11.0 Phase III Data Recovery Work Plan

11.0 PHASE III DATA RECOVERY WORK PLAN

A.D. Marble & Company, Inc. proposes a workplan for a data recovery excavation for that portion of the Grey Farm site (7K-F-11) found within the Area 1 LOD of the SR 1 North Frederica Grade-Separated Interchange project. This data recovery will serve to mitigate any adverse effects to the site due to proposed improvements to SR 1 and SR 12. Previous archaeological investigations (Phase I and Phase II) revealed significant archaeological deposits within the Area 1 LOD of the APE for the improvement project. The APE is spatially limited to a 1.25-hectare parcel of land situated between the east side of SR 12 and the west side of SR 1. Site 7K-F-11 encompasses the entire Area 1 parcel and extends beyond the Area 1 LOD, but no impacts are proposed to Area 1 beyond the LOD limits.

The Area 1 LOD portion of 7K-F-11 will comprise the focus of the data recovery effort. Excavations within the Area 1 LOD will fully expose all subsurface archaeological features not previously exposed during the Phase I/II studies and investigate the archaeological deposits contained within. The workplan ensures that any remaining subsurface archaeological deposits within the Area 1 LOD will be identified and sampled and also serves to provide an expanded context for analyzing the archaeological remains recovered to date from Site 7K-F-11.

All artifacts will be processed and analyzed according to state and federal guidelines, and a Phase III Data Recovery report on the excavation will be prepared. A public outreach program will also be included in the mitigation efforts.

11.1 Archaeological Fieldwork

Previous archaeological investigations revealed several compelling aspects of the Grey Farm site. First, the site was found to have archaeological materials dating over an extensive period of time, including the Archaic (6500 to 3000 B.C.), Woodland I (3000 B.C. to A.D. 1000) and Woodland II (A.D. 1000 to 1600) periods. In particular, the Area 1 LOD exhibited diagnostic materials indicative of Woodland I (3000 B.C. to A.D. 1000) and Woodland II (A.D. 1000 to 1600) periods of occupation. The diversity of ceramic types, projectile points, flake tools, cores, bifaces, cobble and pebble tools, hammerstones, FCR, and lithic debris suggests that lithic

procurement and tool manufacturing, cooking, and floral and faunal processing activities occurred in the Grey Farm site. A fragment of a steatite pendant and a possible clay bead may be associated with ornamentation or ceremonial uses. Features 1, 3, 5/5A, and 11, found within the Area 1 LOD, illustrate the preservation of subsurface deposits associated with the Native American activities. These archaeological findings suggest that the Grey Farm site comprises a large assemblage of activity areas associated with seasonal and/or permanent occupations. The recovery of hickory nutshell fragments and Accokeek sherds in Feature 5/5A suggests at least a fall occupation of the site. Excavations may reveal additional subsurface deposits and cultural materials, which can provide evidence of the horizontal and vertical distribution of activity areas or new types of activities located within the Area 1 LOD portion of Site 7K-F-11.

The archaeological investigations to date identified a possible trend in temporal patterning of activity areas across Area 1. The recovery of the middle Woodland I period Accokeek ceramic sherds in Feature 5/5A and the presence of Woodland I and Woodland II diagnostic artifacts in the surface collection of Locus 3, which encompasses Features 5/5A and 11, reflect discrete areas temporally linked to middle Woodland I through Woodland II occupations. The presence of a small sample of charred wood and nutshell fragments in Feature 5 /5A, along with the FCR recovered in the surface collection, may represent the remains of a cooking activity area located in the unexposed portion of Locus 3 adjacent to Feature 5/5A. Locus 1, situated at the northern end of Area 1 and outside of the LOD, yielded Archaic period projectile points in the surface collection, as well as a steatite vessel fragment in the plowzone horizon of TU N660 E519. While no features were identified in Locus 1, the recovery of Archaic period artifacts in a limited area reflects a high potential for undocumented Archaic period features to be present in this locus. The data recovery excavations may reveal unrecorded features within the Area 1 LOD that could yield diagnostic artifacts and datable carbon samples. These temporal markers could be used to trace how site activities expanded over time within the LOD and to compare/contrast these interpretations with the current understanding of settlement patterns in the Murderkill River drainage and the Delmarva Peninsula.

Archaeological excavations will also increase our understanding of the informational networks in which the Native Americans who occupied the project area participated. As previously

discussed, the ceramic assemblage recovered from Area 1 yielded wares with unique geographical distributions found typically in northern and southern Delaware and the eastern shore of Maryland, suggesting that the project area was situated in a zone of overlapping technological and cultural influences. Examples of Accokeek, Popes Creek, and Page ceramics, more commonly found along the western shore of Maryland and into the Piedmont, indicate either the long-distance portage of vessels or the introduction of a ceramic technology from outside the local area. A polished steatite pendant fragment, a broken fragment of a quartz crystal, and a possible clay bead may indicate objects with religious or social value. The data recovery will review reports on previously documented archaeological sites within the Murderkill River drainage, as well as ones on sites within portions of the Marshyhope Creek branch of the Nanticoke River and the headwaters of the Choptank River in Delaware (the nearest waterways linking the Chesapeake Bay to the Murderkill River drainage) to identify any distribution patterns of ceramics or other artifact types suggesting overland transportation routes linking the western shore of Maryland to the project area.

Current investigations into periglacial soil deformation features in the Pine Barrens Region of New Jersey and across the Delmarva Peninsula suggest that a permafrost or deep seasonal frost layer may have extended farther south than previously recognized. Excavations in Area 5 documented two non-cultural soil features possibly associated with a permafrost horizon and its subsequent thaw, as did excavations of one non-cultural feature in Area 1. Area 1 also contained two cultural features, Features 1 and 8, which exhibited an oval shape and similar gravelly coarse sand C-horizon at their bottoms. Feature 8 evidenced characteristics similar to a “sediment pot” associated with permafrost soil deformations. Feature 1 was shallower than Feature 8, but exhibited a similar oval shape and coarse sand subsoil below the feature matrix. Features 1 and 8 may represent Native American use of soft soil deformations to access cobble and pebble deposits located in these features, supplementing raw lithic materials recovered from the banks of the Murderkill River and Spring Creek. These deformations were likely excavated and used as storage pits and shelters as well, given the ease of excavating the softer soil rather the densely packed subsoil. Further research into the composition and age of the soil matrices surrounding and underlying Features 1 and 8, as well as the non-cultural soil anomalies, may provide valuable information concerning environmental conditions of the landscape prior to or at the

time of the first aboriginal peoples' migration into the project area. In turn, the confirmation of soil deformations as a product of a permafrost setting and their subsequent use as raw resource procurement sites and shelters offers an interesting new approach to site formation processes on the Delmarva Peninsula, and a possible selective factor for repeated visitation and/or permanent occupation of the project area. These possibilities will be explored in the Phase III research.

To summarize, the archaeological research questions for the data recovery include:

- What can the archaeological record reveal about the types of activities that occurred in the Area 1 LOD and across the site?
- Are the temporally distinguishable activity areas in Feature 5/5A, Feature 11, and Locus 3 indicative of an interconnected network of features/activity areas across the site? Can these activity areas temporally delineate expansion and migration of Native Americans over the project setting?
- What does the archaeological record from the Area 1 LOD portion of Site 7K-F-11 indicate about our current understanding and theories regarding settlement patterns on the Delmarva Peninsula? Does the variability of ceramic types reflect extensive trade activates exclusively, cultural and technological influences brought into a local sphere and incorporated into ceramic production, or both?
- Was the project area once part of a periglacial, tundra-like setting exhibiting a permafrost horizon? Do Features 1 and 8 represent cultural use of permafrost soil deformations? Did the soil deformations in the project area influence long-term use of the project setting?

11.1.1 Archaeological Methodology

Plowzone Removal. A.D. Marble & Company will have the plowzone horizon mechanically stripped from the Area 1 LOD to expose any subsurface features. Prior to any mechanical excavations, the 10.0-meter square grid employed in the Phase I/II investigation will be re-established across Area 1, and wooden flagged stakes will be inserted at 30.0-meter intervals. Northing and easting coordinates utilized in the Phase I/II investigation of Area 1 will be employed in the data recovery effort. It is anticipated that the limits of the LOD will be clearly marked out by Century Engineering prior to any excavations. The plowzone horizon will be

mechanically stripped from the LOD and stockpiled outside of the LOD in Area 1. The exposed surface will be flat-shoveled and hand-troweled to delineate the limits of soil stains and other anomalies. Each stain and anomaly will be assigned a feature number, correlated to the appropriate northing and easting coordinates, and plotted on a scale map of the LOD. All features will be covered with plastic sheeting to retain moisture and protection from the weather.

Feature Excavation. Features will be mapped and photographed in plan view prior to excavation. All features will be appropriately sampled. It is anticipated that up to five C14 samples will be taken from feature soils within the LOD of Area 1. Features will be bisected along their longest axis and one half will be excavated. Feature profiles will then be drawn and photographed. The remaining half of the feature will then be excavated according to natural stratigraphy. Feature soils will be screened though 0.3-centimeter hardware cloth in order to recover all artifacts. Soil samples will be taken of all features identified during the Phase III data recovery. It is anticipated that up to 30 soil samples from features will be taken from Area 1 LOD in the Phase III effort. Final mapping and photography will be completed after the feature is excavated. All excavated feature locations will be plotted on a scaled map of the APE.

Permafrost Soil Sampling. A maximum of five 30.0-meter long by 4.0-meter wide trenches will be excavated in the project APE to expose a profile of the underlying soil stratigraphy. One trench will be placed based on the location of Feature 1 and the soil anomaly identified in TU N590 E5548 within the Area 1 LOD in an attempt to determine if these resources are of periglacial origin. A second trench will be placed in Area 7 extending between the farm pond and STP N580 E580. This STP exhibited an E-horizon consisting of 40 to 50 percent gravels overlying a Bt-horizon containing 50 percent gravels. This gravelly deposit might have been the source of raw materials exploited by Native Americans, and is possibly associated with a permafrost-related soil deformation. A third trench will be conducted in the LOD of Area 5, specifically exposing the soil anomalies recorded in TUs B and G. The remaining two trenches will be placed in the Area 1 LOD based on the results of the Phase III feature excavations. It is anticipated that the maximum depth of the trenches will not exceed 4.0 meters. Mark Demitroff, a periglacial landform specialist with the Department of Geography at the University of Delaware, and other staff from the Department of Geography, will be on-site during the trench

excavations to inspect the trench profiles, record any soil deformations or other soil anomalies, take soil samples, and provide initial interpretations regarding the origins of the anomalies. A maximum of eight potential permafrost-related soil anomalies will be sampled as part of the effort. At the completion of the trench inspection and documentation, each trench will be photographed and backfilled.

11.2 Data Recovery Analyses

Phase III artifact research will include flake attribute analysis, lithic sourcing, blood residue analysis on projectile points, plant starch analysis on ground stone tools, and floral and faunal analysis of soil samples. The technological aspect of flake attribute analysis will focus on determining the means and methods employed to produce the artifacts. Flake attribute analysis will record a variety of distinctive characteristics associated with production/reduction activities for an appropriate sample of debitage from the site. Flake characteristics may include flake dimensions, flake portion, scar count and direction, platform type, and the presence/absence of platform preparation.

On a larger scale, attempts will be made to source the outcrops and/or general locales of the lithic types recovered in the assemblage. Sourcing of the lithic types recovered from the Hickory Bluff site revealed materials from the Carolina Ridge and Valley area in North Carolina, the Piedmont region of southeastern Pennsylvania, and the Ridge and Valley region of Maryland and Pennsylvania. Sourcing of the lithic materials from the Grey Farm site may indicate a similar collection of materials, or possibly a greater reliance on local gravels. Lithic sourcing will be conducted by visual comparison of the lithic assemblage from the Grey Farm site with artifact collections located in the DSM, as well as with repositories located in other states. Given the number of potential repositories and site collections available, much of this task will be handled via discussion with knowledgeable staff and exchange of artifact photodocumentation and/or loans.

Paleofaunal information will be gathered through the identification of blood protein residue recovered in association with prehistoric tools from the site. A maximum of ten lithic tools recovered from the site will be analyzed for remnant animal proteins associated with the tools. A

maximum of ten ground stone tools will be sampled for plant starch residues to identify the types of floral resources gathered and processed by the site's occupants. Faunal analysis will also be performed. This work will record a wide range of attributes, including taxon, minimum number of individuals (MNI), butchery marks, and portion/cut. Additionally, seeds and other floral remains recovered from soil flotation will be carefully analyzed. Faunal and floral analyses will assist in interpreting the diet of the site's inhabitants and in identifying plant resources indicative of particular environmental climates.

Analysis of the soil deformations attributed to a permafrost horizon will consist of three methods: optically stimulated luminescence (OSL), C14 dating, and a comparison of grain-size and grain-surface features of the soil anomalies. OSL testing involves the discharge of stored electrons within minerals by exposure to light, producing a luminescent emission. This emission is calibrated in a laboratory and divided by an estimate of the radioactivity the mineral sample received during burial, producing a luminescence age (French et al. 2003:266). It is anticipated that a maximum of four soil samples will be subjected to OSL analysis. A grain-surface analysis records the surface of the sediment grains found within a deformation. Grains with a frosted, worn surface indicate wind-abraded sediments, whereas angular, shiny surfaces reflect water-worn sediments. Grain-size analysis distinguishes the percentage of particle sizes within a sample (ibid.:264-265). A maximum of eight samples will be subjected to grain-size and grain-surface analyses. A maximum of five charcoal samples will be collected in the Phase III effort for the permafrost analysis and submitted for radiocarbon dating.

A maximum of 30 soil samples recovered from features exposed in the Phase III data recovery will be processed through fine-screen flotation tanks. Cultural and organic materials will be separated by light and heavy fractions in the flotation process. Light and heavy fractions will be air-dried and returned to clean bags with new provenience tags. Floated materials will be separated into various subgroups, including, but not limited to, lithic materials, seeds, nuts, bones, ceramics, and non-cultural materials (gravels, roots, etc.). Floral material, including seeds and nuts, will be classified by genus and species, if possible. All floral remains will be examined for evidence of food preparation activities, including grinding, cutting, and burning. A ten percent sample of faunal material separated from the light and heavy fractions of the feature soil

flotation will be sent for analysis. The information derived from the faunal analysis will be used to determine if additional, intensive studies are required of the entire bone assemblage. Any faunal materials present will be classified by genus and species. The MNI for each species will be determined as well. It is anticipated that 400 bones, including many small fish bones, will be analyzed during this task of the project.

11.3 Reporting

A.D. Marble & Company will produce a final technical report detailing the mitigation efforts for the Area 1 LOD portion of the Grey Farm site. This report will include the research methodology, data analysis, interpretations of site formation, structure, and function. The report will be produced in accordance with the DESHPO guidelines. Copies will be provided to DelDOT, the DESHPO, and Century Engineering, Inc.

11.3 Public Outreach

Public outreach for the project will include the production of a non-technical booklet and a journal article, and will also include public lectures on the project.

Non-Technical Booklet. In addition to the technical report, a booklet summarizing the results of the mitigation study will be produced for dissemination to the general public. A.D. Marble & Company will formulate the content of this booklet and submit it to DelDOT and the DESHPO for review and comment. In its final form, this booklet will be made available to local historical organizations and to individuals and other groups upon request.

Journal Article. A.D. Marble & Company will summarize the data recovery in an article for publication. This article will be submitted for publication to an appropriate regional journal, such as the *Journal of Middle Atlantic Archaeology* or the *Archaeology of Eastern North America.*

Lectures. A presentation will be made at a conference of a professional archaeological organization, if appropriate. Potential organizations may include the Middle Atlantic Archaeological Council, or the Eastern States Archaeological Federation. Also, non-technical lectures will be scheduled for the general public. These may be held at the site during the course

of the data recovery excavations to interested school or local groups, at the Historical Society of Delaware in Wilmington, at the Kent County Public Library, or at an appropriate local school.

Website Data. A.D Marble & Company will provide text, photographs, and illustrations to DelDOT for incorporation into the SR 1 North Frederica Grade Separated Intersection project website. The information provided to DelDOT will describe the archaeological investigations at the Grey Farm site (7K-F-11). Illustrations related to the excavations will also be provided.