

APPENDIX C:  
GEOMORPHOLOGIC  
INVESTIGATION REPORT

# Geo-Sci Consultants, Inc.

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4410 Van Buren Street, University Park, Maryland 20782

tel: 301 277 3731

fax: 301 277 2147

February 18, 2005

Mr. Scott Emory  
A.D. Marble & Company, Inc.  
347 High Street, Suite C  
Burlington, NJ 08016

Dear Scott:

The following discusses geomorphological interpretations of landscapes in the vicinity of the Route 141 crossing of Little Mill Creek northwest of Wilmington, Delaware. The area was examined primarily for the purpose of assessing the potential for cultural resources. Such assessments are based on considerations of apparent deposit age and stability as well as environmental conditions relating to human utilization of a landscape.

Field efforts were undertaken on January 18, 2005 and entailed pedestrian traversal of landscapes to be impacted by bridge and road modifications along the southeast side of Route 141 as it approaches and crosses Little Mill Creek. Due to apparent conditions preclusive to prospects for intact cultural resources, only cursory notes were recorded.

The project location is situated within the Fall Zone portion of Delaware where geologic materials of two physiographic provinces are intermingled. These include ancient metamorphic rocks of the Piedmont Physiographic Province as well as unconsolidated Coastal Plain sediments that range widely both in composition and age. Eroded soil exposures suggest that uplands in the immediate vicinity of the project are probably largely of Coastal Plain composition; however, all of the upstream watershed is within the Piedmont. Hence, the great majority of alluvium carried by Little Mill Creek is derived from the mica schist that predominates in the Piedmont upstream of the project area. Consistent with this are high mica concentrations that were observed in recent deposits of sandy alluvium along the creek.

The rolling nature of Piedmont and Coastal Plain landscapes in the vicinity of the Fall Zone, together with the regional history first of widespread clearing and farming, and then urbanization, result in important cultural ramifications. The combination of sloping terrain and land use history have caused greatly accelerated rates of soil erosion as well as greater volumes of water runoff and increased flooding frequencies. These processes, much aggravated over the more natural ones of the Holocene, have been so widespread that floodplains and low-lying terraces of the region are nearly everywhere mantled by significant deposits of historically derived alluvium.

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Both upland and alluvial terrain are present within and near the project area. Uplands are present on both sides of Little Mill Creek, particularly to the south where at the bridge they are in direct contact with the creek. To the north uplands occur roughly 25 m from the creek where they are marked by a rising slope. Unfortunately, these upland positions close to the creek are so severely disturbed that little or no potential for intact cultural resources exists. Filling and grading of the upland surfaces have been extensive, and owing to an antiquity for these surfaces likely predating even the earliest human presence in the region, even minor disturbances to upland surfaces result in significant impacts to any prehistoric cultural resources. Well south of the bridge some open yards and lightly wooded areas exhibit fewer indications of disturbance, but even at these locations varying amounts of compromise to any cultural resources are still likely.

Floodplain positions rising to a height of about 1.5 m above Little Mill Creek are also present on both sides of the creek, but on the south side the floodplain is outside of the anticipated project impact area. On the north side of the creek the floodplain abuts Route 141 and spans the roughly 25 m between the creek and the toe of the disturbed upland. On the south side the floodplain is distributed along a pronounced meander in the creek that actually wraps around the upland by the bridge to more closely near the road at some distance south. As with the upland surfaces much of the floodplain has been disturbed by filling and some grading. Within the project impact area on the north side of the road a fill apron extends some 10 m from the road onto the floodplain, and a considerable swath has also been disturbed by a sewer line. In addition to the modern disturbances, examination of the floodplain revealed a very active flood setting, with all surfaces marked by recent flood debris and deposits of recent alluvium. A portion of the floodplain south of the stream is also distinctly swampy. This unstable landscape would not have been suitable for human occupation, and is also composed of deposits too young to contain intact prehistoric cultural resources.

In summary, few or no prospects for intact cultural resources exist within the examined portion of project area. Upland landscapes have suffered varying degrees of disturbance that all but negate any prospects for intact cultural resources near the bridge, and offer only very limited potentials at greater distances south of the bridge. The floodplain deposits are too young to have been available to prehistoric inhabitants, and this unstable, sometimes poorly drained landscape has no potential for prehistoric cultural resources.

Most of the points addressed in this letter were discussed in the field, but should you or other involved parties have any questions, I would be pleased to respond.

Sincerely,

Daniel P. Wagner, Ph.D.  
Pedologist