R.C. BURDICK, P.E. P.P. P.C.

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Lee Kalomiris
Arcadia Construction, LLC
P.O. Box 7-236,
68 White St.
Red Bank, NJ 07701
(908) 902-5737

February 3, 2025

Re: 39 Hooper Ave
Atlantic Highlands
New Jersey
Lots 5, Block 55
Project No. 25-9002 JOB # 9012

Dear Mr. Kalomiris:

In accordance with our proposal dated January 13, 2025 and your subsequent authorization on January 23, 2025, we have reviewed the proposed construction, reviewed the regional geology, and conducted a site visit on January 24 and February 1, 2025. We understand the proposed construction includes renovation of an existing one-story residence and an addition of a 2nd floor to the existing one-story residence.

The existing house is located in a "slope area" in Atlantic Highlands borough. Atlantic Highlands has a steep slope ordinance (Section 150-78B) which requires a professional engineer evaluation for new construction. This letter is an evaluation in accordance with the ordinance.

Regional Geology

Atlantic Highlands is located within the Upper Coastal Plane Physiological Province of New Jersey. This province consists primarily of narrow, irregular layers that are composed primary of sand, sandy silt, silty clay and clay. Some sediments may contain large percentage of glauconite. The underlying soils are covered by discontinuous surficial deposits of alluvium.

The Atlantic Highlands bluffs, located in New Jersey, are composed of interbedded layers of cemented sands that rise to over 200 feet above sea level. The bluffs of Atlantic Highlands have many slump blocks. Slump blocks are large blocks of soil that can become destabilized and shift resulting in landslides or movement of soil down a slope.

Generally, the following factors can cause slump blocks:

- Steepness of the slope: Higher slopes indicate a greater landslide potential due to increased steepness.
- Water Content: Water contributes to landslides by acting within soil pores to reduce shear strength of soil, causing erosion of slope, lubricating between soil layers or slip surfaces, adding additional weight, or producing seepage force.
- Additional load from sources other than water.
- Toe erosion by waves or tidal currents.
- Earthquake.
- Vegetation: Vegetation can stabilize slopes, but removal of vegetation increases slumping risks.
- Human Activities: Construction, excavation, and deforestation disturb slope stability, increasing the likelihood of slump block movements.

The Atlantic Highland Bluffs have been studied, mapped and monitored by the United States Geological Survey (USGS) and other researchers such as John M. Rehm.

Areas of know slump blocks that were determined by the USGS have been included in the NJDEP Surficial Geology of The Sandy Hook Quadrangle Monmouth County, NJ (Sandy Hook Quadrangle). A screen shot of the Sandy Hook Quadrangle showing the project location and the known slump blocks is enclosed with this letter as **Figure 2**. As presented in **Figure 2**, the project location is about 0.5 miles away from the areas of known slump blocks.

Furthermore, John M. Rehm, Jr. authored a research paper titled "Landslide Potential in the Atlantic Highlands". This paper analyzed historical landslides in the Atlantic Highlands to assess the potential for additional slump blocks. Based on the map provided in the research paper, and enclosed in **Figure 3** of this letter, the project location is about 700 feet away from the closest area of potential slump block.

Therefore, the project site is **not** located near any known slump blocks.

Existing Conditions and Site Visit Observations

The project site is located at 39 Hooper Avenue, Atlantic Highlands, New Jersey, Lot 5, Block 55. The existing property is a single-family 1-story dwelling with a full walkout cellar with garage. Site grades generally slope down away from the home. Most of the slopes range from 15% slope to greater than 30% slope. Refer to **Figure 1** enclosed with the letter.

During our site visit performed on January 24, 2025, the existing slope was observed to be in stable condition with no obvious signs of slumping or sloughing. An evaluation of the exterior of the existing house foundation was also performed on February 1, 2025. The foundation wall exhibited two vertical hairline cracks on the backside of the house. However, those cracks do not appear to be caused by slope movement as the foundation wall did not exhibit a sign of tilting or shifting. A retaining wall behind the footing wall is shifting. We believe that the retaining wall was constructed to retain an access walkway from the driveway to the cellar. The walkway is not in

use anymore, as the homeowner has constructed a deck over it. We do not believe that the shift in the retaining wall supporting the abandoned access walkway is in any way related to slope movement.

No obvious signs of slumping were observed during the site visit near or around the home.

Proposed Construction and Recommendation

We understand that the proposed construction consists of renovation and the addition of one floor to the existing dwelling. The existing slopes will not be disturbed. The existing drainage is not expected to change. If the existing drainage changes or is inadequate, continuous or sporadic water draining onto a slope could saturate the soil or erode surface material resulting in slope failures. Thus, draining water onto the existing slope utilizing drainpipes or spouts should be avoided.

We recommend a professional engineer perform a foundation analysis to confirm that the existing footings will support the weight of the proposed second story.

That said, based on the current plans dated December 12, 2024, and review of existing information, the proposed construction will have no detrimental impact to the stability of the existing slope either during construction or following the completion of construction.

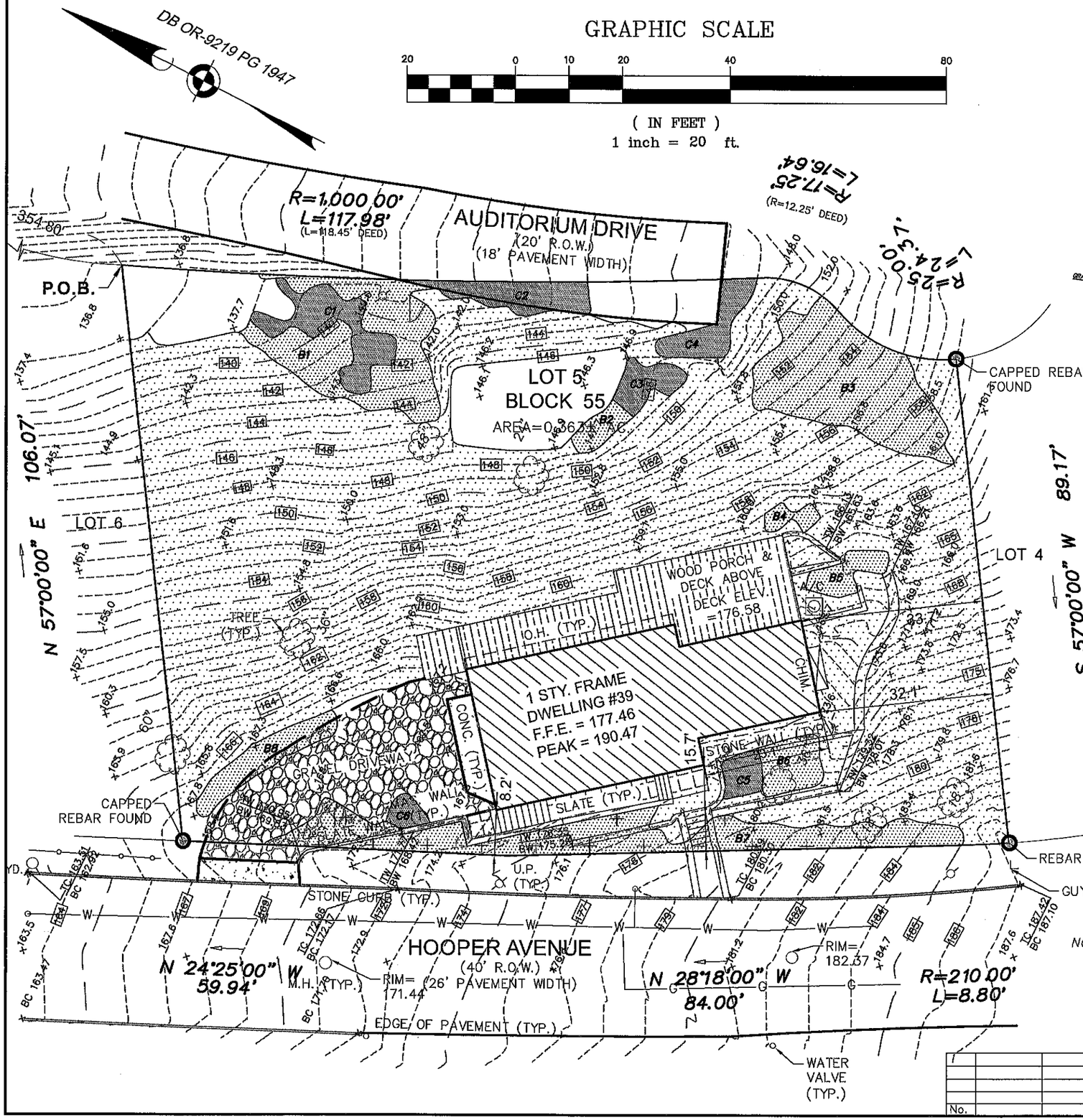
Disclaimer

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site visit and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study and our past experience. If additional information becomes available that might impact our geotechnical opinions, it will be necessary for R.C. Burdick and Associates to review the information, reassess the potential concerns, and re-evaluate our conclusions and recommendations.

Thank you for the opportunity to provide you with this professional service. Should you have any questions or comments feel free to contact us.

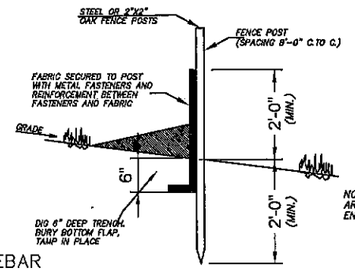
Sincerely,

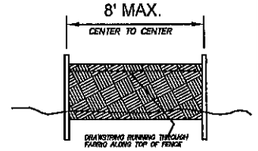
Mussie Eyob, P.E.



MAXIMUM IMPERVIOUS AREA PERMITTED IN SLOPE AREA

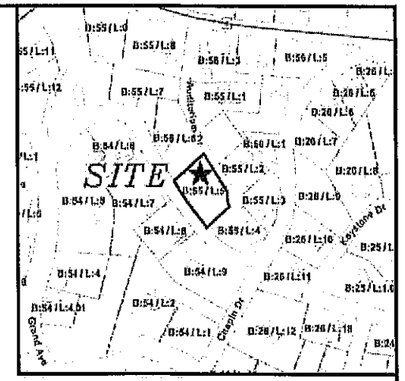
SLOPE	AREA	PERCENTAGE	
>30%	8,675 SF	10%	867.5 SF
20% TO 30%	2,057 SF	15%	308.6 SF
15% TO 20%	604 SF	25%	151.0 SF
<15%	4,477 SF	35%	1,566.9 SF
TOTAL	15,813 SF		2,894.0 SF
MAX LOT DISTURBANCE ALLOWED=130% OF 2,894 SF =3,762 SF			
PROPOSED DISTURBANCE = -- SF (NONE PROPOSED)			





NOTE: SYNTHETIC FILTER FABRIC SHALL BE FIRMLY ATTACHED SIDE OF FENCE POST. OPEN AREA SHALL BE GREATER THAN 4% BUT LESS THAN 10% MEETING U.S. ARMY CORPS. OF ENGINEERS SPECIFICATION NO. CW02215 FOR STRENGTH.

SILT FENCE DETAIL
N.T.S



KEY MAP

LOT COVERAGE

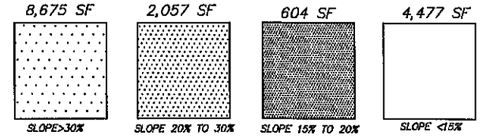
	EXISTING	PROPOSED
DWELLING	1,534 SF	--
REAR WOOD DECK	703 SF	--
FRONT ENTRANCE	231 SF	--
DRIVEWAY	1,045 SF	--
WALLS	252 SF	--
FRONT COVERED PORCH	33 SF	--
AUDITORIUM DRIVE	288 SF	--
TOTAL	4,086 SF	--
LOT AREA	15,813 SF	--
TOTAL LOT COVERAGE	25.84%	--

GENERAL NOTES

1. Owner and Applicant: Lee Katamiris
   39 Hooper Ave
   Atlantic Highlands, N.J. 07716
2. Property known as lot 5, block 55 as shown on sheet No. 16 of the Borough Atlantic Highlands, Monmouth County, New Jersey tax maps.
3. Boundary and topographic survey based on a plan entitled "Boundary and Topographic Survey, Lot 5 Block 55 Borough of Atlantic Highlands, County of Monmouth, NJ" Prepared by David J. Von Steenburg, NJPLS No. 34500, dated 12/4/2023.
4. Steep slope permit exception claimed per §150-76 B.3.a-e; no soil disturbance, change in impervious ground cover, removal of tree, or vegetation disturbance/removal proposed.

MAXIMUM LOT COVERAGE

SLOPE	AREA	FACTOR	
>30%	8,675 SF	0.25	2,169 SF
20% TO 30%	2,057 SF	0.50	1,029 SF
15% TO 20%	604 SF	0.75	453 SF
<15%	4,477 SF	1.00	4,477 SF
TOTAL	15,813 SF		8,128 SF
Multiply by max coverage allowed			X 40%
MAX LOT COVERAGE PERMITTED			3,251 SF
COVERAGE PROPOSED			-- SF



>30% SLOPES

SLOPE	AREA
A1	8,675 SF
TOTAL	8,675 SF

20%-30% SLOPES

SLOPE	AREA
B1	469 SF
B2	52 SF
B3	592 SF
B4	34 SF
B5	73 SF
B6	103 SF
B7	596 SF
B8	138 SF
TOTAL	2,057 SF

15%-20% SLOPES

SLOPE	AREA
C1	187 SF
C2	145 SF
C3	78 SF
C4	109 SF
C5	52 SF
C6	33 SF
TOTAL	604 SF

NOTE: SLOPES SHALL REMAIN STABLE BEFORE AND AFTER CONSTRUCTION NEAR 30% OR GREATER SLOPES.

No.		Description	By
1			

STEEP SLOPE PLAN: 39 HOOPER AVE

LOT 5 IN BLOCK 55
BOROUGH OF ATLANTIC HIGHLANDS
MONMOUTH COUNTY, NEW JERSEY

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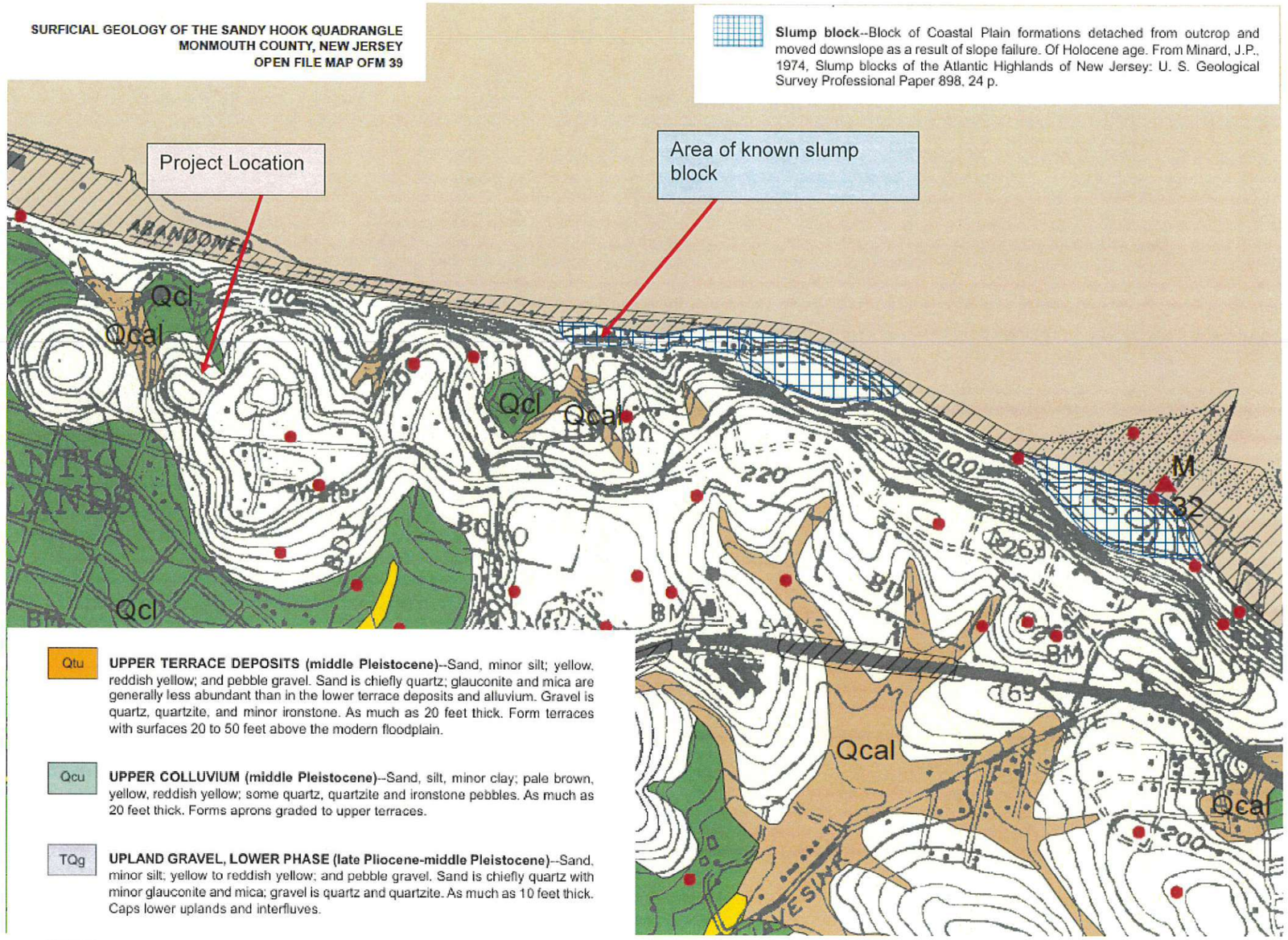
MUSSIE EYOB
PROFESSIONAL ENGINEER #GE52932

DATE: 4/26/2025
SCALE: 1" =20'
JOB No.: 25-0012 KALOMIRIS
SHEET 1 OF 1

SURFICIAL GEOLOGY OF THE SANDY HOOK QUADRANGLE
MONMOUTH COUNTY, NEW JERSEY
OPEN FILE MAP OFM 39



Slump block--Block of Coastal Plain formations detached from outcrop and moved downslope as a result of slope failure. Of Holocene age. From Minard, J.P., 1974, Slump blocks of the Atlantic Highlands of New Jersey: U. S. Geological Survey Professional Paper 898, 24 p.

Qtu **UPPER TERRACE DEPOSITS (middle Pleistocene)**--Sand, minor silt; yellow, reddish yellow; and pebble gravel. Sand is chiefly quartz; glauconite and mica are generally less abundant than in the lower terrace deposits and alluvium. Gravel is quartz, quartzite, and minor ironstone. As much as 20 feet thick. Form terraces with surfaces 20 to 50 feet above the modern floodplain.

Qcu **UPPER COLLUVIUM (middle Pleistocene)**--Sand, silt, minor clay; pale brown, yellow, reddish yellow; some quartz, quartzite and ironstone pebbles. As much as 20 feet thick. Forms aprons graded to upper terraces.

TQg **UPLAND GRAVEL, LOWER PHASE (late Pliocene-middle Pleistocene)**--Sand, minor silt; yellow to reddish yellow; and pebble gravel. Sand is chiefly quartz with minor glauconite and mica; gravel is quartz and quartzite. As much as 10 feet thick. Caps lower uplands and interfluves.

Qwcp **WEATHERED COASTAL PLAIN FORMATIONS**--Exposed sand and clay of Coastal Plain bedrock formations. May be overlain by thin, patchy alluvium and colluvium. Quartz and ironstone pebbles left from erosion of surficial deposits may be present on the surface and in the upper several feet of the formation.

SURFICIAL GEOLOGY OF THE SANDY HOOK QUADRANGLE MONMOUTH COUNTY, NEW JERSEY

By

Scott D. Stanford

2000

DESCRIPTION OF MAP UNITS

Age of unit indicated in parentheses. For units spanning more than one period, principal age is listed first. Order of map units in list does not necessarily indicate chronologic sequence.

ARTIFICIAL FILL--Sand, silt, clay, gravel; brown, gray, yellowish brown; may include demolition debris (concrete, brick, asphalt, glass) and trash. As much as 20 feet thick. In road and railroad embankments and made land. Many small areas of fill in urban areas are not shown.

Qal **ALLUVIUM (Holocene and late Pleistocene)**--Sand, silt, clay, peat; yellowish brown, dark brown, gray; and pebble gravel. Abundant organic matter. Sand is chiefly quartz, with some glauconite and mica. Gravel is quartz and quartzite with minor ironstone. As much as 15 feet thick. Deposited in floodplains, channels, and ground-water seepage areas.

Qs **SWAMP AND MARSH DEPOSITS (Holocene and late Pleistocene)**--Freshwater peat and organic silt, sand, and clay; dark brown to black. As much as 10 feet thick.

Qcal **COLLUVIUM AND ALLUVIUM (Holocene and late Pleistocene)**--Interbedded alluvium and colluvium in headwater valleys. As much as 15 feet thick.

Qbs **BEACH AND NEARSHORE MARINE SAND (Holocene)**--Sand, very pale brown to light gray; and pebble gravel. As much as 150 feet thick but generally less than 20 feet thick. Silt and clay, dark gray to black, as much as 10 feet thick, overlie the sand and gravel in Sandy Hook Bay. Deposited during Holocene sea-level rise. Underlain in places by estuarine deposits.

Qmm **ESTUARINE DEPOSITS (Holocene)**--Salt-marsh peat, organic silt and clay; dark brown to black; sand and minor pebble gravel; very pale brown, white, gray. As much as 100 feet thick. Deposited during Holocene sea-level rise. Commonly underlain by lower terrace deposits.

Qtl **LOWER TERRACE DEPOSITS (late Pleistocene)**--Sand and minor silt; yellow, yellowish brown, reddish yellow; and pebble gravel. Sand is chiefly quartz with some glauconite and mica. Gravel is quartz and quartzite with minor ironstone. As much as 50 feet thick. Form stream terraces with surfaces 5 to 20 feet above the modern floodplain.

Qcl **LOWER COLLUVIUM (late Pleistocene)**--Sand, silt, minor clay; yellow, yellowish brown, reddish yellow, light gray; some quartz and ironstone pebbles. As much as 20 feet thick, generally less than 10 feet thick. Forms aprons graded to lower terraces or the modern floodplain.

Qcm2 **CAPE MAY FORMATION, UNIT 2 (late Pleistocene)**--Sand, minor silt and clay; very pale brown, yellow, white, olive yellow; and pebble gravel. Sand is chiefly quartz with minor glauconite and mica; gravel is quartz and quartzite. As much as 50 feet thick. Forms a shore-facing terrace with surface elevation between 15 and 40 feet. Deposited in beach and estuarine settings during the Sangamon sea-level highstand between 120,000 and 130,000 years ago.

Figure 2: Surficial Geology of the Sandy Hook Quadrangle

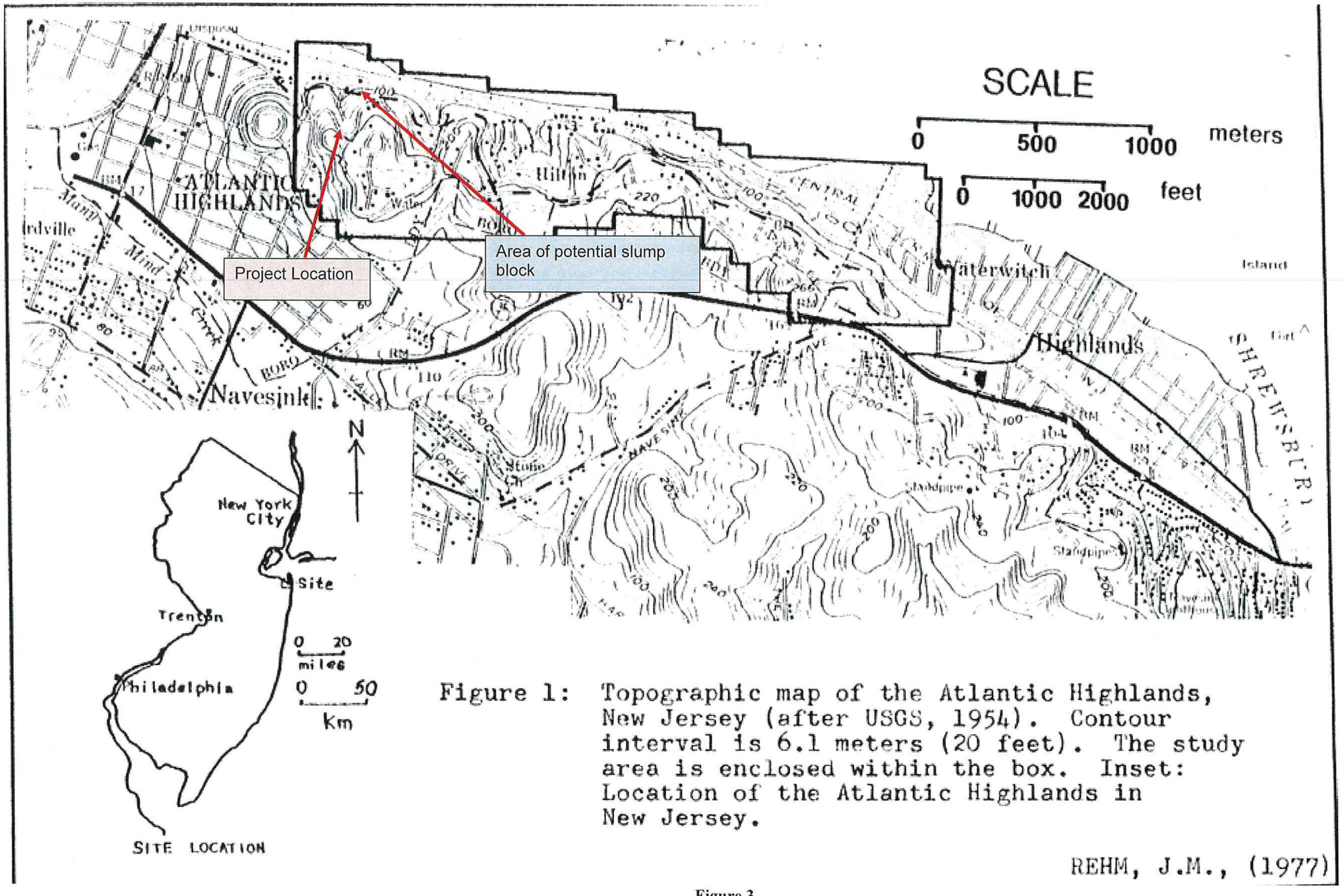


Figure 1: Topographic map of the Atlantic Highlands, New Jersey (after USGS, 1954). Contour interval is 6.1 meters (20 feet). The study area is enclosed within the box. Inset: Location of the Atlantic Highlands in New Jersey.

REHM, J.M., (1977)

Figure 3