the potential for cultural remains. Thomas W. Boor acted as Principal Investigator for the project, and Danica Ziegler served as Field Director. A list of personnel can be found in Appendix A. Dr. Antonio V. Segovia provided the geological and geomorphological services during the course of the field investigation. The historical background of the station was researched by the Kise Franks & Straw Historic Group in 1992 for the Base Realignment and Closure Memorandum of Agreement. The complete rendition of the cultural and architectural background of Cameron Station is included in their report (Kise, Franks, and Straw 1992) which is on file at the offices of Alexandria Archaeology. Greenvest L.C. purchased the property in 1996 from the federal government for the purpose of constructing a housing development.

The engineering design plans for the development guided the strategy that was employed in this investigation. The investigation was focused on the locations of sewer, utility line, or other impacts to the historic grade below the existing fill. These locations were investigated with the use of a hydraulic soil probe which could reach depths of 20 feet or more, providing 2-inch diameter soil core samples, which were then examined by a professional geologist. The massive construction of this installation in the 1940s displaced most of the landscape during excavation, grading, and filling. The identification of areas containing undisturbed surfaces (A horizons) beneath current ground level was a primary goal in this endeavor. The subsequent effort to determine whether those soils were conducive to human habitation (e.g., non-marsh, non-stream bed, well-drained, etc.) narrowed the investigation to two areas totaling 10 acres within the 166-acre property. Archaeological excavations followed the mechanical removal of fill from trenches that overlaid the proposed utility lines in those two discrete areas. While no archaeological sites were identified as a result of the excavations, valuable data was retrieved which contributes to the pre-construction archaeological potential of the project area.

II. Project Location and Description

Cameron Station is situated near the western boundary of the City of Alexandria, Virginia. The property is bounded by Duke and South Pickett Streets on the north and west, respectively (Figure 1). A cement plume containing Back Lick Creek and a wide stretch of railroad tracks belonging to Southern Railway form the southern boundary of the property. Another cement plume designed to contain the overflow of Holmes Run forms the eastern boundary.

A. Present Environmental Setting

Located in the Inner Coastal Plain of northern Virginia, Cameron Station occupies 166 acres in a valley at the base of two hills. Two streams pass on either side of the installation, Back Lick Creek to the south and Holmes Run to the east. The streams converge just beyond the southeast corner of the property, and form the larger Cameron Run, which empties into the Potomac River four miles east of the station. A sharp slope that rises ten to fifteen feet above the grade of the installation delineates the northwest boundary (Figure 2). The slope was formed as a result of the excavation and grading during construction of Cameron Station in 1942. The exposed face contains subsurface Pleistocene soil horizons (Kise Franks & Straw 1992). At the top of this slope several large businesses are built on properties facing South Pickett Street, a busy commercial avenue. At the northern terminus of the station Duke Street passes in an east-west direction. This historic by-way has served as a major transportation route for two centuries and has been widened several times. The current ground surface of the installation is level, and most of the acreage is either paved or built. A large man-made pond located at the east end of the property serves as a drainage for the low-lying property. The U.S. Department of Agriculture Soil Conservation Service Survey (1963) classifies the Cameron Station property as "made-land", because extensive filling was utilized to create the present grade (Kise Franks & Straw 1992).

The geology of the area is characterized by a series of unconsolidated deposits of gravel, sand, silt, and clay resting on sandstone bedrock. These deposits range in age from the Cretaceous to the recent periods. The stream-cut valley in which the project area lies is composed of more recent Coastal Plain deposits which date from the Pleistocene (Force 1979; Bromberg 1987). These thick alluvial deposits result from the wide range of flood activity surrounding the Potomac River, into which feed Back Lick and Holmes Run. The stream terraces in this area were originally carved into earlier Cretaceous deposits (personal communication, A. Segovia, 1997). The project area included a wide variety of ecological settings prior to construction. In its natural state, the property would have included a freshwater marsh, seasonally dry wetland borders, streambanks, and gradual slopes to the north and west extending to the base of the bluffs.

B. Past Environmental Setting

The 1992 final report submitted by the Kise Franks & Straw Historic Group (KFS) to the U.S. Army Corps, "Architectural and Archaeological Investigations, Base Closure Activities", included documentation on the previous environment based on descriptions found in the deed research. The eighteenth and nineteenth century deeds were very useful in the effort to document the "pre-fill" physical and topographic conditions of the 166 acres comprising the installation. The following information is drawn from the 1992 report by KFS describing the results of the deed research. The historic deed compilations by Beth Mitchell (1976) and Donald Sweig (1987) and deeds on file at the Fairfax County Courthouse and the Virginia State Library were reviewed by KFS for descriptions of local environmental conditions.

1. Environmental information from eighteenth century deeds

The earliest deed for the project area is a 1706 deed for a 4,639-acre land grant that encompassed much of the western portion of what is now the City of Alexandria. By 1746, the original grant property had been divided. The boundaries of the divided parcels are vague; however, it is clear that William Harrison owned the northern portion along Holmes Run and that Colonial John West owned the southern portion along Backlick Creek. Both Harrison and West held their parcels until at least 1760. There are no indications of the environmental conditions of the area for these transactions and no land plats are present in the records of the Orphan's Court or the Chancery Court. However, a 1743 deed reference to a tenant property located on the tract owned by Harrison's heirs describes Holmes Run as "a branch of Difficult river." The eighteenth century usage of this phrase implies a swampy and shallow stream and may hint at swampy conditions in the vicinity of Holmes Run, including the area presently occupied by Cameron Station.

2. Environmental information from nineteenth century deeds

A series of 19 deeds dating from 1819 to 1859 describe the nineteenth century appearance of the area. All the deeds describe a 254-acre parcel known as "The Meadows" bounded on the east and south by Holmes and Backlick Runs and encompassing the entire project area. An 1819 deed describes the property as a "pocosin," which is another term for an upland swamp. A further indication of the swampy character of the project area is found in the kinds of trees and landscape features used in the description of metes and bounds. Numerous deeds contain references to small willows, box oaks, and spring heads. Both willows and box oak grow in poorly drained areas. In contrast, the metes and bounds of adjacent well-drained upland areas specify red oak, white oak, and hickory, which grow in well-drained soil.

III. Cultural Background

A. Prehistoric Background

Human habitation in eastern North America began in the Paleoindian Period, around 10,500 B.C. (Funk 1978). Paleoindian hunter-gatherers probably traveled long distances to obtain food and raw materials for tool production. In the archaeological record, early Paleoindian sites are usually recognized and represented with the presence of large, fluted, lanceolate shaped projectile points such as Clovis type, while later Paleoindian components are represented by projectile point types such as the Dalton/Hardaway types. Excavations such as those at the Flint Run complex in Virginia and the Shawnee Minisink site in eastern Pennsylvania have recovered some evidence that eastern Paleoindians utilized many of the plant foods later important in prehistoric economies, and may have begun to utilize fish as a resource (Gardner 1974; Dent 1985).

By 8,000 B.C., at the transition into the Archaic Period, there was a change in tool types which corresponded to a shift in economy towards a broad-spectrum based adaptation, utilizing a number of species of animals and plants, rather than focusing primarily on large animals. Stemmed and side notched points replaced the earlier fluted forms. While White-tailed deer may have been the preferred game, a wide variety of other species were successfully hunted, as shown in the archaeological record. The appearance of mortars and pestles, used for plant processing, suggests that these foods assumed greater importance in the diets of prehistoric native groups. New evidence from Paleoindian sites and reconstructions of the Archaic way of life suggest that in the east, the transition from the Paleoindian Period to the Archaic Period was not a sharp break, but was instead a gradual transition.

Archaic sites are much more numerous, larger, and richer in artifacts than the earlier Paleoindian sites (Funk 1978:19-20). Evidence of adaptation to aquatic and marine resources includes the appearance of fish bones and shell in the archaeological records of these sites. At the same time hunting remained an important aspect of a broad resource-based adaptation.

The introduction of pottery and horticulture, around 1,000 B.C., mark the beginning of the Woodland Period. Pottery innovations, as reflected in ceramic types, have become a significant basis for dating deposits within the Woodland Period. At the end of the Woodland Period, the geographic distribution of ceramic types within the Middle Atlantic corresponded with ethnohistoric cultural/linguistic boundaries (Stewart 1987:118). Although cultivated plants were used by Early Woodland groups in the South and Midwest, there is presently little evidence that cultivated foods played a major role in the diet of Early Woodland people in the Chesapeake Bay area. After A.D. 700 agriculture began to assume an important role in the Woodland subsistence economy.

B. Historic Background

The Potomac River area was first settled by English colonists in the early 1600s. The flat ground and rich floodplain soils adjacent to the Potomac River was undoubtedly attractive to early English farmers. By the mid-seventeenth century the English colony in Virginia had a firmly established economy based on tobacco agriculture and had the largest population in the colonies. Social, economic, and political life was dominated by the planter aristocracy. Virginia continued to be an agricultural area based on a plantation/slave economy throughout the eighteenth and into the nineteenth century.

Duke Street, which forms the northern border of the project area, has been a major thoroughfare since the eighteenth century when it was known as the Little River Turnpike. The turnpike connected Alexandria to farming villages west of the city such as Annandale and Fairfax. This transportation route was extremely important for the sale and distribution of goods between the outlying farms and the port town of Alexandria. The project area was part of a large farm called "The Meadows" in the mid-nineteenth century. T. Michael Miller, Research Historian for the City of Alexandria, identified an advertisement (Alexandria Gazette August 21, 1868) for the auction of "The Meadows" farmstead, which described the 185 acres farm as a "beautiful tract of land" and a substantial dwelling among a grove of trees and several outbuildings. The house was described as being set upon a "lofty eminence" on the property. The highest elevation near the project area is to the west under the commercial developments along South Pickett Street. On the 1865 Barnard map (Figure 3), a small road branches off Duke Street and enters the Cameron Station project area. The road bisects the southern appendage of the property and then crosses the railroad tracks. This road, later identified as Topping Lane on the 1906 Chancery Court Plat of "The Meadows" (KFS Group 1992), appears to connect Duke Street to south Alexandria. The 1906 Topping farmstead was located outside the project area, on a hilltop several hundred feet west of Topping Lane. The Topping farmstead is probably the remains of the original Meadows dwelling, although no deed research to confirm this has been done. The existence of Topping Lane continues into 1937, where it can be observed on the aerial photograph (Figure 4). The road was removed when the hillside was cut during construction of the station.

The eighteenth and nineteenth century deeds described in the section outlining past environmental settings (Section II Part B) indicate that the property was wet marshy terrain, but it is possible that those characteristics do not define the whole project area. Other sections of the property were apparently better drained, as the 1937 aerial photograph demonstrates, and those areas appear to have been used agriculturally (Figure 4).

IV. Previous Investigations and Predictive Models

A. Previous Investigations

Cameron Station has been investigated twice before, in 1989 by Louis Berger & Associates for the Virginia Department of Transportation, and in 1990-1992 by Kise Franks & Straw for the U.S. Army Corps of Engineers. These investigations resulted in the conclusion that extensive deposition of modern fill had occurred in the Cameron Run Valley and that there was little to no potential for the preservation of archaeological resources.

Alexandria Archaeology has identified over 175 sites in Alexandria. Many additional sites have been identified in the surrounding edges of Fairfax and Arlington counties. In consulting the map of these sites, it was found that none existed within the project area. The closest archaeological sites date from the Historic Period. These include a mill race on Holmes Run north of the station, a family cemetery on the hill to the northeast, and another mill race near the railroad tracks south of the station (Alexandria Resource Map).

Prehistoric sites near Cameron Station are situated around Holmes Run and its tributaries, north of the Shirley Highway, and on the hill south of the property in Fairfax County. Both of these areas are upland settings within the Coastal Plain region. The Jones Point site is located along the Potomac River on a floodplain approximately four miles east. Part of the reason stream terrace sites in the Cameron Run valley have not been identified is the heavy disturbance caused by extensive filling, which was necessary for the construction of railroads.

Michael Johnson, Fairfax County archaeologist, identified the prehistoric sites south of the station during a survey for the development of a tract of land. These upland sites appear to have served as transient camps and procurement/processing sites.

The prehistoric sites north of the station were identified as exploitative foray camps, lithic scatters, and quarry-related procurement and manufacture sites (Bromberg 1987). Intensive investigations within the Stonegate development have shown the variety of landforms these sites occur on: a series of sites along a creek floodplain terrace area and an adjacent hilltop revealed evidence of cobble quarrying and biface manufacturing during the Late Archaic and Woodland Periods (Adams et al 1993; Gardner et al 1995).

B. Predictive Models for Site Location

Predictive models are created by archaeologists to assist in the identification of archaeological resources. These models are based on understanding which landforms were attractive and how they were used by early inhabitants. Just as the past inhabitants had to consider variations in the local environmental in making these choices, archaeologists must evaluate local environmental variables in designing predictive models of site location. The variation over time in both the local environmental conditions and the local cultures must be considered (Frink 1996).

The ecological setting within and around Cameron Station provided abundant resources for foraging, hunting, and fishing by the Native Americans. Plant species commonly found in the marshes include cattails, smartweeds, bulrushes, and cordgrass (Lippson *et al.* 1979:89; Bromberg 1987). The wetlands also provide an important dietary source in the form of tubers (Peterson 1977; Bromberg 1987). The slopes might have included several species of nut-bearing trees, such as hickory and oak. Waterfowl, muskrats, turtles, and beavers would have lived in and around the wetlands. Deer, raccoons, rabbits, foxes, bears, and other forest dwelling mammals may have lived in the wooded areas upslope of the marsh. Anadromous and semi-anadromous species of fish such as shad and herring may have been channeled into the smaller tributaries such as Cameron Run during spawning periods in the spring and summer months (Lippson *et al.* 1979: Folio Map 8; Bromberg 1987). Lithic sources in the Coastal Plain region are found in secondary deposits of cobbles and gravels, commonly found in streambeds or river terraces (Wentworth 1930; Walker et al. 1989). The most abundant materials are quartz and quartzite, with the occasional chert or jasper cobble.

The availability and abundance of these resources varied over time and across the landscape within the Cameron Station vicinity. The topographic variability of this area can be understood by defining three general landforms: upland bluffs, terraces, and swamps. Predictive models of prehistoric site locations in the Middle Atlantic Coastal Plain emphasize well-drained landforms with less than 10% slope that have access and proximity to fresh water and wetlands, as the most critical variables in prehistoric site location (Bromberg 1987; Gardner 1987). Areas meeting these criteria can be considered to have a high potential for prehistoric sites. Historic sites were generally located in accord with these criteria, although access to transportation and avoidance of living on prime agricultural land were also considerations (Gunn and Holland 1996). Given these criteria, the bluffs and terraces within the project area hold the best potential for the identification of archaeological sites.

The upland bluffs lie outside of the present project area, but their close proximity requires consideration of habitation on these hilltops. Previous investigations in Coastal Plain interior areas indicates that small camp sites aimed at recovering forest resources were located on bluffs throughout prehistory. The Stonegate excavations show that tool manufacturing also occurred in these locales in Alexandria (Gardner et al. 1995). Historic documentation indicates that the adjacent hilltop is also the most probable location of the historic residence in the vicinity.

The lower terraces at the base of the bluff slopes are also known to contain prehistoric sites. Gently sloping terraces adjacent to the confluence of streams have been shown to be particularly high potential areas for prehistoric sites in the Potomac Coastal Plain (Gunn and Holland 1996:124). Within Alexandria, Late Archaic to Early Woodland occupations have been identified in such settings (Adams et al. 1993). Although large sites from these time periods are generally found along the major rivers, more information is needed to understand the role of interior terrace sites in these settlement systems.

Prior to the military development of the 1940s, the Cameron Station vicinity was predominately wetlands or swamps. While these areas were not attractive for human occupation over most of the Holocene, the rich variety of plant and animal resources they supported would have made the adjacent well-drained terraces quite attractive. Historic documentation indicates that these areas continued to be valued for their resources long into the Historic Period.

V. Research Goals

The methods were selected, in coordination with Alexandria Archaeology, to provide the fullest set of data on buried landforms within the project area in the safest and most efficient way. Three research goals were formulated to guide this investigation.

1. The first goal was to identify the presence or absence of the intact, buried historic landform. This was accomplished by the mechanical excavation of 51 soil cores at defined locations across the property. The depth of each soil core sample was dependent upon the amount of fill, the amount of water, and the nature of the natural soil column.

2. The second goal of the research was to recreate the pre-fill landscape using the information from the test bores. The depths of fill calculations of relative elevation before construction were overlaid on the Barnard 1865 map. This enabled a visual representation of the older contours of the landscape with the results of the soil test augers.

3. The third goal of the research was to complete an archaeological investigation of the areas within Cameron Station which were identified by the test bores as containing intact historic grade to document the presence or absence of potentially significant archaeological resources. The presence of a historic grade with a well-developed A horizon beneath the fill indicates the potential for archaeological resources.

VI. Methodology

The methodology utilized to accomplish the research goals incorporated a series of three investigative procedures: 1) geomorphological testing with deep soil borings; 2) synthesis of the soil boring information with historic topographic maps and predictive models for site location; and 3) archaeological testing of areas found to contain intact historic grade. In addition, an archeologist was present to monitor the removal of subsurface structural supports in two original buildings and the removal of modern fill in seven trenches. All work performed during this project was closely coordinated with Alexandria Archaeology, and followed the recommended procedures outlined in Alexandria Archaeology's 1994 *Draft Archaeology Standards*.

A. Geomorphological Test Bores

The identification of the presence or absence of intact historic soils beneath the fill was accomplished with 51 mechanically-drilled soil cores taken across the property (Figure 5). The placement of these borings was selected to coincide with proposed impacts below the depth of fill, and to give fairly even coverage of the terrain. The elevation above mean sea level of the surface of each boring was determined by professional surveyors. The boring was conducted by Northeast Regional Probing, Inc. of Newark, Delaware, with a Geoprobe model 5400. The samples were removed in four-foot-long by two-inch-wide columns that were encased in clear plastic. Each sample was examined in the plastic casing, or removed from the casing by bisecting the tube, for closer inspection. Dr. Antonio V. Segovia, a geomorphologist familiar with geoarchaeological investigations, was present during the coring and was responsible for the examination of each core sample. The samples were examined for the nature and integrity of the soils and whether the historic grade was present. An archeologist was present to record locational information and the general conclusion from the geomorphological analysis.

B. Analysis of Geomorphological Data

The analysis of collected soil profile data from the coring was accomplished by incorporating the soil profile data into an AutoCAD computer base. Contour lines were drawn based on the fill depth at the 51 soil test bore (STB) locations (Appendix B). The topographic map drawn using the AutoCAD program gave relative elevations and dimensions of the pre-construction, pre-fill landform at Cameron Station. This map was then compared to the 1865 Barnard map on file at Alexandria Archaeology, which included some contour and elevation information for that time period. The computer database also incorporated the depth and layout of all proposed sewer lines. By comparing the data from the soil bores to the depth of the sewer lines, conclusions regarding the impact and/or avoidance of the historic grade could be made.

C. Archaeological Excavations

Archaeological excavations were conducted in two areas determined to have the potential for archaeological deposits. These areas could not be avoided by the proposed installation of sewer lines. The testing strategy was based on the proposed impacts of construction. Sewer lines were the only places which were expected to have disturbance of the original surfaces, while the rest of the proposed construction was to be built on concrete slabs on the modern grade. The investigation was accomplished through a combination of mechanical stripping and shovel testing at 50 feet intervals.

Fill soils along the sewer line axis were mechanically removed to slightly above the identified historic grade along the course of seven trenches. The backhoe followed the course of the sewer lines, excavating the fill at locations spaced at 50-foot intervals in the seven trenches; these locations were referred to as "trench holes". The removal of fill from each trench hole was closely monitored by an archeologist to minimize impacts to sub-fill deposits.

Following the mechanical excavation, shovel test pits (STPs) measuring 50 centimeters square were manually excavated at the base of each trench hole as necessary. In some cases, no STP was excavated because either the fill layers continued below the proposed depth of the utility line, or because no A horizon was present, thus indicating no impact to potential archaeological resources. The STPs were intended to provide conclusive information on the presence or absence of undisturbed archaeological materials, as well as additional information on the effects of the 1940s construction of Cameron Station to the original landscape. The shovel tests were excavated by soil layers, and each layer was screened for artifacts using 1/4 inch hardware mesh. Recovered artifacts were bagged and recorded with vertical and horizontal provenience information. The artifacts were then returned to the archaeology laboratory at G&O for washing, identification, and cataloging.

VII. Results

A. Geomorphological Testing

Soil test bores (STBs) were examined by Dr. Segovia, the project geomorphologist for the nature and depth of the fill deposited across the property. Beyond the depth of fill, the geomorphologist examined the nature and condition of the deposits at depths ranging from 4 to 20 feet. The eight soil test bores described here were chosen for their representation of different geographical regions within the station boundaries. Descriptions of all 51 augers are included in Appendix B.

STB # 14 (Surface = 63.9 feet AMSL)

Located in the northwest section of the project area near the hillside cut, this soil test bore had a fill depth of 7.75 feet (to a depth of 56.2 feet AMSL). Beneath the fill, a thin band of dark yellowish brown sand with iron oxide staining was followed by sand with gray clay inclusions and quartz pebbles. At a depth of approximately nine feet below the surface (54.9 feet AMSL), bedload gravels and very coarse sand appeared. The boring was terminated at 12 feet below the surface (51.9 feet AMSL). Dr. Segovia determined that the historic grade had been removed in this location before filling (Figure 6).

STB # 19 (Surface = 62.1 feet AMSL)

This test boring was located in the upper central section of the of the project area approximately 150 feet south of Duke Street. The fill extended to a depth of 7 feet below the surface (55.1 feet AMSL). Included in the fill was a deposit of re-deposited swamp material at a depth of 3 to 4 feet below surface (58.1 feet to 59.1 feet AMSL). At the base of the fill a natural wetland deposit was identified. The wetland soil was dark gray silt with a clay component. The test bore was terminated at 12 feet below the surface (50.1 feet AMSL; Figure 6).

STB # 23 (Surface = 59.8 feet AMSL)

This STB was situated in the northeast section of the tested area. The fill was determined to reach a depth of 10 feet below surface (49.8 feet AMSL). Beneath the fill was an eroded surface of well-sorted fine sands and silt that held some iron oxide staining. Dr. Segovia called the original landscape a probable topographic depression. The test was ended at 12 feet below the surface (47.8 feet AMSL; Figure 7).

STB # 28 (Surface = 59.5 feet AMSL)

Located in the southeast section of the tested area, this auger contained 11 feet of fill (48.5 feet AMSL). At the interface of the fill, natural wetland deposits were encountered that included vegetal debris and other organic material. Beneath the wetland stratum at a depth of 13 feet below the surface (46.5 feet AMSL), a pebbly gray sand appeared. At 14 feet below the surface (45.5 feet AMSL), the sand became less pebbly and at 15 feet below the surface (44.5 feet AMSL), the sand changed color to a dark yellowish brown. The test was terminated at 16 feet below the surface (43.5 feet AMSL; Figure 7).

STB # 3 (Surface = 61.5 feet AMSL)

This soil boring test was situated in the center of the southern section of tested acreage. The fill was found to reach a depth of only 5.5 feet below the surface (56.0 feet AMSL), interfacing with an apparently intact A horizon. The A Horizon soil was a silty, clayey gray sand that extended for approximately six inches before encountering natural B-horizon soils of a darker gray clayey silt. Beneath the B- horizon were bands of grayish brown sands that gradually included more pebbling. At 8.5 to 10 feet below the surface (53.0 feet to 51.5 feet AMSL) there was a swampy organic deposit of dark gray clayey silt. Then at 10 feet below the surface (51.5 feet AMSL), the deposits changed again to a clean, gray, very coarse sand with fine gravel. At the base of the test bore, from 11 to 12 feet below the surface (50.5 feet to 49.5 feet AMSL), the soil became an organically rich, fine gray sand (Figure 8).

STB # 37 (Surface = 64.5 feet AMSL)

Test bore # 37 was excavated along the south edge of the property, approximately 50 feet north of the concrete plume directing the flow of Backlick Run. The fill extended to a depth of 7 feet below the surface (57.5 feet AMSL) before reaching an organic wetland surface containing layers of sand, clay, and silt mixed with vegetal matter. The swamp deposit terminated on coarse sand and gravel at 11 feet below the surface (53.5 feet AMSL). At 12 feet below the surface (52.5 feet AMSL), the test bore retrieved bed load gravels, and at 14 feet below the surface (50.5 feet AMSL), weathered bedrock. The auger concluded at 15 feet below ground surface (49.5 feet AMSL; Figure 8).

STB # 43 (Surface = 66.4 feet AMSL)

Located in the central area of the station property, this test auger reached the base of fill at only 4 feet below the surface (62.4 feet AMSL). An intact A Horizon layer of brownish gray sand was found under the fill. At 5.5 feet below the surface (60.9 feet AMSL), a possible second A Horizon was encountered. Beneath these layers of original grade, B-horizon alluvial deposits extended to the base of the test at 12 feet below the surface (54.4 feet AMSL; Figure 9).

STB # 51 (Surface = 73.3 feet AMSL)

This last test bore was located in the grassy area north of the main entrance road into Cameron Station. The fill was determined to reach a depth of 7 feet below the surface (66.3 feet AMSL) before interfacing with stripped alluvial deposits. The alluvium was augered to 12 feet below the surface (61.3 feet AMSL) before termination (Figure 9).

B. Geomorphological Analysis

Dr. Segovia prepared nine geographical profiles of the auger results. His profiles follow the list of soil bore test descriptions in Appendix B. In addition, the lines of profile across the project area are presented in a figure accompanying the appendix.

The test bore locations were first overlaid on the Barnard 1865 map (Figure 10). This enabled a visual representation of the older contours of the landscape with the results of the soil test augers. This was followed by the mapping of the STBs on AutoCAD using the depth of fill measurements to create pre-construction contours. The depths reflect the topography of both the low wetland depressions and the graded areas that were once sloped terraces rising to the north and west. The computer-generated map was then compared to the historic 1865 Barnard map which includes topographic contours. The overlay of the two maps demonstrates the relative compatibility of the geomorphological data to the historic data (see Appendix B). Because of the geomorphological evaluation of sub-surface stratigraphy, Dr. Antonio V. Segovia, professor of geology at the University of Maryland, was essential to this investigation. As Greenhorne & O'Mara's consulting geomorphologist for this project, he evaluated each test bore for the nature of the original landscape. It was necessary to determine the extent of the disturbance and identify the potential for archaeological resources before excavating. This section examines the results of the geomorphological investigation. In conjunction with the interpretations, a list of all the soil test bores and their descriptions is included for reference.

As was described in the environmental background of this report, the alluvial sediments in this area were deposited during the Holocene Epoch on terraces carved out of Cretaceous deposits during the Pleistocene. The archaeological potential of Holocene alluvial sediments can be high if the conditions are dry for most of the year and soils have time to develop. According to Dr. Segovia, the alluvial deposits across the east end of Cameron Station were seasonally dry during the prehistoric period, and most appeared to be mostly saturated wetlands (Figure 11). The swampy acreage may have been harvested for marsh grass fodder in the historic period (KFS Historic Group).

Stream environment deposits were found near Backlick Run where the gravel fill was difficult to distinguish from the stream channel bedload. The fill gravels in many STBs extended through the water table, without reaching a natural stream bed deposit. These STBs are in positions adjacent to the historic course of Backlick Run (Figure 11). A sizeable drainage is depicted on the 1865 map at the north end of the property. STB #6 reflects a topographic depression that coincides with this drainage.

During the construction of Cameron Station, soils near the confluence of Backlick Run and Cameron Run were graded out and utilized to fill the lower elevations at the east end of the property. The creation of the lake in this area during the 1940s probably provided additional fill for grade attainment during construction. Several of the augers exhibited re-deposited swamp material within the fill (STBs #19, #22, #34, and #32).

The higher elevations of the property, across the north and west, were scalped either to Cretaceous deposits or early Holocene/ Pleistocene alluvial deposits. STB locations #15 and #16 indicated slopewash sediments interfingered with alluvium. Dr. Segovia described the weathered metamorphic rock and coarse angular sand combination in the 4 to 8 foot section of the two augers as being the result of slope wash (colluvial deposits) from a terrace nearby. The terrace was a result of the excavation of the valley by Holmes Run. The historic background of this acreage indicates that the higher ground was used for agriculture.

C. Geomorphological Recommendations

Through consultation with Dr. Segovia, the soil bore locations with the most potential for archaeological resources were determined to be: STB #3, STB #4, STB #41, STB #42, STB #43, and STB #44. These cores samples contained remnants of soil columns developed on alluvial sediments deposited during the Holocene Epoch, thus indicating the potential for archaeological deposits.

As a result of this analysis, two discrete areas with potentially undisturbed A horizon were delineated around six STBs in the central portion of the installation (Figure 12). One discrete area was located between Buildings 6 and 7; this area of archaeological potential surrounds STBs #3 and #4, and is referred to as Area 1. The other discrete area was located near Building 20 approximately 600 to 1000 feet southwest of Area 1; this area of potential surrounds STBs #41, #42, #43, and #44, and is referred to as Area 2. The remaining test bore locations indicated either a loss of integrity due to extensive grading or low potential due to wetland and stream environments.

D. Monitoring Activities

The reason for the archaeological monitoring in Area 1 was Dr. Segovia's identification of A horizon soils in STBs #3 and #4. These two STBs were located in the street between Buildings 6 and 7. When the footers and pads beneath those buildings were being removed, the presence of an archeologist was necessary to ensure that additional undisturbed historic surfaces and features were not destroyed in the process. The proposed impact in this area involved the installation of a sewer line, approximately 78 to 84 inches in diameter. The path of the sewer line was planned to cut across the southern portion of those buildings in an east-west direction.

The soils observed during the removal of the subsurface structural supports for Building 7 consisted of a gravel fill that extended to 55 to 56 feet AMSL (five to six feet beneath the then-existing grade). Underlying the fill layer was mixed gray clay and gravelly sand that extended to the base of each footer locale. These soils are indicative of disturbed or redeposited swamp deposits. Cassion-style cement footers were attached with rebar to 10-12 foot vertical piers across the south end of the structure (Figure 13). The large blocky footers were set in excavated pits in a 20 foot interval grid, destroying all the stratigraphy within the bounds of the structure's foundation.

The footers under Building 6 were of the same construction and grid interval, but extended to only 58 to 59 feet AMSL (four to five feet beneath the then-existing grade). The observed yellowish brown coarse sand and fine gravels beneath the footers appeared to be B or C-horizon alluvium that had been stripped during construction in the 1940s.

E. Archaeological Investigation

Fieldwork for the Phase I archaeological investigation of Cameron Station was focused on the proposed impacts to the buried historic grade by utility trenches. The testing strategy was based on the proposed impacts of construction. Sewer lines were the only places which were expected to have disturbance of the original surfaces, while the rest of the proposed construction was to be built on concrete slabs on the modern grade. The investigation was accomplished through a combination of mechanical stripping and shovel testing at 50 feet intervals.

The depth of the historic grade was determined through geological evaluation of soil test bores (STBs) by Dr. Segovia. Six of these bores in two discrete areas appeared to contain evidence of an historic surface (see Figure 12). Five of those STBs coincided with proposed utility trenches (all except STB #4). Further investigation of the positive bores required mechanical trenching to the base of fill and manual excavation of shovel test pits. The archaeological excavation of shovel test pits was conducted along the proposed utility corridors within these two areas (Figure 14).

Prior to the hand excavation of shovel tests, the upper fill layer was mechanically removed by a backhoe under the supervision of an archeologist. In total, 41 trench holes were excavated by the backhoe. The results of the mechanical stripping of fill were varied.

At 12 locations (Trench 5- holes 1-4; Trench 6 - holes 1-4; Trench 7 - hole 2; Trench 2 - holes 1 and 11; Trench 1- hole 4), the backhoe excavation revealed disturbed soils or no observed A Horizon soils beneath the fill. In these cases the stratigraphy was recorded and the trench profiles photographed, but no shovel test pits were excavated.

The remaining 29 locations were investigated with STPs excavated at the base of the trench holes (Figure 15). Again, not all of these shovel test pits identified intact A Horizon soils. Many encountered deeper fill, wetland clays, exposed subsoil, and stream gravels. Relatively undisturbed A horizons were identified in eight STPs, three of which were positive for cultural material.

Area 1 Excavations

Area 1 was bordered on the east and west by Buildings 6 and 7. The removal of these buildings revealed deeply disturbed contexts, as described in Section VII.C (Monitoring Activities). Based on information from STB 3 and STB 4, intact A Horizon soils were expected within Area 1 at 55.6 to 56 feet AMSL. Five shovel tests were excavated within in this area adjacent to STB 3. The surface topography in this area sloped very gently (less than 1% slope) to the southeast.

The trench hole for STP 1 was 3.5 feet deep and the shovel test was dug to a depth below surface of 6.6 feet (55.2 feet AMSL). The entire contents of the pit were determined to be fill. The fill consisted of sand, clay, cobbles, and brick and glass. STP 1 was located closest to Building 6.

The trench hole for STP 2 was excavated to a depth of four feet below surface (57.5 feet AMSL). The STP encountered a buried A Horizon at 5.25 to 5.7 feet below modern grade (56.25 to 55.8 feet AMSL). The A horizon matrix was an olive brown to light gray sand that terminated on a dark yellowish brown compact clay (Figure 16). A quartz spall flake and a lead bar/strap were recovered in the A layer.

Additional trench holes and STPs were excavated at 25 foot intervals around STP 2 in response to the recovery of cultural material from the buried A horizon in STP 2. The radial STPs were negative for cultural material. The west radial was not laid in because of electric poles, and the north radial STP was not excavated because of a damaged water line at the base of the hole. The other two radials, to the east and the south, encountered wetland soils and river gravel beneath the fill at six feet below surface (55.5 feet AMSL).

The third shovel test pit in Trench 1 exhibited much disturbance (Figure 16). It was located closest to Building 7. The modern fill was removed to a depth of three feet (58.2 feet AMSL). The stratigraphy of the shovel test pit included three fill layers (A, B, & C) above a temporary construction surface (Layer D). The temporary surface was a band of gritty gray clay with brick flecking at approximately 56.1 feet AMSL. The E layer was a dark yellowish brown sandy clay. Layer E appeared to be the top of a stripped original grade.

Area 2 Excavations

Area 2 was east of Building 9 and encompassed Building 20 as well as surrounding parking lots. The modern topography sloped gently (about 1%) to the east. Based on information from STBs 42, 43 and 44, intact A Horizon soils were expected within the northern portion of Area 2 between 62.4 feet and 68.6 feet AMSL, immediately below 2.5 feet to 4 feet of fill. The elevations of identified A horizons indicate a gentle east-facing slope in the past. STB 41 revealed that the surface immediately below the fill had been graded away at this location, but that a deeper intact A Horizon is present at 60.3 feet AMSL under naturally-redeposited alluvium.

Six trenches were laid out over proposed utility corridors in Area 2. Within those trenches 35 trench holes were excavated by the backhoe (see Figure 15). Most of these trench holes encountered a disturbed landscape consisting of wetland fill over gravel fill ending on coarse alluvial sands. STPs were not excavated within trench holes that did not encounter buried A horizons. The following section describes the results of each trench, including representative shovel tests and non-grade trench holes.

Trench 2. Eleven trench holes were mechanically excavated in Trench 2. Shovel tests were dug at the base of nine of these trench holes. Two of the trench holes (#1 and #11) revealed profiles indicating too much disturbance for hand excavation. A buried A horizon was identified at 68.6 feet AMSL in the soil boring adjacent to trench hole #1 (STB 44), but the trench hole revealed only a stripped surface.

Directly to the east of trench hole #1 and the STB 44 was a grass lawn containing several mature trees. Two of the initial sample of trench holes (STPs #2 and #3) were located within this grassy area. Two prehistoric artifacts were recovered from STP #2. Four radial trench holes were excavated at 25 foot intervals around this STP. All four radial excavations encountered intact A Horizon soils. All six of the STPs within the grassy area contained an intact A Horizon layer, with the top of the A horizon varying between 2.3 and 3.0 feet below surface (67.7 to 67.0 feet AMSL).

The prehistoric artifacts from STP #2 included one very small quartz shatter and a small chert shatter/chunk. They were recovered from Layer B, a compact yellowish brown sandy clay loam

(Figure 17). One piece of colorless glass was found in the north radial of STP #2. The glass was recovered from Layer B as well.

The remaining seven shovel test pits were located in the parking lot. The soils encountered at the base of the obvious fill in the trench holes contained rotting wood, large cobbles and loose sand. The location of two STPs (#8 and #9) straddled the site of STB 43. The stratigraphy identified in STB 43 indicated multiple A Horizons consisting of dark gray to brown sand with rootlets between 62.4 and 60.9 feet AMSL (see Figure 9). The adjacent trench holes were excavated to 3 to 4.25 feet below the parking lot surface (63.4 to 62.15 feet AMSL). The STPs excavated in these trench holes (#8 and #9) revealed stratigraphy comparable to the STB profile but did not contain any cultural material (Figure 17). The stratigraphy in STPs 8 and 9 was similar to other STPs at the east end of Trench 2. The rotting wood, loose sand and gray clay, and heavy concentrations of water-worn cobbles indicated a poorly drained environment (Figure 18).

Trench 3. Trench 3 was located along the west side of Building 20. All four of the mechanically excavated trench holes were suitable for hand excavated shovel tests. Only shovel test #3 appeared to have encountered an intact A horizon at 66.1 feet AMSL (Figure 19), and cultural material was not recovered from the A horizon. STP #4 encountered a dense layer of river cobbles at 4.5 feet below the surface (66.5 feet AMSL). The other two STPs encountered disturbed stratigraphy related to utility trenches (STP #1) and a stripped B horizon (STP #2).

Trench 4. Trench 4 was located on the east side of Building 20. Five trench holes were excavated by the backhoe and one STP was hand excavated at the base of each trench hole. None of these excavations encountered A Horizon soils within the five to six foot depth of the proposed utility lines (down to between 64 and 65 feet AMSL). STP #1 was adjacent to an STB 42, where a buried A horizon was identified. However, STP #1 encountered sewer line disturbance. Within STP #2, the stripped sandy clay at the base of the fill (3 feet below surface; 67 feet AMSL) contained an area of decomposed wood which was initially suspected of being a feature but appears to have been decomposing natural vegetation. The trench hole for STP #3 was six feet deep (down to 64 feet AMSL). A rotted fencepost was observed in the trench wall at approximately five feet below surface (see Figure 18). The backhoe excavation was halted at a layer that appeared to have some integrity but STP #3 encountered additional fill. Thus it appears that the fencepost in trench hole #3 was an inclusion within the fill. STPs #4 and #5 were excavated to 65.5 feet AMSL and neither encountered historic grade.

Trench 5. Trench 5 was situated between the water tower, the railroad tracks, and several smaller outbuildings. All four trench holes were negative for historic grade. The holes were seven feet deep (to 60 feet AMSL) and contained disturbed soils that appeared to terminate on bedload alluvium (Figure 20).

Trench 6. Trench 6 was situated across the railroad tracks into a parking lot behind another set of buildings. Four trench holes were mechanically excavated without encountering historic grade.

Trench hole #1 was approximately seven feet deep (down to 60.5 feet AMSL). The fill terminated on gravels and clay.

Trench hole #2 filled with water at 3.5 feet (63.8 feet AMSL). STB 41 was located adjacent to trench hole #2 and did not intercept a water line or trapped water. The interpretation of this STB indicated a buried A Horizon at seven feet (60.3 feet AMSL) below naturally deposited alluvium and fill, but an intact historic surface was not seen during the excavation of this hole. The fill depth in both STB 41 and trench hole #2 was determined to be approximately three feet (down to 64.3 feet AMSL).

Trench hole #3 was 3.3 feet deep (down to 63.2 feet AMSL) and an STP was started at the base. The STP was terminated when the fill was determined to interface with a stripped compact clay. Trench hole #4 was also 3.3 feet deep (down to 62.7 feet AMSL) and exhibited similar stratigraphy to trench hole #3. The reason for the shallow fill in these two trench excavations may be that: 1) the base of fill was not reached by the backhoe, or 2) the area represents a higher elevation.

Trench 7. Trench 7 contained three trench holes and was located between Building 20 and the railroad tracks. Two shovel tests were partially excavated in trench holes 1 and 3. Trench hole 2 was six feet deep (down to 62 feet AMSL) and was determined to consist of gray clay and sand fill resting on water-worn cobbles and oxidized dark yellowish brown coarse sand (Figure 20). Trench holes 1 and 3 were left high at depths of 3 to 4 feet (64 to 65 feet AMSL). Shovel test pit #1 terminated on a compact conglomerate of pebbles and reddish yellow sand. Shovel test pit #3 was determined to be fill as well and was discontinued. Because trench hole #2 contained fill to a depth exceeding five feet, the adjacent holes were assumed to contain similar stratigraphy.

F. Artifacts Recovered

A total of five artifacts were recovered during the archaeological investigation at Cameron Station (Appendix C). Three of the artifacts were prehistoric and two were historic. The prehistoric artifacts were lithic debitage. Modern artifacts such as brick and glass observed in the fill layer of the STPs were not collected for processing.

In Area 1, a single cortical quartzite flake (<45mm) was found in the buried A Horizon in Trench 1 STP #2 at 1.59 to 1.71 meters below current grade (55.9 to 56.3 feet AMSL). Some thermal alteration appears on the cortical surface of the artifact. A flat piece of lead of unidentified manufacture and function was also recovered from this STP in the buried layer.

In Area 2, two pieces of prehistoric debitage were recovered from the B layer in Trench 2 STP #2 at 0.98 to 1.18 meters below ground surface (66.8 to 66.1 feet AMSL). The excavators labeled the stratum as Layer B because it appeared beneath the identified A layer in the STP. The B layer was a gravelly sandy clay loam that included many naturally broken pebbles. The debitage recovered is questionable because of the association with this layer. One artifact is a small (<10mm) white quartz shatter lithic and the other an equally small brown chert shatter chunk. The historic artifact from Area 2 was also recovered in Trench 2 from the north radial of STP #2. It was a curved, colorless piece of glass found at the interface of layers A and B, 1.0 to 1.03 meters below ground surface (66.6 to 66.7 feet AMSL).

VIII. Interpretation of Results

The geomorphological results of this investigation contribute to the estimation of potential for buried cultural resources in urban Alexandria. The auger borings indicate that the landscape at Cameron Station was highly disturbed by construction activities. Although filling has in other places been found to preserve underlying natural deposits, the grading and filling at Cameron Station left only minimal pockets of undisturbed buried ground surfaces.

The integration of results from all four phases of this investigation is complicated by the varied ecological composition of the property. The pre-fill valley region was not a static environment because of the nature of its wetland marshes, stream drainages, sandbars, and slopes. As a result, the soil probe tests encountered many apparent anomalies within a limited area. Due to these anomalies, the identification of historic grade during the removal of fill in trenches and the subsequent excavation of shovel test pits did not always match the auger evaluations. Some of the auger evaluations may have been skewed by the distribution of wetland material within the 1940s fill zones. Overall, however, the auger data provided reasonable predictions of the presence and elevations of intact buried surfaces.

In Area 1, the location of positive STB 3 was approximately 50 feet from STP 2, where artifacts were found. The buried A horizon was identified at essentially the same elevation in STB 3 (56.00 to 55.5 feet AMSL) and in STP 2 (56.25 to 55.8 feet AMSL). The two nearby shovel tests (STP #2 radials south and east) contained buried A horizons within the same elevation range and were negative for cultural material.

The testing of Area 2 was more extensive than Area 1 because of the greater extent of proposed impact. A horizons were identified in four STBs in Area 2. In three of these STBs the A horizon varied between 62.4 feet and 68.6 feet AMSL, immediately below 2.5 feet to 4 feet of fill. STB 41 revealed that the surface immediately below the fill had been graded away at this location, but that a deeper intact A Horizon is present at 60.3 feet AMSL under naturally-redeposited alluvium. Intact, well-drained A horizons were only identified in seven STPs within Area 2 (Trench 2-STPs 2 and 3; in the four surrounding radial STPs; and Trench 3-STP 3). The other trench holes surrounding the four STBs did not reveal intact, well-drained A Horizons. A variety of factors account for the negative results. Proposed impacts and thus trench holes in the vicinity of STB 41 were shallower than the A horizon identified in STB 41. Disturbance from sewer lines adjacent to STB 42 and STB 44 account for the negative results in trench holes adjacent to these STBs. The trench holes in the vicinity of STB 43 revealed that the A horizons in this area were within a poorly-drained portion of the terrace. Excavations to the east of STB 44 provided the most consistent identification of intact, well-drained A horizon surfaces. All six excavations within a grassy lawn to the east of STB 44 encountered intact, well-drained A horizons and one STP yielded prehistoric artifacts. The only other intact, well-drained A horizon identified in the trench holes was in Trench 3, approximately 200 feet south of the grassy lawn area. The combined data from Area 2 indicates that only small patches or pockets of intact, well-drained A horizon remain in this area.

When the locations of intact A Horizon are mapped directly onto the historic map, one can see where they fall on the landform (Figures 21 and 22). It would appear that the intact surfaces in Areas 1 and 2 are aligned along the same terrace, parts of which were spared in the stripping process. Pockets of intact surfaces were found to remain immediately below the 1940s fill at elevations varying between 55.6 feet AMSL in Area 1 and 68.6 feet AMSL in Area 2. A deeper, naturally-buried A horizon was found in Area 2 (STB 41) at 60.3 feet AMSL; this deeper A horizon was minimally investigated as it remained below the proposed depth of impact.

IX. Conclusions and Recommendations

The investigations produced a number of results related to the project's stated research goals. First, it was determined that intact historic grade does exist within the project area, even if only in remnant pockets. Following this it was determined that the remnant pockets of preserved original surfaces do contain evidence of prehistoric and historic activity. The location of these archaeological resources on the lower terraces at the base of the bluff slopes provides support for the predictive model presented earlier of high potential on gently sloping terraces adjacent to the confluence of streams. Unfortunately, the archaeological remains in the limited remnant pockets were of too limited frequency and quantity to allow more detailed conclusions. The presence of artifacts within the original surface horizon soils of the lower terraces indicates that human occupation occurred there, but does not shed much light on the activities that took place there.

The geomorphological and archaeological investigations of Cameron Station have provided valuable information regarding the original landforms and environment in this area prior to the 1940s construction of the installation. The investigation has also provided information on the effects of large-scale development on the landscape which may be useful in augmenting current data on the environmental conditions in Alexandria through time. Much of the resulting information supports, at least in part, the previous investigations at Cameron Station by Louis Berger and Associates and the Kise Franks & Straw Historic Group. Although they determined that the sub-fill landscape at Cameron Station could be classified as wetlands, and would therefore hold very little potential for cultural deposits, this investigation found that the project area did hold pockets of relatively undisturbed, well-drained, A horizon soils. The recovery of prehistoric lithics, albeit small in size and number, within the archaeological investigation of those pockets, demonstrates the prehistoric utilization of these terraces. However, because of the scarcity of prehistoric debitage and the absence of tools or ceramics, the locations in which they were found are not considered as significant sites.

The geomorphological reconstruction of this particular location within the Inner Coastal Plain enables an assessment of its potential for prehistoric resources prior to construction of Cameron Station in the 1940s. The terraces which existed in Areas 1 and 2 probably held the highest potential for archaeological sites within the installation. The construction of Cameron Station in the 1940s involved extensive grading and filling, which resulted in the destruction of most terrace surfaces. The auger borings demonstrated that most filled areas were graded prior to filling. Some small portions of the terrace surface were filled without grading, leaving pockets of intact areas with potential for prehistoric archaeological sites.

Based upon the results of the combined archaeological and geomorphological investigation at Cameron Station, no further archaeological work is recommended prior to the development of the property. The minimal prehistoric artifacts do not constitute a potentially significant archaeological resource.

The investigations leave open the possibility that additional remains from prehistoric occupation could exist on the remnant terraces outside of the tested areas. Such resources have been preserved under fill below the townhouse development. Figures 11, 21, and 22 provide mapping of the extent of areas with potential for such resources. Based on the results of the archaeological testing it is probable that the highlighted areas are mostly disturbed by earlier grading, although small pockets of intact A horizon surfaces may be preserved.

As many archaeologists must necessarily deal with urban environments where massive impacts have been made on the original landscape, it is hoped that the methods and results outlined in this investigation will be of use. Geomorphological investigation is invaluable to the archaeologist because of its utility in enabling landscape and environmental reconstructions. The GeoProbe 5400 auger was efficient in reaching great depths in a short period of time, enabling the on-site interpretation of subsurface deposits by a geomorphologist. Reconstruction of the original landform under an urban landscape is a necessary tool for the prediction of remnant potential prehistoric and early historic site locations.

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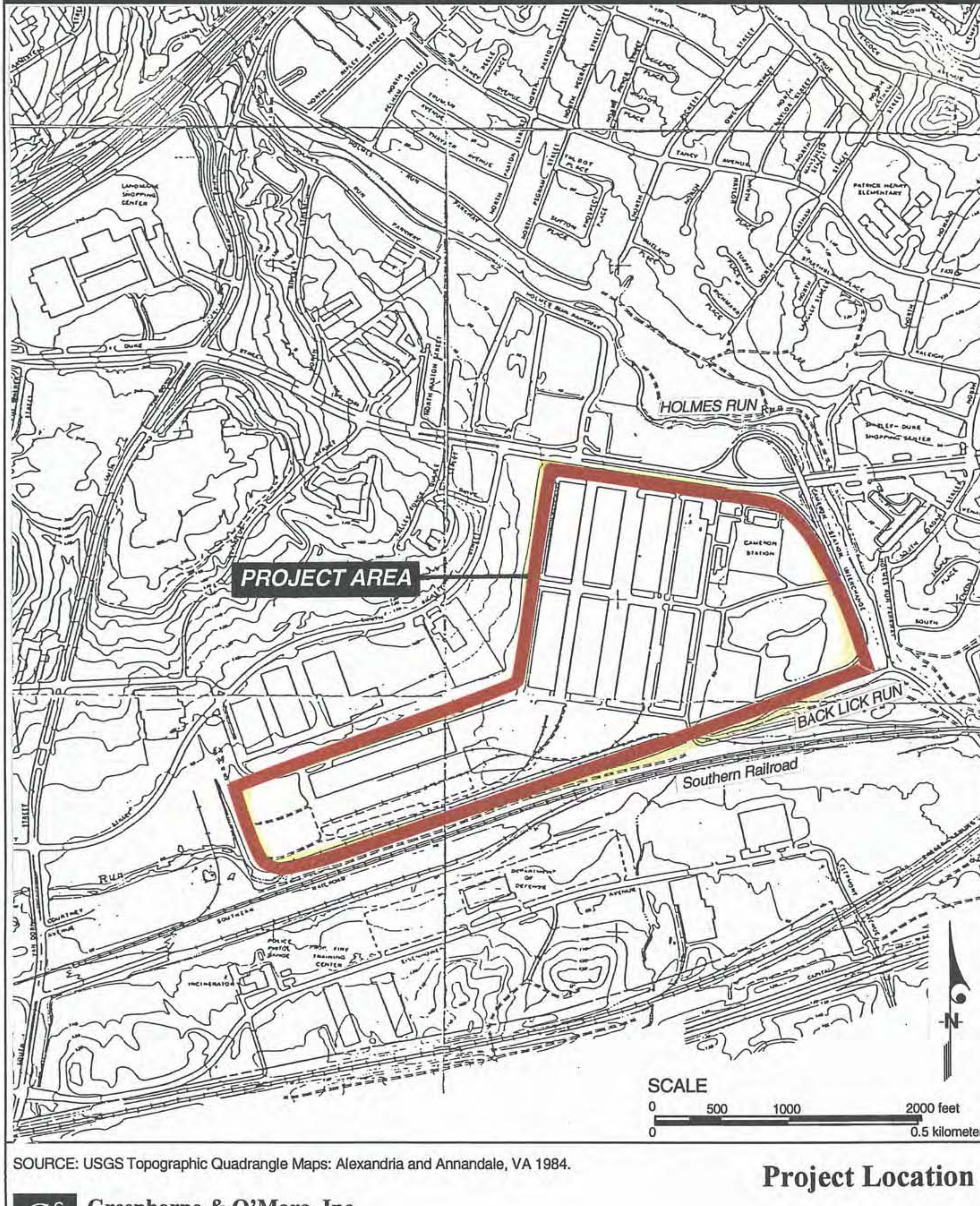
CAMERON STATION



SOURCE: USGS Topographic Quadrangle Maps: Alexandria and Annandale, VA 1984.

Project Location

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Figure 1

SOURCE: KFS Group

Identification of Slope Cuts

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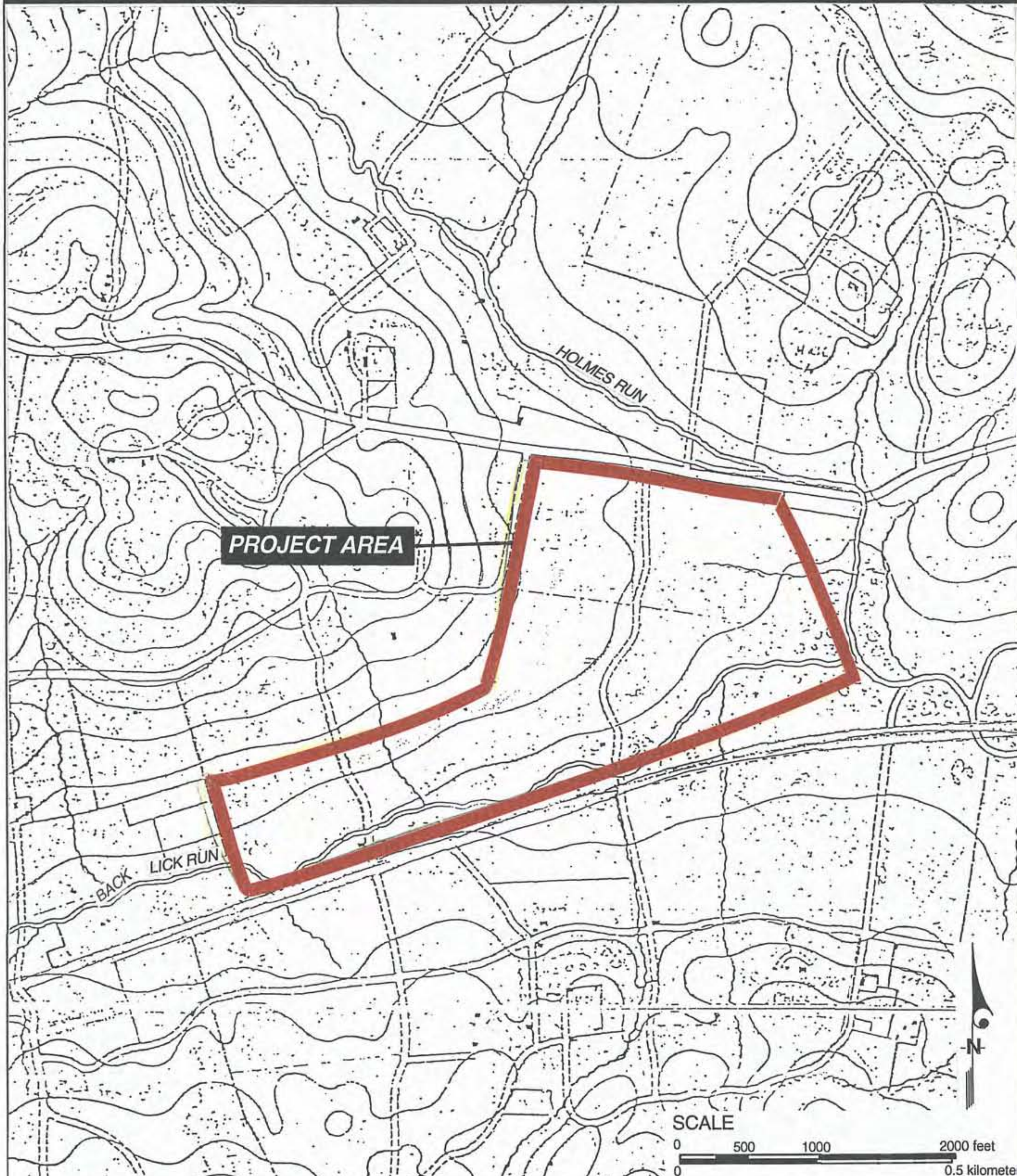
Figure 2

CAMERON STATION



SOURCE: General John Barnard "Environs of Washington"

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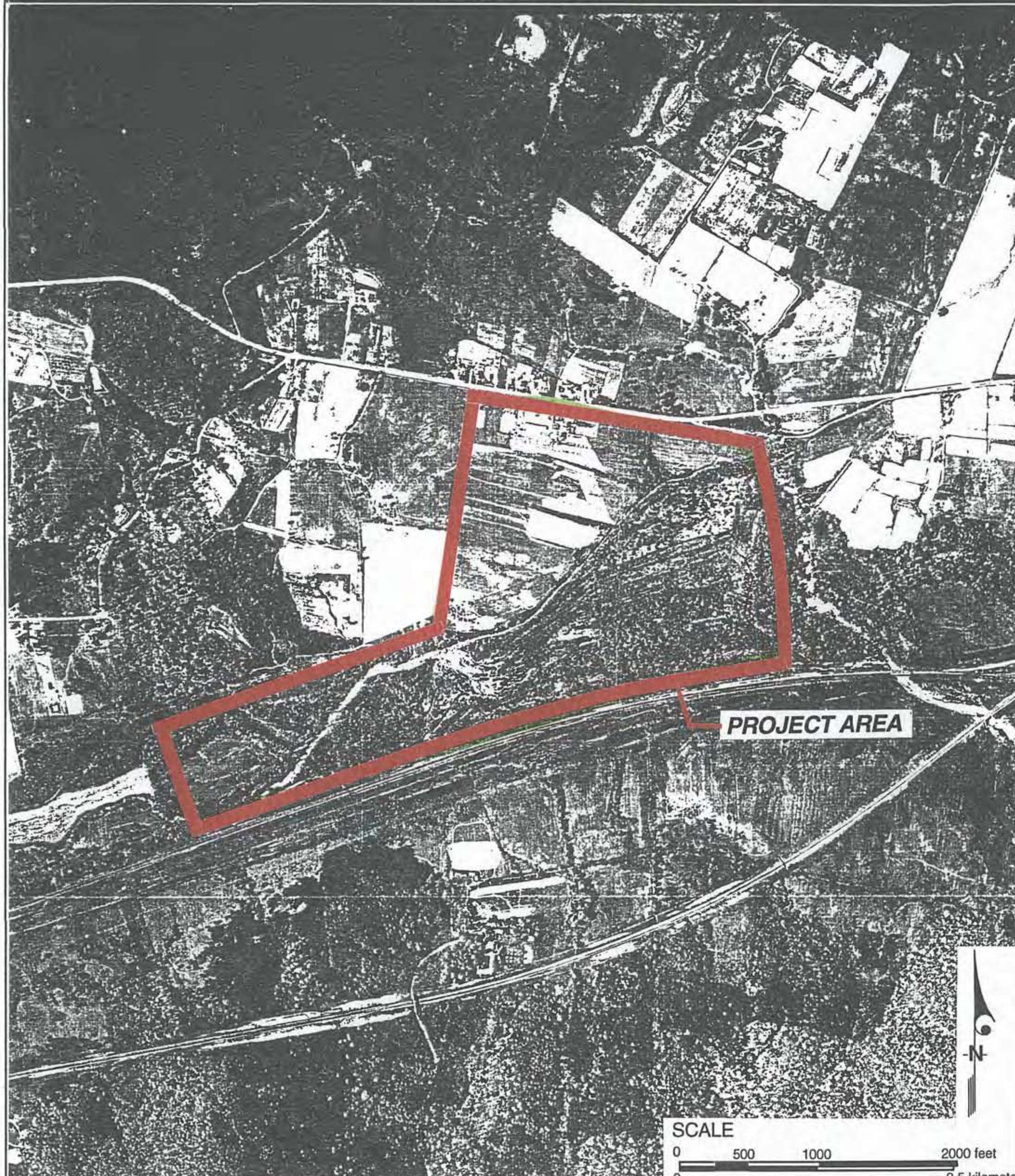
Barnard 1865 Map with Project Boundaries
Figure 3

CAMERON STATION



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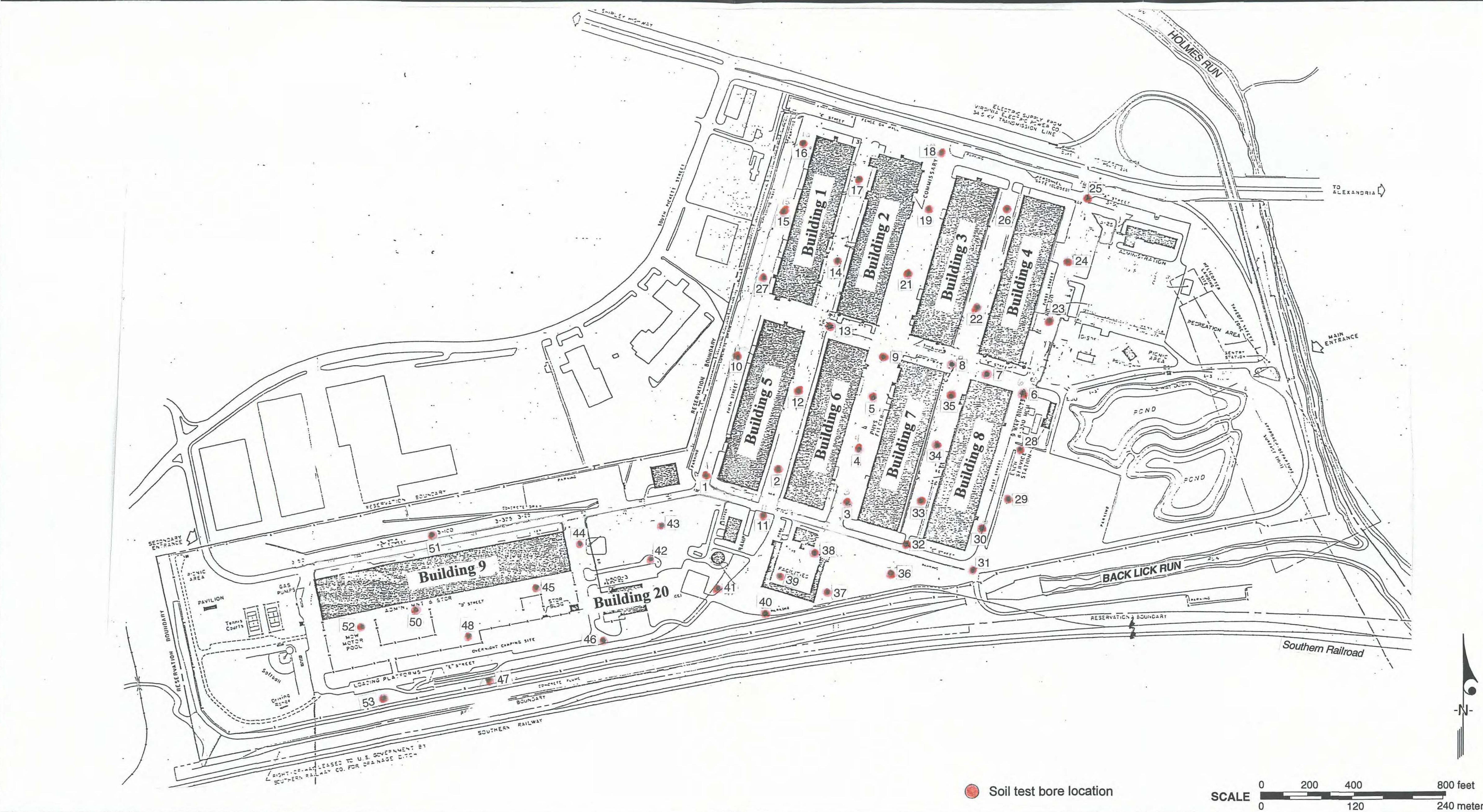
1937 Aerial Showing Project Boundaries

Figure 4

CAMERON STATION



Map of Soil Test Bores (STBs)

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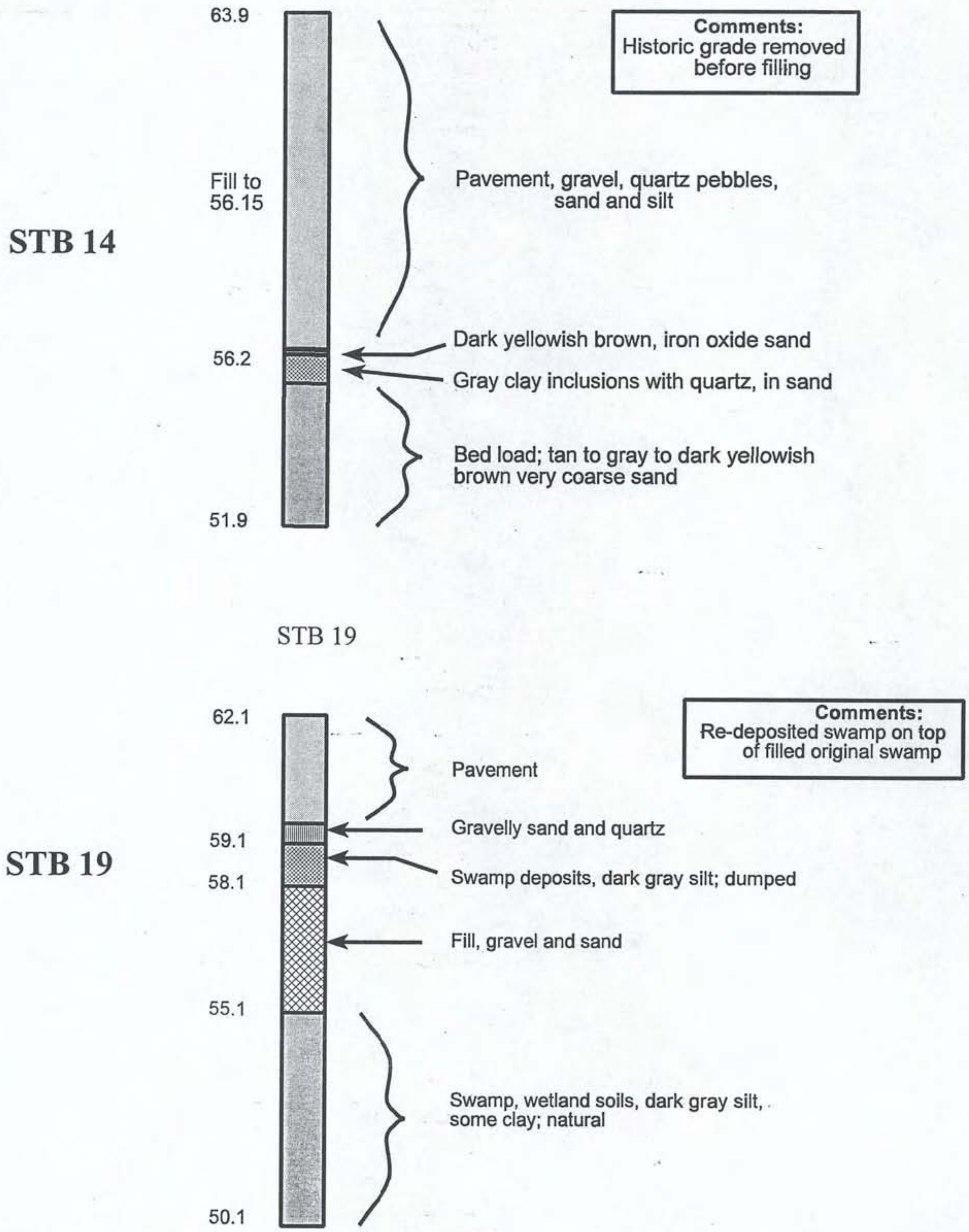
Figure 5

CAMERON STATION



Elevations in feet AMSL

STB Profiles 14 and 19

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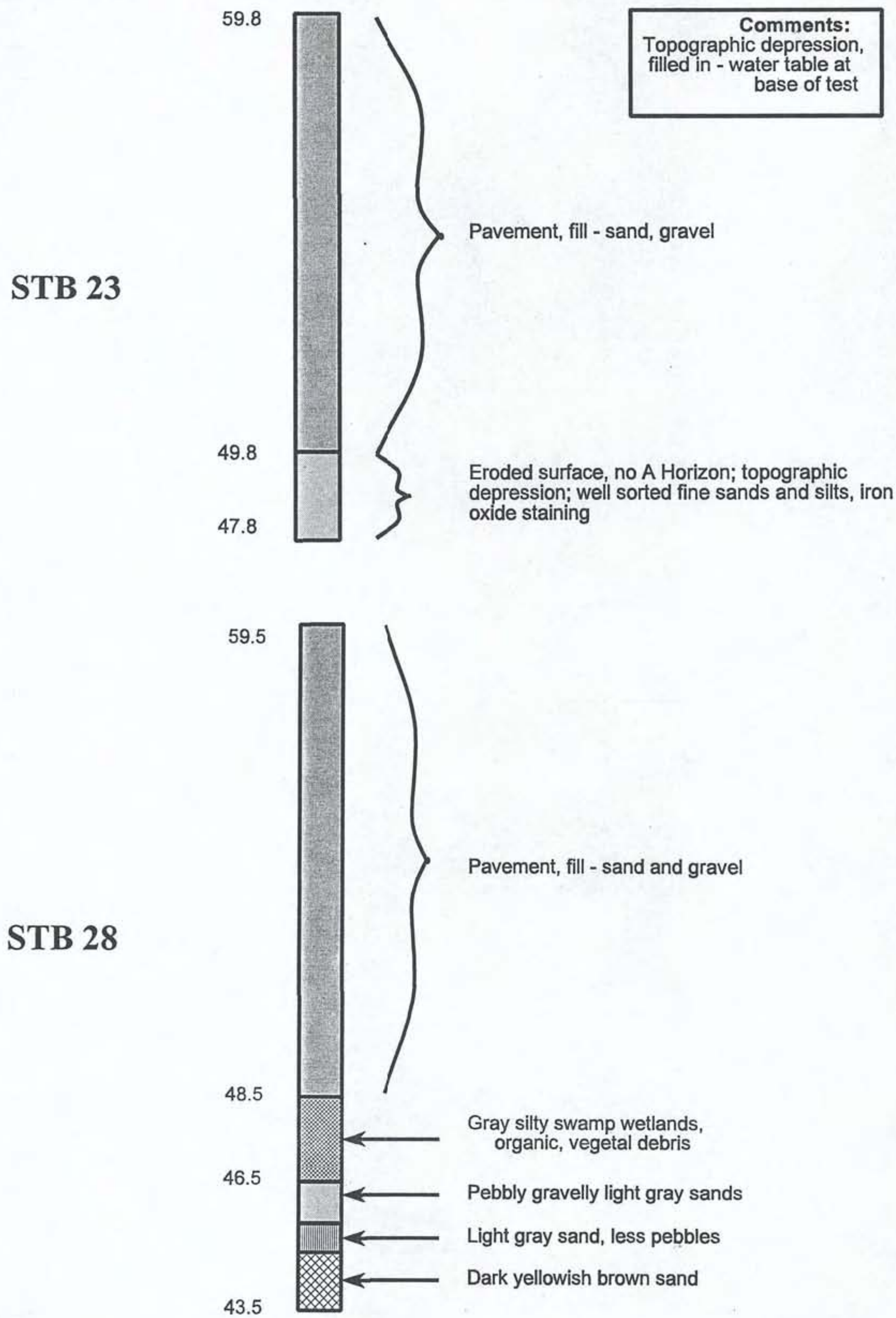
Figure 6

CAMERON STATION



Elevations in feet AMSL

STB Profiles 23 and 28

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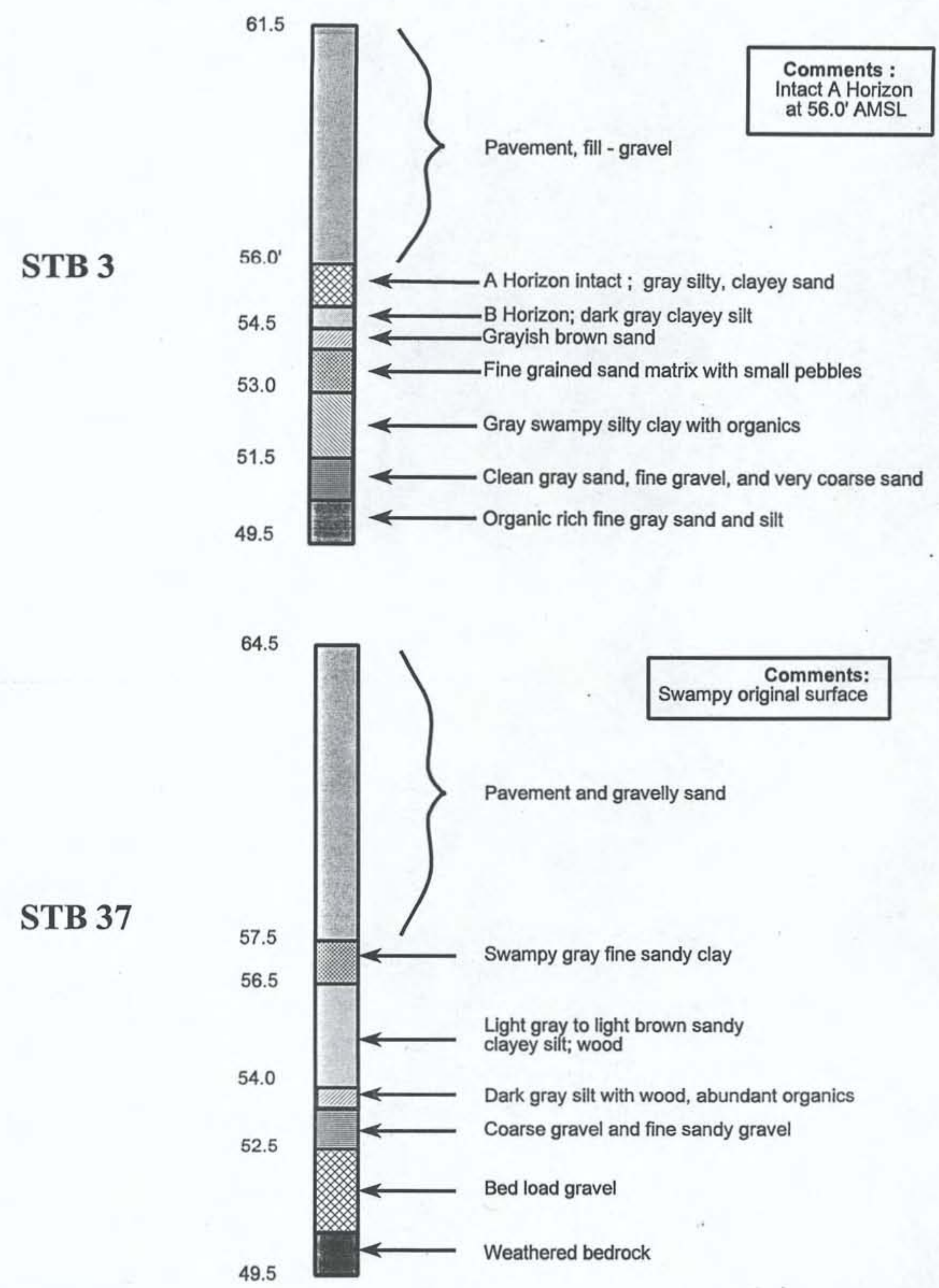
Figure 7

CAMERON STATION



Elevations in feet AMSL

STB Profiles 3 and 37

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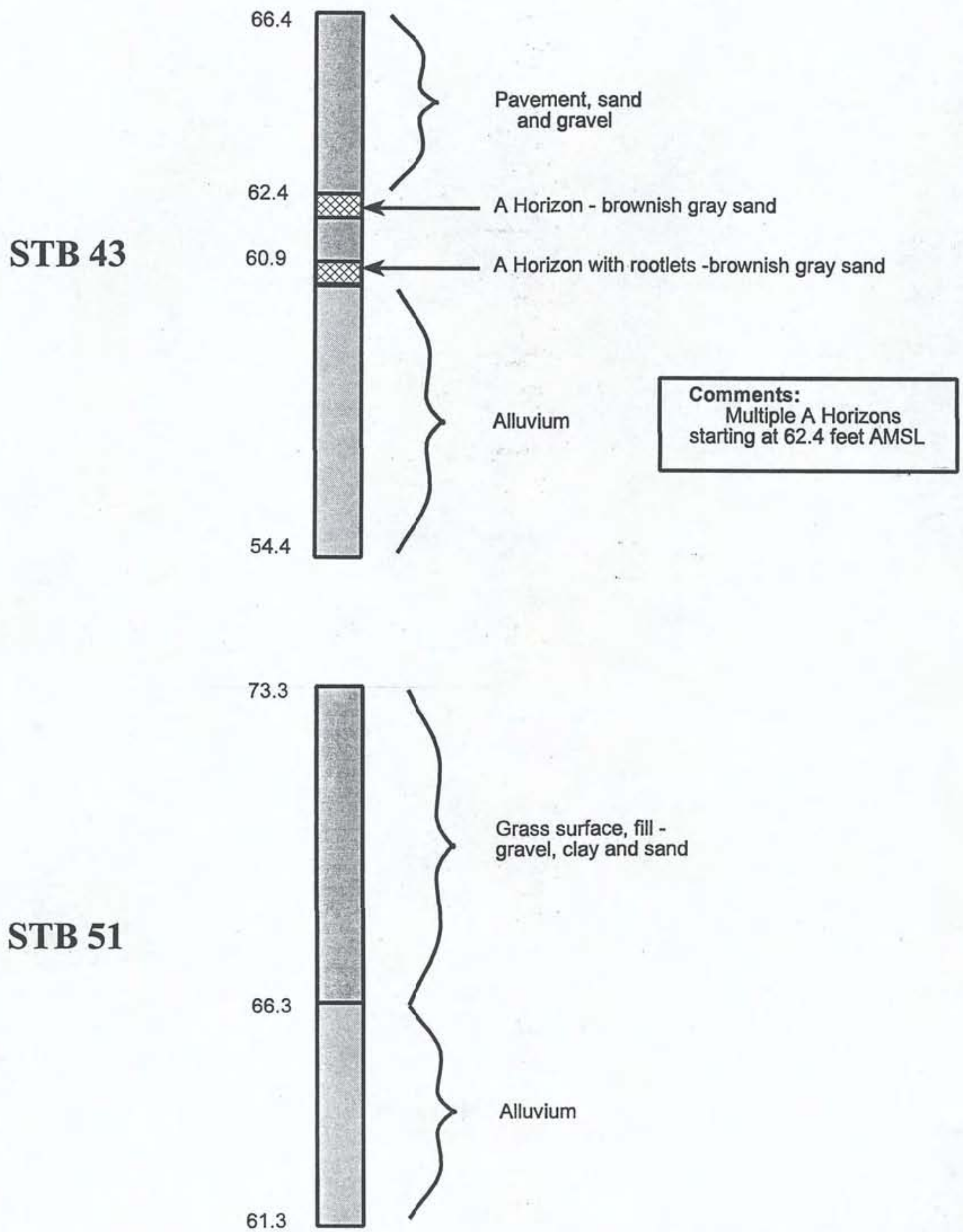
Figure 8

CAMERON STATION



Elevations in feet AMSL

STB Profiles 43 and 51

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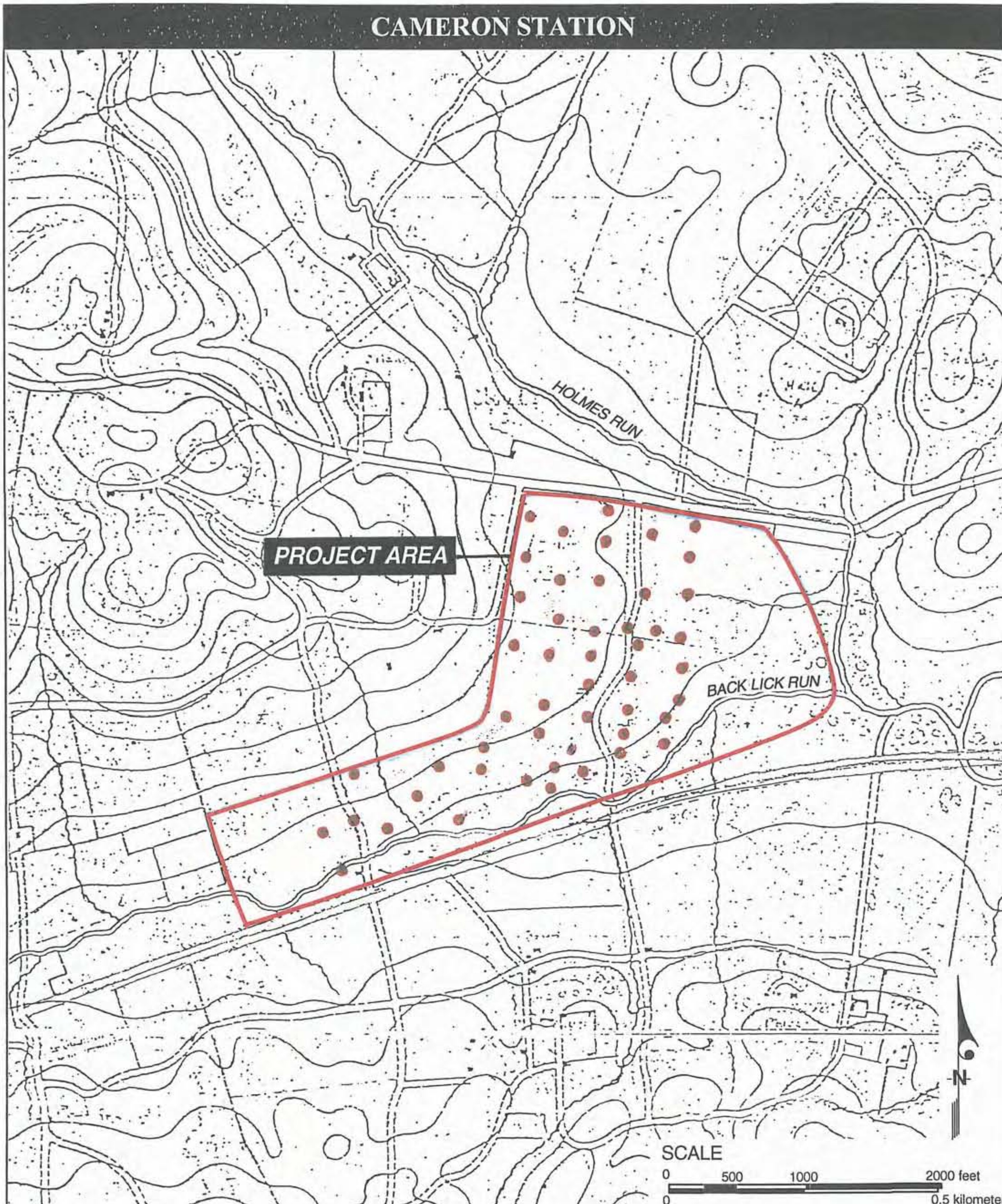
Figure 9



SOURCE: Barnard Map, 186(5)

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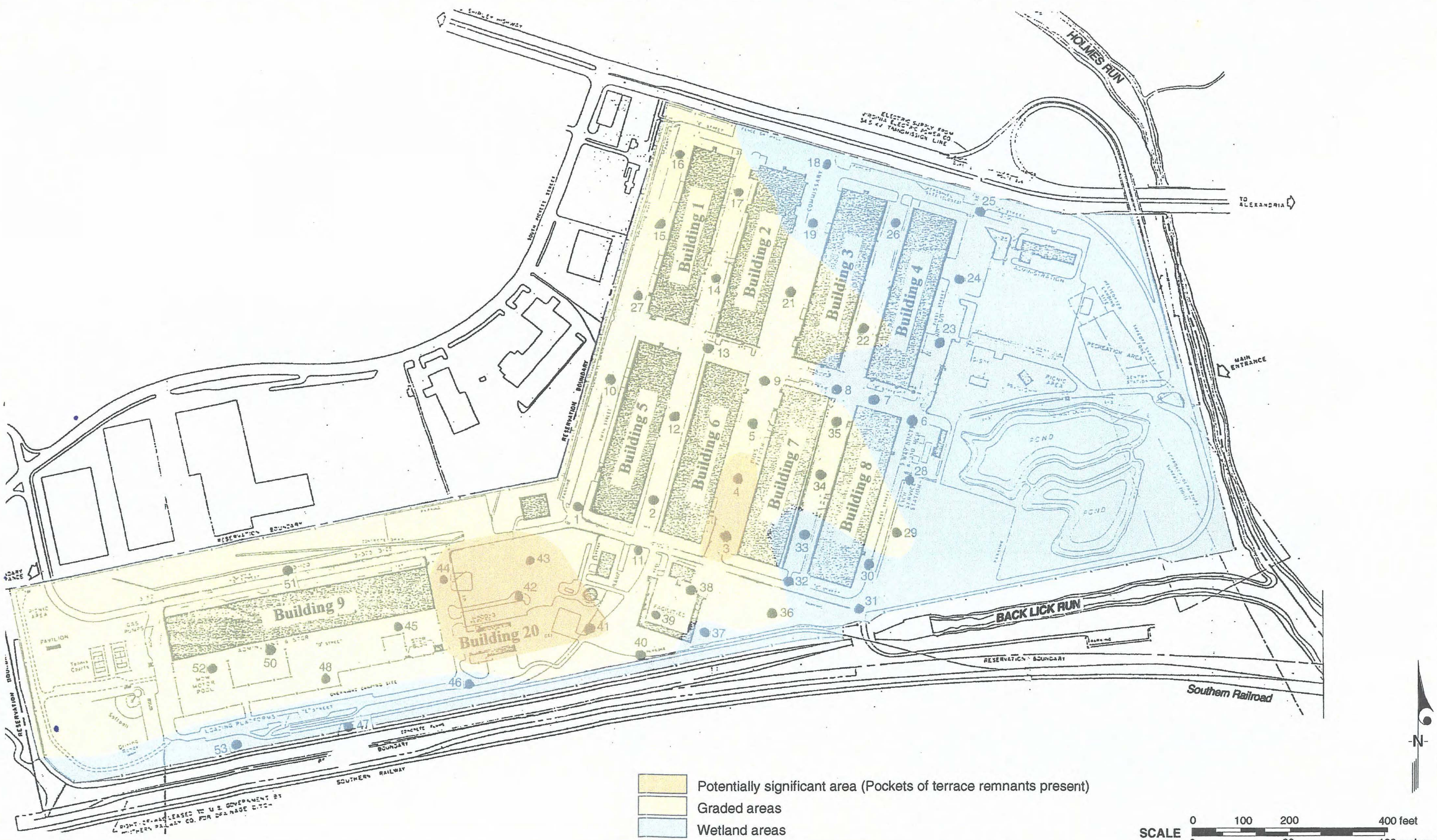
Overlay of STBs on Barnard 1865 Map
Figure 10

CAMERON STATION



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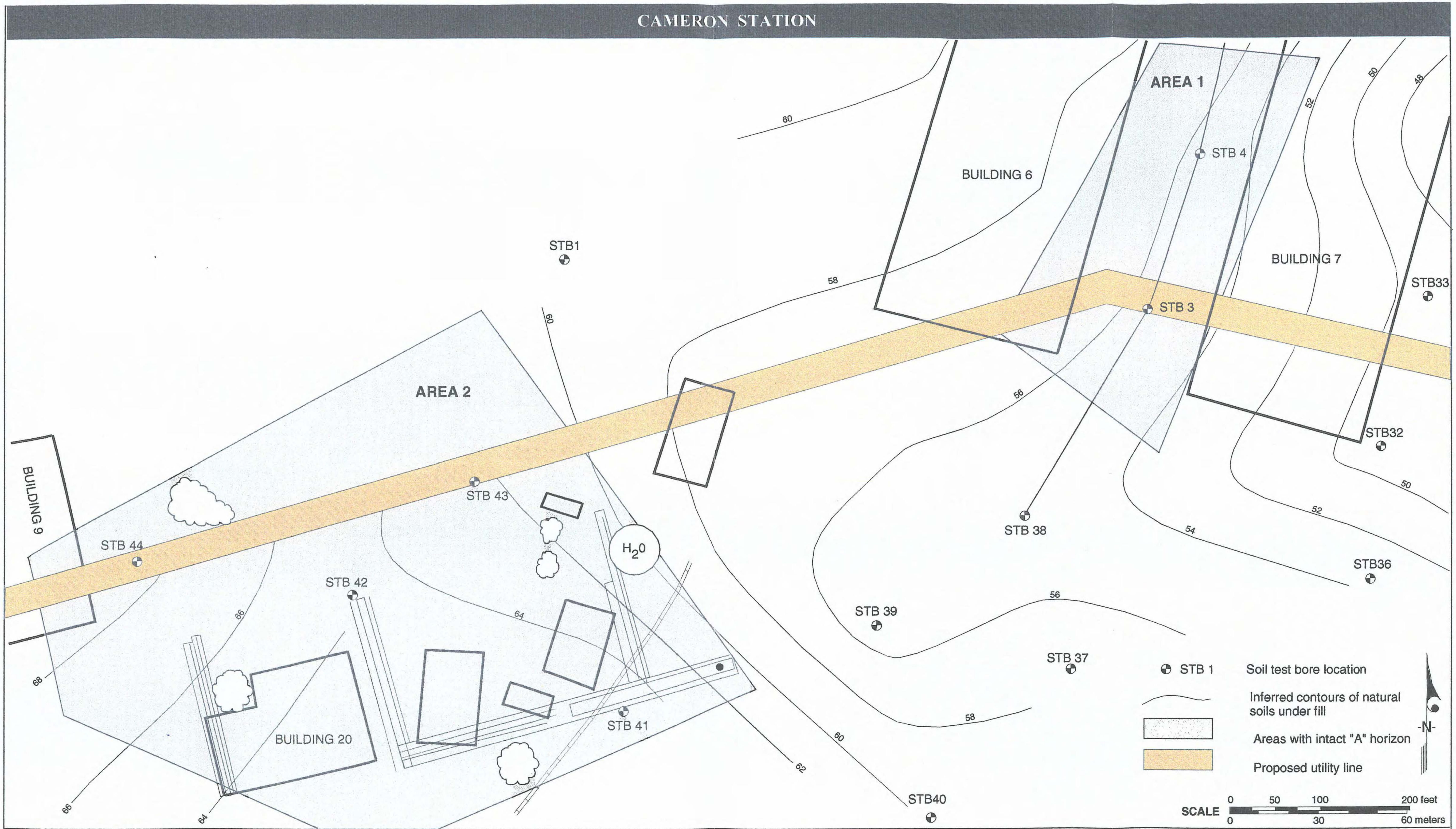
Results of Geomorphological Testing

Figure 11



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Map of Proposed Utility Lines with Areas 1 and 2

Figure 12

CAMERON STATION

Photographs of Monitoring Activities

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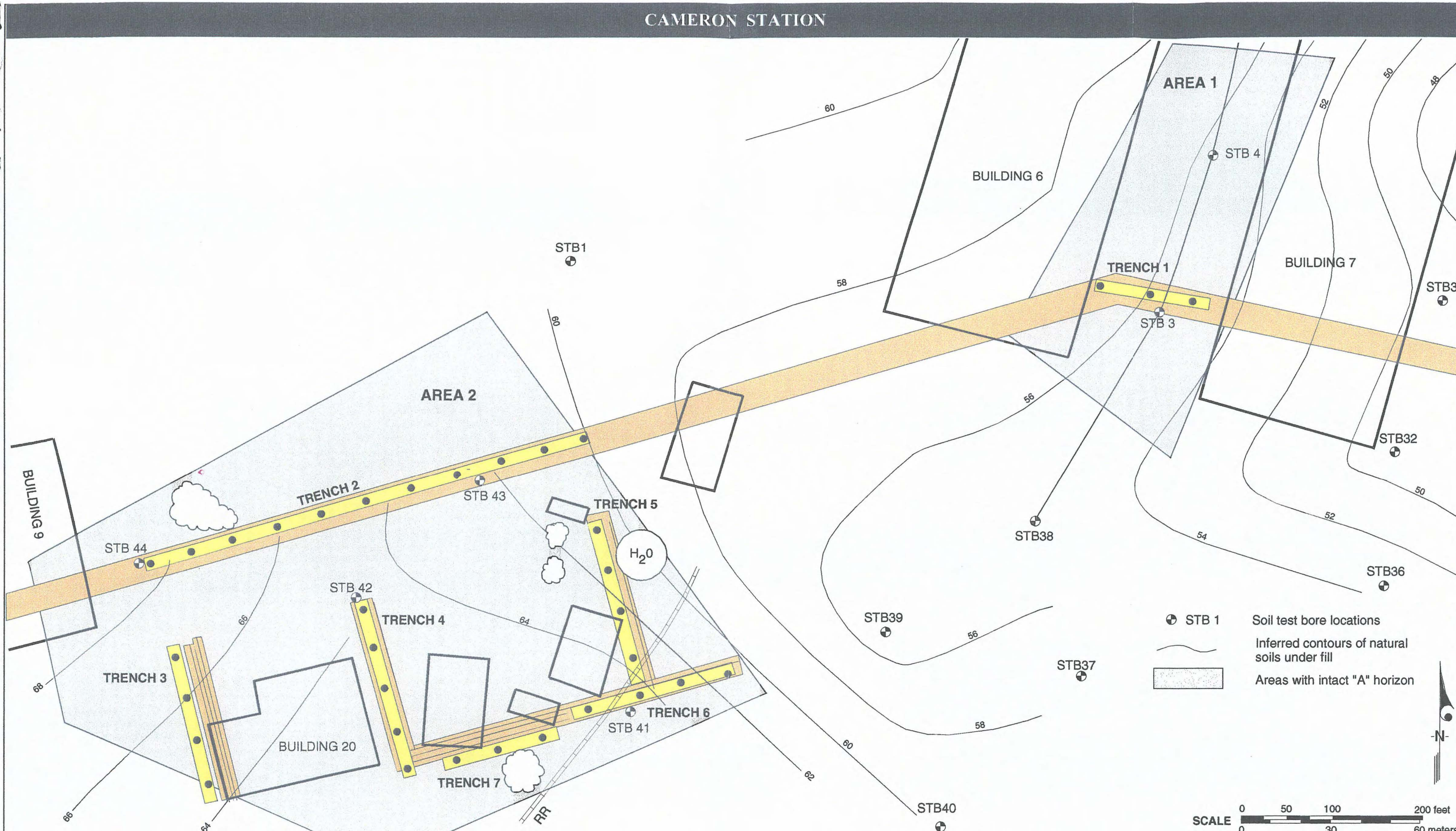
Figure 13



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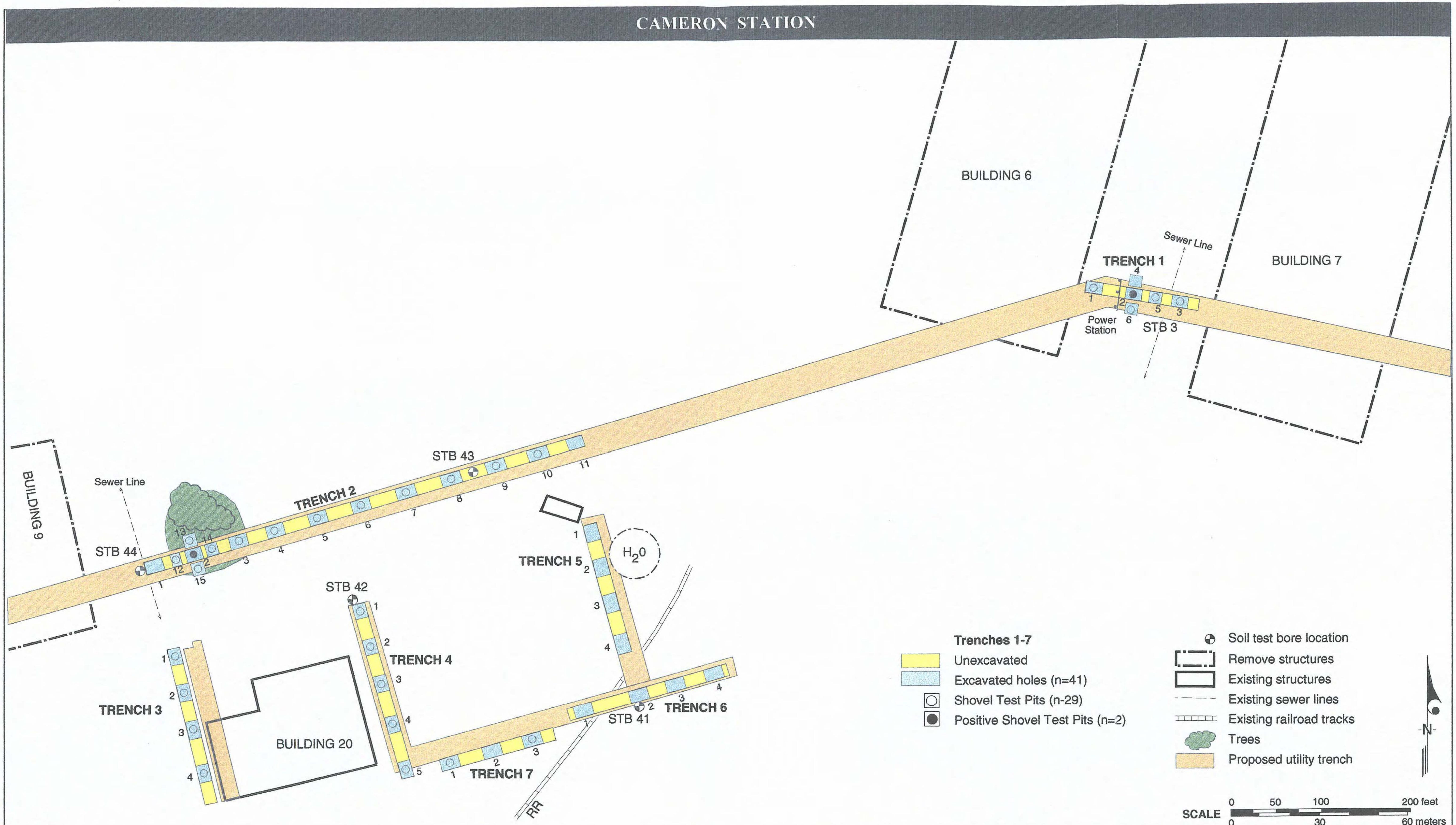
Map of Proposed Excavations over Utility Lines

Figure 14



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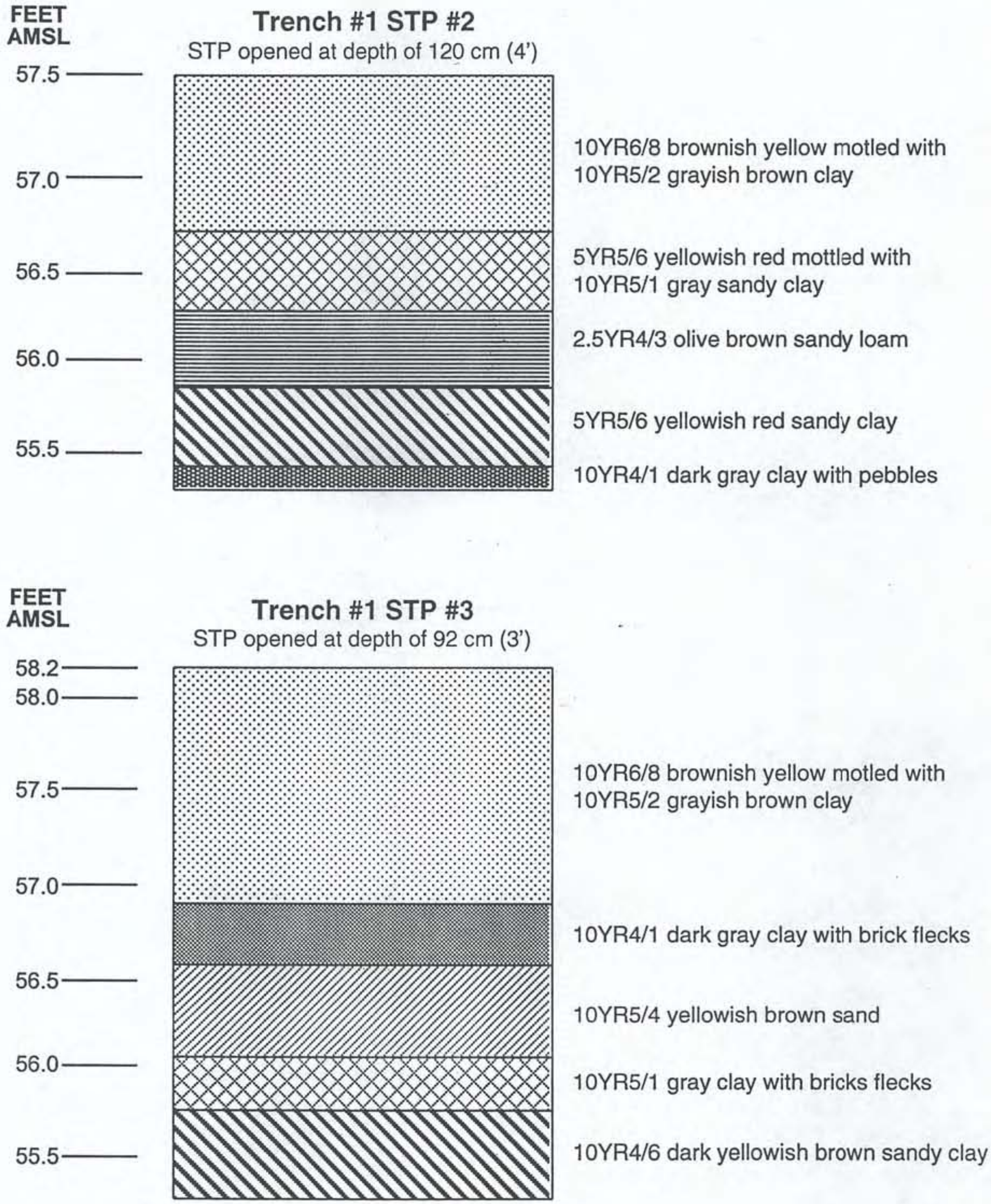
Map of Excavations

Figure 15



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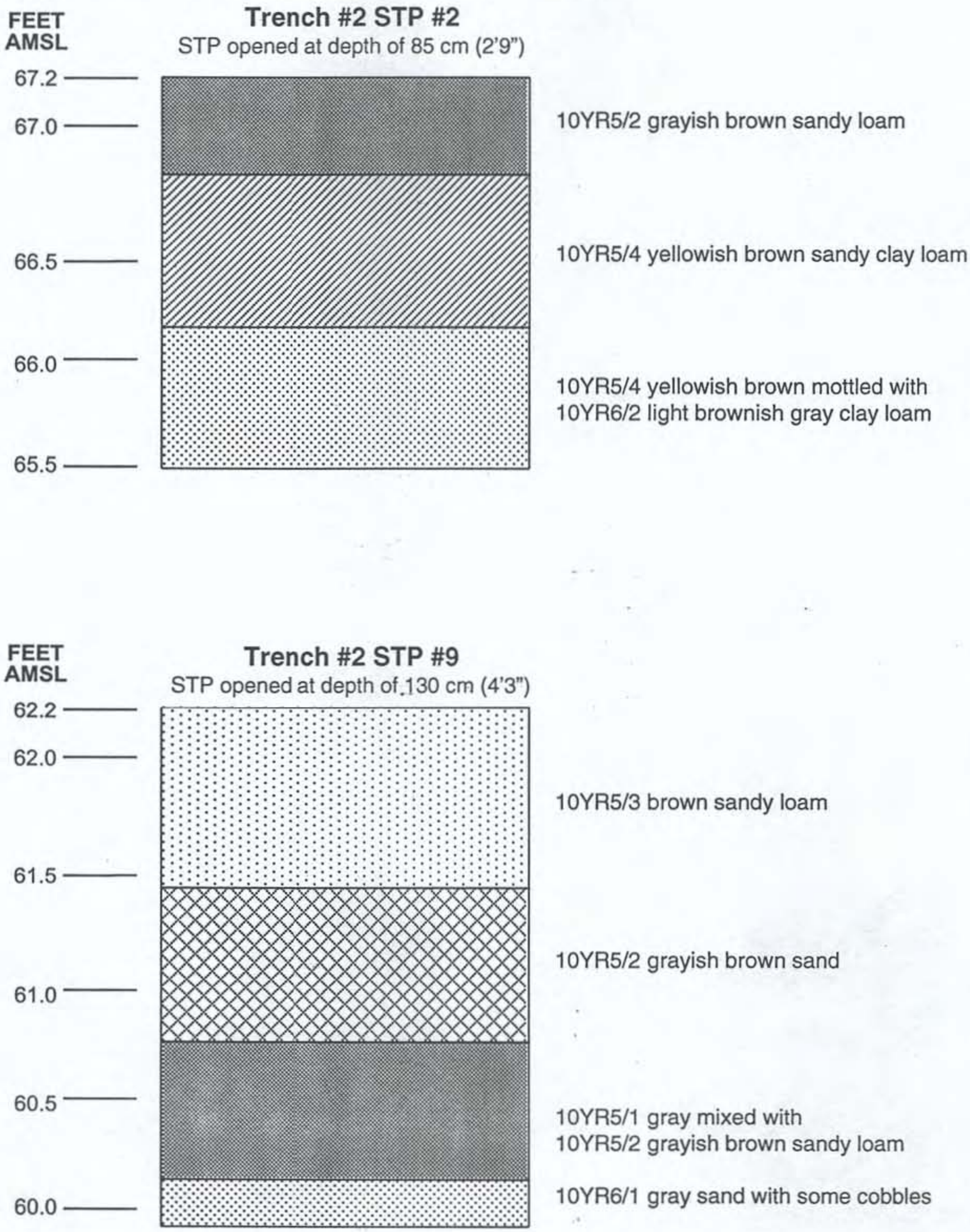
Profiles of Shovel Test Pits
#2 and #3 in Trench 1
Figure 16

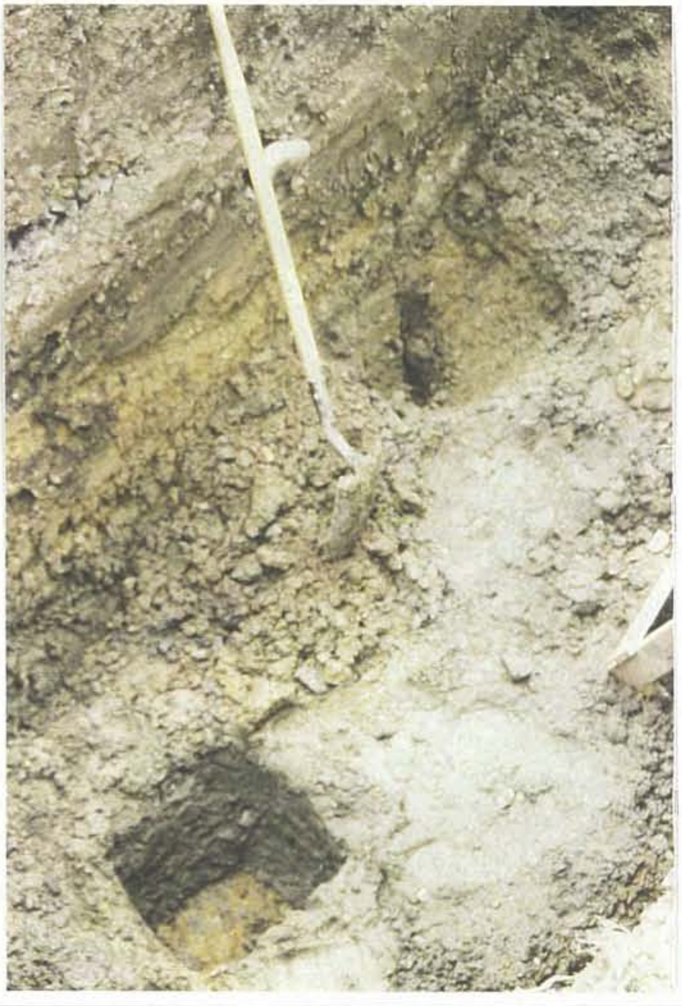


Profiles of Shovel Test Pits #2 and #9 in Trench 2

Figure 17

CAMERON STATION

Trench 2, STP #8

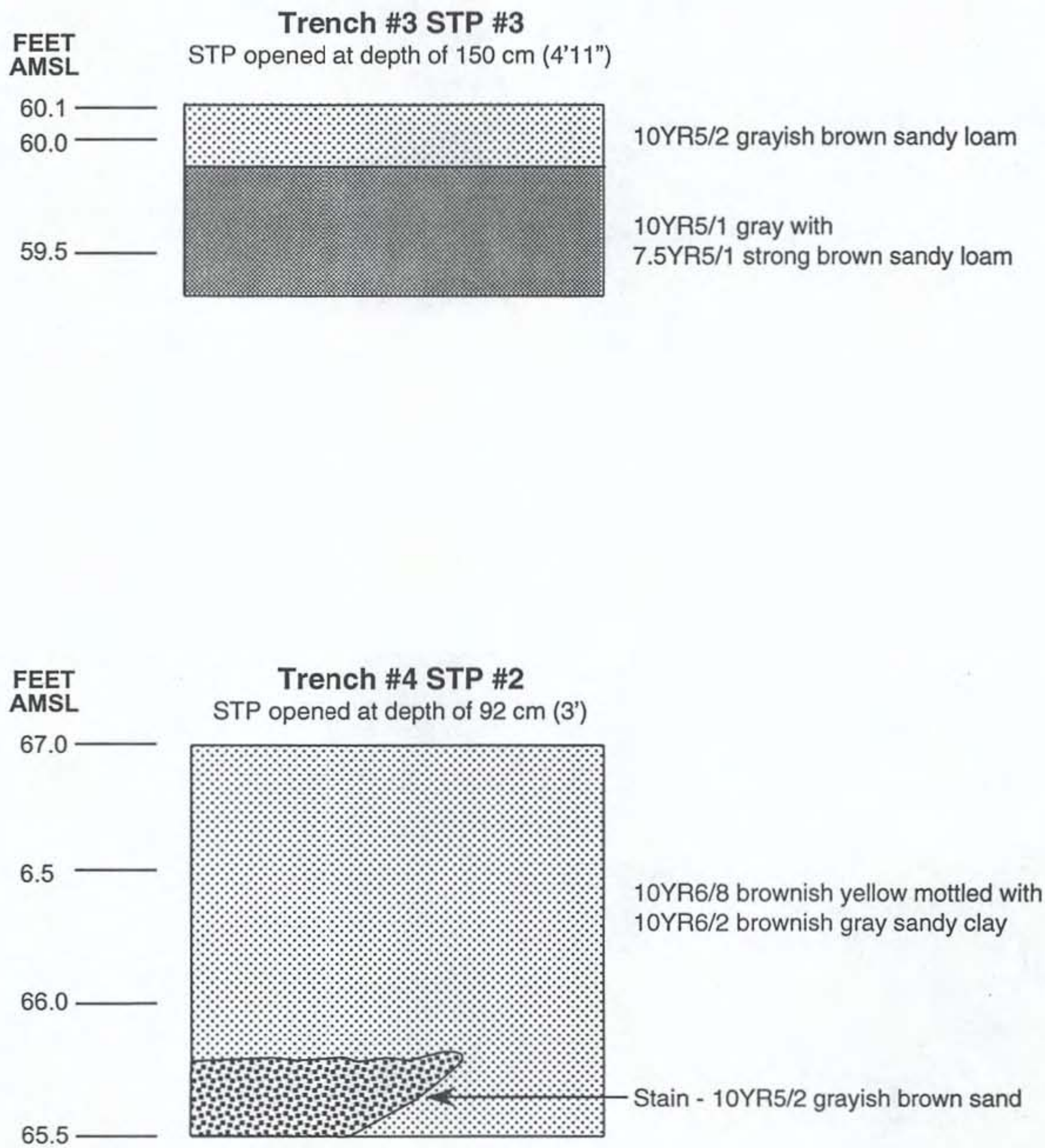


Trench 4, STP #3
Wooden Post in wall right of shovel.

Photographs of Trench 2 STP #8 and Trench 4 STP #3

Figure 18

CAMERON STATION



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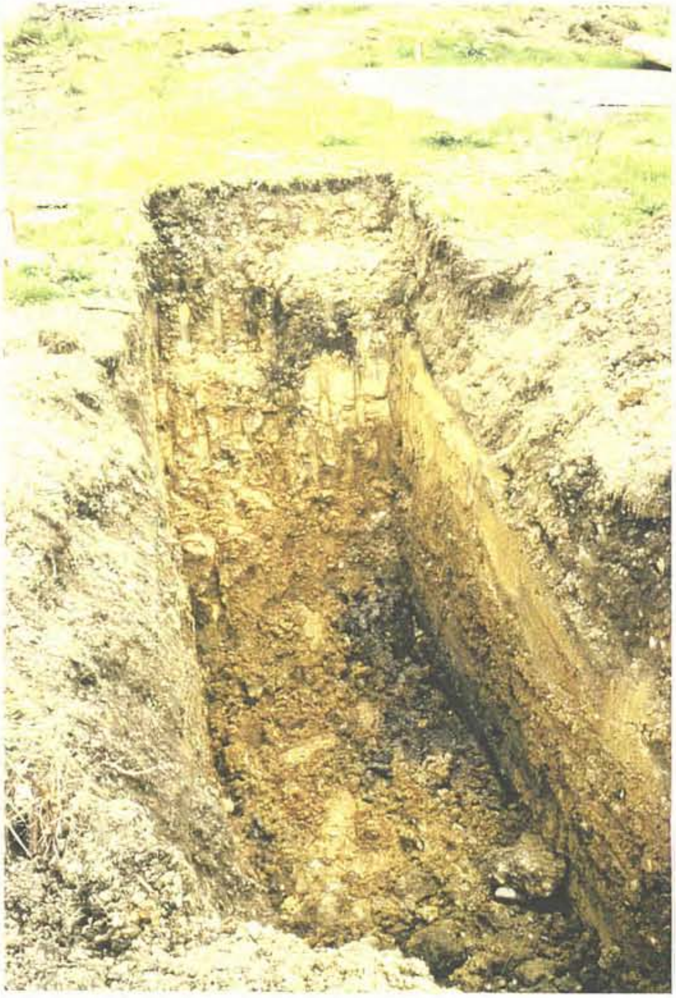
Profiles of Shovel Test Pit #3 in Trench 3 and Shovel Test Pit #2 in Trench 4

Figure 19



Trench 5, Hole #2

Trench 7, Hole #2

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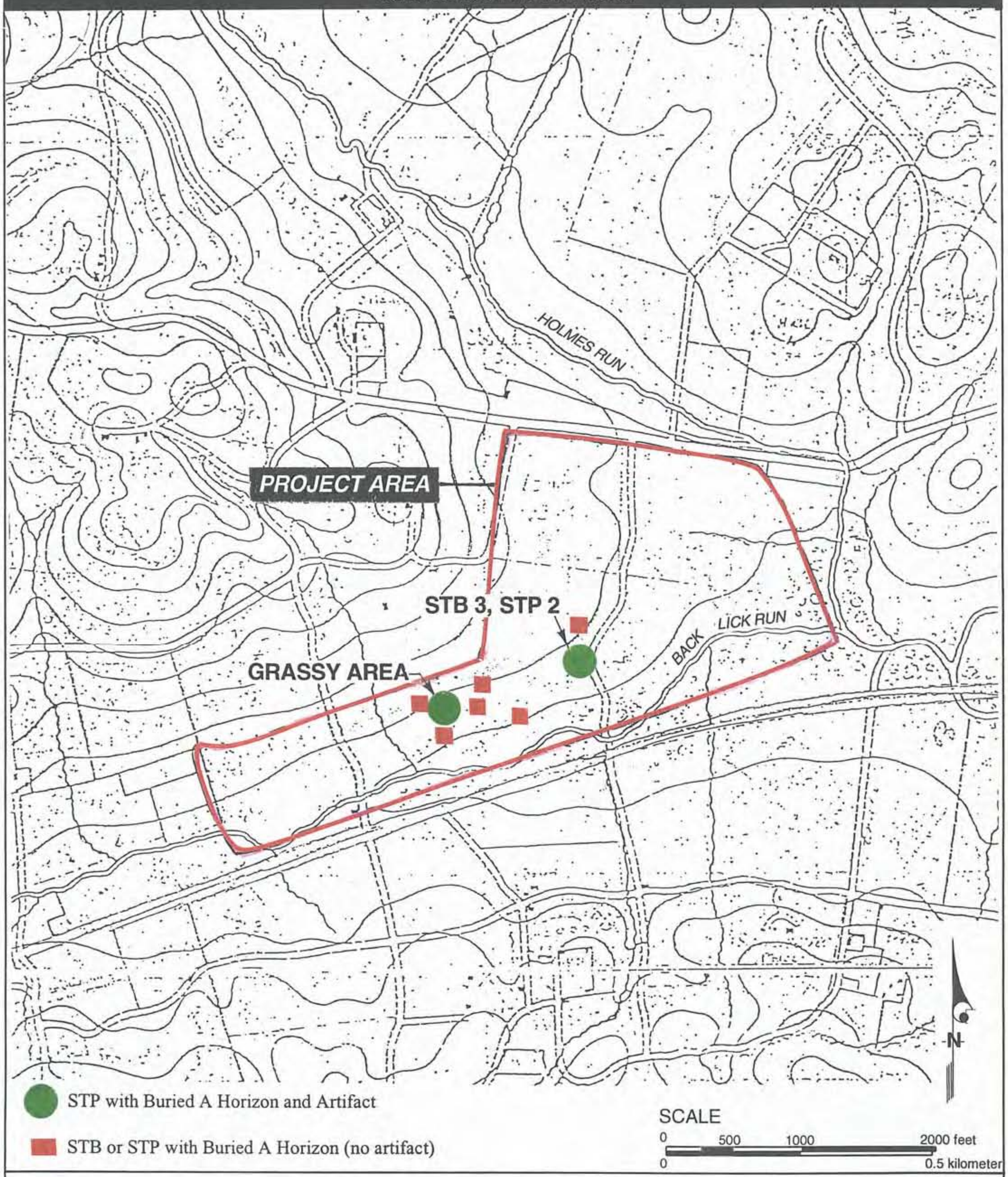
Photographs of Trench 5 Hole #2 and Trench 7 Hole #2

Figure 20



SOURCE: Barnard Map, 1865.

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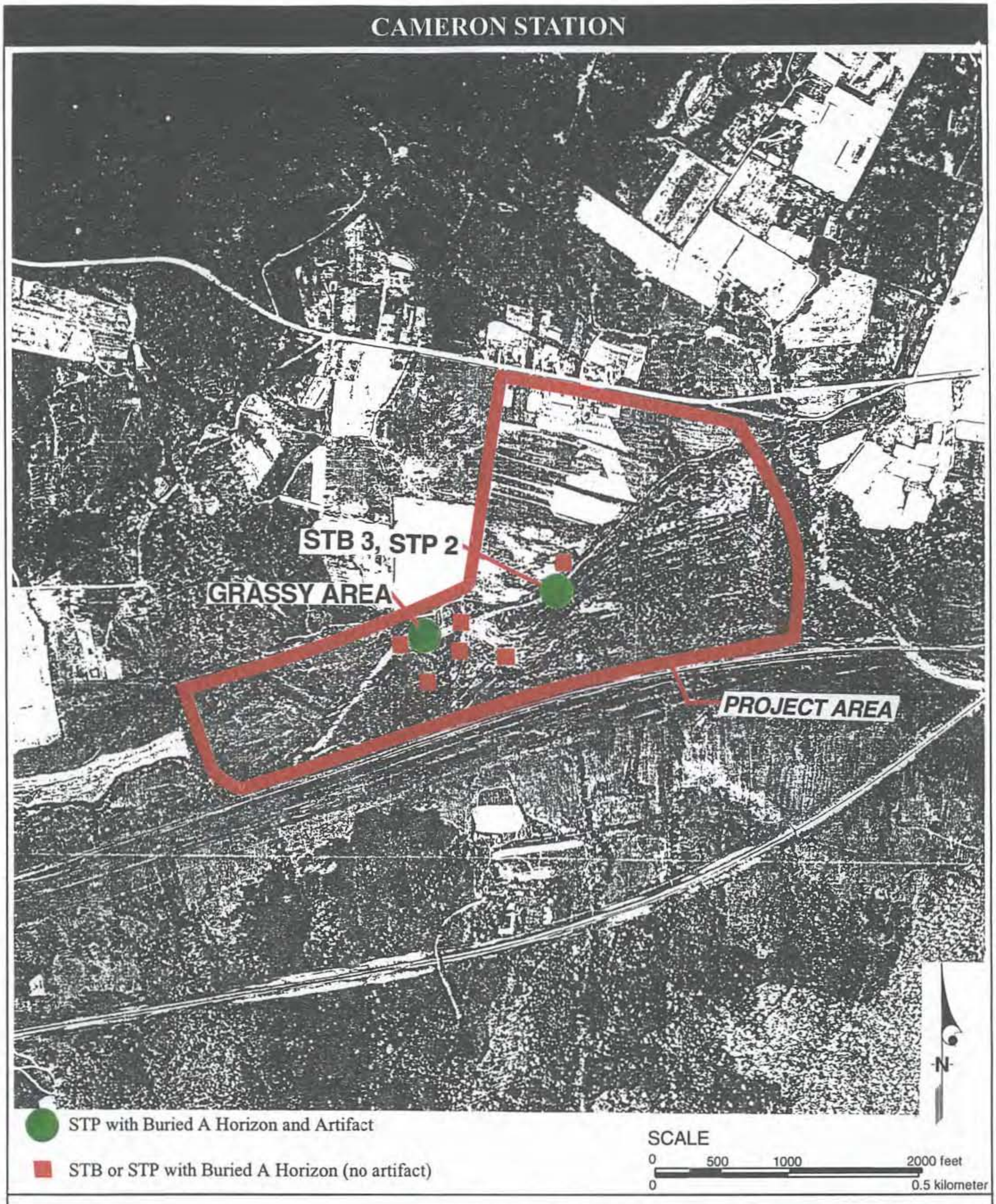
Location of Positive Archeological Results on 1865 Barnard Map
Figure 21



Location of Positive Archeological Results on 1937 Aerial

Figure 22

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Appendix A

List of Personnel

List of Personnel

Thomas W. Bodor, M.A.A, Applied Anthropology, University of Maryland, College Park. B.A., Anthropology, University of Denver. Mr. Bodor has over eight years of archeological experience in the Southwest, Midwest, and Mid-Atlantic regions of the United States. Mr. Bodor served as Principal Investigator for this project and is secondary author of this report.

Danica Ziegler, B.A., Anthropology, University of California, Berkeley. Ms. Ziegler has 10 years of experience in archaeology in the Mid-Atlantic region and California. Ms. Ziegler served as Field Director for the Bryan Property investigation and is the primary author of this report.

Benjamin R. Fischler, M.A., Anthropology, University of Michigan, B.A., Anthropology, American University. Mr. Fischler assisted with revisions to this report.

Carey O'Reilly, M.A. candidate, College of William and Mary, Williamsburg. B.A., University of Maryland, College Park. Ms. O'Reilly has 10 years of archeological experience in the Mid-Atlantic and Midwest regions of the United States. She served as Laboratory Director during this investigation.

Nancy Anthony, B.A., Anthropology, College of William and Mary, Williamsburg, Virginia. Ms. Anthony has eight years of archeological experience in the Mid-Atlantic region. She served as the Laboratory Crew Chief during this investigation and is co-author of the Artifact Section of this report.

Field Staff: Grant Capes, Christina Lawhead, Elena Lippolis, James Long

Laboratory Staff: Forrest Crosley, Nancy Anthony

Graphic Artists: Julie Liptak, Grant Capes

Appendix B

Geomorphological Cross-Sections
and
Bore Descriptions

CAMERON STATION

SOIL TEST BORE DESCRIPTIONS

STB	EXISTING SURFACE ELEVATION (FEET AMSL)	DEPTH OF FILL (FEET)	DEPTH OF TEST (FEET)	DESCRIPTION
1	64.8	5.5	8	No A horizon; Alluvium to base of test, tan to yellowish brown sands
2	63.7	3	8	A horizon stripped off; lower B horizon, yellowish brown sand, above water table part of year
3	61.5	5.5	12	A horizon intact, grey silty clayey sand to 6.5'; B horizon, dark grey clayey silt & greyish brown sand to 8.5'; swampy wetlands to 10', grey silty clay w/ organics; clean grey sand & fine gravel to 11'; organic rich wetlands to 12', grey fine sand & silt
4	60.6	5	12.25	Possible A horizon from 5-6', light brown and grey sand; B horizon alluvium, yellowish brown sand, well-drained to 11'; wetland, dark grey silt with leaf casts 12-12.25'
5	61.3	3.5	8	No A horizon; Alluvium to base of test, yellowish brown to tan sands
6	59.9	10.5-11	12	A horizon eroded; B horizon, yellowish brown and grey sand--topographic depression
7	60.2	9	12	fill includes ceramic water/sewage pipe at 8'; No A horizon; Alluvium, yellowish brown and grey sand
8	60.4	8	12	No A horizon; Alluvium, yellowish brown and grey sand--underwater environs
9	62	4.5	8	No A horizon; B horizon alluvium, light grey and yellowish brown sand with translocated clays to base of test
10	no info	2	12	Decomposing sandstone bedrock to base of test
11	62.1	9.5	12	Alluvium to 10.5'; Decomposing sandstone bedrock to base of test
12	64.1	2.5	8	A horizon stripped off; Alluvium, yellowish brown and grey sand
13	63.9	6	8	No A horizon, B horizon, grey to yellowish brown sand alluvium
14	63.9	8	12	No A horizon, B horizon, grey to yellowish brown sand with grey clay inclusions and quartz
15	64	3	8	A horizon stripped off, B horizon - mottled yellowish brown sand; disturbed
16	65	2	8	A horizon stripped off, B horizon - mottled yellowish brown sand; disturbed
17	64.1	6	8	A horizon stripped off, B horizon - mottled yellowish brown sand and clay; disturbed

CAMERON STATION

SOIL TEST BORE DESCRIPTIONS

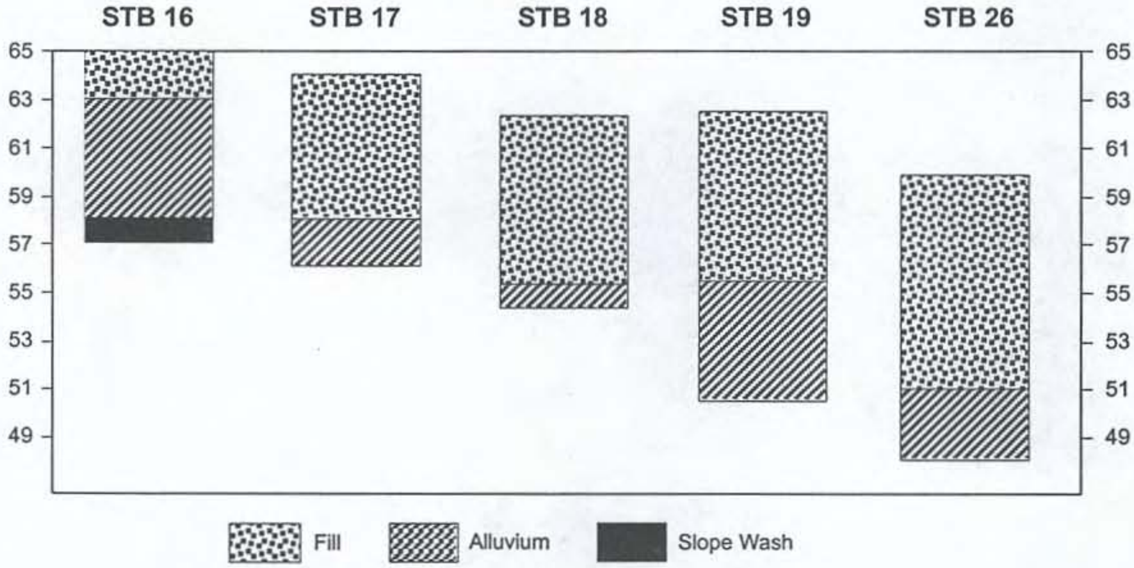
STB	EXISTING SURFACE ELEVATION (FEET AMSL)	DEPTH OF FILL (FEET)	DEPTH OF TEST (FEET)	DESCRIPTION
18	62.7	7	8	Interface dumping; 6" grey silt with wood fragments; A/B horizon from 7.5 to 8', wetland backswamp -saturated grey silt and sand
19	62.1	7	12	fill includes 1' of re-deposited grey saturated swamp soils; A/B horizon from 7 to 12', wetland backswamp--saturated grey silt and sand
21	60.9	6.5	8	No A/B horizon; C horizon yellowish brown sand alluvium
22	60.2	10	16	fill includes 3.5' of wetland deposits; vegetal debris 1.5-5', rest of fill sand and gravel, gray to tan, medium to coarse grained; Alluvium, well-drained 10-12' tan to yellowish brown sand; Bedload 12-14'; Sandbar alluvium 14-16', light yellowish brown to light grey
23	59.8	10	12	No A horizon; B horizon, yellowish brown and grey sand--topographic depression
24	59.8	10.5	12	fill includes temporary surface at 3'; No A horizon; Alluvium to base of test, some manganese in light grey to yellowish brown sand
25	no info	4.5	12	Alluvium to 11', clay alluvium to 7' then gravelly sand alluvium to 11'; Decomposing sandstone bedrock to base of test
26	60	9	12	Water table at 6'; No A horizon; Alluvium to base of test, light grey to grey to yellowish brown silty clay sand in layers
27	64.1	6	8	A/B horizon; fine grained sand, includes layer of wetland organic grey silt
28	59.5	11	16	Swamp deposits 11-13', grey silt and gravel, vegetal debris; Alluvium to base of test, grey with pebbles to light grey with less pebbles, to dark yellowish brown sand
29	60	13	16	Alluvium to base of test; dark yellowish brown to grey sand, fine to coarse grained
30	60	13.5	16	Fill includes void of loose grey sand from 8-12'; Alluvium 2.5' to base of test, greenish grey Cretaceous sand and fine gravel
31	59.8	11	16	Fill includes void of loose sand from 4-8'; No A horizon; Alluvium to 15', medium to coarse dark yellowish brown to grey sand layers; Cretaceous greenish grey sand 15-16'
32	60	12	20	fill includes layers of gray silt, slag, and wood; No A horizon; Alluvium, Cretaceous greenish grey sand 12-16', yellowish brown and grey 16-20', underwater environs
33	59.3	10	12	Wetlands A horizon 10-11' (includes 6" organic grey silt with rootlets and 6" of fine grey sand, possible swale or pond; B horizon 11-11.5', yellowish brown sand; C horizon 11.5-12' yellowish brown sand and gravel
34	59.5	14	20	Fill includes 4' of re-deposited gray swamp silt with wood (4-8') and loose unconsolidated sand-apparent void 8-13'; A horizon missing; Alluvial sand to 18', yellowish brown with manganese staining; Terrace 18-20', yellowish brown with manganese
35	59.9	4	16	Ziegler noted fill to 11' including wetland as fill; Segovia noted wetlands deposit, grey silt and vegetal debris 4-11'; possible terrace 11-12', grey to brown to yellowish brown layers; sand to 16', tan medium to coarse grained sand; bed load at 16', sand bar

CAMERON STATION

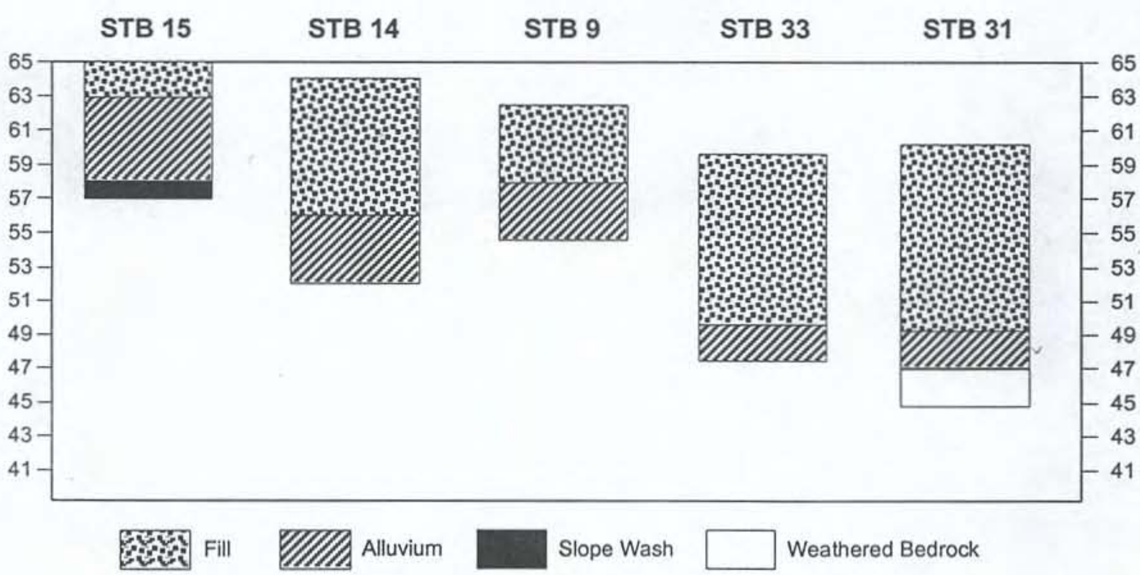
SOIL TEST BORE DESCRIPTIONS

STB	EXISTING SURFACE ELEVATION (FEET AMSL)	DEPTH OF FILL (FEET)	DEPTH OF TEST (FEET)	DESCRIPTION
36	61.2	7.5	12	A horizon possible at 7.5-8', grey sandy clay with some organics; Alluvium to 10.5'; Decomposing sandstone bedrock to base of test
37	64.5	7	15	Wetlands, swampy soil to 11'; Alluvium to 14'; Decomposing sandstone bedrock to base of test
38	63.8	9	16	Alluvium to 14'; Decomposing sandstone bedrock to base of test
39	64	10	12	Alluvium to 11.5', includes fragments of black shale; Decomposing sandstone bedrock to base of test
40	63.6	4	12	No A horizon; textural B horizon, reddish brown gravelly sand with clay; Alluvium to 10'; Decomposing sandstone bedrock to base of test
41	67.3	2.8	16	Naturally redeposited alluvium to 7'; A horizon at 7-7.5', dark grey sand and silt, roots, and organic matter; Alluvium to 14.5', wet gravels and coarse sands; Decomposing sandstone bedrock to base of test
42	67.8	3.5	12	A horizon to 4', light gray sand with charcoal fragments; A/B horizon to 7', silty sand; Alluvium to base of test
43	66.4	4	12	Multiple A horizons at 4-4.5' and 5.5-6', brownish grey sand with rootlets; Alluvium to base of test
44	71.1	2.5	12	A horizon to 2.5' to 3.5', more or less undisturbed clayey sand; Alluvium to base of test
45	71.5	12	12	fill to base of test, includes loose sand and pebbles from 4-8'
46	69.3	10	10	water table at 8', gravel and pebbles
47	71.5	8 to 9	12	fill to base of test, includes pebbles, gravel, and chert; Water table 4-8'
48	71.9	10	12	Alluvium to base of test
50	71.8	8	12	Alluvium to base of test
51	73.3	7	12	Alluvium to base of test
52	72	2.5	12	Brown sand, possible A horizon 2,5-3'; Alluvium to 11.5'; Decomposing sandstone bedrock to base of test
53	75	8	8	fill to base of test, includes pebbles, gravel, and chert; Water table at 7'

Cross-section 1



Cross-section 2



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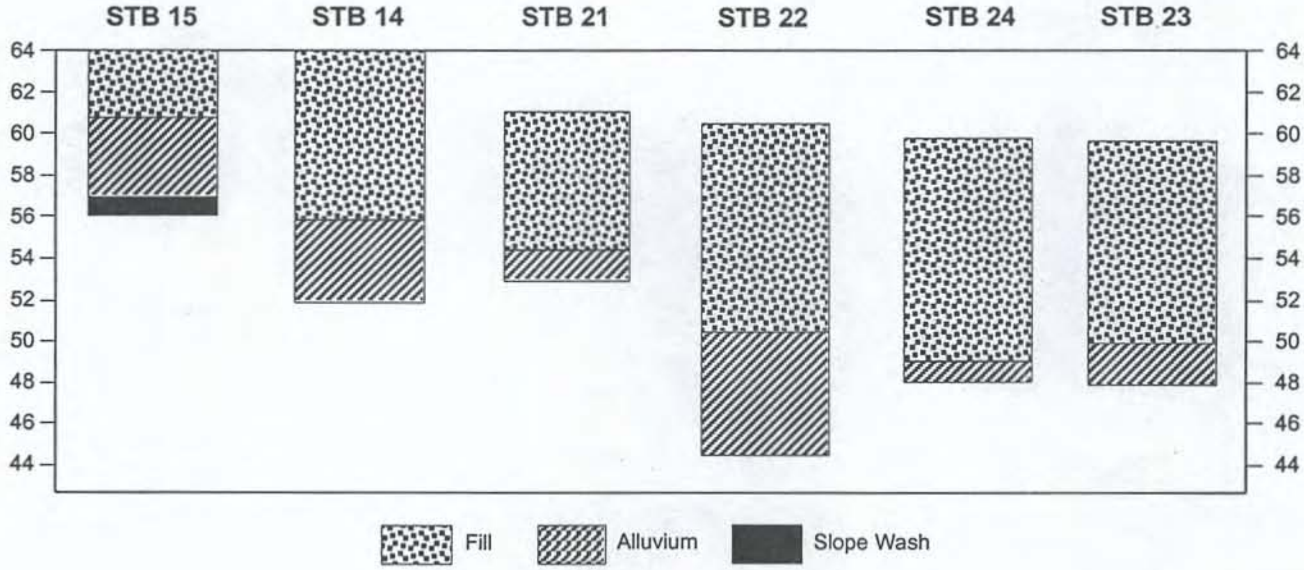
Stratigraphic Cross-section Across Test Sites
Cross-sections 1 and 2
Figure B-1

CAMERON STATION

Cross-section 3



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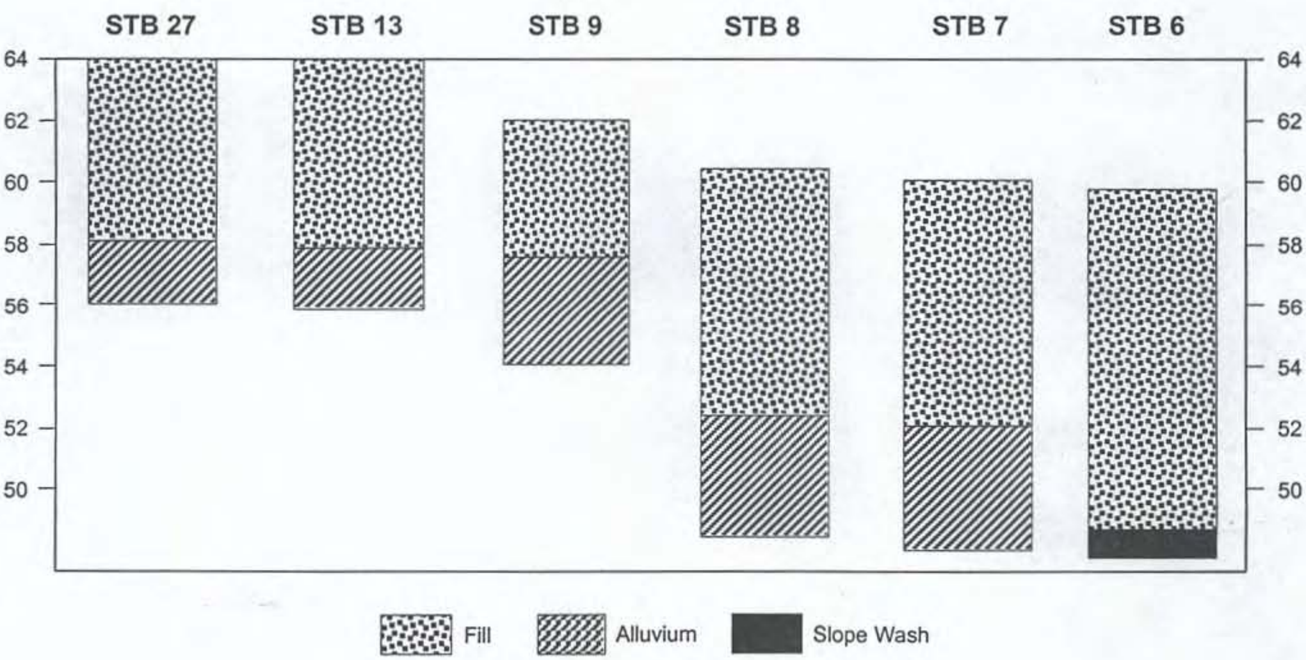

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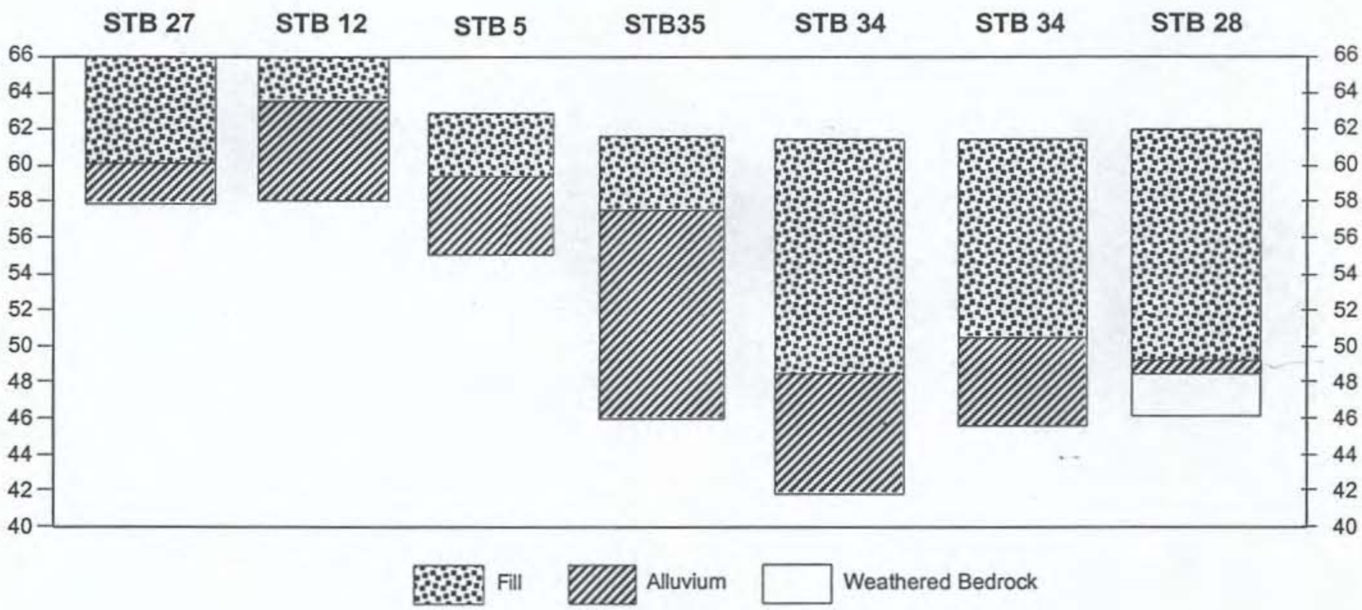
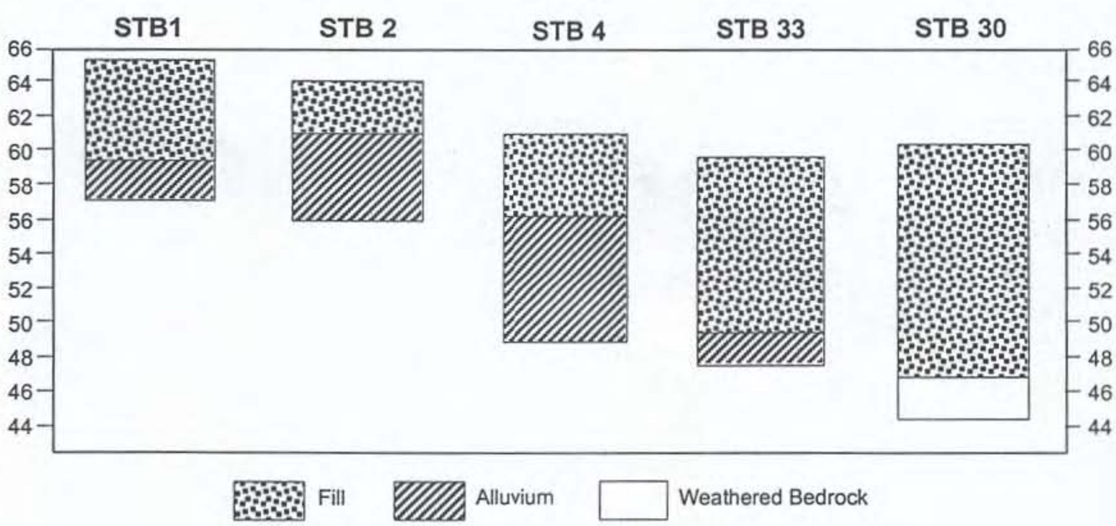
Stratigraphic Cross-section Across Test Sites
Cross-sections 3 and 4
Figure B-2

Cross-section 5



Cross-section 6



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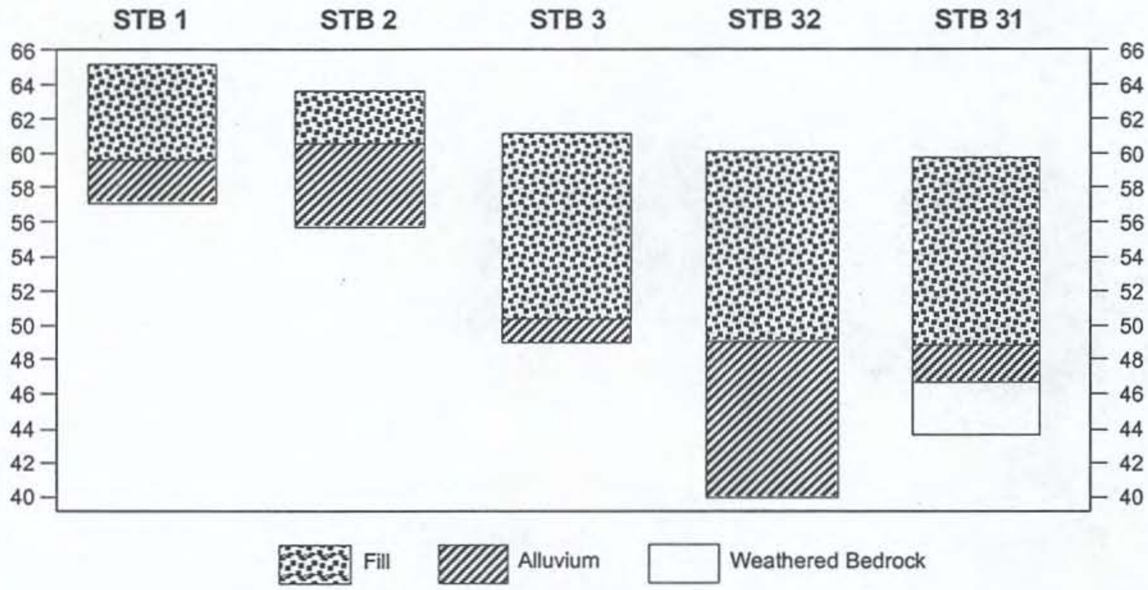
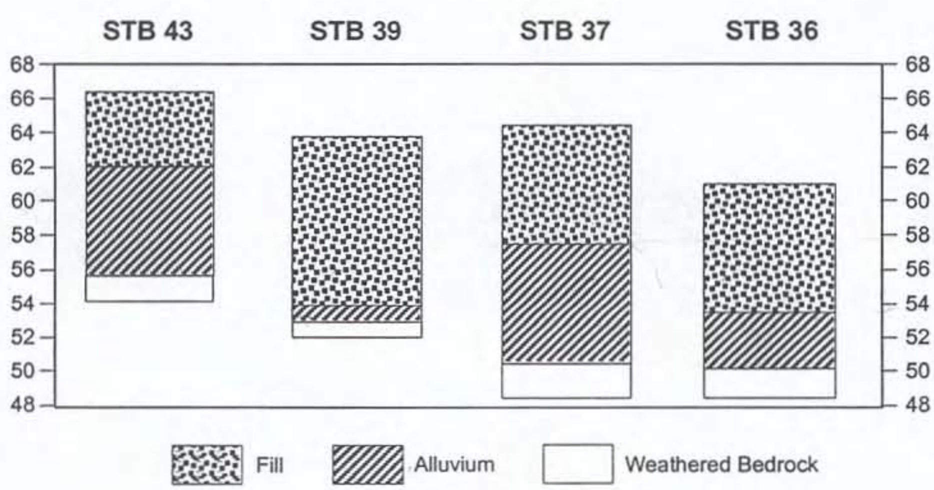
Stratigraphic Cross-section Across Test Sites
Cross-sections 5 and 6
Figure B-3

CAMERON STATION

Cross-section 7



Cross-section 8



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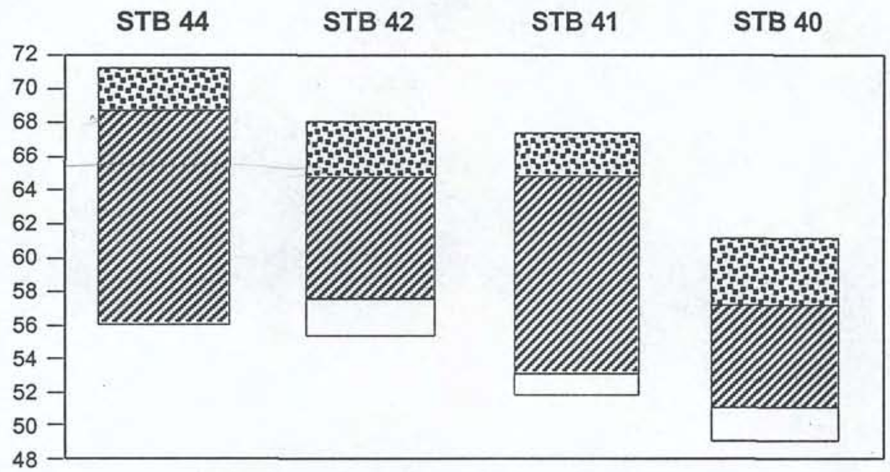
Stratigraphic Cross-section Across Test Sites
Cross-sections 7 and 8
Figure B-4

Cross-section 9



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Stratigraphic Cross-section Across Test Sites
Cross-section 9
Figure B-5

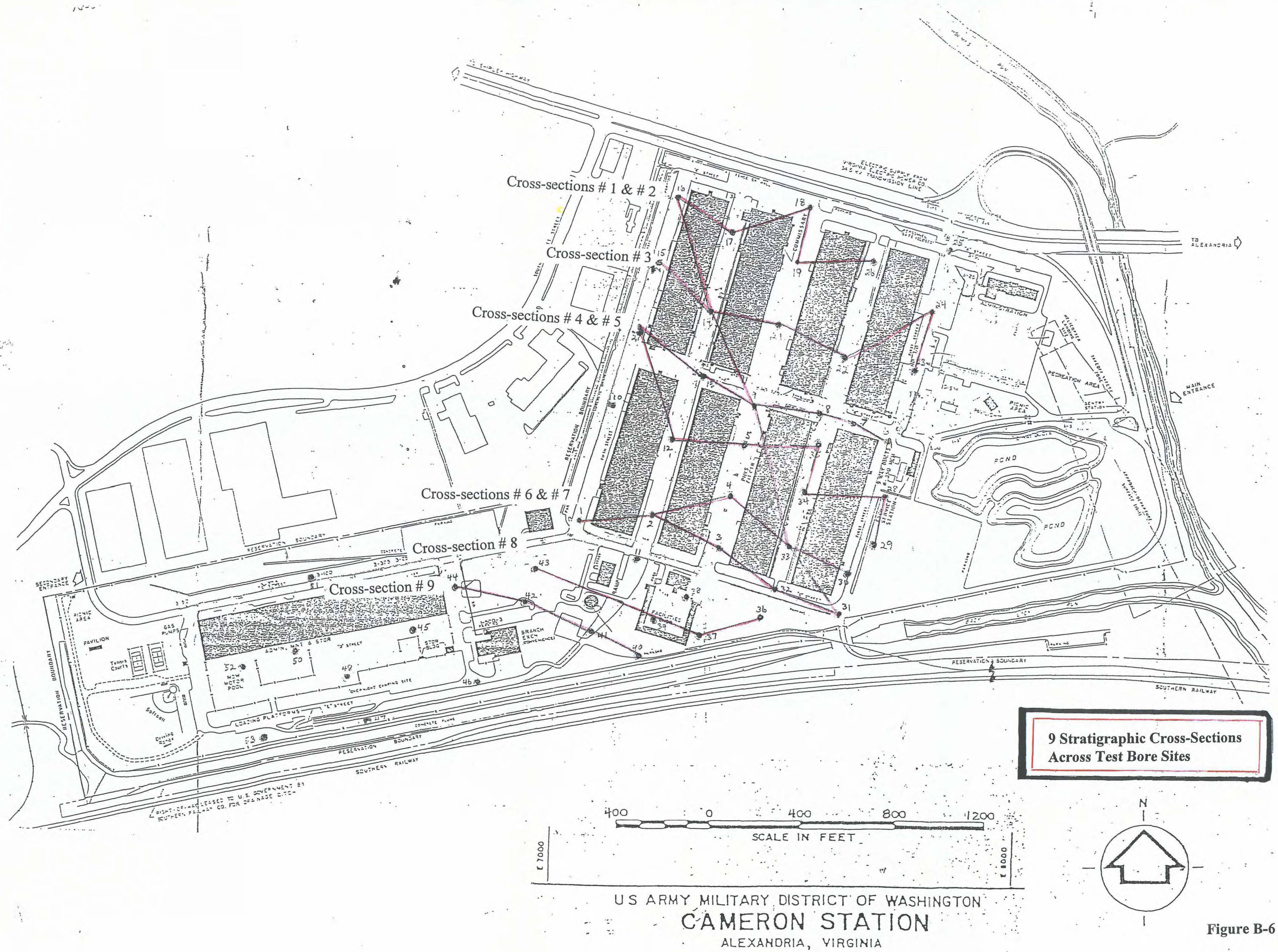
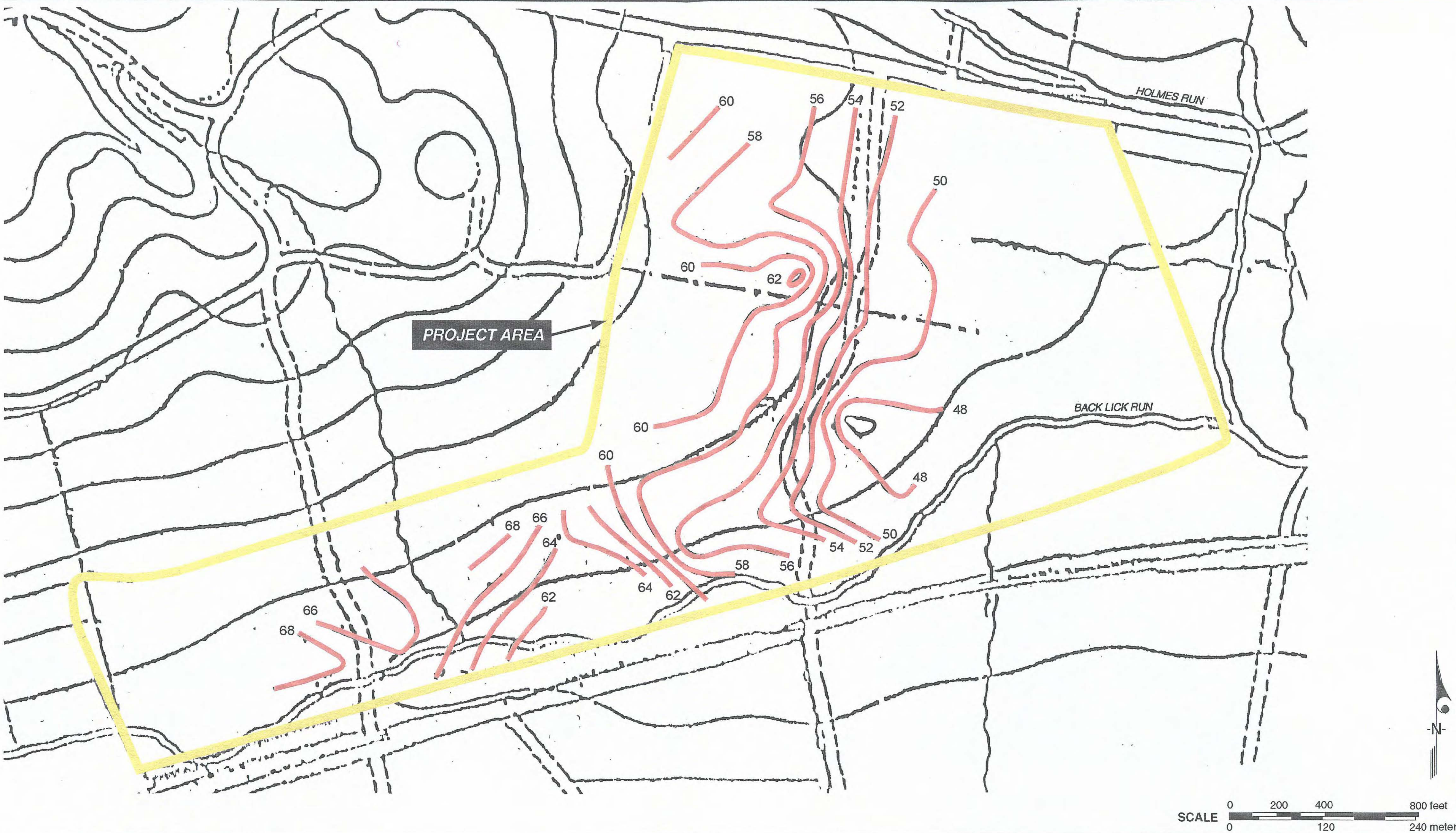

Cross-sections # 1 & # 2
Cross-section # 3
Cross-sections # 4 & # 5
Cross-sections # 6 & # 7
Cross-section # 8
Cross-section # 9
9 Stratigraphic Cross-Sections
Across Test Bore Sites
POND
POND
RESERVATION BOUNDARY
SOUTHERN RAILWAY
400 0 400 800 1200
SCALE IN FEET
N
US ARMY MILITARY DISTRICT OF WASHINGTON
CAMERON STATION
ALEXANDRIA, VIRGINIA

Figure B-6

CAMERON STATION



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Overlay of AutoCadd Contours on Barnard 1865 Map

Figure B-7

Appendix C

Artifact Catalog

Cameron Station Phase I

BAG NO	PROVTYPE	LAYER	DEPTH	COUNT	MATERIAL	MANUF TECH	FORM	COLOR	MAX DIM	COMMENTS
100	TRENCH 2, STP 2	B	0.98-1.18 BGS	1	QUARTZ		SHATTER	WHITE	10 mm	
100	TRENCH 2, STP 2	B	0.98-1.18 BGS	1	CHERT		SHATTER	BROWN	10 mm	
101	TRENCH 1, STP 2	C	1.59-1.71 BGS	1	QUARTZITE		SPALL	GRAY	45 mm	ALSO RED, APPEARS POSSIBLY THERMALLY ALTERED, 100% CORTEX
101	TRENCH 1, STP 2	C	1.59-1.71 BGS	1	LEAD		UNIDENTIFIED			
102	TRENCH 2, STP 2, RADIAL NORTH	B	1.00-1.03 BGS	1	GLASS	UNIDENTIFIED MANUFACTURE	CURVED	COLORLESS		