

II. ENVIRONMENTAL SETTING

The BR 159 project APE is located in Delaware's Mid-Drainage physiographic zone, just south and west of the zone's boundaries with the Interior Swamp (to the north) and Delaware Shore (to the east) zones (**Figure 5**). The APE is located in Delaware Geographic Zone II: Upper Peninsula (**Figure 5**). The APE spans the Christina River at Newport, which is located in the Christina River (HUC 10)/Lower Christina (HUC 10) watershed. This watershed is part of the Brandywine-Christina subbasin (HUC 8) (**Figure 6**).

A. Geologic and Physiographic Setting

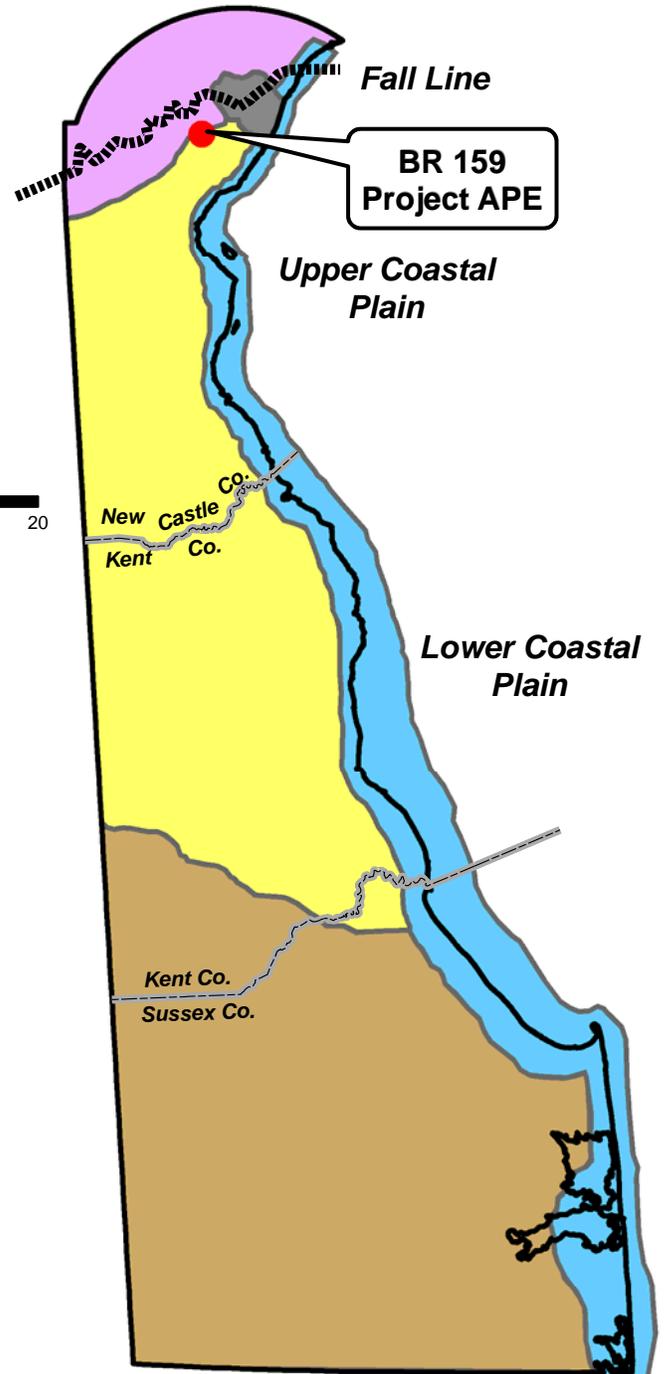
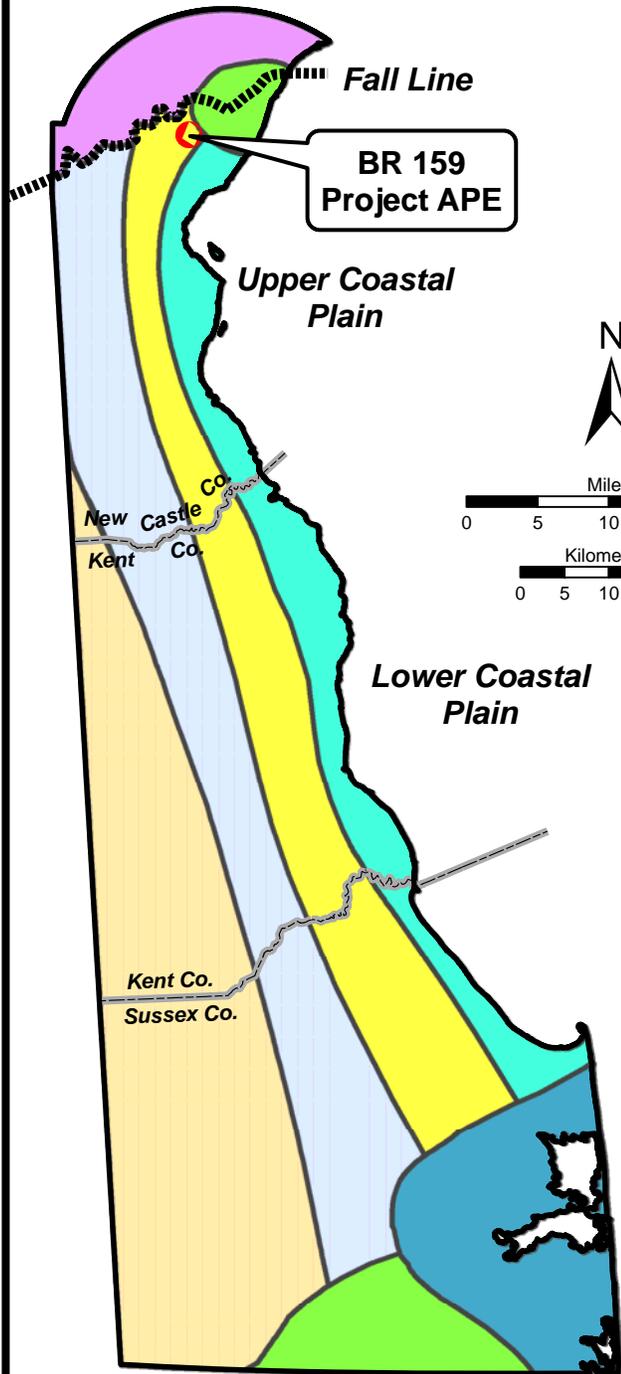
The Mid-Drainage physiographic zone is a section of Delaware's Coastal Plain. Bounded by the Delaware Bay/Atlantic Ocean to the east and foothills of the Appalachian Mountains that define the Piedmont physiographic province to the northwest, Delaware's Coastal Plain encompasses most of the state. The Fall Line marks the boundary between Delaware's Coastal Plain and Piedmont Uplands physiographic provinces. In Delaware (and in the neighboring state of Maryland), the general vicinity of the Fall Line closely coincides with the course of I-95. Delaware's Coastal Plain is part of a larger physiographic province. In its entirety, the Coastal Plain, which is divided into various sections, spans much of the eastern seaboard of the United States.

The landscape of Delaware's Coastal Plain is characterized by a low topographic relief that ranges from gently rolling to nearly level sandy plains. Numerous interior tidal freshwater swamps, which drain into saltwater marshes toward the shoreline, are also present throughout the Coastal Plain. Waterways tend to be low energy. In general, drainage in the Coastal Plain is relatively poor. Soils of the Coastal Plain consist of fine sands and loams that are underlain by unconsolidated deposits of quarternary, tertiary, and cretaceous silts, sands, clays, and marls (www.mgs.dnr.gov; Widmer 1964). Silty to sandy soils interspersed with large surface deposits of cobbles and gravels are common throughout the Coastal Plain. Although loam, clay, and marl deposits can also be found throughout the Coastal Plain, these deposits tend to be found toward more interior portions of the physiographic zone. Consequently, the more inland portions of Delaware's Coastal Plain tend to be more fertile.

Delaware's Coastal Plain is divided into a northern and southern section. The Upper (aka. High) Coastal Plain, within which the BR 159 project APE is located, encompasses the portion of New Castle County south of the Fall Line and roughly the north third of Kent County. The Lower Coastal Plain encompasses most of Kent County and all of Sussex County. In general, the differences between Delaware's Upper and Lower Coastal Plains are based mainly on geologic history, sedimentary characteristics, and topographic relief.

Physiographic Zones

Geographic Zones



Key of Physiographic Zones

- Piedmont Uplands/Fall Line
- Interior Swamps
- Delaware Shore
- ✓ Mid-Drainage
- Mid-Peninsular Drainage Divide
- Chesapeake Headwater Drainages
- Coastal Bay

Key of Geographic Zones

- Zone I: Piedmont
- ✓ Zone II: Upper Peninsula
- Zone III: Lower Peninsula/Cypress Swamp
- Zone IV: Coastal
- Zone V: Urban

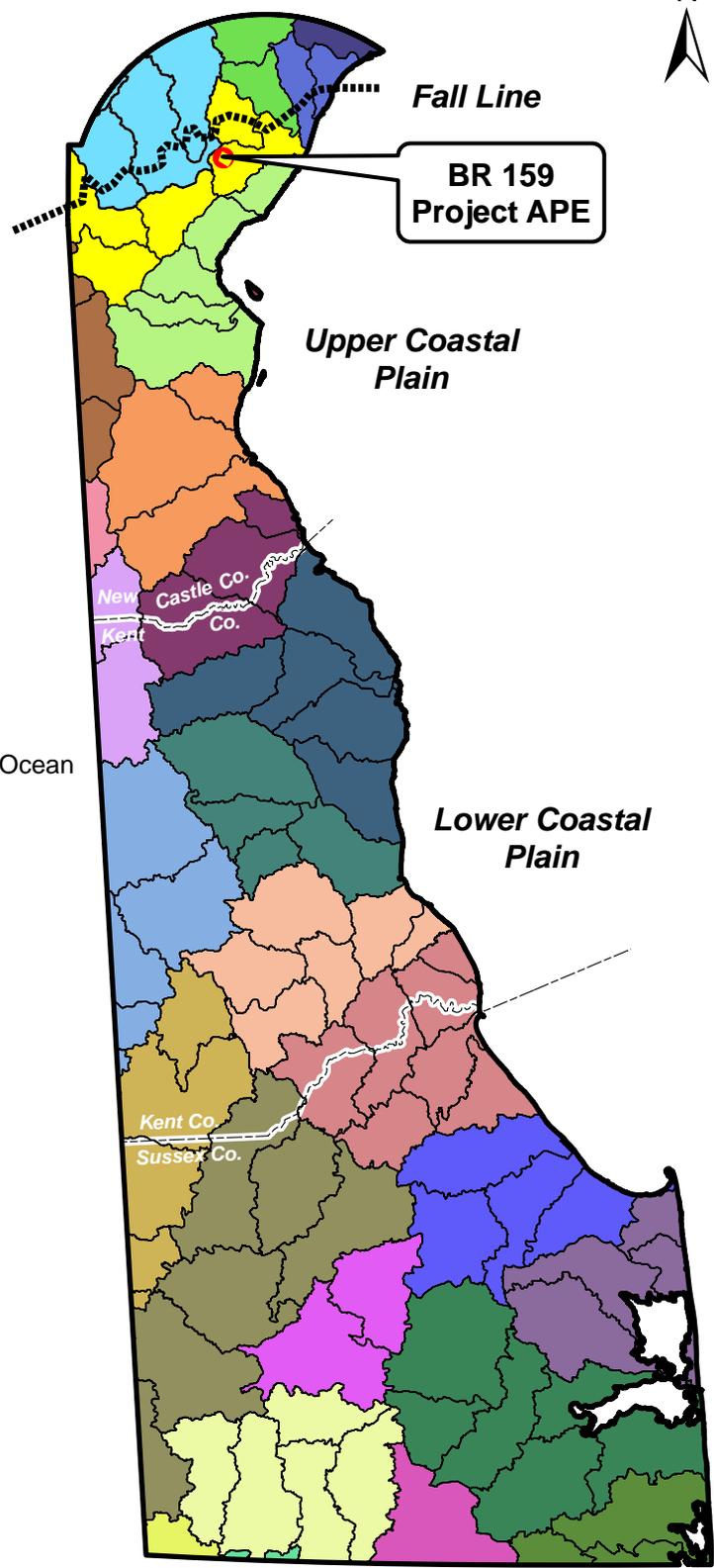
Physiographic and Geographic Zones of Delaware

FIGURE 5



Key of Watersheds (HUC 10)

-  Appoquinimink River-Delaware River
-  Bald Cypress Branch-Pocomoke River
-  Brandywine Creek
-  Broad Creek
-  Broadkill River-Delaware Bay
-  C&D Canal - Red Lion Creek
-  Chester River
-  Christina River
-  Deep Creek
-  Delaware Bay-Deep
-  Elk River
-  Fenwick Island-Assateague Island-Atlantic Ocean
-  Indian River Bay
-  Inland Bays
-  Leipsic River-Delaware Bay
-  Lower Nanticoke River
-  Marshyhope Creek
-  Mispillion River-Delaware Bay
-  Murderkill River-Delaware Bay
-  Raccoon Creek-Delaware River
-  Rehoboth Bay
-  Saint Jones River
-  Sassafras River
-  Shellpot Creek-Delaware River
-  Smyrna River-Delaware Bay
-  Upper Choptank River
-  Upper Nanticoke River
-  White Clay Creek
-  Wicomico River



Watersheds of Delaware

FIGURE 6

For example, soils in the Upper Coastal Plain consist of assorted sands and gravels of the Columbia Formation whereas those in the Lower Coastal Plain are composed of unconsolidated sands and clays of the early Cretaceous Potomac Formation. Overall, the soils in the Lower Coastal Plain tend to be better-drained than those found in the Upper Coastal Plain. The terrain of the Lower Coastal Plain is also notably flatter than that of its northern counterpart.

Delaware's Coastal Plain is also divided into several eastern and western sections, or physiographic zones. These divisions are in relation to a long, low ridge of well-drained land that runs the entire length of the Coastal Plain. This ridge, known as the Mid-Peninsular Drainage Divide zone, marks the divide between rivers that run eastward and into Delaware Bay and those that run westward and drain into Chesapeake Bay.

The project APE is located east of this ridge in the Mid-Drainage physiographic zone, which is situated due east and west of the Mid-Peninsula Drainage Divide and Bay Coast zones, respectively.

The Mid-Drainage Zone surrounds the central sections of all Coastal Plain tributaries of the Delaware River. The modern tidal limit along these drainages marks the center of the zone. West, or inland, of this limit, the major drainages and their tributaries are fresh. The zone is characterized as an area that contains extensive combinations of brackish and freshwater resources, and as such, this zone is one of the resource-richest physiographic zones of the state (Custer 1989, 1994). The Mid-Drainage Zone varies between two to eight miles in width, depending on location.

B. Geographic Setting

The BR 159 project APE is located at the north end of Delaware's Upper Peninsula geographic zone (Ames, et al. 1989; Herman et al. 1989). This zone is the largest of Delaware's geographic zone and is approximately 700 square miles in size,. The Upper Peninsula Zone generally encompasses the portion of the New Castle County south of the Fall Line and nearly all of Kent County. The north boundary of the zone runs through southern Christiana Hundred, southern/southeastern White Clay Creek Hundred, and northern Pencader Hundred. The Upper Peninsula geographic zone generally coincides with the Upper Coastal Plain of the state.

C. General Soil Description

Figure 7 presents a map of the identified soil types in and around the BR 159 project APE as recorded in the current Natural Resources Conservation Service (NRCS)'s Soil Survey Geographic database (SSURGO) for New Castle County (USDA/NRCS 2009; SSURGO V2.1; MD 2.2.32009; <http://SoilDataMart.nrcs.usda.gov/>). The project APE crosses three of New Castle County's 129 soil map units. A summary listing of the soil types in the project APE is presented in **Table 1**.

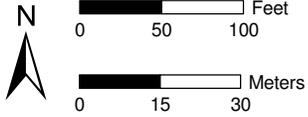
**Table 1:
Soils Mapped by the NRCS within the Project APE (approximated)**

Soil Type	Description	Hydric	Total Acres (within APE)	Total Hectares (within APE)
Up*	Urban land	No	1.140	0.461
UzC	Udorthents 0 to 10 percent slopes	No	0.116	0.047
UsB	Udorthents, refuse substratum 0 to 10 percent slopes	No	0.460	0.186
W	Water	Unknown	0.733	0.297
Total			2.449	0.991

* soil within the archaeological survey area

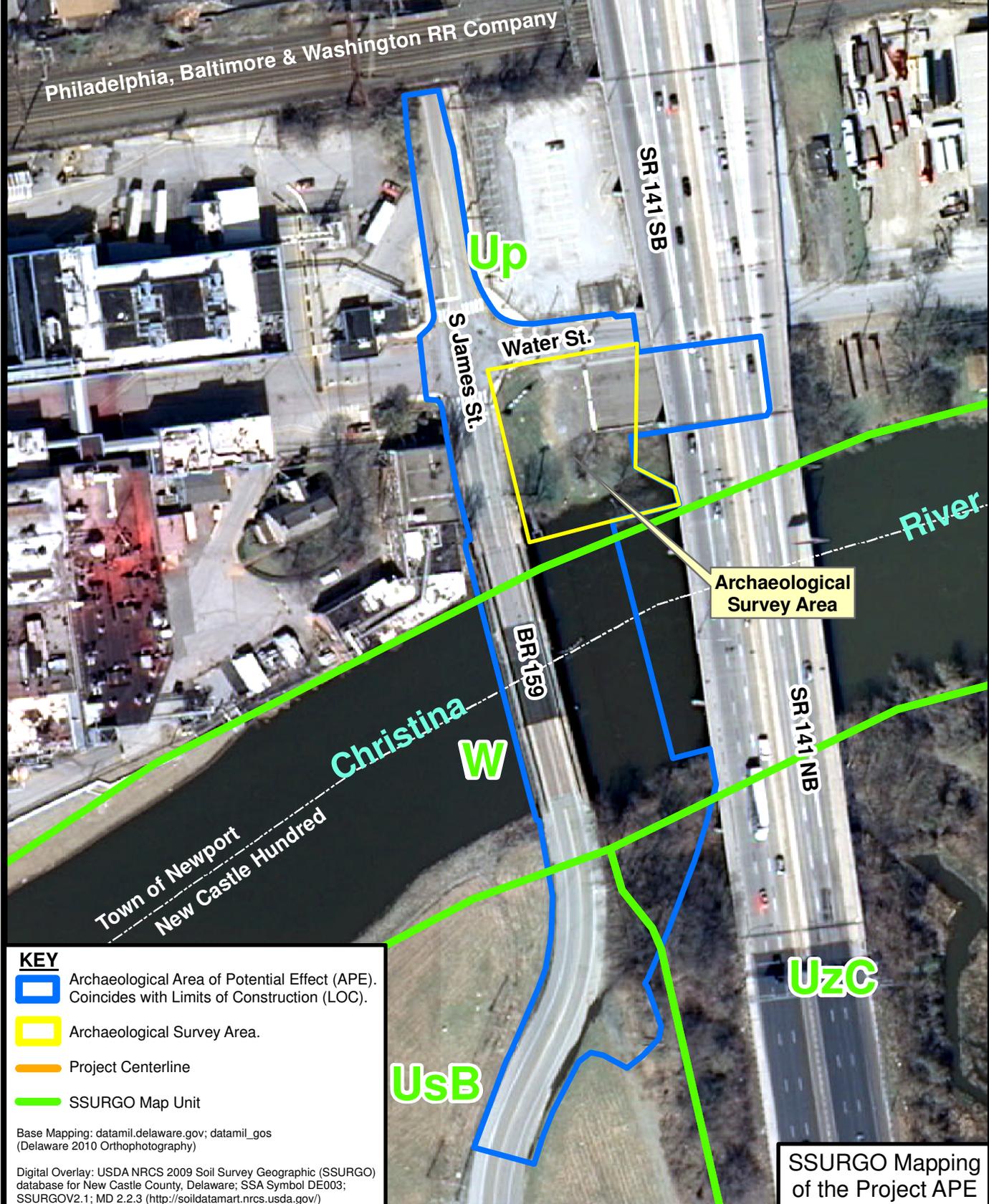
Heavy modern urbanization has since altered the natural soil stratigraphy of much of northern/northeastern New Castle County beyond recognition. Soils within the archaeological survey area have been classified as Urban Land (Up), which, like Udorthent variants, are those that have been created as a result of cutting, filling, dredging, and other human ground disturbances. Although most of the land in the greater Newport area is composed of various human-made soils and landscapes, remnants of natural soil types can occasionally be found in open areas such as parks and in areas where modern development has been relatively limited. For example, intact natural soil profiles have been encountered within the large tracts of land located to the west of the BASF Corporation (i.e. Kopper Properties) (Kellogg and Woodward-Clyde Consultants 1996; Kellogg and Catts 1997a, 1997b, 1997c; Harris et al. 2008).

Overall, soils within the archaeological survey area and the broader APE are loamy. Pre-SSURGO soil data provides some insight into the pre-urban subsurface stratigraphy of the Newport area. Under the pre-NRCS SSURGO classification program, the BR 159 project APE was delineated as Elsinboro-Delanco-Urban Land (EuB), which is a variant of the Elsinboro soil series (USDA/DAES 1970). This ancestral soil classification was described as level to gently sloping, well-drained to moderately well-drained, medium-textured, silty, clayey, and sandy loams that have formed in old alluvium on stream terraces. In relatively undisturbed to moderately disturbed landscapes, Elsinboro soil profiles consist of brown to yellow-brown silt loams underlain with various strong-brown slightly sticky to sticky silty clay loams and silt loams (USDA/ DAES 1970). It can be suggested that the pre-urban soil profile in the archaeological survey area was similar.



SSURGO Soil Map Unit		APE Acreage	APE Hectares
Up*	Urban Land	1.140	0.461
UzC	Udorthents, 0 to 10 percent slopes	0.116	0.047
UsB	Udorthents, refuse substratum, 0 to 5 percent slopes	0.460	0.186
W	Water	0.733	0.297
Total		2.449	0.991

* Soil within Archaeological Survey Area



- KEY**
- Archaeological Area of Potential Effect (APE). Coincides with Limits of Construction (LOC).
 - Archaeological Survey Area.
 - Project Centerline
 - SSURGO Map Unit

Base Mapping: datamil.delaware.gov; datamil_gos (Delaware 2010 Orthophotography)

Digital Overlay: USDA NRCS 2009 Soil Survey Geographic (SSURGO) database for New Castle County, Delaware; SSA Symbol DE003; SSURGOV2.1; MD 2.2.3 (<http://soildata.mart.nrcs.usda.gov/>)

SSURGO Mapping of the Project APE

FIGURE 7

D. Project Setting

The approximately 0.396 acre (0.16 ha) BR 159 archaeological survey area is an undeveloped, vacant corner lot located in an urban riverfront environment. The lot is located at the southeast corner of the S. James Street/Water Street intersection. The north half (i.e. inland half) of the lot is located on a slight terrace that overlooks the Christina River. The terrain of the lot's south half (i.e. riverside half) slopes downward in a southerly direction towards the Christina River. The physical condition of the survey area lot is fair.

The lot often functions as a temporary staging/storage area for utility/roadway construction and maintenance. The lot is also used for overflow parking by the BASF Corporation, which occupies the southwest, northwest, and northeast quadrants of the S. James Street/Water Street intersection. Use of the lot for recreational fishing and evidence of transient habitation is also apparent.

The ground surface of the lot is irregular. Intermittent patches of asphalt paving are present throughout the lot, but most notably along its Water Street edge and beneath SR 141. These asphalt patches vary in condition. The ground covering of non-paved areas consist of a mix of grass and gravel (graded aggregate). General maintenance of the lot is minimal and is generally limited to occasional attendance to an extant free-standing billboard located in the northwest corner of the lot (at 45 degree angle to the intersection), basic mowing of the grass around the billboard, and servicing of the various subsurface utilities that run through the lot.

The S. James Street side of the lot abuts the roadway toe of slope and BR 159 approach, which are capped with sod and subjected to routine mowing. The S. James Street sidewalk runs the north-south length of the lot. The river (south) edge of the lot is lined with bank stabilizing rock riprap.