

## 1.0 INTRODUCTION

This document presents an archaeological predictive model developed for the study area associated with the U.S. 301 Project Development in St. Georges and Pencader Hundreds, New Castle County, Delaware (Figure 1). A.D. Marble & Company has undertaken this work as a subconsultant to Rummel, Klepper & Kahl, LLP, which is in turn the prime consultant for the project to the Delaware Department of Transportation (DelDOT) and the Federal Highway Administration (FHWA). The study area for the U.S. 301 Project Development includes a number of alternative designs that have been proposed to improve traffic flow between the Delaware – Maryland state line and S.R. 1.

This predictive model is intended to serve as a planning tool to assist in the development of the designs for these various alternatives and to aid in the assessment of their relative potential impacts on archaeologically sensitive areas. Both prehistoric and historic archaeological potential are considered in this model. For the former, archaeological sensitivity has been assessed using a set of environmental criteria to define areas of high, moderate and low potential. Most prominently, these include distance to water sources, ground slope, and soil drainage characteristics, among others. For the latter, vicinity to early historic roads, existing structures that predate 1940, the locations where such structures once stood, and vicinity to historic crossroads have been used as the principal criteria to determine archaeological sensitivity. The model is at heart a deductive one, based on assumptions about how prehistoric and historic peoples exploited the environment within which they lived. An inductive consideration has also been incorporated into the model, using the locations of previously reported sites to help refine the parameters for delineating areas of high, moderate and low potential.

Characterization of the environment has been accomplished using data available in a Geographic Information System (GIS) format, and GIS has been used to compare the relative significance of the relevant criteria within the various parts of the study area. Clustering within the range of scores generated by this approach was discerned using the Jenks Optimization Method for identifying natural breaks within a dataset distribution, and the patterning defined by this analysis was then used to define the three classes of probability, high, moderate, and low.

Kvamme's Gain statistic was applied to the model to determine its efficiency in defining the locations of previously reported sites within the study area. Finally, historic and modern ground disturbances were modeled to qualify the areas of archaeological potential relative to their likely integrity.

These studies were undertaken for DelDOT and FHWA in an effort to comply with the provisions of the Delaware State Historic Preservation Office (DESHPO) *Guidelines for Architectural and Archaeological Surveys*, and the Secretary of the Interior's Standards and Guidelines. In addition, all cultural resource studies were conducted in accordance with Section 106 of *The National Historic Preservation Act* of 1966, as amended; the *Procedures for the Protection of Historic and Cultural Properties* set forth in 36 CFR 800, as amended; 23 CFR 771, as amended; guidance published by the Advisory Council on Historic Preservation (ACHP); Sections 1(3) and 2(b) of *Executive Order* 11593; and the *National Environmental Policy Act* of 1966. Funding for the cultural resources survey was provided by DelDOT.