SECTION 2.0 ENVIRONMENTAL SETTING

The APE is an approximately 123-acre parcel containing agricultural fields and woodlands in St. Georges Hundred in New Castle County, Delaware (see Figures 1.1-1.3). Recent commercial development in the vicinity includes large retail stores, shopping centers, restaurants, and gasoline service stations along U.S. Route 301 north and south of the APE. Recent residential developments have been constructed north and west of the APE. Nineteenth century farmhouses are still standing along U.S. Route 301 near the APE, including the Rumsey Farm house and Summerton to the east of the APE (Figures 2.1-2.2).

The APE is situated on a gently rolling upland with elevations between 50-70 feet above mean sea level (see Figure 1.2). The geomorphological investigation of the APE indicated that it was situated on a deflated landform that consisted of ancient uplands where the archaeological potential is within the upper portions of the soils and there is little potential for deeply buried prehistoric deposits. Gravelly outcroppings and deposits attributed to the Columbia Formation can be seen throughout the APE. Columbia Formation gravels include hard silica-rich rocks, including quartz, quartzite and jasper (Hayes 2009, see Appendix J).

The APE is bordered to the north and south by tributaries to Sandy Branch, a tributary to Great Bohemia Creek (see Figure 1.2). The confluence of Sandy Branch with Great Bohemia Creek is approximately one mile to the northwest of the APE. Three small stream confluences are located to the north and east of the APE. Silted-in relict headwater streams are present in portions of the APE near the field margins. The tributaries sit well above the head of tide, and are not within navigable portions of Sandy Branch. Great Bohemia Creek joins Little Bohemia Creek to form the Bohemia River approximately 4.5 miles northwest of the APE. The Bohemia River empties into the Elk River approximately nine miles northwest of the APE, and the Elk River flows into the Chesapeake Bay at Elk Neck, approximately 12 miles west of the APE.

The Elk and Bohemia Rivers are estuarine and close to the Chesapeake Bay. The Upper Bay, near the mouth of the Susquehanna River and estuaries such as the Elk River, has relatively low salinity when compared to the Lower Bay outlet to the Atlantic Ocean (Dent 1995; Lowery 2002, 2003). Areas of tidal marsh, as well as high bluffs and sand beaches, fringe Great Bohemia Creek and the Elk, Bohemia, and Sassafras Rivers. Headwater tributaries of the Appoquinimink Creek in the Delaware Bay drainage are approximately one mile east of the APE.

Figure 2.1:

Northeastern portion of the APE near Levels Road on an aerial photograph.

Meters
0 50

Figure 2.2:

Northern portion of the APE on an aerial photograph (DelDOT 2008).

Meters
0 50

The APE is located within the Upper Peninsula Geographic Zone, and within the Mid-Peninsular Drainage Divide Zone of the High Coastal Plain of Delaware (Figure 2.3). Topography in the Mid-Peninsular Drainage Divide Zone is gently rolling with minor differences in elevation separating the headwaters of drainage systems that flow into the Delaware and Chesapeake Bays. This Zone also contains areas of poorly drained wetlands divided by low sandy ridges and bay/basin or seasonal pond features (Custer 1984: 26; Kellogg 1992; A.D. Marble & Company 2006a: 4). Although considered part of the Mid-Peninsular Drainage Divide Zone, the APE is situated in the headwaters of the Chesapeake Bay watershed.

No major topographical features or eminences are present within the APE, but slight elevations or knolls were noted in portions of the agricultural fields (see Figures 1.2, 1.3, 2.1, and 2.2). No apparent sand ridges or bay/basin features were noted within the APE, although upland knolls, gently sloping upland area, bordered by swales and lower-lying areas were noted at the northern and southern edges of the APE landform (see Figures 1.3, 2.1, and 2.2). The Upper Peninsula Geographic Zone is the largest geographic zone in the state. This area historically contained hardwood forests and became primarily agricultural during the nineteenth century (Ames et al. 1989).

Surficial deposits approximately 10 to 30 feet thick within the APE are mapped as part of the middle Pleistocene Columbia Formation, fine to coarse yellowish- to reddish-brown quartz sands and gravels cross-bedded with clayey silt (Pickett and Spoljaric 1971; Ramsey 2005; A.D. Marble & Company 2006a: 4). These deposits formed during colder portions of the middle Pleistocene based on pollen cores. Aeolian and periglacial reworking of these sandy sediments has resulted in a flat landscape with low-lying linear ridges trending northwest to southeast. Scattered upland dunes and circular ponds or bay/basin features with sandy rimscalled Carolina Bayshave been identified in other portions of the Mid-Peninsula Drainage Divide. These features are believed to be the result of wind action upon freeze-thaw features during glacial periods in non-glaciated areas (e.g., Custer 1984; Egghart 2008; Lowery 2003).

The Paleocene (Tertiary) Hornerstown Formation underlies the Columbia Formation, and is composed of gray, green, reddish-brown highly glauconitic fine to medium sand with silt. These formations are underlain by bedded sediments and crystalline basement rocks. Erosion of overlying soils and sediments has exposed cobbles and rocks of the Columbia Formation in areas of the APE and its vicinity. These cobbles may have been attractive to Native Americans as a local lithic source material given the lack of rock outcrops or quarry sources in the vicinity of the APE (A.D. Marble & Company 2006a; Custer and Galasso 1980; Jay Custer, personal communication December 18, 2008; Darrin Lowery, personal communication November 15, 2008).

Figure 2.3:

Southern portion of the APE on an aerial photograph (DelDOT 2008).

Exposures of Columbia Formation gravels indicate the shallowness of surface soils and the degree of erosion within the APE (Hayes 2009). Although no rock outcrops or quarry sources are documented in the vicinity of the APE, quartz, quartzite, and sedimentary cobbles of various sizes were noted in agricultural fields, woods, and in streams within and near the APE. Lithic material types recovered from archaeological sites in northern New Castle and Cecil Counties and nearby areas include jasper, ironstone, steatite, quartz, and chalcedony. These lithic materials come from cobbles and sources in the Piedmont and High Coastal Plain north of the APE, such as Delaware Chalcedony Complex outcrops and ironstone outcrops near Herring Island (Custer et al. 1986b, Custer 1989: 209, 236; Lowery 2002; Ward 1984, 1988; Ward and Custer 1988; Ward 1988; Ward and Doms 1984).

Soils mapped for the APE are included in the Matapeake-Sassafras Association, nearly level to steep, well-drained soils on uplands in the western part of the county (Matthews and Lavoie 1970: Sheet 41). Both well-drained and wetlands soil types are located within the APE (Table 2.1).

Table 2.1: Soil series within the APE.

	New Castle County, DE (Matthews and Lavoie 1970)	**New Castle County, DE** (USDA-NRCS 2010)
Wetland or poorly drained soils	Mixed Alluvial Land: Mv Fallsington loam: Fs	Longmarsh and Indiantown soils, frequently flooded: LO Zekiah sandy loam, frequently flooded: Za
Upland, well-drained soils	Matapeake silt loam: MeA, MeB2, MeC2, MeC3 Sassafras sandy loam: SaB2, SaC3, SmE Woodstown loam: WsA	Reybold silt loams: ReA, ReB, and ReC Collington fine sandy loam: CnD

The 1970 soils survey indicated that the APE was dominated by well-drained Matapeake soils and that the central portions of the APE were somewhat eroded (Figure 2.4). Other well-drained soils in the APE included patches of Sassafras soils on eroded sloped areas, such as gullies, and small areas of Woodstown loam. Poorly-drained Mixed Alluvial Land was found on the floodplain of the tributary on the northern side of the APE, while poorly-drained Fallsington loam was found on the floodplains and poorly-drained areas in the southern portions of the APE.

The U.S. Department of Agriculture - Natural Resources Conservation Service Web Soil Survey (USDA-NRCS 2010) does not show major changes in landforms or conditions. The Web Soil Survey indicates that soils within the northern portion of the APE formerly classified as Matapeake are now mapped as Reybold silt loams (ReA, ReB, and ReC) with slopes ranging from 0 to 10 percent (Figure 2.5). Reybold silt loams are described as formed in silty eolian deposits underlain by sandy and loamy fluvio-marine sediments (USDA-NRCS 2010). Collington fine sandy loam, 5 to 15 percent slopes (CnD), another well-drained upland soil, is present in the APE along the southern

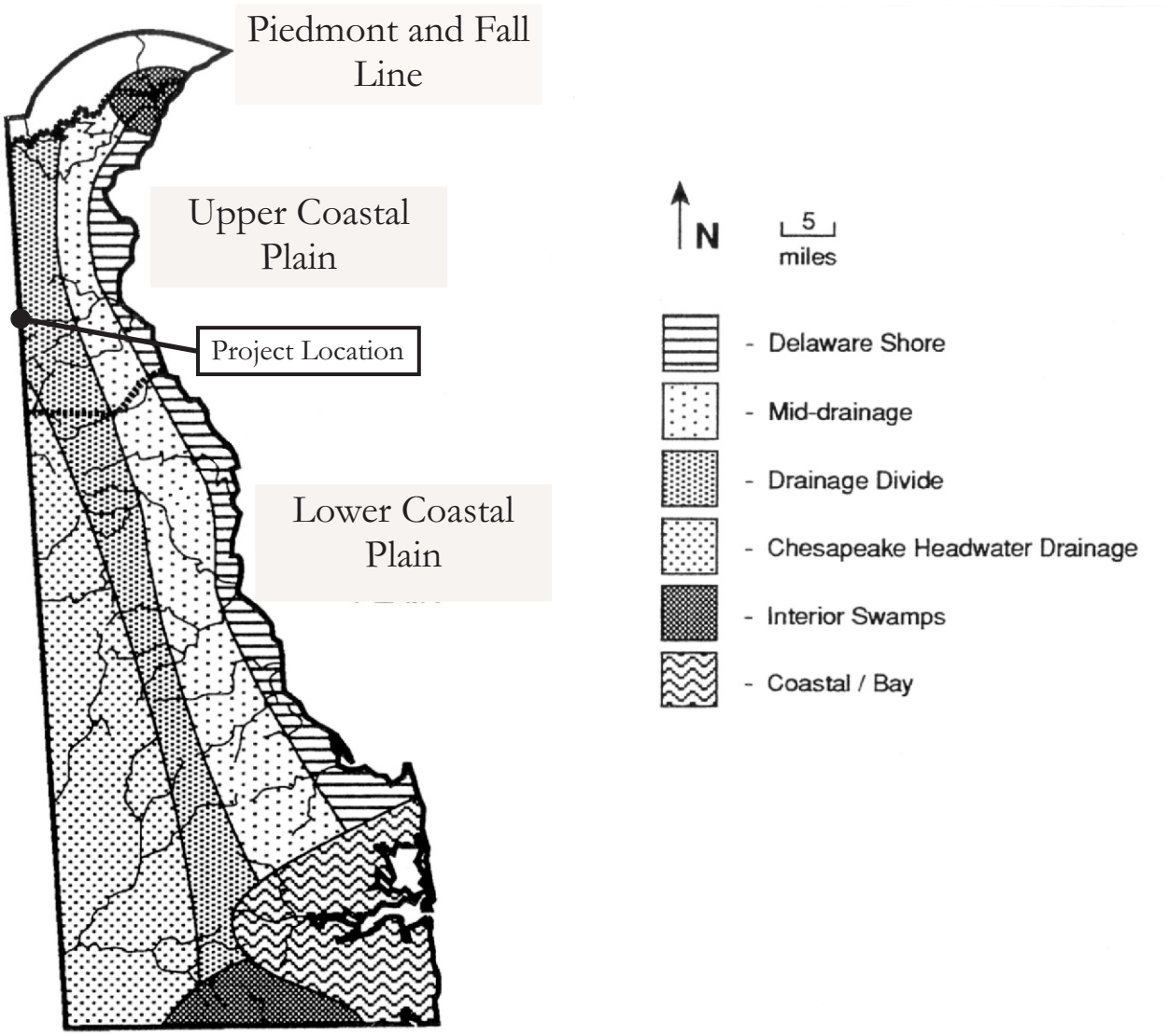

Figure 2.4:

Physiographic Provinces Map
(Delaware Physiographic Zones, redrawn from Grettler, et. al. 1996).

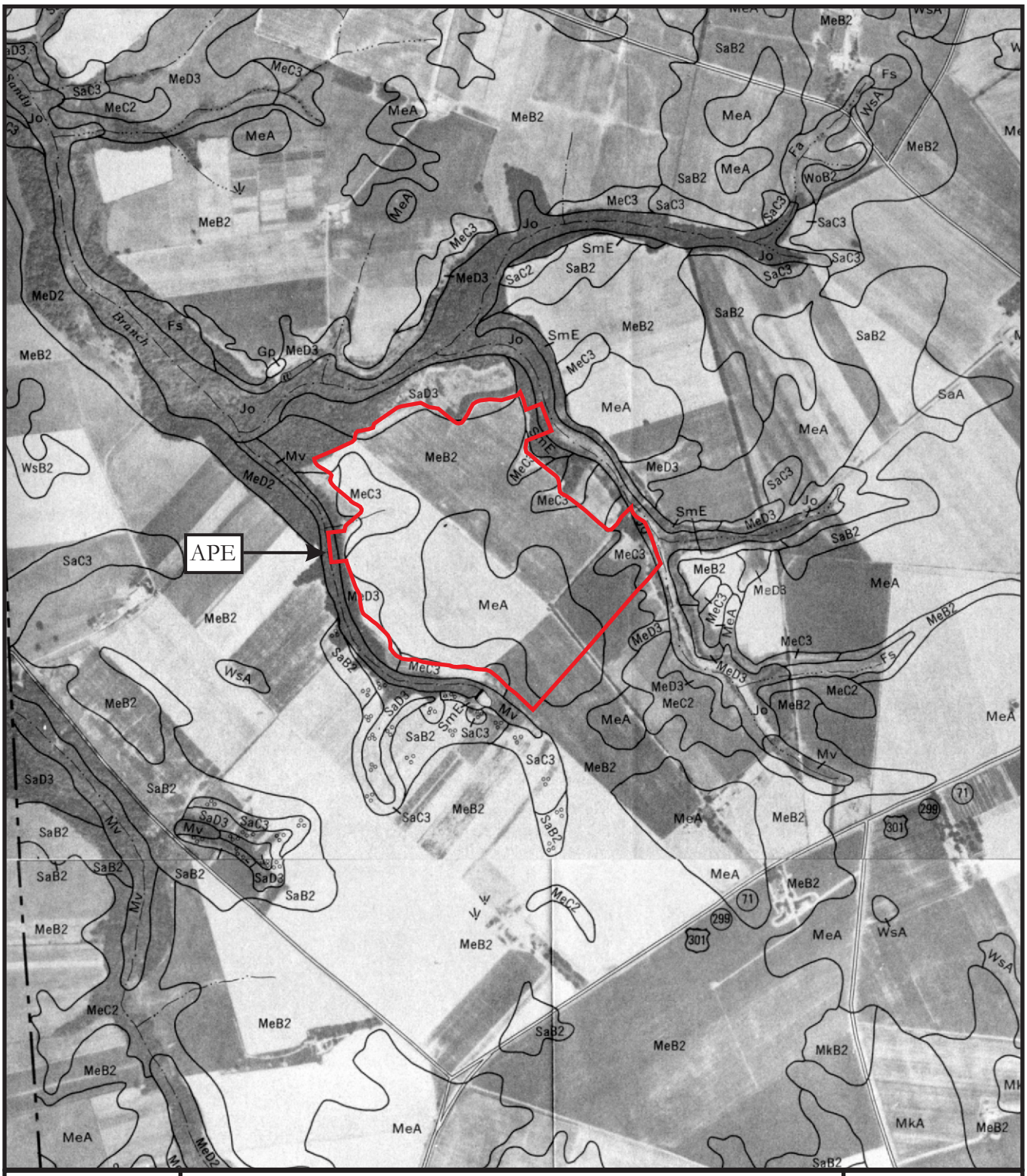

Figure 2.5:

Soils Map
(from 1970 Earle D. Matthews and Oscar L. Lavoie,
Soil Survey of New Castle County, Delaware,
Sheet Numbers 41 and 44).

N
W E
S

Feet
0 1320

end. This soil was formed in glauconite bearing eolian and/or fluvio-marine deposits (USDA-NRCS 2010). Mixed Alluvial Land and Fallsington soils are no longer present along streams and locations of poorly-drained are more limited. These areas are reclassified as poorly-drained Longmarsh and Indiantown soils, frequently flooded (LO) and Zekiah sandy loam, frequently flooded (Za), (USDA-NRCS 2010). Generally both soil surveys indicate that the central upland portions of the APE are on well-drained soils; poorly-drained soils are located on floodplains to the north and south of the APE. The majority of soils are described as Eolian and the APE does fall at the eastern edge of the loess (wind-blown silt) deposit area associated with the Chesapeake, but has been deflated by erosional processes during the Holocene (Lowery et al. 2010 [in press], Wah 2003, Hayes 2009).

Current vegetation in the APE includes agricultural fields recently planted in corn and soy with wooded areas to the north, west and south. To the north and south of the APE, the woodlands are dominated by oak and other deciduous trees while those bordering the western end of the APE are largely coniferous trees. Ornamental Osage-orange trees approximately 50 years old were planted in a row along the farm lane.