5. Natural Resources

5.1 Geology

The Midcounty Corridor study area (study area) is located in the Piedmont Plateau physiographic province, with bedrock consisting of hard, crystalline igneous and metamorphic rocks of the Paleozoic Age called the Wissahickon Group. Study area bedrock consists of schist, gneiss, gabbro, and other highly metamorphosed sedimentary and igneous rocks. Exposed bedrock occurs in some areas, primarily along steep sections of stream valleys and the existing cleared and graded areas south of Gatlin Drive. Shallow bedrock is evident by scattered surface rocks within North Germantown Greenbelt Park.

The Geologic Map of Maryland (Maryland Geological Survey, 1968) indicates the southern portion of the study area overlies the Wissahickon formation (Upper Pelitic Schist) of the Eastern Piedmont and the northern section overlies the Ijamsville formation (Marburg Schist) of the Western Piedmont. The Wissahickon formation Upper Pelitic Schist consists of albite-chlorite-muscovite-quartz schist with sporadic thin beds of laminated micaceous quartzite. The Ijamsville formation Marburg Schist is composed of fine grained muscovite-chlorite-albite-quartz or phyllite and phyllitic slate. Alternatives 2, 4 Modified, 5, 8 and 9 do not impact the geology of the study area.

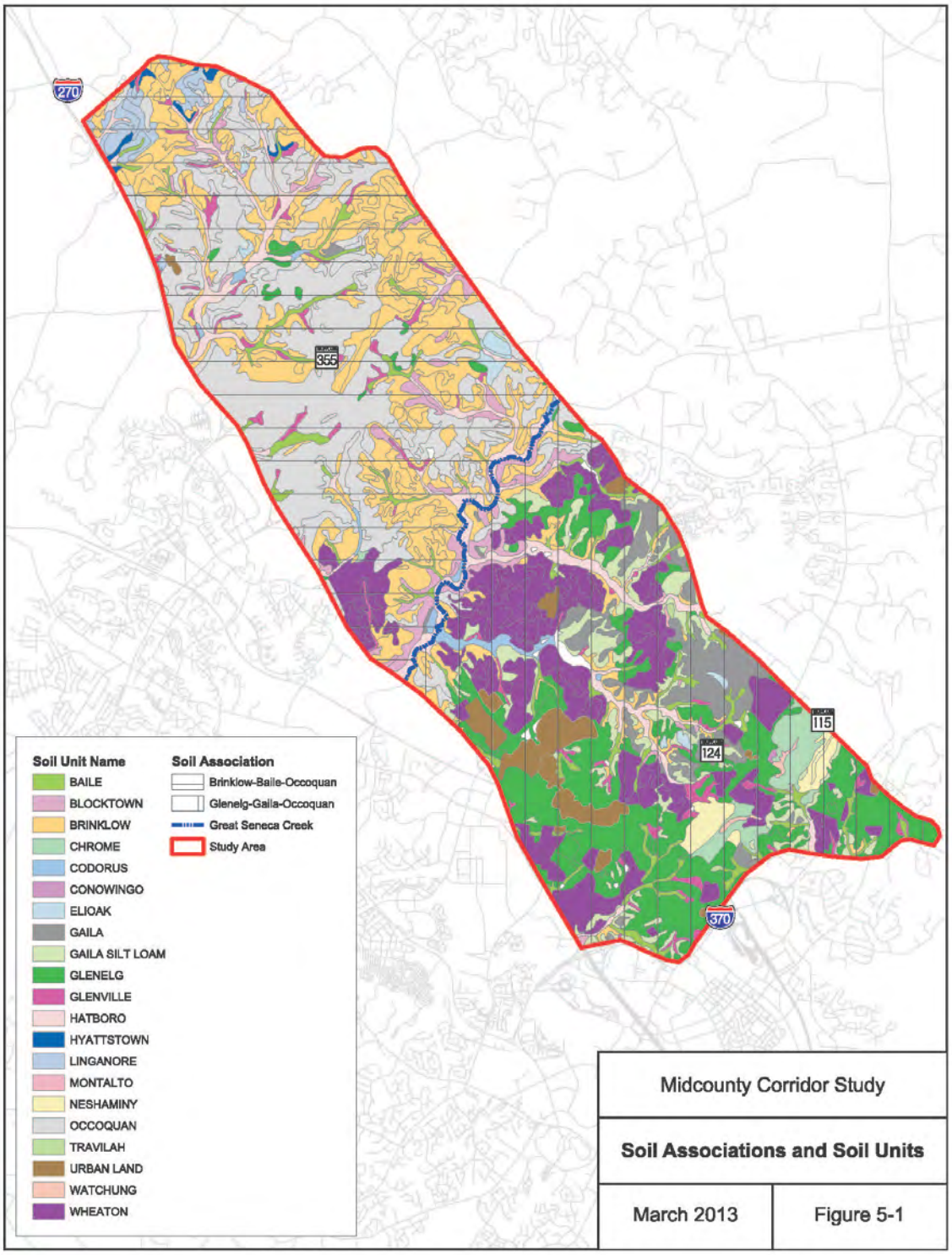
5.2 Soils

The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) in cooperation with the Maryland Agricultural Experiment Station and the Montgomery Soil Conservation District conducted a soil survey of Montgomery County. Excluding the stream channels, the study area includes two soil associations divided at the intersection with Great Seneca Creek (see **Figure 5-1)**.

Southeast of Great Seneca Creek, the study area lies within the Glenelg-Gaila-Occoquan association, composed of moderately deep to deep, and moderately erodible, well-drained, strongly sloping, micaceous soils. Northwest of Great Seneca Creek, the study area lies within the Brinklow-Baile-Occoquan soil association, composed of shallow to moderately deep, well drained, strongly sloping, channery soils. Both associations are classified as having a fair to good suitability as material for roadway subgrade or fill.

Whetstone Run, Great Seneca Creek and its tributaries, and Wildcat Branch, are bordered along their stream channels by varying widths of Baile, Codoros, Hatboro and Glenville silt loams. These poorly drained erodible soils derived from crystalline rocks, are poor for roadway subgrade and fill, and are typically wet and frequently flooded. Baile and Hatboro silt loams are Hydric soils and classified as Typic Fluvaquents. The study area also includes portions of the soil association designated as Urban Land, primarily residential and/or containing properties developed for commercial, office and recreational uses. The soils have been disturbed and the land has a moderate to high amount of impervious surfaces. Residential dwelling units in the study area include garden apartment complexes between Montgomery Village Avenue and Watkins Mill Road with townhouse and single family homes above Watkins Mill Road. Vegetation cover in this area is typically mowed lawns with trees and shrubs in landscaped areas.

Figure 5-1: Soil Associations



The soil map unit 16D, Brinklow-Blocktown channery silt loam on 15-25% slopes, is classified as having a severe hazard of erosion by the NRCS, based on the soil map unit erodibility index. These soils should be incorporated into wetland buffers according to the soil survey guidance in chapters III and V. These severely erodible soils should also be incorporated into the project's open space as much as possible and carefully managed during construction. Alternatives 2, 4 Modified, 5, 8 and 9 do not impact the soils of the study area.

5.3 Wildlife, Including Rare, Threatened, and Endangered Species

A combination of field survey, previous studies, and desktop information was used to determine impacts to wildlife including rare, threatened, and endangered species. Desktop information and a modified field survey (for Watchlist species) was carried out for Alternatives 4 Modified and 5. Two detailed field surveys and abundant desktop information from Montgomery County and the natural resource agencies was available for Alternatives 8 and 9.

Detailed field surveys/studies for Alternatives 8 and 9 included a March 2004 study by John Parrish and R.G. Steinman titled Select Environmental Inventory and Impact Analysis for Amphibians, Forest Birds, Rare Flora, & Significant Habitats in North Germantown Greenway & Great Seneca Park, and a 2005-2006 study by Charles Davis titled Survey for Crested Iris (Iris cristata) and Reconnaissance Survey for Habitats of other Rare, Threatened and Endangered Species along the Proposed Alignment for the Mid-County Highway, Montgomery County, Maryland. An additional document, Draft Environmental Site Assessment: Midcounty Highway / Middlebrook Road Montgomery Village Avenue to MD 27 was compiled by A. Morton Thomas and Associates and RK&K in September 2004.

The Maryland-National Capital Park and Planning Commission (M-NCPPC) of Montgomery County provided a list of Watchlist plants in 2004 to be noted during the field investigation. Watchlist species are those species not officially listed as state-threatened or endangered in Maryland, but considered rare or uncommon by the MD DNR Wildlife and Heritage Service. The 2004 plant Watchlist provided by M-NCPPC included Sanicle (*Sanicula marilandica),* Allegheny chinkapin (*Castanea pumila*), shingle oak (*Quercus imbricaria*), crested iris (*Iris cristata*), black snake-root or black cohosh (*Cimicifuga racemosa*), and green dragon (*Arisaema dracontium*). Watchlist species are updated periodically by the state with the September 2012 Watchlist for Montgomery County including only one carryover from the 2004 Watchlist, *Iris cristata,* with its status changing from "Rare to uncommon" to "Highly State rare." The 2012 Watchlist plants for Montgomery County include American chestnut (*Castanea dentata*), few-flowering panicgrass (*Dichanthelium oligosanthes*), butternut (*Juglans cinerea*), reticulated nutrush (*Scleria reticularis*), and bashful bulrush (*Trichophorum planifolium*). Field investigation for the 2004 Watchlist species along Alternatives 4 Modified, Alternative 5, and the Alternative 8 and 9 Northern Terminus Options occurred during July and August 2011. Findings should not be considered final since an investigation for the presence of particular species should be conducted during the appropriate time of year when a species is most readily identifiable (*e.g.*crested iris blooms in May-June and its presence should be evaluated during that time). Correspondence dated March 13, 2012 (**Appendix –Agency Correspondence**), from the Maryland Department of

Natural Resources (DNR) listed numerous concerns regarding rare, threatened, or endangered species (RTE's) within the study area. Correspondence dated March 28, 2012 from the U.S. Fish and Wildlife Service (FWS) indicated that no federally proposed or listed endangered or threatened species are known to exist within the study area and no Biological Assessment or further Section 7 consultation with the FWS is required.

Forest Interior Dwelling (bird) Species (FIDS), white-tailed deer, rare trees, rare herbaceous plants, and potential habitat for rare butterfly species exist within the study area. Known impacts to these resources are described below for each alternative.

Alternative 2
No impacts are associated with this alternative since it impacts no wildlife including rare, threatened, or endangered species.

Alternative 4 Modified
Correspondence from DNR identified a population of the state-listed threatened purple fringeless orchid (*Platanthera peramoena*) north of the intersection of Brink Road and Wightman Road. Road-widening for this alternative and a proposed wetland mitigation site for this project (see Mitigation discussion, Page 5-58) may impact the purple fringeless orchid. The 2011 field investigation revealed shingle oaks at two locations impacted by Alternative 4 Modified, the Davis study noted shingle oak in the Great Seneca Creek floodplain, and specific shingle oak locations were provided in the 2004 Environmental Site Assessment (ESA). White tailed deer would be impacted (see recommendations from the Montgomery County Deer Management Work Group under Alternatives 8 and 9).

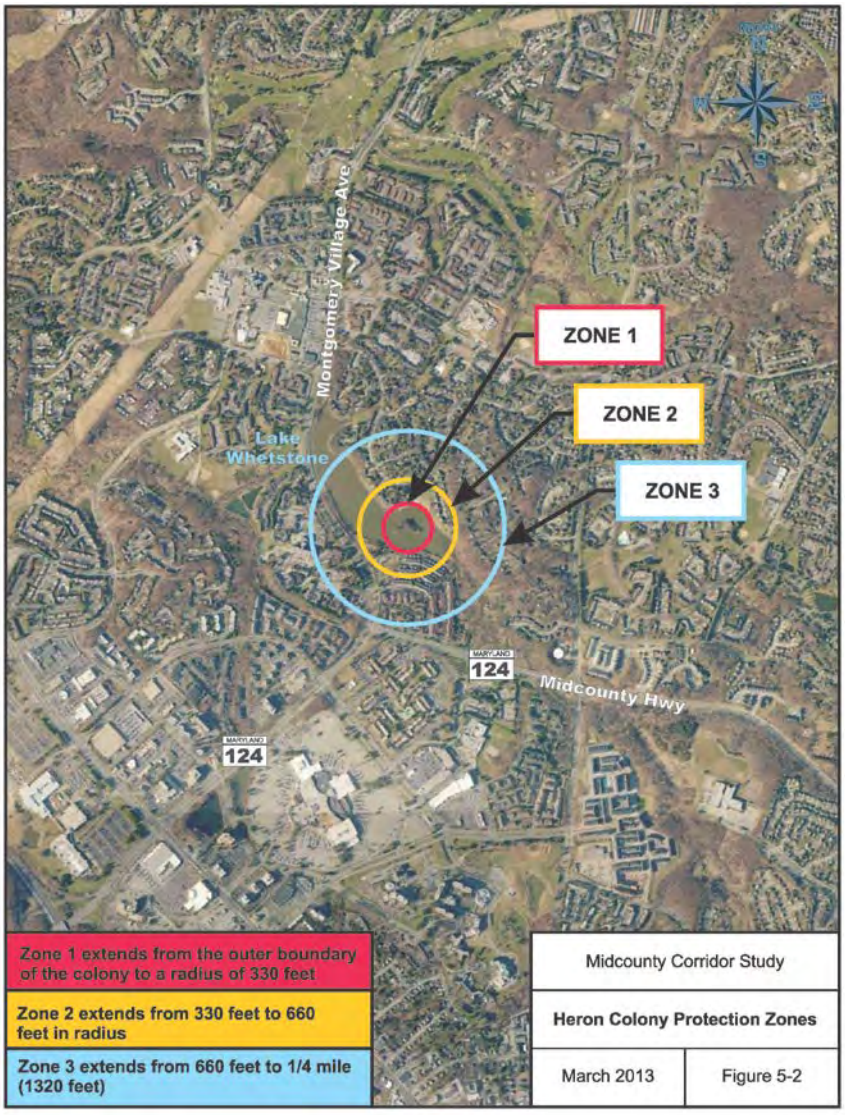
Alternative 5
DNR noted that a mixed heron colony (Great blue herons and Black-crowned night herons) is located at Lake Whetstone in Montgomery Village (March 13, 2012 letter-**Appendix**). This is approximately 0.25 miles from the portion of existing Midcounty Highway that would be widened under Alternatives 5, 8, and 9. The colony is located on the island within Lake Whetstone. Disturbance includes cutting nesting or nearby trees, or carrying out construction nearby causing adult abandonment of the chicks. Mortality of heron chicks is a violation of the U.S. Migratory Bird Treaty Act. The Great blue herons and Black-crowned night herons establish nesting colonies in forested areas relatively predator and disturbance free. DNR recommend implementing the following guidelines for any construction that may occur near the area:

- Establish a protection area of 0.25 mile radius from the colony's outer boundary. Within this area establish three zones of protection: Zone 1 extends from the outer boundary of the colony to a radius of 330 feet, Zone 2 extends from 330 feet to 660 feet in radius, and Zone 3 extends from 660 feet to 0.25 mile (1320 feet). Alternative 4 Modified is within Zone 3 (see **Figure 5-2)**.
- During the breeding season, 15 February through 15 August, all human entry into Zone 1 should be restricted to only that essential for protection of the heron colony. Human disturbance of colony sites that results in significant mortality of eggs and/or chicks is considered a prohibited taking under various state and federal regulations.

- No land use changes, including development or timber harvesting, should occur in Zone 1.
- Construction activities, including clearing, grading, building, etc., should not occur within Zones 1 and 2.
- Selective timber harvesting may occur in Zone 2, but clearcutting should be avoided.
- No construction or timber harvesting activities should occur within the 0.25 mile protection area during the above-mentioned heron breeding season.

Specific protection measures depend upon site conditions, planned activities, colony site type, history and other factors. DNR recommends close coordination during project design and construction to ensure heron colony protection.

Figure 5-2



DNR correspondence noted the designation of Germantown Bog located along Observation Drive as a nontidal Wetland of Special State Concern (WSSC) by Maryland Department of the Environment (MDE), however Alternative 5 road widening would not impact this wetland. White tailed deer would be impacted (see recommendations from the Montgomery County Deer Management Work Group under Alternatives 8 and 9).

Alternatives 8 and 9

Alternatives 8 and 9 pass through areas of undisturbed, high-quality forest and, as a result, impacts to natural resources are more extensive than along Alternatives 4 Modified and 5. These impacts are discussed as follows:

Heron Colony

As shown on **Figure 5-2**, the improvements to existing Midcounty Highway (MD 124) associated with Alternatives 8 and 9 would be just beyond the three protection zones.

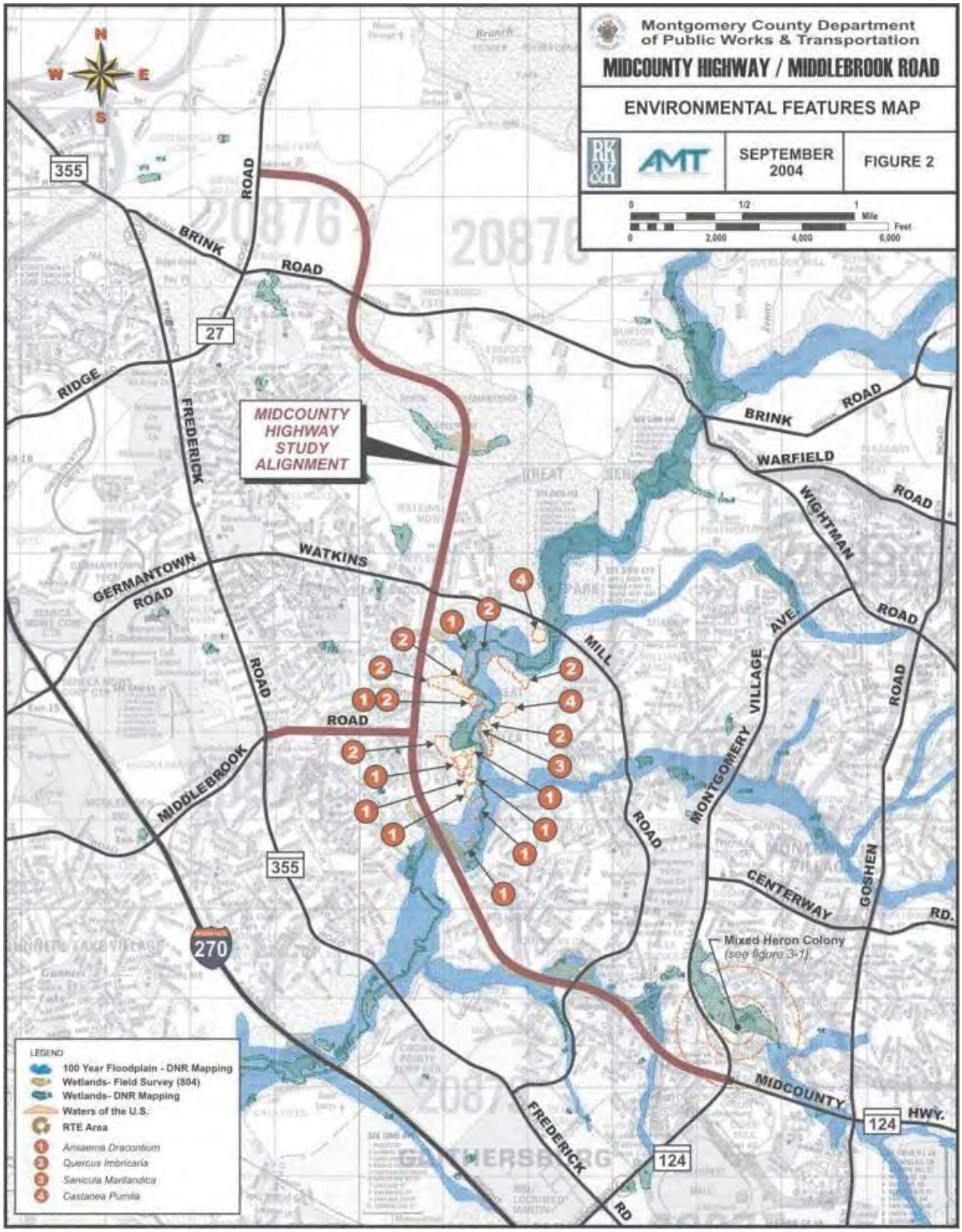
State-Rare and County-Rare Plants

Two state-rare plant species were identified in the Parrish/Steinman study near or within Alternatives 8 and 9 including butternut (*Juglans cinerea*) and American chestnut (*Castanea dentata*). Butternut is found in the floodplain of Brandermill Tributary in Great Seneca Park upstream of Alternatives 8 and 9 and would not be directly impacted by these alternatives. American Chestnut occurs in several locations in Great Seneca Park and North Germantown Greenway and could potentially be impacted by Alternatives 8 and 9.

The study listed two additional plants, bashful bulrush (*Scirpus verecundus* or *Trichophorum planifolium*) and black ash (*Fraxinus nigra*), as state-listed plants, however neither is currently state-listed as threatened or endangered. Bashful bulrush is currently a Watchlist species and black ash has no special status. Bashful bulrush was found growing near the rock outcrops of Great Seneca Park and could be impacted by Alternatives 8 and 9 at the crossing of Brandermill Tributary. A population of the state-listed endangered crested iris (*Iris cristata*) is located in the Forest Brooke residential community, far from any build alternative. **Figure 5-3** shows the locations of Watchlist species, wetlands, and floodplains along Alternatives 8 and 9 and Northern Terminus Option A (as reported by A. Morton Thomas for the ESA, 2004). This figure does not include impacts along Northern Terminus Option D since the AMT study was conducted many years prior to the development of Option D. Two former Watchlist plants were found outside the study area: sanicle (*Sanicula marilandica*) occurs in small numbers on a single slope above Great Seneca Creek, and chinkapin (*Castenea pumila*) is scattered on the slopes above Great Seneca Creek. Large scattered groups of another former Watchlist plant, green dragon (*Arisaema dracontium*), was located in the floodplain of Great Seneca Creek approximately 1,000 feet from Alternatives 8 and 9. This is one of only a few occurrences of this species in Montgomery County away from the Potomac River floodplain.

The former Watchlist species Shingle oak (*Quercus imbricaria*) was found during the 2011 field reconnaissance, and was also documented in the Davis study occurring in the floodplains of Dayspring Creek, Brandermill Tributary, and Great Seneca Creek. The 2011

Figure 5-3: Environmental Features Map - AMT Report



reconnaissance revealed occasional Shingle oaks along Northern Terminus Option D (see FS-8 in Forest Stand [FS] Location Map) and a large stand of Shingle oak in the forest near the intersection of existing Midcounty Highway and Middlebrook Road (FS-57). The ESA report identified four Shingle oaks in the study area that are significant trees (>24" diameter at height (DBH), cited populations of 100-200 trees occurring on four separate slopes within Alternatives 8 and 9, and provided some specific Shingle oak locations.

Forest Interior Dwelling Species

Alternatives 8 and 9 and Northern Terminus Option A would impact habitat of Forest Interior Dwelling Species (FIDS) in the North Germantown Greenway Stream Valley Park and the Great Seneca Stream Valley Park. Information on FIDS for this area was derived from Maryland/DC Breeding Bird Atlas Project listings for the Gaithersburg block cross referenced with FIDS information from "A Guide to the Conservation of Forest Interior Dwelling Birds in the Chesapeake Bay Critical Area, June 2000." Total FIDS impacts at these parks for Alternatives 8 and 9 are shown in **Table 5-1**.

Table 5-1: FIDS Impacts within ARDS

Alternatives	FIDS Impacts S.F. (acres)	Resource Area Impacted
Alts 8 & 9	41,004 (0.94)	Great Seneca Creek
Alts 8 & 9	3,445 (0.08)	Brandermill Tributary
Alts 8 & 9, Option A	790,012 (18.14)	North Germantown Greenway
Alts 8 & 9, Option B	428,591 (9.84)	North Germantown Greenway
Alts 8 & 9, Option D	428,591 (9.84)	North Germantown Greenway

Populations of many FIDS are declining in the eastern United States and in Maryland; as a result, conservation of FIDS habitat is strongly encouraged. Portions of Alternatives 8 and 9 would fragment high quality interior forest habitat creating undesirable forest edge habitats and increasing ambient noise which can interfere with FIDS breeding. Canopy openings created by roadways change microclimate wind and shade, creating additional exposure to noise, vehicle lights, and vulnerability to external competition and predation.

Current bird species information collected in the Gaithersburg area of Montgomery County is listed in **Table 5-2**. Bird species are listed with a rating for evidence of breeding with either confirmed breeding evidence (CO), possible breeding evidence (PO), probable breeding evidence (PR), or observed but no breeding evidence (OB). An asterisk following the species listing indicates the species is a FIDS. Bird breeding information is derived from the *Second Maryland/DC Breeding Bird Atlas Project Handbook (2002-2006).*

DNR provided the following recommendations to minimize FIDS impacts along Alternative 8 and 9:

- Avoid placement of new roads or related construction in the forest interior. If forest loss or disturbance is unavoidable, restrict development to the perimeter of the forest (i.e. within 300 feet of the existing forest edge), and avoid road placement in areas of

FIDS habitat (e.g., old-growth forest). Maximize the amount of remaining contiguous forested habitat.

Table 5-2: Bird Species along Alternatives 8 and 9

Acadian flycatcher (PR)*	Eastern Meadowlark (PO)	Orchard Oriole (PR)
Willow flycatcher (PR)	Eastern Phoebe (CO)	Ovenbird (PO)*
American crow (CO)	Eastern Screech-Owl (PR)	Pileated woodpecker (CO)*
American goldfinch (CO)	Eastern Towhee (CO)	Prairie Warbler (PR)
American Kestral (PR)	Eastern wood peewee (PR)	Purple Martin (PO)
American Redstart (PO)*	European Starling (CO)	Red-bellied Woodpecker (CO)
American robin (CO)	Field sparrow (CO)	Red-shouldered hawk (PO)*
Baltimore oriole (CO)	Fish Crow (PO)	Red-winged Blackbird (CO)
Barn swallow (CO)	Grasshopper Sparrow (PR)	Red-tailed Hawk (CO)
Barred Owl (CO)*	Gray catbird (CO)	Ring-necked Pheasant (PO)
Belted kingfisher (PR)	Great blue heron (OB)	Rock Pigeon (CO)
Blue jay (CO)	Great Crested Flycatcher (CO)	Ruby-throated Hummingbird (PO)
Blue-gray gnatcatcher (PR)	Green Heron (CO)	Scarlet Tanager (CO)*
Brown Creeper (PO)*	Hairy Woodpecker (CO)*	Song Sparrow (PR)
Brown-headed cowbird (CO)	House Finch (CO)	Tree Swallow (CO)
Brown Thrasher (CO)	House Sparrow (CO)	Tufted Titmouse (CO)
Northern Cardinal (CO)	House wren (CO)	Turkey Vulture (PO)
Canada Goose (CO)	Indigo bunting (CO)	Red-eyed Vireo (PR)*
Carolina chickadee (CO)	Kentucky Warbler (PO)*	Warbling Vireo (CO)
Carolina wren (CO)	Killdeer (PO)	White-breasted Nuthatch (CO)
Cedar waxwing (CO)	Louisiana Waterthrush (PO)*	White-eyed Vireo (PR)
Chimney swift (PR)	Mallard Duck (CO)	Wood Duck (PO)
Chipping sparrow (PR)	Mourning dove (PR)	Wood Thrush (CO)*
Common Grackle (CO)	Northern Bobwhite (PO)	Yellow-billed Cuckoo (PO)
Common Yellowthroat (CO)	Northern Flicker (PO)	Yellow-breasted Chat (PR)
Cooper's Hawk (CO)	Northern Mockingbird (CO)	Yellow-throated Vireo (PR)*
Downy woodpecker (CO)	Northern Rough-winged Swallow (PO)	Yellow Warbler (PR)
Eastern bluebird (CO)		
Eastern kingbird (PO)	Northern Parula (PR)*	

* Forest Interior Dwelling Species (FIDS)

- Do not remove or disturb forest habitat during May through August, the breeding season for most FIDS. This seasonal restriction should be expanded to February through August since early nesting FIDS (*e.g.* Barred owl) are present.
- Maintain forest habitat as close as possible to the road and maintain canopy closure where possible.
- Maintain grass height to at least 10" during the breeding season (May-August).

DNR noted that a state authorized permit may warrant additional evaluations that could lead to protection or survey recommendations.

M-NCPPC Planning Department also provided directives for preservation of FIDS habitat in the study area (email correspondence). Additional recommendations not included in DNR's directives include:

- In areas with little forest or high levels of disturbance, strive to preserve or restore even the smallest of forest fragments, providing some habitat for forest dwellers and providing important stopover sites for migrating species.

- Minimize impacts to wetland areas and riparian bottomland streams, especially steep slopes along the North Germantown Branch within the North Germantown Greenway Stream Valley Park.
- Habitat for early nesting FIDS should be retained and protected. Standing live or dead trees with cavity-nesting habits vary but are more prevalent in the larger climax stage forest stands of the North Germantown Greenway Stream Valley Park and the Great Seneca Stream Valley Park. Cavities in trees, standing dead trees, snags, and protected thickets protect nests from most predators, high winds, driving rains, and late spring snows that often destroy nests for open-nesters.

Deer

The extensive stream valleys and forests in the project area offer valuable wildlife habitat for the abundant deer population. In a letter dated September 27, 2004 (see **Appendix**), the Montgomery County Deer Management Work Group, a multi-agency group charged with deer management, expressed the following concerns with the study alignment of Alternatives 8 and 9 with regard to safeguarding the deer population against deer-vehicle collisions (DVC's):

- The study alignment of Midcounty Highway crosses habitat that holds some of Montgomery County's largest deer populations.
- The North Germantown area of the Great Seneca Stream Valley is listed in the Deer Management Work Group's Annual Report and Recommendations for FY 2004 as the number one area of concern for deer issues in the County.
- Other roads nearby presently experience the highest numbers of DVC's in the County.
- The proposed design for Alternatives 8 and 9 is expected to be similar to Great Seneca Highway. For the first few years after Great Seneca Highway was constructed, it was the highest risk roadway in the county for DVC's.
- Landscape design including planted medians and planting along roadsides could attract deer and other wildlife onto the roadway to feed.

To address these concerns, the Deer Management Work Group recommended a careful evaluation of design elements to avoid and/or minimize DVC's including longer bridges at many streams providing ample room for wildlife passage. With Alternatives 8 and 9, long bridges are being provided with ample underclearance for deer passage to accommodate migration along riparian wildlife corridors (see **Section 4** – Page 4-25 for bridge lengths).

Additional Species

The Davis study notes several sites with potential habitat for rare butterfly species, the two-spotted skipper (*Euphyes bimaculata bimaculata)*and Ontario oak hairstreak (*Satyrium favonius ontario*), as well as rare dragonfly habitat. The host plants for both rare butterflies are found in the alignment, including swamp milkweed (*Asclepias incarnata*) and tussock sedge (*Carex stricta*) for the two-spotted skipper and white oak (*Quercus alba*), red oak (*Quercus rubra*), black oak (*Quercus velutina*), and scarlet oak (*Quercus coccinea*) for the Ontario oak hairstreak. A favorable location for the two-spotted skipper is the floodplain wetland associated with Whetstone Run where scattered host plants of this butterfly occur.

Favorable areas for locating the Ontario oak hairstreak occur along the northern portions of the oak forest within the North Germantown Greenway Stream Valley Park and in the Woodland Conservation Area west of Wayfarer Road. Searches to detect adults for either species should occur during the time of year when the food plants used by the butterflies are in peak flower. Two favorable locations exist for rare dragonfly habitat resulting from an unusual assemblage of plants and diversity of stream flowing and still water types. These include the wetlands to the north of Watkins Mills Road in Blohm Park in the Whetstone Run floodplain and where the alignment crosses Dayspring Creek.

The Parrish/Steinman study noted ten amphibian species, including six frogs, six salamanders, and one toad. These species use wetlands for some portion of their life cycle. Alternatives 8 and 9 would avoid wetlands in the North Germantown Greenway Stream Valley Park through bridging. The study also noted the disturbance of unusual Maryland habitat, including glades and bedrock outcrops, posed by Alternatives 8 and 9. Glades are dry, open habitats with shallow soils, rocks, grasses, and few trees. Glade habitat exists near Dayspring Creek near Alternatives 8 and 9 and in a Chestnut Oak forest within the alignment of Alternatives 8 and 9. Bedrock outcrops occur on the slopes of Dayspring Creek and can support rare plant species including the State listed bashful bulrush.

5.4 Farmland

Correspondence from Natural Resources Conservation Service (NRCS) dated July 9, 2012 (**Appendix**) provided an evaluation and completion of portions of the Farmland Conversion Impact Rating for Corridor Type Projects. **Table 5-3** provides an impact summary for prime farmland, statewide important farmland, and other farmland. Discussions with owners of the two affected farms revealed that neither owner is interested in continuing to lease their farm on a long-term basis. Both properties have previously sought, or are currently seeking, permission to construct a church, which is a permitted activity for properties zoned Rural Density Transfer (RDT) assuming there is sufficient septic capacity and the land is not covered by a Transfer Development Rights (TDR) easement.

Table 5-3: Farmland Impact Summary

Alternative	Prime Farmland (acres)	Statewide Important Farmland (acres)	Other Farmland (acres)
Alt 2	0	0	0
Alt 4 Modified	2.2	0.6	0
Alt 5	0	0	0
Alt 8A/9A	15.9	1.8	1.2
Alt 8B/9B	2.5	0.6	0
Alt 8D/9D	17.7	13.8	2.9

It is noted that the NRCS included a portion of the All Souls Cemetery in their evaluation of prime farmland, statewide important farmland, and other farmland. While this property is no

longer farmed and has improvements and graves on a portion of it, the NRCS included the unutilized portion of the property in their evaluation because it continues to have the potential to be used as farmland until such time as it is committed to another use.

5.5 Water Quality and Aquatic Habitat

The Mid-County study corridor lies within Sub-Basin 02-14-02 (Washington Metropolitan Area) as defined within the Code of Maryland Regulations (COMAR) 26.08.02.08 Stream Segment Designations (see **Figure 5-4)**. The majority of the project is located in the Middle Great Seneca Creek watershed, with a small portion of Alternative Modified 4 draining to the Upper Rock Creek watershed. All streams within the corridor are classified as Use 1-P, with the exception of Pope Farm Branch and Wildcat Branch. Use 1-P streams are for water contact recreation and the protection of aquatic life and serve as a public water supply. Pope Farm Branch is a Use III stream located in the Upper Rock Creek Special Protection Area. Pope Farm Branch and its tributaries are located south-east of Alternative Modified 4 and will not be impacted by any of the proposed alternatives. Use III streams are capable of supporting self-sustaining trout populations and their associated food organisms. COMAR classifies Wildcat Branch and all its tributaries upstream of the confluence with Great Seneca Creek as Use III-P. Use III-P streams support natural trout populations and serve as a public water supply. The portion of the Wildcat Branch watershed bounded by Ridge Road, Brink Road, Wildcat Road, and an unnamed tributary to Wildcat Branch is included in the Clarksburg Special Protection Area. Water quality criteria are provided in **Table 5-4**.

Table 5-4: Water Quality Criteria Specific to Designated Stream Uses

Designated Use	Constituents			
	Dissolved O_2	pH	Turbidity	Temperature
Use I-P	>5 mg/l at all times	6.5 - 8.5	≤ 150 NTU's	≤32ºC (90ºF)
Use III-P	>5 mg/l at all times, and a min daily avg >6 mg/l	6.5 - 8.5	≤ 150 NTU's	≤20ºC (68ºF)

The biological conditions of streams within the Mid-County Highway study corridor were determined by analyzing existing data collected by the DNR Maryland Biological Stream Survey (MBSS) and Montgomery County Department of Environmental Protection (MCDEP). These agencies collect data on fish and benthic macro-invertebrates, and evaluate the data using an Index of Biotic Integrity (IBI) to rate stream health. The IBI is a statistical analysis that compiles data on the biotic community (total number of species, number of intolerant species, etc.) of a monitoring station and compares it to the conditions of a least-impaired stream. An IBI score is calculated for fish and a separate IBI score is calculated for benthic macro-invertebrates, resulting in two scores for each monitoring station. Data from the agencies was supplemented with volunteer benthic data from DNR's Stream Waders volunteer program for streams without MBSS or MCDEP monitoring stations.

MIDCOUNTY CORRIDOR STUDY
Wetlands, Waters of the U.S., &
Stream Monitoring Location Map
FIGURE 5-4

RK&K
Montgomery County
Department of
Transportation

Numerous MBSS, MCDEP, and Stream Waders monitoring stations are located within several hundred feet of the Mid-County Corridor Study alternatives. The monitoring stations summarized in this report were selected based on their proximity to the waters features along the alternatives. Stations nearest to and along the same stream reach of the waters features were used to determine the biological condition of the associated feature. Descriptions of the conditions for each associated feature and potential impacts are included in the Waters of the U.S. section of this report. Ephemeral features were not rated due to the limited aquatic habitat that they provide.

IBI Scores Based on Benthic Macro-invertebrates

Benthic macro-invertebrate samples are collected during the spring index period from March through April. MBSS, MCDEP, and DNR's Stream Waders Program collect benthic macro-invertebrates using the same sampling protocols. Twenty square feet of the best available habitat (riffles, root wads, undercut banks, etc.) is sampled within a 75 meter reach with a D-net. A subsample is then taken from the composite sample to calculate the Benthic IBI (BIBI) score. Stream Waders scores differ from the agency scores in that they are calculated based on family level identifications, rather than genus level identifications. MBSS and MCDEP use different metrics to calculate their BIBI scores, resulting in different scoring systems (see **Table 5-5**).

Benthic IBI scores for monitoring stations within and near the Mid-County Corridor Study alternatives ranged from poor to excellent. Cabin Branch, Whetstone Run, and the tributary to Pope Farm Branch received poor BIBI scores. The benthic-macroinvertebrate communities at these sites were dominated by non-biting midges (*Chironomidae*), common

Table 5-5: Benthic Index of Biotic Integrity Narratives

MCDEP BIBI Narrative		MBSS & Stream Waders BIBI Narrative	
Score	**Narrative**	**Score**	**Narrative**
< 17	Poor	1 – 2	Very Poor
17 - 25	Fair	2 – 3	Poor
26 - 35	Good	3 - 4	Fair
> or = 36	Excellent	4 – 5	Good

net-spinning caddisflies (*Hydropsychidae*), blackflies (Simuliidae), and riffle beetles (Elmidae). These macro-invertebrate groups are generally considered to be tolerant of pollution and other environmental stressors. Two sites along the mainstem of Great Seneca Creek and one site along Brandermill tributary received fair BIBI scores. Common macro-invertebrates identified at these sites included non-biting midges, nemouid stoneflies (*Nemouridae*), spiny crawler mayflies (*Ephemerellidae*), and aquatic worms (*Naididae*). The MCDEP monitoring station in Dayspring Creek was the only site to receive an excellent BIBI score. The Dayspring Creek site is surrounded by an extensive forested buffer, most likely contributing to the high water quality of this stream. BIBI scores for each monitoring station are summarized in **Table 5-6**. The scores and narratives of the DNR monitoring

stations should not be compared to the MCDEP or Stream Waders results due to their different scoring systems.

Table 5-6: Summary of Benthic Index of Biotic Integrity within the Study Area

Monitoring Station	Agency	Stream	BIBI Score	BIBI Narrative	WUS Number
0840-02-2009	Stream Waders	Trib to Pope Farm Branch	1.57	Very Poor	15 & 16
863-2-2001	Stream Waders	Cabin Branch	1.57	Very Poor	20, 21, 22 & 25
863-4-2001	Stream Waders	Trib to Cabin Branch	1.57	Very Poor	27 & 31
GSMS411	MCDEP	Great Seneca Creek	22	Fair	76
MO-P-445-318-97	MBSS	Great Seneca Creek	3.25	Fair	37
860-3-2001	Stream Waders	Trib to Great Seneca Creek	3.00	Fair	1
GSMS202	MCDEP	Brandermill Tributary	18	Fair	78
GSMS203	MCDEP	Dayspring Creek	36	Excellent	73
SENE-113-R-2001	MBSS	Whetstone Run	2.00	Poor	52
0862-93-2009	Stream Waders	Whetstone Run	1.57	Very Poor	53

Source: MBSS website (http://mdimap.towson.edu/streamhealth/) & MCDEP Mid-County Corridor Data Request

IBI Scores Based on Fish

Fish samples are collected during the summer index period from June through September. MBSS and MCDEP collect fish samples using double pass electrofishing, within the same 75 foot reach sampled for benthic macro-invertebrates in the spring. All fish are identified to species to calculate the Fish Index of Biotic Integrity (FIBI) score. MBSS and MCDEP use different metrics to calculate their FIBI scores, resulting in different scoring systems (see **Table 5-7**).

Table 5-7: Fish Index of Biotic Integrity Narratives

MCDEP FIBI Narrative		MBSS FIBI Narrative	
Score	**Narrative**	**Score**	**Narrative**
<2.2	Poor	1 – 2	Very Poor
2.2 – 3.2	Fair	2 – 3	Poor
3.3 – 4.5	Good	3 - 4	Fair
> 4.5	Excellent	4 – 5	Good

Overall, 22 species of fish were identified within the project study corridor. Of these species, 10 were tolerant, 6 were intolerant, and 6 did not have a tolerance value. The Fish Index of Biotic Integrity (FIBI) scores ranged from very poor to excellent for monitoring stations within or near the Mid-County Highway alignment alternatives. The monitoring station along Whetstone Run was the only site to receive a very poor FIBI score. The site had only 4 fish species, all of which are tolerant of environmental stressors. Both monitoring stations along

the mainstem of Great Seneca Creek received good FIBI scores. Common species identified at these sites included Potomac sculpin (*Cottus girardi*), blue ridge sculpin (*Cottus caeruleomentum*), longnose dace (*Rhinichthys cataractae*), white sucker (*Catostomus commersonii*), blacknose dace (*Rhinichthys atratulus*), and central stoneroller (*Campostoma anomalum*). These sites had a relatively high number of benthic fish species (3), which is often associated with better stream conditions. The MCDEP monitoring stations along Brandermill Tributary and Dayspring Creek had excellent FIBI scores. Common fish species found at these sites included blacknose dace, blue ridge sculpin, longnose dace, rosyside dace (*Clinostomus funduloides*), and fantail darters (*Etheostoma flabellare*). Fish IBI scores for each monitoring station are summarized in **Table 5-8**. The scores and narratives of the DNR monitoring stations should not be compared to the MCDEP monitoring stations due to their different scoring systems.

Table 5-8: Summary of Fish Index of Biotic Integrity within the Study Area

Monitoring Station	Agency	Stream	FIBI Score	FIBI Narrative	WUS Number
GSMS411	MCDEP	Great Seneca Creek	4	Good	76
MO-P-445-318-97	MBSS	Great Seneca Creek	5	Good	37
GSMS202	MCDEP	Brandermill Tributary	5	Excellent	78
GSMS203	MCDEP	Dayspring Creek	5	Excellent	73
SENE-113-R-2001	MBSS	Whetstone Run	1.5	Very Poor	52

Source: MBSS website (http://mdimap.towson.edu/streamhealth/) & MCDEP Mid-County Corridor Data Request

High-Quality Streams

Streams within the study area that received good or excellent ratings included Dayspring Creek (GSMS202), Brandermill Tributary (GSMS203), and the mainstem of Great Seneca Creek (GSMS411 & MO-P-445-318-97). Due to the numerous factors that influence the biological community of a stream (impervious surfaces, water temperature, nutrient runoff, available habitat, etc.) it is often difficult to determine the exact cause of a stream's IBI score. However, streams that have a high abundance and diversity of fish and benthic macro-invertebrates can generally be associated with upstream watersheds that have extensive forested buffers and less impervious surfaces. All of the sites within the study area that received good or excellent ratings appeared to provide habitat for fish and benthic macro-invertebrates that included a variety of stream bed substrates, instream cover, and riffle-pool sequences. Dayspring Creek and the southern reach of Great Seneca Creek (GSMS411) have extensive forested buffers that most likely contribute to their excellent and good IBI scores. The well vegetated stream banks and stable streambed of Dayspring Creek must also contribute to the stream's excellent IBI score.

Impacts on Water Quality and Macro-invertebrate habitat

The proposed bridges would minimize impacts to benthic macro-invertebrate habitat and water quality. Proposed bridges would span well beyond the limits of the streams,

preventing any direct disturbance to the existing aquatic habitat. Where culverts are proposed, macro-invertebrate habitat would be lost for the length of the culvert plus any riprap placed for velocity dissipation at the outfall of the culvert. Canopy cover and leaf litter would be lost for the length of the bridge or culvert. Bridges constructed over streams would allow sunlight to penetrate beneath a portion of the structure. The extent of shading would vary, depending upon the height of the structure. The impact on benthic macro-invertebrate habitat due to shading is expected to be minimal. Long-term water quality effects would be minimized through the use of stormwater management plans developed in accordance with state regulations requiring the use of Environmental Site Design (ESD). These requirements place heavy emphasis on infiltration and water quality management, and would minimize thermal impacts in the Use III Wildcat Branch. (All other streams affected by the alternatives are Use I streams, which are warm-water streams containing organisms that have adapted to high water temperatures.) Because Wildcat Branch is located within the Clarksburg Special Protection Area (SPA), discharges to Wildcat Branch would be subject to Montgomery County Department of Environmental Protection's (DEP's) stringent SPA water quality requirements. MCDOT has initiated coordination with MCDEP concerning this issue. In addition, in-stream construction would not be performed in Use I streams during the period of fish spawning and early development from March 1 to June 15 in accordance with the State's Use I time-of-year restrictions. In Wildcat Branch and its tributaries, in-stream construction would be restricted from October 1 through Aril 30 in accordance with the State's Use III time-of-year restrictions.

During construction, the potential effects of sediment-laden runoff on aquatic habitat and water quality would be minimized by adherence to sediment and erosion control plans approved by Montgomery County Department of Permitting Services (DPS). If a contractor needs to cross these high-quality streams during construction, a temporary bridge would be required.

5.6 Waters of the U.S., Including Wetlands

The National Wetlands Inventory (NWI), Gaithersburg Quadrangle, identifies six major wetland complexes within the study area. These wetlands included classification of PFO1A (palustrine forested, broad-leaved deciduous, temporarily flooded), PSS1A (palustrine scrub-shrub, broad-leaved deciduous, temporarily flooded) and PEM5A (palustrine emergent). The Alternatives Retained for Detailed Study (ARDS) cross a number of major streams including Cabin Branch, Walkers Run, Whetstone Run, Great Seneca Creek, and the King, Brandermill, North Germantown and Brink tributaries to Great Seneca Creek. Many of these streams contain abutting or adjacent wetlands. Field investigations were conducted in July and August, 2004 for Alternative 9 within a 600-foot wide corridor, and in April and August, 2011 for Alternatives 2, 4, and 5 in a 200-foot band along each side of the existing roadway. Additional field investigations for Alternatives 8 and 9 were conducted in July, 2012. A jurisdictional determination (JD) was issued by the US Army Corps of Engineers (USACE) on August 10, 2005 to verify the wetland delineation for Alternative 9, however that JD has expired. A preliminary JD was issued on November 29, 2011 for wetlands located along Alternatives 8 and 9 in Blohm Park, adjacent to Whetstone Run, from the

utility right-of-way to Watkins Mill Road. A new JD will be sought for whichever alternative is subsequently identified as the Preferred Alternative.

Waters of the U.S. other than wetlands, which are typically referred to as "waters," include streams and ponds located within the study area. Those waters which were determined to be under USACE jurisdiction are labeled in this report using the prefix "WUS" for Waters of the U.S. Waters were delineated consistent with the definitions in 33 C.F.R. § 328. The boundaries of non-tidal waters were set at the limit of ordinary high water (OHW). The OHW was determined in the field using physical characteristics established by the fluctuations of water (e.g., change in plant community, changes in the soil character, and/or shelving) in accordance with USACE's Regulatory Guidance Letter No. 05-05.

Wetlands along Alternative 9 (including Northern Terminus Option A) were delineated in 2004 in accordance with the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). Wetlands for Alternatives 4 Modified, 5, and the Northern Terminus Options B and D were delineated in 2011 using the 1987 Manual and USACE's *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region, Final Report* (ERDC/EL TR-10-9), Vicksburg, MS: U.S. Army Engineer Research and Development Center, July 2010. Clean Water Act jurisdiction of delineated features was determined in accordance with the June 5, 2007 joint guidance issued by EPA and USACE following the U.S. Supreme Court's decision in the consolidated cases Rapanos v. United States and Carabell v. United States (Rapanos Guidance); and the January 19, 2001 joint guidance issued by EPA and USACE following U.S. Supreme Court's decision in Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers (SWANCC). Although the 2004 delineation did not make use of the 2010 Interim Regional Supplement, USACE confirmed that the 2010 Interim Regional Supplement would not be expected to substantially change the results of that earlier delineation. Therefore, USACE permitted the 2004 delineation of Alternative 9 to be used in this report for purposes of impact calculation. However, because the 2004 delineation is more than five years old, it would not be sufficient to support a permit decision. Therefore, if Alternative 8 or 9 is subsequently identified as the Preferred Alternative, a new delineation and Jurisdiction Determination would be undertaken using the latest methodology. A map of the delineated wetlands is included in **Figure 5-4**. Wetlands are labeled in this report using the prefix "W."

Descriptions of the impacted wetlands and waters are provided in the following tables, proceeding along the alternative from south to north. Descriptions of impacted wetlands use the following nomenclature: forested (F), scrub/shrub (S), or emergent (E). Wetland "conversions" refer to forested wetlands that must be cleared to construct a bridge, which will revert to emergent or scrub/shrub wetlands following construction. The table also provides a wetland quality evaluation based on the condition of the resource, diversity of plant species, presence of invasive species, and best professional judgment. WUS quality evaluations are based on these same parameters, with the addition of the previously described water quality parameters.

Alternative 2
This alternative would not impact wetlands or waters.

Alternative 4 Modified

WUS 15, WUS 16, W 17, W 18, and W 19
These features comprise a wetland complex along a sloped area on the eastern side of Muncaster Mill Road and south of Woodfield Road (see **Figure 5-4**). Slopes in this area contain seeps providing hydrology for the wetlands and waters features. **Table 5-9** summarizes the wetland and waters impacts and is followed by descriptions of the affected resources.

Table 5-9: Impacts - WUS 15, WUS 16, W17, W18, W19

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 15	NA	NA	113	Fair/poor
WUS 16	NA	NA	86	Fair/poor
W 17	0	0	NA	Fair
W 18	1,012 (F)	0	NA	Fair
W 19	412 (F)	0	NA	Fair

WUS 15
Feature WUS 15 is a perennial RPW (Relatively Permanent Water) originating at a stormwater pond in the Rock Creek watershed. The stream has a natural channel shape, with a width of 3 to 8 feet, a channel depth of 18 to 30 inches, and banks with a 2:1 slope. Channel substrate consists of cobbles, sands, and gravel. The feature has well defined bed and banks, and observed indicators of the ordinary high water mark include disturbed leaf litter, sediment deposition, water staining, presence of litter and debris, sediment sorting, and scour. The forest surrounding WUS 15 is dominated by slippery elm (*Ulmus rubra*), southern arrowwood (*Viburnum dentatum*), blackhaw (*Viburnum prunifolium*), and persimmon (*Diosyparis virginiana*). Feature W15 provides limited aquatic habitat due to its small size. Maryland DNR's Stream Waders collected benthic macro-invertebrate samples at a site (0840-02-2009) downstream of Feature W15 in 2009. The site had a total of 8 macro-invertebrate families, with 4 EPT (Ephemeroptera, Plecotera, Trichoptera) taxa and 3 Dipteran taxa, resulting in a poor IBI score of 1.57.

Feature WUS 15 was flowing during the April 2011 field review, and is jurisdictional under Rapanos guidance. Fish passage at the road culvert is unnecessary due to the absence of upstream habitat. Impacts to waters here total 113 LF.

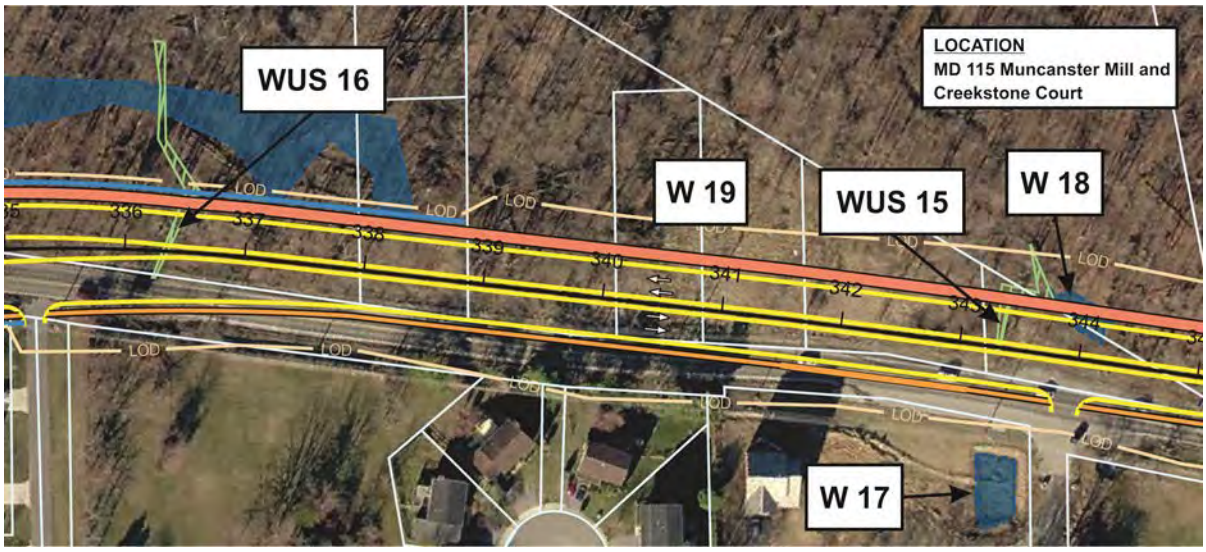


Figure 5-5: Location WUS 15, WUS 16, W17, W18, W19

WUS 16

Feature WUS 16 is an ephemeral channel that flows north-east through a forested wetland (Feature W19) in Muncaster Recreational Park. WUS 16 is a tributary to Pope Farm Branch, located in the Upper Rock Creek watershed. The feature originates at a 24 inch culvert receiving run-off from residential lawns west of Muncaster Mill Road. The stream has a width of 1 to 5 feet and a channel depth of 1 to 4 inches. WUS 16 has moderate areas of bank erosion just downstream of the culvert and becomes less incised as it enters the forested wetland. The forest surrounding the feature is dominated by white oak (*Quercus alba*), slippery elm, and southern arrowwood. The feature has bed and banks, and observed indicators of the ordinary high water mark include disturbed leaf litter, sediment deposition, water staining, presence of litter and debris, sediment sorting, and scour. Though the channel exhibited flow in April 2011, the feature was considered ephemeral due its small size and the recent rain event (> 1 in.) that occurred two-days prior to the site visit. Feature WUS 16 is located upstream from DNR's Stream Wader site 0840-02-2009 (same site compared in Feature W15), which received a poor IBI score of 1.57.

Feature WUS 16 is an ephemeral Non-RPW abutting a wetland, with portions of the channel (outside the impact area) considered to be jurisdictional under Rapanos guidance. Due to the ephemeral nature of the channel, the feature provides very limited aquatic habitat and therefore fish passage at the culvert is unnecessary. Impacts to waters here total 86 LF.

W 18

Feature W18 is a small, closed-contour, seep-fed forested wetland adjacent to perennial stream W 15. Dominant vegetation includes red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), white oak, honeysuckle vine (*Lonicera japonica*), and dotted smartweed (*Polygonum punctatum*). Primary indicators of hydrology include A2: High Water Table and A3: Saturation. The soils in W18 meet the requirements of Hydric Soil Indicator F3: Depleted Matrix. Feature W18 is a USACE jurisdictional wetland since it meets the three-

parameter definition of a wetland and is adjacent to Feature W15, an RPW flowing year round. Roadway widening was minimized in this area to reduce wetland impacts. Wetland fill impacts here total 1,012 SF.

W 19

Feature W19 is a large forested wetland along the toe of slope on Muncaster Mill Road. Dominant vegetation includes slippery elm, red maple, blackhaw viburnum, honeysuckle vine, and jack-in-the-pulpit (*Arisaema triphyllum*). Primary indicators of hydrology include A3: Saturation, B1: Water marks, and B9: Water-Stained Leaves with a secondary indicators including B8: Sparsely Vegetated Concave Surface and B10: Drainage Patterns. The soils in W19 meet the requirements of Hydric Soil Indicator F3: Depleted Matrix. Feature W19 is a USACE jurisdictional wetland since it meets the three-parameter definition of a wetland and is adjacent to Feature W15, an RPW flowing year round. Forested wetland fill impacts here total 412 SF.

WUS 20, WUS 21, WUS 22, W 23, WUS 24, WUS 25, and W 26

These features comprise a system of wetlands and waters associated with Cabin Branch (see **Figure 5-6**). Refer to **Table 5-10** for a wetland and waters impact summary, which is followed by descriptions of these resources.

Table 5-10:Impacts - WUS 20, WUS 21, W23, WUS 24, WUS 25, W26

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 20	NA	NA	145	Fair
WUS 21	NA	NA	284	Fair/Poor
W 23	0	9,993	NA	Good
WUS 24	NA	NA	63	Fair
WUS 25	NA	NA	153	Fair/Good
W 26	0	1,844	NA	Fair

WUS 20

Feature WUS 20 is a section of Cabin Branch that flows west through Cabin Branch Stream Valley Park, within the Great Seneca Creek watershed. The stream flows under a bridge at Snouffer School Road and receives drainage from a small perennial stream (Feature WUS 21) and an emergent wetland (Feature W23). The feature has moderately stable banks with a channel width of 4 to 12 feet and water depth (provided at base flow) of 6 to 24 inches. The streambed substrate consists of cobbles, sands, and silts. The riparian forest surrounding the channel is dominated by red maple, black walnut (*Juglans nigra*), and spicebush (*Lindera benzoin*). This feature has well defined bed and banks, and observed indicators of the ordinary high water mark include: changes in the soil character, vegetation matted down, bent, or absent, disturbed leaf litter, sediment deposition, minor scour, and observed/predicted flow events. Maryland DNR's Stream Waders collected benthic macro-invertebrate samples in 2001 at site 863-2-2001, located just downstream of Feature WUS 20. The site had a total of 8 macro-invertebrate families, with 1 EPT taxa and 5 Dipteran taxa, resulting in a poor IBI score of 1.57.

Feature WUS 20 is a perennial RPW flowing year round, and is jurisdictional under Rapanos guidance. Even though the downstream sampling site received a poor IBI score, the feature provides adequate habitat for fish and benthic macro-invertebrates due to its perennial flow, variety of substrates, and presence of riffle-pool sequences. Fish passage is presently unimpeded beneath the bridge and would continue to be available beneath a widened bridge. Impacts to waters here total 145 LF.

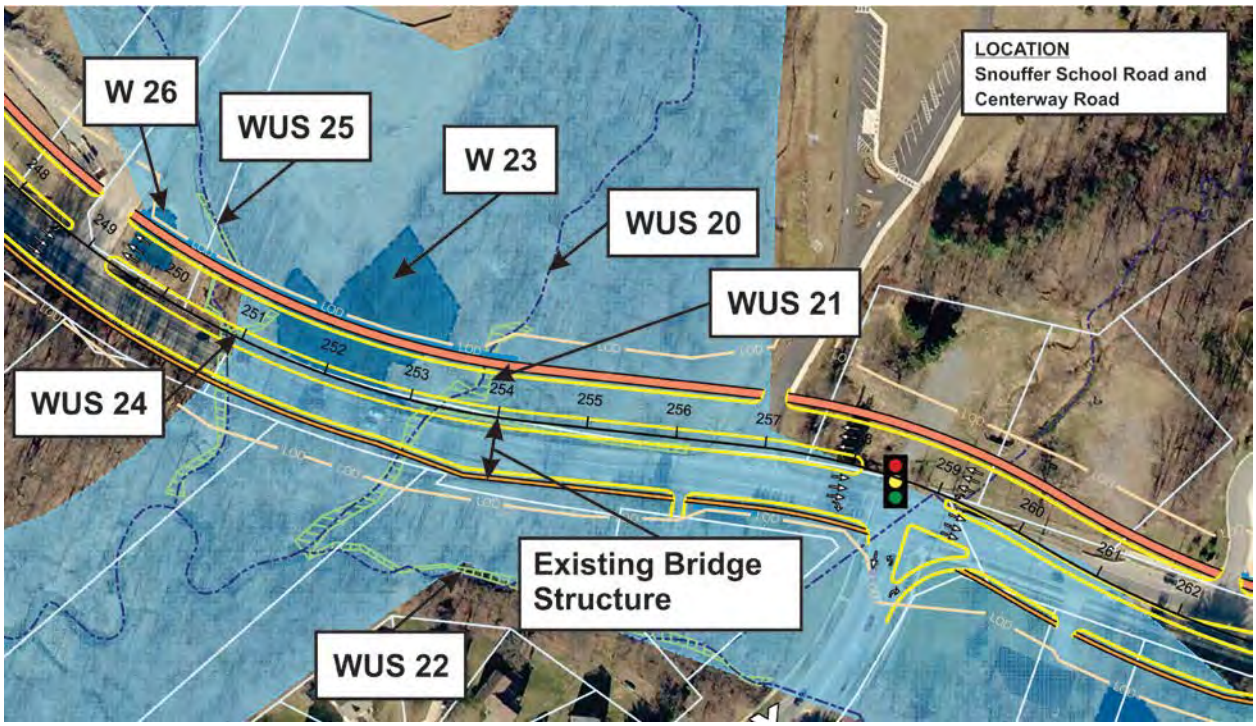


Figure 5-6: Location WUS20, WUS21, WUS22, W23, WUS24, WUS25, W26

WUS 21

Feature WUS 21 is a small perennial RPW stream that flows into Cabin Branch (Feature WUS 20) just north of Snouffer School Road. The stream has a manipulated (man-altered) channel

shape, with a width of 3 to 4 feet, a water depth of 2 to 4 inches, and banks with a 2:1 slope. The channel substrate consists of sands and gravel. The stream is surrounded by a narrow forested buffer that is dominated by sweet gum (*Liquidambar styraciflua*), red maple, and spice bush. This feature has bed and banks, and observed indicators of the ordinary high water mark include: vegetation matted down, bent, or absent, sediment deposition, and sediment sorting. Feature WUS 20 is located upstream from DNR's Stream Wader site 863-2-2001 (same site compared in Feature WUS 20), which received a poor IBI score of 1.57.

Feature WUS 21 was flowing during the 2011 spring field review, and is jurisdictional under Rapanos guidance. The stream provides limited aquatic habitat due to its shallow flows and lack of stable substrate. Since this stream is along the roadway, widening the road will require that the stream be piped and connect to an existing headwall. Fish passage is unnecessary since upstream habitat is absent. Impacts to waters here total 284 LF.

W 23
Feature W23 is a large forested/emergent wetland adjacent to WUS 20, Cabin Branch. Dominant vegetation includes red maple, persimmon, blackberry (*Rubus allegheniensis*), and soft rush (*Juncus effusus*). Primary indicators of hydrology include A1: Surface Water, A3: Saturation, B1: Water Marks, and B9: Water-Stained Leaves, with a secondary indicators including B8: Sparesely Vegetated Concave Surface, B10: Drainage Patterns, and D2: Geomorphic Position. The soils in W63 meet the requirements of Hydric Soil Indicator F3: Depleted Matrix. Feature W23 is a USACE jurisdictional wetland since it meets the three-parameter definition of a wetland and is adjacent to Feature WUS 20, an RPW flowing year round. The bridge replacement here will require the removal of forest; resulting wetland conversion impacts here would total 9,993 SF. Widening entirely to the west side of Snouffer School Road was considered to avoid this wetland, yet would result in the displacement of a residence in the northwest quadrant of the intersection with Centerway Road and potential displacements along Ridge Heights Drive, as well as impact other wetlands on the west side of Snouffer School Road.

WUS 24
Feature WUS 24 is an ephemeral channel connecting a forested/emergent wetland (Feature W23) to a perennial stream (Feature WUS 25) that flows into Cabin Branch just south of Snouffer School Road. The feature has a natural channel shape and serves as a drainage outlet for the upstream wetland. The channel has a width of 5 to 7 feet, a channel depth of 2 to 3 inches, and banks with a 2:1 slope. Feature WUS 24 drains through a narrow forested buffer dominated by red maple and spice bush. The feature has defined bed and banks that are relatively stable, with minor areas of erosion. The streambed substrate consists of silts, sands, and gravel. Observed indicators of the ordinary high water mark include: disturbed leaf litter, scour, and an abrupt change in the plant community. Feature WUS 24 is an ephemeral Non-RPW with an abutting wetland, and is jurisdictional under Rapanos guidance. Due to the ephemeral nature of the channel, the feature provides very limited aquatic habitat and fish passage is unnecessary. Impacts to waters here total 63 LF.

WUS 25
Feature WUS 25 is an unnamed, perennial tributary to Cabin Branch flowing south through a twin culvert under Snouffer School Road. The stream receives drainage from a forested/emergent wetland (Feature W23) hydrologically connected via an ephemeral channel (Feature WUS 24). The feature has a natural channel shape, with a width of 4 to 8 feet, a water depth of 2 to 8 inches, and banks with a 3:1 slope. Dominant vegetation includes black walnut, red maple, spicebush, blackberry, Multiflora Rose (*Rosa multiflora*), and honeysuckle vine. The channel substrate consists of cobbles, sands, and gravel. Feature WUS 25 has well defined bed and banks that are moderately stable. Observed indicators of the ordinary high water mark include: shelving, vegetation matted down, bent, or absent, leaf litter disturbed, scour, and the presence of litter and debris. Feature WUS 25 is located upstream from DNR's Stream Wader site 863-2-2001 (same site compared in Feature WUS 20), which received a poor IBI score of 1.57.

Feature WUS 25 is a perennial RPW flowing year round, and is jurisdictional under Rapanos guidance. The feature provides poor, yet adequate habitat for fish and benthic macro-

invertebrates due to its perennial flow and presence of riffle-pool sequences. Replacement of the twin culvert will be designed to allow for fish passage. Impacts to waters here total 153 LF.

W 26

Feature W26 is a small, emergent, isolated wetland on the edges of a pond excavated in uplands. Dominant vegetation includes cattail (*Typha latifolia*), beaked spikerush (*Eleocharis rostellata*), and silky willow (*Salix sericea*). Primary indicators of hydrology include A1: Surface Water and A3: Saturation, with a secondary indicator D2: Geomorphic Position. It was not possible to collect a soil sample since a high fence surrounds the pond. Feature W26 is possibly a USACE jurisdictional wetland since it would likely meet the three-parameter definition of a wetland and is adjacent to WUS 25. Wetland fill impacts here total 1,844 SF. It is not possible to avoid this wetland for the same reasons that it is not possible to avoid wetland W23.

WUS 27 and W 28

Both features are associated with an unnamed tributary to Cabin Branch and its abutting wetland (see **Figure 5-7**). Refer to **Table 5-11** for a wetland and waters impact summary which is followed by descriptions of the affected resources.

Table 5-11: Impacts - WUS 27, W28

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 27	NA	NA	0	Fair
W 28	1,136 (F)	0	NA	Fair

WUS 27

Feature WUS 27 is an unnamed, perennial tributary to Cabin Branch originating at a stormwater pond outfall west of Snouffer School Road and flowing west through a forest in the Hunters Woods Neighborhood Conservation Area. WUS 27 receives drainage from a forested wetland (Feature W28) to the north and exhibits a natural channel shape, with a width of 3 to 6 feet, water depth of 4 to 12 inches, and banks with a 2:1 slope. The channel substrate consists of silts, cobbles, and gravel. The feature has well defined bed and banks, and observed indicators of the ordinary high water mark include: presence of litter and debris, sediment sorting, and scour. The forest surrounding the feature is dominated by red maple, black gum (*Nyssa sylvatica*), and southern arrowwood. Maryland DNR's Stream Waders collected benthic macro-invertebrate samples at a site (863-4-2001) located ½ mile downstream, just below Goshen Road, in 2001. The site had a total of 9 macro-invertebrate families, with 1 EPT taxon and 2 Dipterans, resulting in a poor IBI score of 1.57. EPT taxa made up only 1.7% of the macro-invertebrates in the sample, indicating unhealthy stream conditions. Despite having a poor IBI score, the feature provides adequate aquatic habitat for a first order stream due to its perennial flow and instream cover.

Feature WUS 27 is a perennial RPW that flows year round, and is jurisdictional under Rapanos guidance. Fish passage at the road culvert is unnecessary due to the absence of

upstream habitat. An eastward shift in the centerline of Alternative 4 Modified has avoided this stream. There are no impacts to waters at this location.

Figure 5-7: Location WUS 27, W28

W28

Feature W28 is a narrow, forested, floodplain wetland adjacent to WUS 27 on the north side of the channel. Dominant vegetation includes red maple, blackberry, greenbrier (*Smilax rotundifolia*), and poison ivy (*Toxicodendron radicans*). Primary indicators of hydrology include A1: Surface Water, A3: Saturation, and B9: Water-Stained Leaves with secondary indicators including B8: Sparsely Vegetated Concave Surface and D2: Geomorphic Position. The soils in W28 meet the requirements of Hydric Soil Indicator F19: Piedmont Floodplain Soils. Feature W28 is a USACE jurisdictional wetland since it meets the three-parameter definition of a wetland and is abutting Feature WUS 27, an RPW flowing year round. Wetland fill impacts here total 1,136 SF.

WUS 31

Feature WUS 31 is an unnamed tributary to Cabin Branch. It originates at a stormwater pond outfall on the west side of Snouffer School Road (see **Figure 5-8**). Refer to **Table 5-12** for an impact summary, followed by a description of the resource.

Table 5-12: Impacts - WUS 31

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 31	NA	NA	55	Fair

This stream flows southwest through a forest in the Hunters Woods Neighborhood Conservation Area and is dominated by red maple, slippery elm, and southern arrowwood. The stream has a natural channel shape, with a width of 6 to 10 feet, a water depth of 4 to 18 inches, and banks with a 2:1 slope. The banks of WUS 31 are relatively unstable with moderate areas of erosion and channel substrate consisting of silt, cobble, sand, and gravel. The feature has well defined bed and banks, and observed indicators of the ordinary high water mark include: disturbed leaf litter, sediment deposition, water staining, presence of litter and debris, destruction of terrestrial vegetation, and scour.

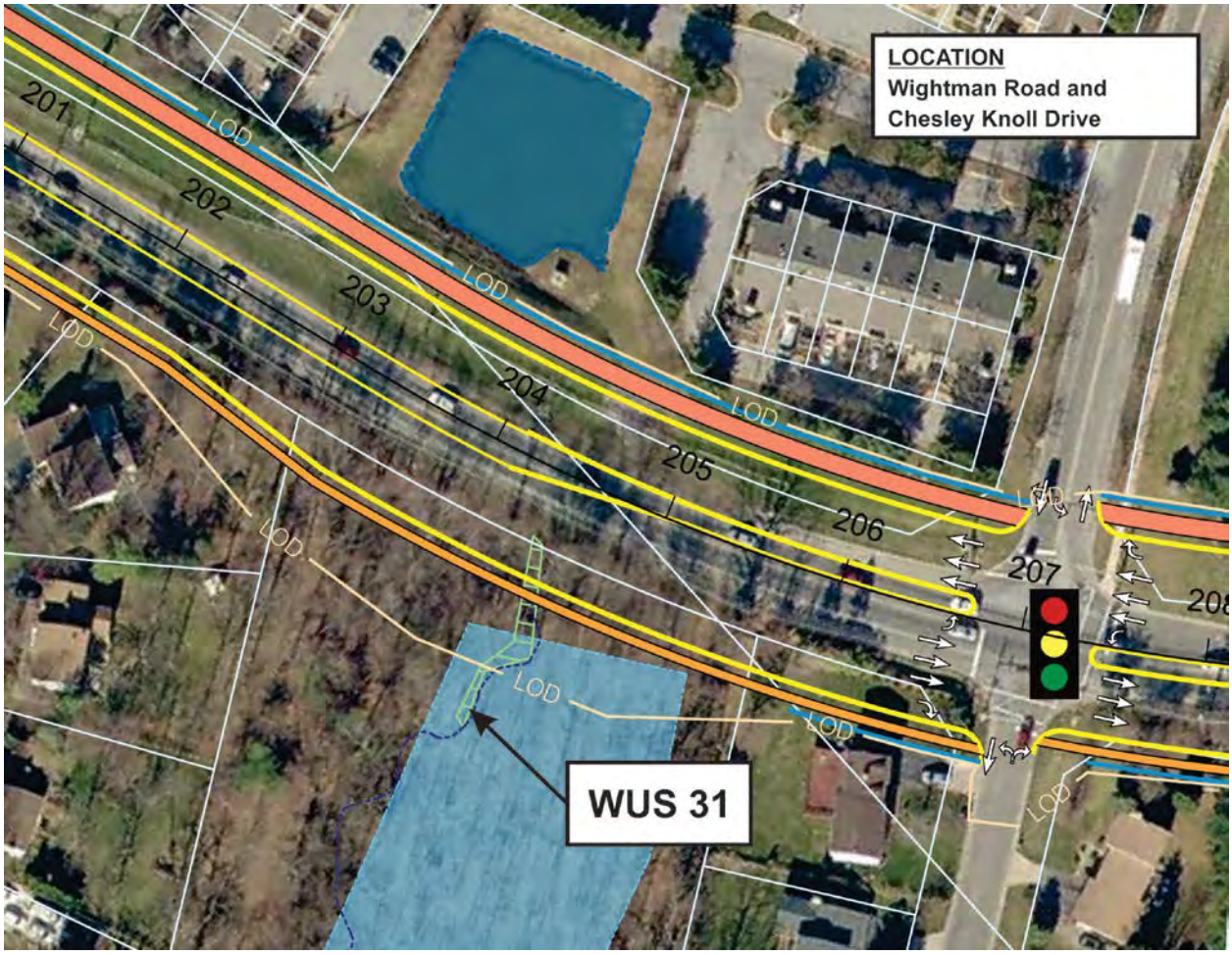


Figure 5-8: Location WUS 31

Maryland DNR's Stream Waders collected benthic macro-invertebrate samples at a site (863-4-2001) located ½ mile downstream, just below Goshen Road, in 2001. The site had a total of 9 macro-invertebrate families, with 1 EPT taxon and 2 Dipterans, resulting in a poor IBI score of 1.57. EPT taxa made up only 1.7% of the macro-invertebrates in the sample, indicating unhealthy stream conditions. Despite having a poor IBI score and unstable conditions, the feature provides adequate aquatic habitat due to its perennial flow and the presence of riffle-pool sequences. Impacts to waters here total 55 LF for a culvert extension (see **Table 5-12**). Feature WUS 31 is a perennial RPW flowing year round, and is jurisdictional under Rapanos guidance. Fish passage at the road culvert is unnecessary due to the absence of upstream habitat.

WUS 32, WUS 34, and W35

WUS 32, WUS 34, and W35 are a system of wetlands and Waters of the U.S. associated with North Creek (see **Figure 5-9**). Refer to **Table 5-13** for a wetland and waters impact summary followed by descriptions of the affected resources.

Table 5-13: Impacts - WUS 32, WUS 34, W35

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 32	NA	NA	130	Fair
WUS 34	NA	NA	98	Poor
W 35	5,754 (S)	0	NA	Good

WUS 32

Feature WUS 32, North Creek, is a perennial RPW flowing through twin culverts under Wightman Road within the Great Seneca Creek watershed. Forest surrounding WUS 32 is dominated by black willow (*Salix nigra*), black walnut, red maple, and southern arrowwood. The stream receives drainage from a large emergent wetland (Feature W35) upstream of the culvert and a forested wetland (Feature W33) downstream of the culvert. The stream has a natural channel shape with some straightening at the road crossing. The feature has a channel width of 5 to 12 feet and a water depth of 2 to 5 inches. Streambed substrate consists of silts, cobbles, sands, gravel, and muck. WUS 32 has well defined bed and bank and observed indicators of the ordinary high water mark include: vegetation matted down, bent, or absent, leaf litter disturbed, sediment deposition, and the presence of litter and debris. According to the online MBSS interactive map, no biological monitoring records exist for North Creek.

Feature WUS 32 is a perennial RPW flowing year round, and is jurisdictional under Rapanos guidance. The feature provides poor, yet adequate habitat for fish and benthic macro-invertebrates due to its perennial flow and instream cover. Replacement of the twin culvert should be designed to allow for fish passage. Impacts to waters here total 130 LF.

WUS 34

Feature WUS 34 is an ephemeral roadside channel located in a forested area along the west side of Wightman Road. The channel drains west into a forested wetland (Feature W35) hydrologically connected to North Creek (Feature WUS 32). The feature has a manipulated substrate consists of silts, sands, gravel, with rip-rap at the upper end of the feature. Channel width is 2 to 7 feet, channel depth 1 to 3 inches, and banks with a 1:1 to 3:1 slopes. Feature WUS 34 drains a riparian forest dominated by red maple, black locust (*Robinia pseudoacacia*), and southern arrowwood. The feature has relatively stable but weakly defined bed and banks. Observed indicators of the ordinary high water mark include: vegetation matted down, bent, or absent, disturbed leaf litter, water staining, presence of litter and debris, and scour.

Feature WUS 34 is an ephemeral Non-RPW with an abutting wetland, and is jurisdictional under the Rapanos guidance. Due to the ephemeral nature of the channel, the feature provides very limited aquatic habitat. Impacts to waters here total 98 LF.

W35

Feature W35 is a large shrub-scrub wetland on both sides of Wightman Road. Dominant vegetation includes silky dogwood (*Cornus amomum*), blackberry (*Rubus allegheniensis*), skunk cabbage (*Symplocarpus foetidus*), and sensitive fern (*Onoclea sensibilis*). Primary indicators of hydrology include A2: High Water Table, A3: Saturation, and B9: Water-

Stained Leaves with secondary indicators including D2: Geomorphic Position and D4: Microtopographic Relief. The soils in W35 meet the requirements of Hydric Soil Indicator F3: Depleted Matrix. Feature W35 is a USACE jurisdictional wetland since it meets the three-parameter definition of a wetland and abuts Feature W32, an RPW flowing year round. Wetland fill impacts here total 5,754 SF.

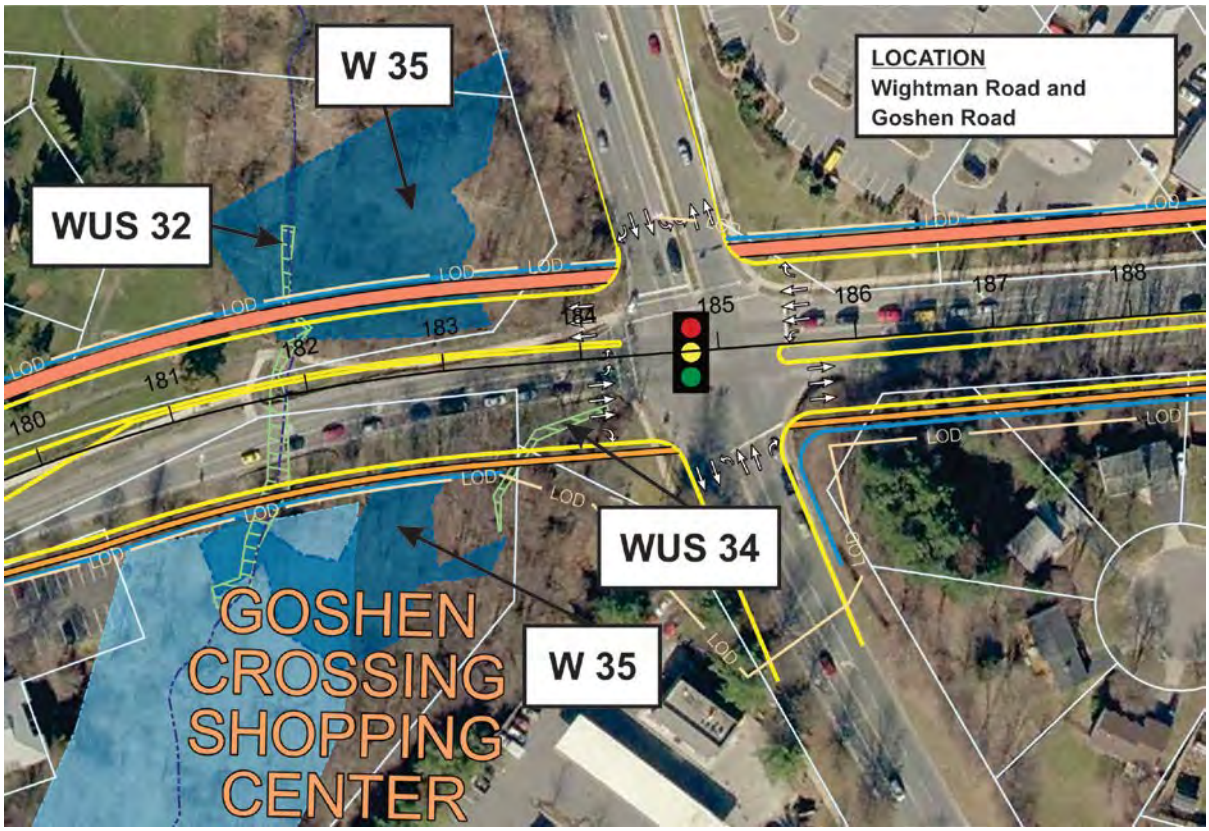


Figure 5-9: Location WUS 32, WUS 34, W35

Shifting the alignment to the west was considered but would increase the impact to the portion of W35 located on the west side of Wightman Road and also increase impacts to residences in Hunters Woods in the southwest quadrant of the intersection with Goshen Road.

WUS 36

Feature WUS 36 is an unnamed, intermittent tributary to Great Seneca Creek originating at a stormwater pond outfall just east of Wightman Road (see **Figure 5-10**). Refer to **Table 5-14** for an impact summary, followed by a description of the resource.

Table 5-14: Impacts - WUS 36

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 36	NA	NA	85	Fair

The feature flows west through a rip-rap channel before draining through a twin culvert under Wightman Road. The rip-rap channel ends a short distance downstream of the roadway, where the stream flows through a narrow forested buffer dominated by silver maple, black cherry (*Prunus serotina*), black walnut, and spicebush. The stream has an artificial channel shape, with a width of 5 to 15 feet, a channel depth of 3 to 7 inches, and banks with a 2:1 slope. Channel substrate near the roadway consists of rip-rap; downstream of the roadway WUS 36 transitions to a natural channel shape with cobble, silt, sand, and gravel substrate. The feature has well defined bed and bank, and observed indicators of the ordinary high water mark include: disturbed leaf litter, sediment deposition, presence of litter and debris, and scour. According to the online MBSS interactive map, no biological monitoring records exist for this unnamed tributary. WUS 36 provides limited aquatic habitat due to the altered state of the channel.

Figure 5-10: Location WUS 36

The April 2011 field review was not conclusive as to whether WUS 36 flows throughout the entire year. WUS 36 is being categorized as an RPW and considered jurisdictional under Rapanos guidance. Fish passage at the road culvert is unnecessary due to the lack of habitat in the artificial channel upstream of the culvert. Impacts to waters here total 85 LF (**Table 5-14**).

WUS 37, WUS 38, and W 41

These features are a system of wetlands and waters connected to Great Seneca Creek (WUS 37). WUS 38 is an ephemeral drainage, and W41 is a wetland associated with Great Seneca (see **Figure 5-11**). Refer to **Table 5-15** for a wetland and waters impact summary, followed by descriptions of the resources.

Table 5-15: Impacts - WUS 37, W41

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 37	NA	NA	0	Good
W 41	2,840 (E)	NA	NA	Fair/Good

WUS 37

Feature WUS 37 is a section of Great Seneca Creek flowing south-west under a bridge at Brink Road. This section of Great Seneca Creek flows through patchy riparian forest with large open grass areas. This riparian area is dominated by red maple, black walnut, American sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), reed canary grass (*Phalaris arundinacea)*, and deer-tongue grass (*Dicanthelium clandestinum*). The banks of Great Seneca are unstable throughout most of the reach, with several areas actively eroding. WUS 37 has a natural channel shape, with a width of 30 feet, a water depth of 6 to 24 inches, and banks with a 1:1 slope.

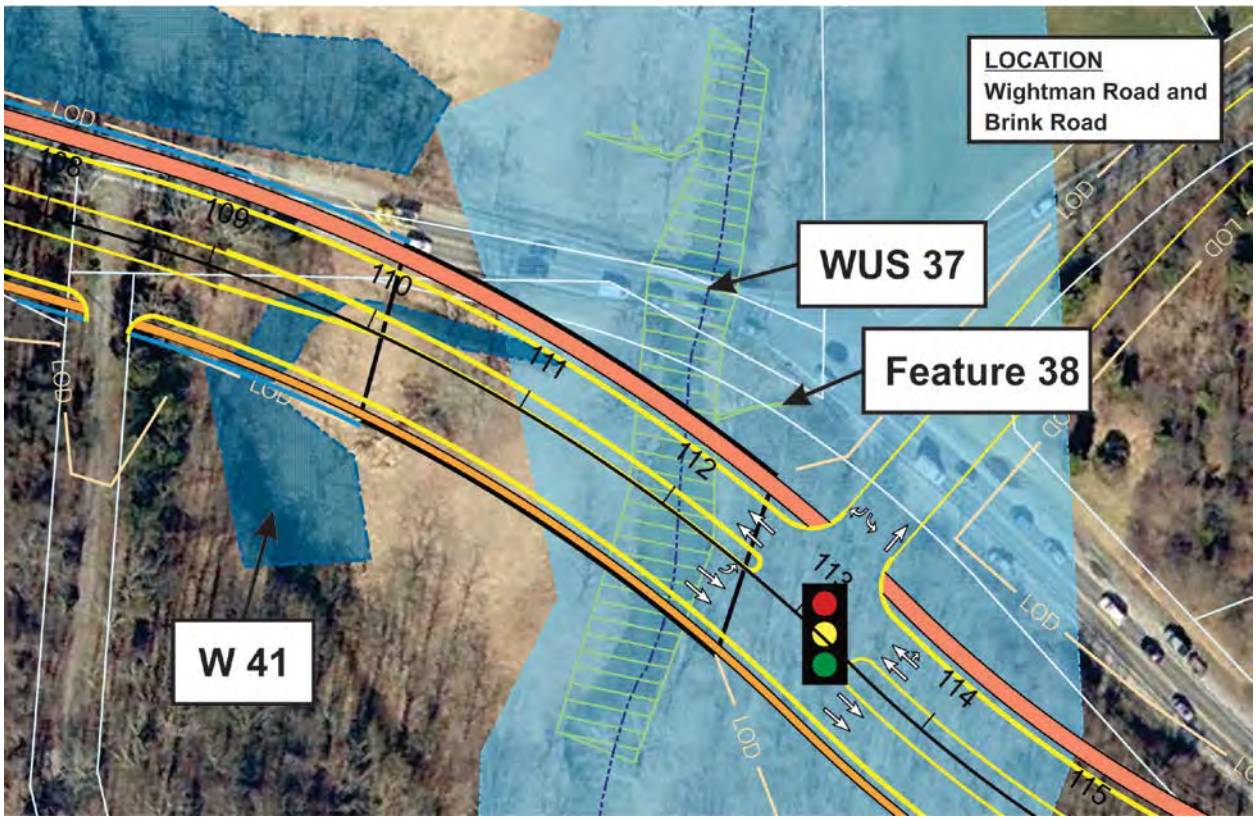


Figure 5-11: Location WUS 37, Feature 38, W41

Channel substrate consists of silt, cobble, sand, and gravel. Observed indicators of the ordinary high water mark include: vegetation matted down, bent, or absent; water staining; destruction of terrestrial vegetation; and scour. DNR's Maryland Biological Stream Survey collected benthic macro-invertebrate and fish samples in Great Seneca Creek in 1997 from a site (MO-P-445-318-97) several hundred feet upstream of the existing crossing. The site had a total of 29 macro-invertebrate families, with 11 EPT taxa and 11 Dipterans, resulting in a fair IBI score of 3.25. A total of 20 fish species were collected at the site, with 10 intolerant species and 5 tolerant species, resulting in a good IBI score of 5.00.

Feature WUS 37 is a perennial RPW flowing year round, and is jurisdictional under Rapanos guidance. Even though the stream appears to be relatively unstable, the feature provides adequate habitat for fish and benthic macro-invertebrates due to its large size, variety of

substrates, and presence of riffle-pool sequences. Fish passage at the feature is necessary due to the relatively large size of the stream and available aquatic habitat upstream of the proposed alignment. A new 250-foot long bridge would be constructed on the west side of existing Wightman Road. The proposed alignment is dictated by the need to improve the horizontal geometry to a 40 MPH design speed.

Feature 38

Feature 38 is an ephemeral drainage swale originating at a pipe outfall just south of Brink Road and drains west into Great Seneca Creek (Feature WUS 37). The feature has a manipulated (man-altered) channel receiving run-off from Brink Road. Channel width is 3 to 4 feet, channel depth is 2 to 21 inches, and banks slopes are 4:1. Feature 38 drains through an area of herbaceous vegetation dominated by deer tongue grass, stinging nettle (*Urtica dioica*), primrose (*Primula vulgaris*), and impatiens (*Impatiens capensis*). The feature has weakly defined bed and banks, and observed indicators of the ordinary high water mark include: vegetation matted down, bent, or absent, presence of litter and debris, and scour.

Feature 38 is a Non-RPW draining uplands, and is not jurisdictional under Rapanos guidance. The channel was dry during the April 2011 field review and does not provide aquatic habitat.

W 41

Feature W41 is a small emergent wetland within the floodplain of Great Seneca Creek. Dominant vegetation includes deer tongue grass and skunk cabbage. Primary indicators of hydrology include A1: Surface Water, A2: High Water Table, and A3: Saturation, with secondary indicators including B8: Sparsely Vegetated Concave Surface and D4: Microtopographic Relief. Soils in W41 meet the requirements of Hydric Soil Indicator F19: Piedmont Floodplain Soils. W41 is a USACE jurisdictional wetland since it meets the three-parameter definition of a wetland and is abutting Feature W37, an RPW flowing year round. Wetland fill impacts here total 2,840 SF. Widening Wightman Road to the east, or equally on both sides of the existing road, was considered but would increase the wetland impacts. Furthermore, the proposed alignment of the new road is dictated by the need to achieve a 40 MPH design speed.

Alternative 5

WUS 46, WUS 52, WUS 81

Alternative 5 impacts three waters at varying locations along this alternative. They are described together and included in **Table 5-16**.

WUS 46

Feature WUS 46 is a perennial stream that originates at a stormwater pond outfall just west of North Frederick Road and is piped under the road (see **Figure 5-12**). The stream flows for several hundred feet before entering a second stormwater pond. The feature is located in the headwaters of Milestone tributary, which flows west into Little Seneca Creek. The stream has a manipulated (man-altered) channel, with a width of 8 feet, a water depth of 12 to 18 inches, and banks with 3:1 slope. The stream is in good condition, with densely vegetated banks and stable instream habitat. The channel substrate consists of rip-rap, cobbles, sands,

and gravel. WUS 46 has defined bed and banks, and observed indicators of the ordinary high water mark include: vegetation matted down, bent, or absent, and presence of litter and debris. The feature is surrounded by a thin strip of forest that is dominated by slippery elm, black willow, and Bradford pear (*Pyrus calleryana*). According to the online MBSS interactive map, there are no biological monitoring records for Milestone tributary.

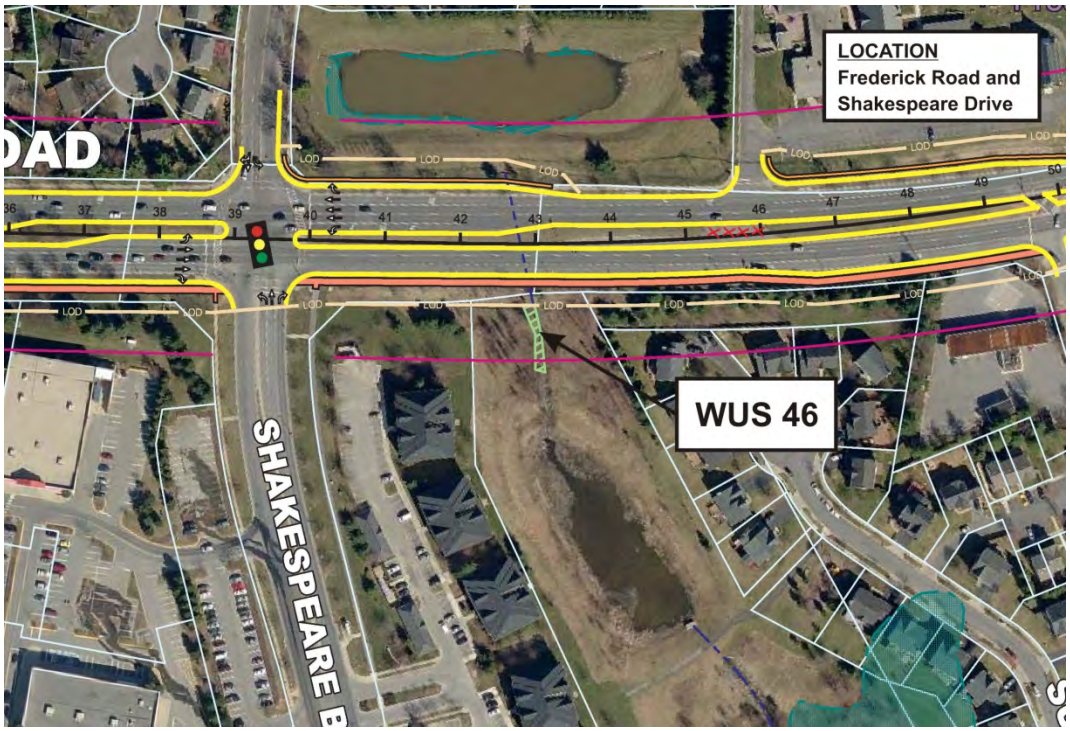


Figure 5-12: Location WUS 46

Table 5-16: Impacts - WUS 46, WUS 52, WUS 81

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 46	NA	NA	0	Fair
WUS 52	NA	NA	70	Fair
WUS 81	NA	NA	15	Poor

Feature WUS 46 is a perennial RPW that flows year round, and is jurisdictional under Rapanos guidance. The feature provides good aquatic habitat due to its perennial flow, stable conditions, and variety of in-stream habitat. Fish passage at the stormwater outfall is unnecessary due to the absence of upstream habitat. There would be no impacts to Waters of the U.S. at this location.

WUS 52

This reach of Whetstone Run, WUS 52, is a perennial channel classified as an RPW by USACE. The stream is conveyed under Summit Avenue North through three 30' wide arched culverts (see **Figure 5-13**) and a short distance later under existing Midcounty Highway

through similar culverts. This reach of Whetstone Run is near the headwaters of the stream. The width varies between 10 to 20 feet, with an average water depth of 1 to 3 feet. Normal flow appears to be contained within the channel and observed ordinary high water marks include matted vegetation, disturbed leaf liter, sediment deposition, water staining, presence of litter and debris and wrack line, and scour. Dominant plants in WUS 52 include sycamore, black willow, box elder, and Japanese stiltgrass (*Microstegium vimineum*). DNR's Maryland Biological Stream Survey collected benthic macro-invertebrate and fish samples from a site (SENE-113-R-2001) upstream of WUS 52 in 2001. The site had a total of 15 macro-invertebrate families, with 2 EPT taxa and 9 Diptera taxa, resulting in a poor IBI score of 1.50. EPT taxa made up only 2.3% of the macro-invertebrates in the sample, indicating unhealthy stream conditions. The site also received a poor fish IBI score of 2.00, with only 4 tolerant fish species. Despite the upstream site's poor IBI scores, the feature still provides adequate habitat for fish and macro-invertebrates due to its perennial flow and stable instream habitat. Fish passage at the feature would be desirable due to the available aquatic habitat upstream of the proposed alignment. If this alternative should ultimately be selected, fish passage would be provided only if the culverts warrant replacement, rather than an extension. The length of impact is estimated to be 10 LF for the construction of new headwalls at Midcounty Highway and 60 LF for the Goshen Road widening.

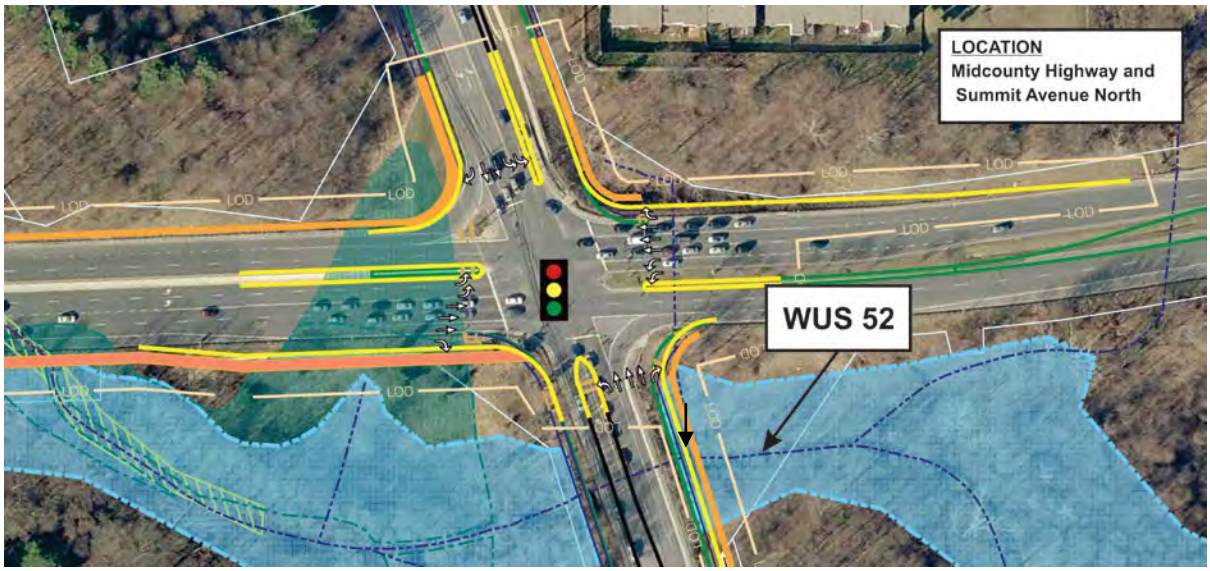


Figure 5-13: Location WUS 52

WUS 81

Feature WUS 81 is an ephemeral drainage swale originating at a pipe outfall on the west side of Frederick Road (see **Figure 5-14**). The feature has a manipulated (man-altered), deeply incised channel receiving run-off from the church and school across the street and from Frederick Road.

Channel width is 12 to 15 feet, channel depth is 5 to 6 feet, and banks slopes vary between 2:1 and 1:1. WUS 81 drains through an area of forest dominated by box elder, green ash (*Fraxinus pennsylvanica*), wild strawberry (*Fragaria virginiana*), and garlic mustard

(*Alliaria petiolata*). Observed indicators of the ordinary high water mark include: vegetation matted down, bent, or absent, presence of litter and debris, and scour. The channel would be impacted for a distance of 15 feet.

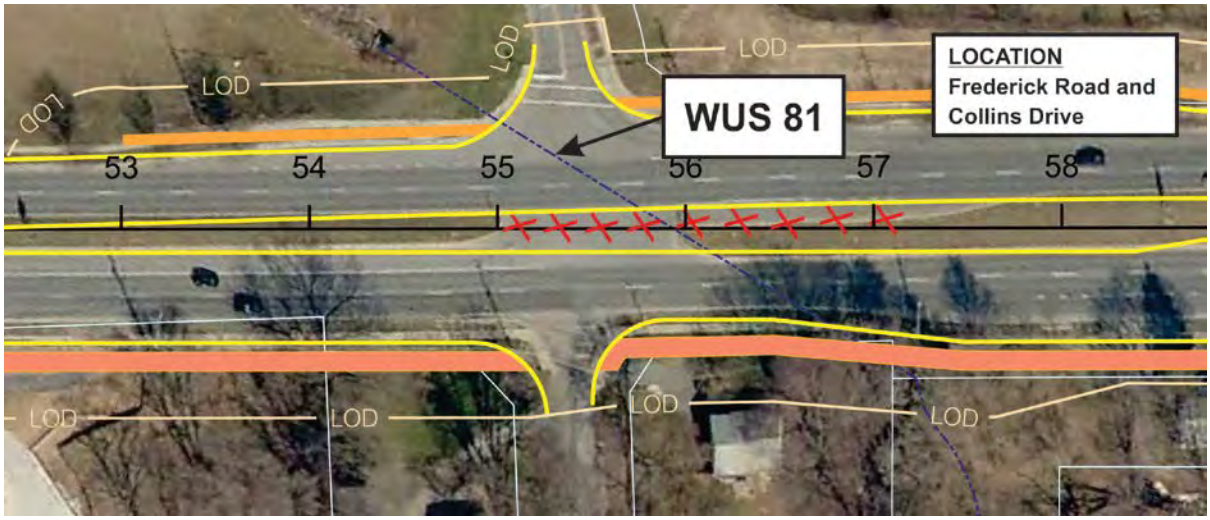


Figure 5-14: Location WUS 81

Alternative 8 – Goshen Road to Montgomery Village Avenue and Frederick Road to the PEPCO ROW

WUS 52, WUS 53, W 59, W 63, W 64, WUS 82

Wetlands and waters impacted in this area include a complex of aquatic resources within the floodplain of Whetstone Run including WUS 53, W 59, W 63, and W 64 (see **Figure 5-15**), a nearby unnamed tributary, WUS 82, flowing under Watkins Mill Road (see **Figure 5-16**), and the upper mainstem of Whetstone Run, WUS 52, flowing under existing Midcounty Highway and Goshen Road. Alternative 8 would provide a 220-foot, single span bridge over Whetstone Run and portions of its floodplain. The existing bridge carrying Watkins Mill Road over Whetstone Run would be widened. Refer to **Table 5-17** for a wetland and waters impact summary followed by descriptions of the resources.

Table 5-17: Impacts - WUS 52, WUS 53, W59, W63, W64, WUS 82

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 52	NA	NA	70	Fair/Poor
WUS 53	NA	NA	0	Fair
W 59	1,138 (F)	142	NA	Fair
W 63	64 (SS/E)	0	NA	Fair
W 64	0	0	NA	Good
WUS 82	NA	NA	450	Fair/poor

WUS 52 is described under Alternative 5.

WUS 53

Feature WUS 53, Whetstone Run, is a perennial, meandering and incised channel within the Middle Great Seneca Creek watershed. Feature WUS 53 begins at Lake Whetstone and flows west, crossing under Watkins Mill Road and Game Preserve Road, and continues flowing north to Seneca Creek. The channel has a natural channel shape that varies between 9 to 15 feet in width, water depth is 2 to 3 feet, and banks are often slumping and up to eight feet high. Whetstone Run is extremely incised, with headwall slumping and toe scour with severe erosion. Channel substrate includes silts, sands, gravel, and cobble. WUS 53 is buffered by a fairly wide riparian forest dominated by sycamore, black walnut, black willow, false nettle (*Boehmeria cylindrica*), Japanese stiltgrass, goldenrod (*Solidago* sp.), mile-a-minute (*Persicaria perfoliata*), deer tongue grass, and small carpgrass (*Arthraxon hispidus*).

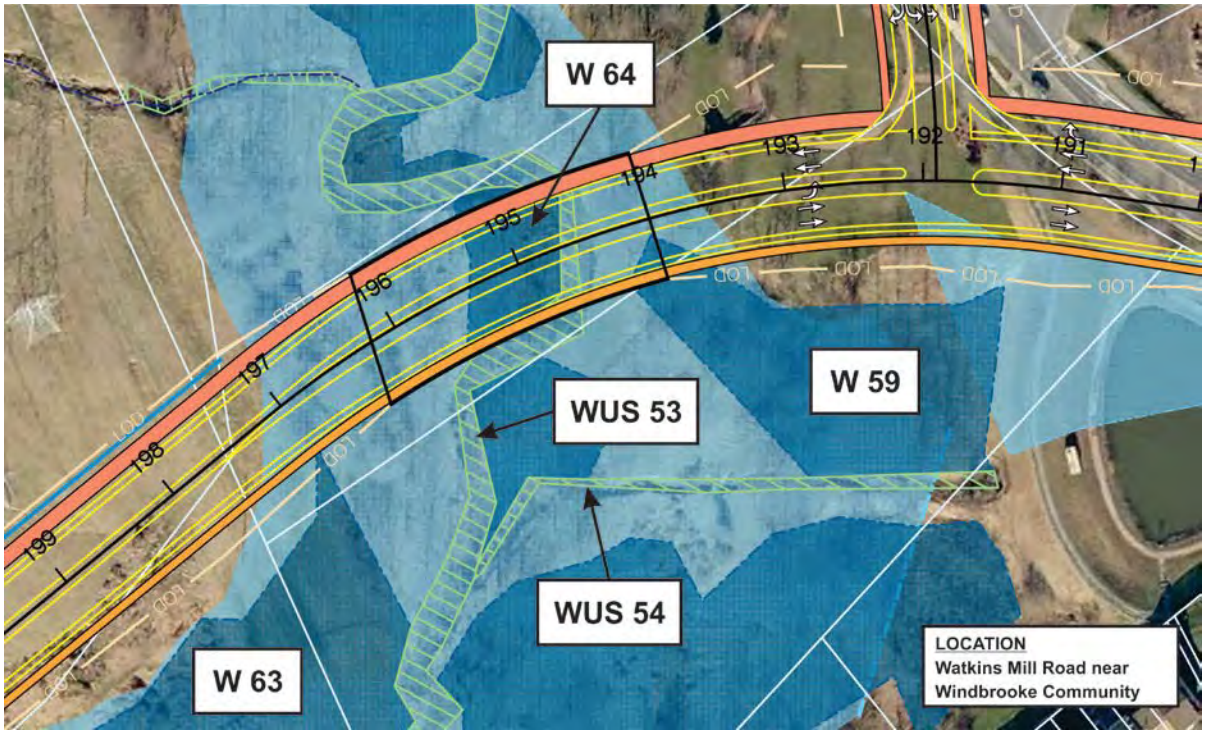


Figure 5-15: Location WUS 53, WUS 54, W59, W63, W64

Observed indicators of the ordinary high water mark include changes in the character of the soil; vegetation matted down, bent or absent; disturbed leaf litter; sediment deposition; the presence of litter and debris and wrack line; sediment sorting; and scour.

Feature WUS 53 is a USACE jurisdictional waterway since it is an RPW with abutting wetlands and flows into Seneca Creek, a Traditional Navigable Water (TNW). DNR's Stream Waders collected benthic macro-invertebrate samples at a site (0862-93-2009) within Feature WUS 53 in 2009. The site had a total of 10 macro-invertebrate families, with 2 EPT taxa and 2 Diptera taxa, resulting in a Poor IBI score of 1.57. EPT taxa made up only 2.5% of the macro-invertebrates in the sample, indicating unhealthy stream conditions. The feature provides poor, yet adequate, habitat for fish and benthic macro-invertebrates due to its perennial flow, instream cover and the presence of riffle-pool sequences. WUS 53 would be

avoided with the construction of a 220-foot single-span bridge. The proposed bridge would accommodate fish passage and approximately 7 feet of underclearance for wildlife passage. The 220-foot bridge would result in an increase in backwater elevation during a 100-year flood event, however, the increase would be confined to existing wetlands and floodplain adjacent to Whetstone Run, on land that is owned by the City of Gaithersburg. Due to the proposed bridging of W53, there are no Waters of the U.S. impacts at this location.

W 59

Feature W59 is located to the east of WUS 54 (tributary to Whetstone Run), and consists of a palustrine forested wetland at the base of an earthen dam which is part of a stormwater detention facility. The primary source of hydrology observed for this wetland appears to be groundwater discharge from adjacent slopes, and a high water table. Primary hydrologic indicators observed include the presence of surface water and a high water table. This wetland is within the floodplain of Whetstone Run, so it would be expected to receive floodwaters during large storm events. Dominant vegetation within W59 includes Box-elder, Multiflora rose, Allegheny Blackberry, False nettle, and Japanese stiltgrass. The soils in this area meet the hydric soil indicator F3: Depleted Matrix. Wetland W59 is considered a jurisdictional wetlands since all 1,138 SF of wetland fill could be avoided by lengthening the bridge by an additional 40 LF, but the additional bridge length would require adding a pier, relocation of Whetstone Run, and additional wetland impacts.

W 63

Feature W63 is a palustrine scrub-shrub/emergent, floodplain depression wetland located north of WUS W53 (Whetstone Run) in the cleared transmission powerline corridor in the western portion of the study area. W63 appears to receive hydrology from adjacent steep slopes. Wetland indicators include a primary hydrologic indicator: drift deposits and a secondary hydrology indicator: geomorphic position (due to the wetland's adjacency to Whetstone Run). Wetland W63 is dominated by Allegheny blackberry, drooping woodreed (*Cinna latifolia*), Rye (*Secale cereal*), Japanese stiltgrass, rough goldenrod (*Solidago rugosa*), and Japanese honeysuckle. W63 soils meet the hydric soil indicator F3: Depleted Matrix. Wetland W63 is considered a jurisdictional wetland since all three wetland parameters are met, and since it abuts an RPW (WUS 53). The wetland fill impact to W63 would be 64 SF.

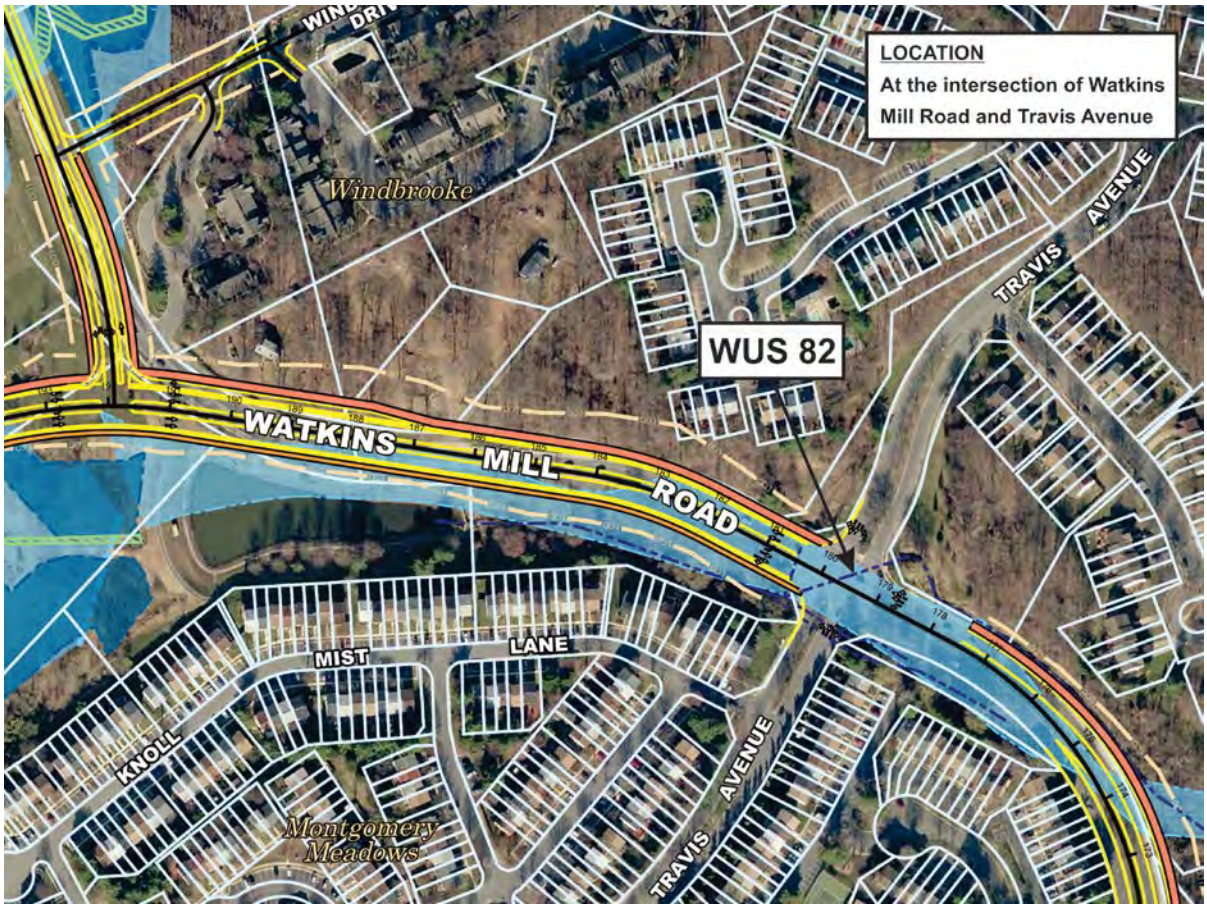


Figure 5-16: Location WUS 82

W 64

Feature W64 is a low-lying depression, palustrine scrub-shrub/emergent wetland directly abutting Whetstone Run in a low stream terrace. This system receives groundwater discharge from a high water table and overbank flooding during storm events. Primary hydrology indicators observed include drift deposits and saturation and a secondary indicator includes geomorphic position. W64 is dominated by black willow, Japanese stiltgrass, Asiatic tearthumb (*Persicaria perfoliata*), and riverbank grape (*Vitis riparia*). Soils in W64 meet the hydric soil indicator F3: Depleted Matrix. Wetland 64 is considered jurisdictional since all three wetland parameters are met and since it directly abuts a TNW, Whetstone Run. Due to the bridging of W64, there would be no wetland impacts at this location.

WUS 82

WUS 82 is an unnamed perennial stream flowing northerly under Watkins Mill Road to a stormwater management pond abutting Blohm Park (see **Figure 5-16**). WUS 82 has been man- altered and channelized and is conveyed under Watkins Mill Road via a culvert. The channel is a 6-foot wide concrete channel on both sides of Watkins Mill Road with rip-rap, coarse-woody-debris, and sand within the channel. WUS 82 is buffered by a narrow riparian area dominated by box elder, birch, sycamore, red bud, black willow, and honeysuckle shrub.

Observed indicators of the ordinary high water mark include water staining and the presence of wrack line. WUS 82 is a USACE jurisdictional waterway since it is a Relatively Permanent Water (RPW). There are no MCDEP benthic macro-invertebrate or fish samples in this area to help assess water quality. There are 450 LF of impact to Waters of the U.S. at this location.

Alternatives 8 and 9 - PEPCO ROW to Northern Terminus Options

W63, 74, and 75

Features impacted in the northern section of the City of Gaithersburg's Blohm Park include wetland W63, and non-regulated drainage features 74 and 75 associated with Whetstone Run (see **Figure 5-17**). Refer to **Table 5-18** for a wetland and waters impact summary followed by descriptions of the resources.

Table 5-18: Impacts - W63

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
W 63	9,296 (F)	0	NA	Fair/Good

W63

Feature W63 is a palustrine forested wetland with wetland vegetation including sycamore, black walnut, black willow, multiflora rose, false nettle, Japanese stiltgrass, rough goldenrod, and drooping woodreed. A primary indicator of hydrology includes B3: Drift deposits and a secondary indicator includes D2: Geomorphic position. Soils in W63 meet the requirements of Hydric Soil Indicator F3: Depleted Matrix. Feature W63 is a USACE jurisdictional wetland since it meets the three-parameter definition of a wetland and abuts Feature W53 (Whetstone Run), a TNW. Impacts to W63 were reduced by narrowing the roadway median where the road crosses the wetland. The resulting wetland impact would be 9,296 SF of fill.

Feature 74

Feature 74 is an ephemeral channel draining the Clusters of Stedwick community. Classified as a non-RPW draining uplands, the channel has an average width of 10 to 12 feet, a channel depth of 5 to 7 feet, and is heavily incised with toe scour with severe erosion. Channel flow has resulted in scour at the interface of the wetland. Channel substrate includes cobble and large rip rap. Feature 74 is buffered by a 10' wide riparian forest dominated by black walnut, box elder, red maple, white mulberry (*Morus alba*), and Japanese stiltgrass. Observed indicators of the ordinary high water mark include disturbed leaf litter, the presence of litter and debris, wrack line, and scour. Feature 74 is not a USACE jurisdictional waterway since it is a non-RPW draining uplands. Due to the ephemeral nature of the channel, the feature does not provide aquatic habitat and fish passage is unnecessary. The channel would be piped under the alternative, with an energy dissipation structure at the outfall.

Feature 75

Feature 75 is an ephemeral channel, located west of feature 74, draining another portion of the Clusters of Stedwick community. Also classified as a non-RPW draining uplands, the

channel has an average width of 2 to 4 feet, an average channel depth of 1 foot, and has been stabilized with riprap. Feature 75 is buffered by a 50' wide riparian forest dominated by tulip poplar (*Liriodendron tulipifera*), box elder, red maple, flowering dogwood (*Cornus florida*), spice bush, and Japanese stiltgrass. Observed indicators of the ordinary high water mark include disturbed leaf litter, the presence of litter and debris, wrack line, and an abrupt change in plant community. Feature 75 is not a USACE jurisdictional waterway since it is a Non-RPW draining uplands. Due to the ephemeral nature of the channel, the feature does not provide aquatic habitat and fish passage is unnecessary. The ephemeral channel would be piped under the alternative.

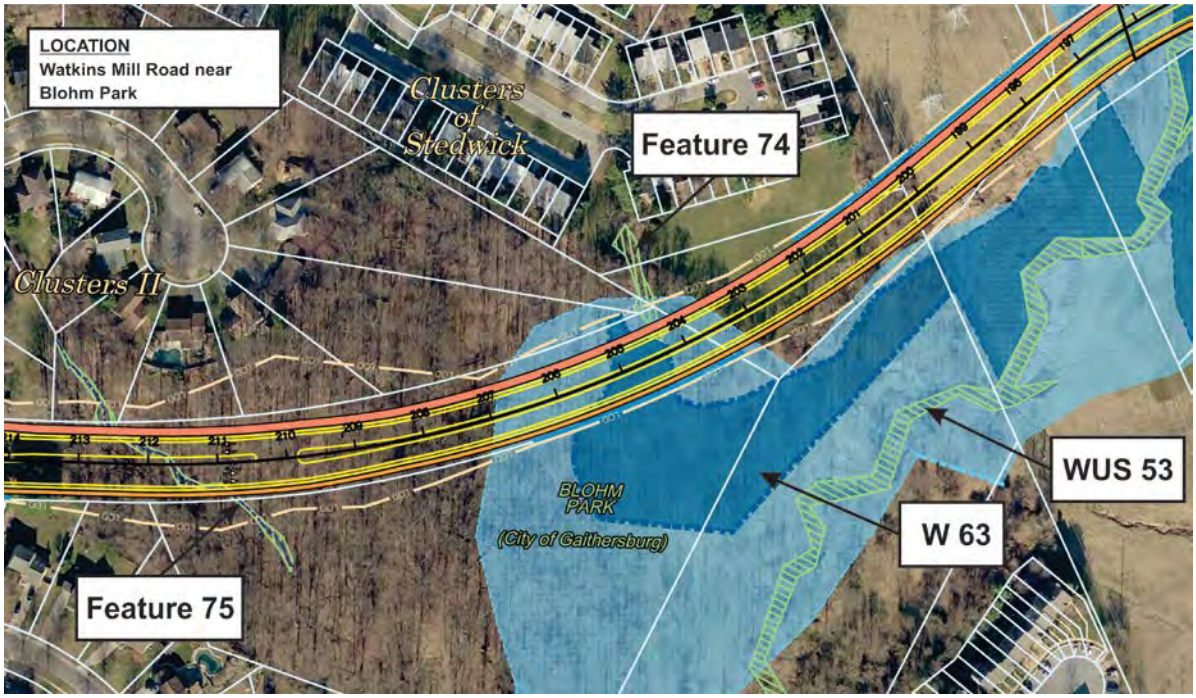


Figure 5-17: Location WUS 53, W63, Feature 74, Feature 75

WUS 76 and W77

Features impacted by Alternatives 8 and 9 at the crossing of Great Seneca Creek include WUS 76 (Great Seneca Creek) and W77, an abutting palustrine forested wetland surrounding the creek (see **Figure 5-18**). Refer to **Table 5-19** for a wetland and waters impact summary followed by descriptions of the resources.

Table 5-19: Impacts - WUS 76, W77

Feature Label	Wetland Fill SF	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 76	NA	NA	0	Good
W 77	21,895 (F)	33,894	NA	Good

WUS 76

Feature WUS 76, Great Seneca Creek, is a perennial channel within the Middle Great Seneca Creek watershed. The Creek has a primary, active channel and a secondary, flood channel at the Alternative 8 and 9 crossing, after which it flows south for approximately 10 miles before flowing into the Potomac River. Classified as a TNW (Traditional Navigable Water), the creek has an average width of 30 feet, and an average water depth of 1 foot to 6 feet with fairly unstable, eroding banks. Channel substrate includes silts, gravel, and cobbles. The secondary channel is similar to the primary channel in width, depth, and channel substrate yet contained no flow, with pools of standing water at the time of the site evaluation. It appears to function as an overflow channel during storm events. WUS 76 is buffered by a 100'+ wide riparian forest dominated by box elder, red maple, green ash, musclewood (*Carpinus caroliniana*), slippery elm, stinging nettle, Asiatic tearthumb, and Japanese stiltgrass.

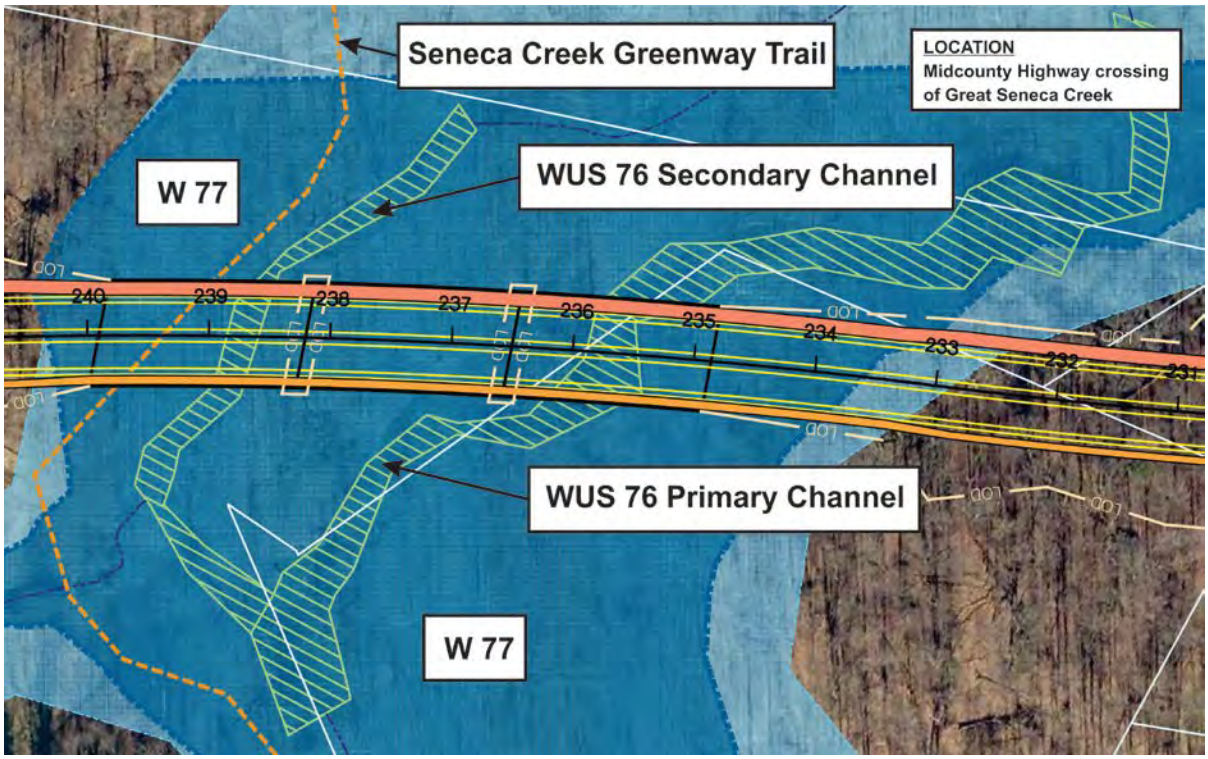


Figure 5-18: Location WUS 76, W77

Observed indicators of the ordinary high water mark include clear, natural line impressed on the bank, sediment deposition, sediment sorting, scour, and presence of litter and debris and wrack line. WUS 76 is a USACE jurisdictional waterway since it is a TNW flowing into the Potomac. MCDEP collected benthic macro-invertebrate and fish samples at a site (GSMS411) downstream in 1998. The site received a fair benthic IBI score of 22 and a good fish IBI score of 4. The feature provides adequate habitat for fish and benthic macro-invertebrates due to its relatively large size, instream cover, and the presence of riffle-pool sequence. The proposed three-span, 500-foot bridge would accommodate fish passage and wildlife passage (17-foot underclearance). The bridge would span both channels without armoring, relocating, or piping any portion of either channel. This was made possible by a

minor alignment shift that introduced a gentle curve into the horizontal alignment through the park.

W77

Feature W77 is a large, palustrine, forested wetland located on the wide floodplain terrace of Great Seneca Creek. Dominant plant species include boxelder, black willow, red maple, American sycamore, Japanese stiltgrass, dotted smartweed, and Sedge (*Carex* sp.). Green dragon, an herbaceous plant formerly a Montgomery County RTE Watchlist species, has been identified within this wetland. A primary indicator of hydrology includes B9: Water-stained leaves and secondary indicators include B6 surface soil cracks and D2: Geomorphic position. Soils in W77 meet the requirements of Hydric Soil Indicator F19: Piedmont Floodplain Soils. This wetland is jurisdictional wetland since it meets the three-parameter definition of a wetland and abuts Feature W76 (Great Seneca Creek), a TNW. The Seneca Creek Greenway Trail, located on the north side of the creek, would incur only temporary disturbance during construction. Retaining walls would be constructed along both sides of the roadway, from the bridge abutments to the wetland limits, to reduce wetland impacts to 21,895 SF (0.50 acre) of fill, including pier impacts. Conversion impacts would total 33,894 SF (0.78 acre). Various bridge lengths were considered at this proposed crossing. Although the 500-foot bridge would result in 0.5 acre of wetland fill, the remaining wetland would be sufficient to continue to provide all of the wetland's functions, including sediment retention, nutrient uptake/export, flood storage, flood desynchronization, wildlife habitat, support for the aquatic food web, and natural heritage function.

WUS 78 and W79

Features impacted by Alternatives 8 and 9 at the crossing of Brandermill Tributary include WUS 78 (Brandermill Tributary) and W79, a palustrine forested wetland adjacent to the tributary (see **Figure 5-19**). The alignment would cross a small portion of the Seneca Creek Greenway Trail in this area. A nearby sewer line installation has disturbed the soil, vegetation, and hydrology. Standing water and groundwater seeps along the slopes are common here. Refer to **Table 5-20** for a wetland and waters impact summary followed by descriptions of the resources.

Table 5-20: Impacts - WUS 78, W79

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 78	NA	NA	0	Good/Excellent
W 79	0	11,425	NA	Good

WUS 78

Feature WUS 78, Brandermill Tributary is a perennial tributary to Great Seneca Creek within the Middle Great Seneca Creek Watershed. The channel has a natural channel shape approximately 20 feet wide, water depth of 1 to 15 inches, with often slumping banks from 4 to 6 feet in height. Channel substrate includes sands, gravel, cobble, and bedrock. WUS 78 is buffered by a fairly wide riparian forest dominated by tulip poplar, slippery elm, black walnut, silky dogwood, Japanese stiltgrass, deer tongue grass, and garlic mustard. Observed

indicators of the ordinary high water mark include vegetation matted down, bent or absent, sediment deposition, the presence of litter and debris and wrack line, sediment sorting, and scour. WUS 78 is a USACE jurisdictional waterway since it is a Relatively Permanent Water (RPW) with abutting wetlands and flows into Great Seneca Creek, a TNW. MCDEP collected benthic macro-invertebrate and fish samples at a site (GSMS202) upstream of Feature WUS 78 in 2006. The site received a fair benthic IBI score of 18 and an excellent fish IBI score of 5. The feature provides adequate habitat for fish and benthic macro-invertebrates due to its instream cover and the presence of riffle-pool sequences. The 170-foot long bridge, with 25-foot underclearance, would maintain the wildlife corridor link to Great Seneca Park, and accommodate fish passage. A small portion of the Greenway Trail would be relocated and the current pedestrian bridge crossing the stream would be avoided. Therefore, there would be no impact to Waters of the U.S. at this location.

W79

Feature W79 is a wetland located at the base of a steep slope on one side of the creek. Dominant vegetation includes box elder, red maple, black walnut, riverbank grape, skunk cabbage, stinging nettle, and dotted smartweed. Primary indicators of hydrology include A3: Saturation and B9: Water-Stained Leaves with a secondary indicator including D2: Geomorphic position. Soils in W79 meet the requirements of Hydric Soil Indicator F3: Depleted Matrix. Feature W79 is a jurisdictional wetland since it meets the three-parameter definition of a wetland and is adjacent to Feature W78 (Brandermill Tributary), an RPW flowing year round. Wetland fills would be avoided through bridging and wetland conversion impacts would total 11,425 sf.

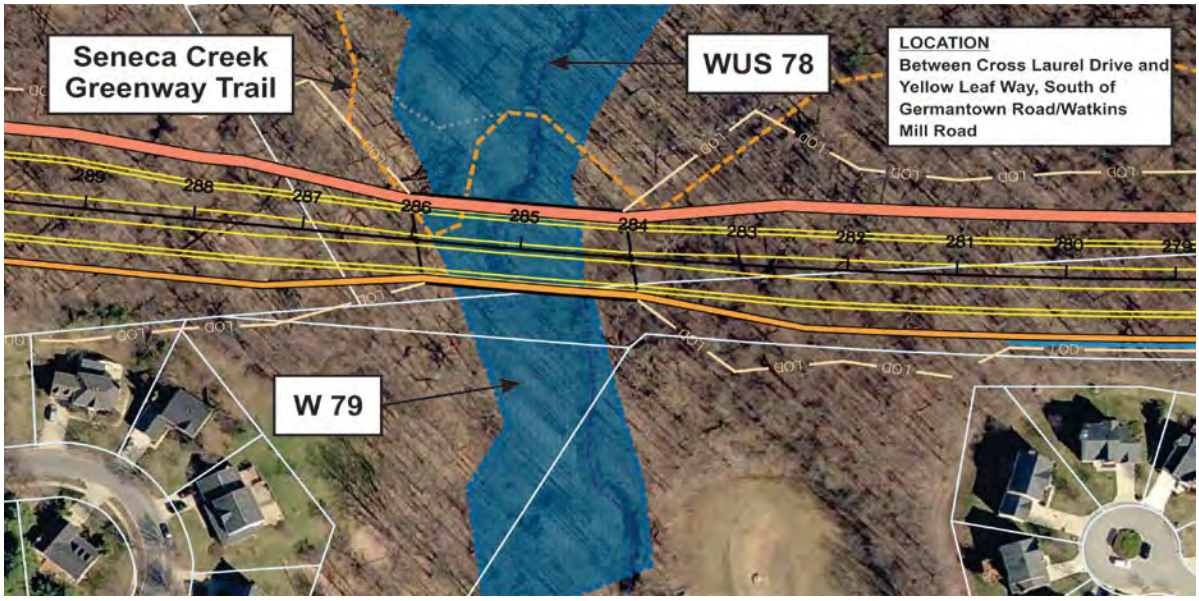


Figure 5-19: Location WUS 78, W79

Alternatives 8 and 9 – Northern Terminus Option B

Review of Northern Terminus Options A, B, and D shows impacts to W 72 and WUS 73 (Dayspring Creek) are common to all options and make up the entirety of Option B impacts.

However, Options A and D would result in additional wetland and waters impacts, which are described following the Option B impacts.

W 72 and WUS 73

The only wetland and waters impacts of Alternatives 8 and 9, Option B are at the crossing of Dayspring Creek (WUS 73) and a portion of the large wetland (W72) adjacent to Dayspring Creek in the North Germantown Greenway Stream Valley Park (**Figure 5-20**. Refer to **Table 5-21** for a wetland and waters impact summary followed by descriptions of the affected resources.

Table 5-21: Impacts - W72, WUS 73

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
W 72	851(F)	21,519	NA	Good
WUS 73	NA	NA	0	Excellent

W72

Feature W72 is a large, palustrine forested wetland abutting Dayspring Creek. Dominant plants include red maple, black walnut, pin oak (*Quercus palustris*), sycamore, green ash, spicebush, Japanese stiltgrass, mile-a-minute, and skunk cabbage. A primary indicator of hydrology includes C3: Oxidized rhizoshperes on living roots and a secondary indicator includes D2: Geomorphic position. The soils in W72 meet the requirements of Hydric Soil Indicator F3: Depleted Matrix. Feature W72 is a jurisdictional wetland since it meets the three-parameter definition of a wetland and is adjacent to Feature WUS 73 (Dayspring Creek), an RPW flowing year round. The Alternative 8 and 9 crossing of W72 would result in 851 SF of fill in wetlands for the pier of a two-span 280-foot long bridge having 16 feet of underclearance. Wetland conversion impacts would be 21,519 SF (0.49 acre).

WUS 73

Feature WUS 73, Dayspring Creek, is a perennial, meandering, braided stream and a tributary to Great Seneca Creek within the Middle Great Seneca Creek Watershed. The channel has a natural channel shape, is 5 to 10 feet wide, with a water depth of 1 to 20 inches, with erosion varied from none to moderate. Channel substrate includes silts, sands, gravel, cobble, and bedrock. WUS 73 is buffered by a wide riparian forest dominated by tulip poplar, slippery elm, black walnut, silky dogwood, Japanese stiltgrass, and mile-a-minute. Observed indicators of the ordinary high water mark include sediment deposition, the presence of litter and debris, sediment sorting, and scour. Feature WUS 73 is a jurisdictional waterway since it is a Relatively Permanent Water (RPW) and flows into Great Seneca Creek, a TNW. MCDEP collected benthic macro-invertebrate samples at a site (GSMS203) downstream of Feature WUS 73 in 1998. The site received excellent benthic (36) and fish (5) IBI scores. The feature provides good aquatic habitat due to its stable conditions, variety of substrates, and the presence of riffle-pool sequences. Fish passage and wildlife passage would be provided beneath the proposed 280-foot bridge. Due to the proposed bridge, there are no Waters of the U.S. impacts at this location.

The portion of Dayspring Creek nearest the Dayspring Silent Retreat Center is within an area designated as a Biodiversity Area (BDA) by M-NCPPC. The North Germantown BDA was

designated in 1999 based on a report by the Maryland Department of Natural Resources, Wildlife and Heritage Division. This designation was based on, "picturesque rock outcrops on slopes and stream banks,…high quality seepage swamps,… and relatively undisturbed habitat that is unusual for Montgomery County parklands." Where the streambed consists of bedrock, the stream does not exhibit the deep incision that is typical of most streams in the area, and creates a picturesque series of cascading ledges uncommon to streams in the County. The beauty of the setting enhances the silent retreat experience for campers at the adjacent Dayspring Church Silent Retreat Center. Well-vegetated stream banks support a diverse native flora with surprisingly few non-native invasive species present. Uncommon flora in this area include American chestnut (*Castanea dentata*), butternut (*Juglans cinera*), black ash (*Fraxinus nigra*), white fringe tree (*Chionanthus virginicus*), small whorled pogonia (*Isotria medeoloides*) (a native orchid), wild columbine (*Aquilegia canadensis*), as well as specimen highbush blueberry (*Vaccinium corymbosum*), and mountain laurel (*Kalmia latifolia*). A 2006 report by botanist Charles Davis entitled *Survey for Crested Iris (Iris cristata) and Reconnaissance Survey for Habitats of other Rare, Threatened and Endangered Species along the Proposed Alignment for the Mid-County Highway, Montgomery County, Maryland"* identified State Rare species within the North Germantown Greenway Park including green dragon (*Arisaema dracontium*), chinquapin (*Castanea pumila*), shingle oak (*Quercus imbricaria*), bashful bulrush (*Scirpus verecundus*), and black birch (*Betula lenta*) which is typically found only in Western Maryland.

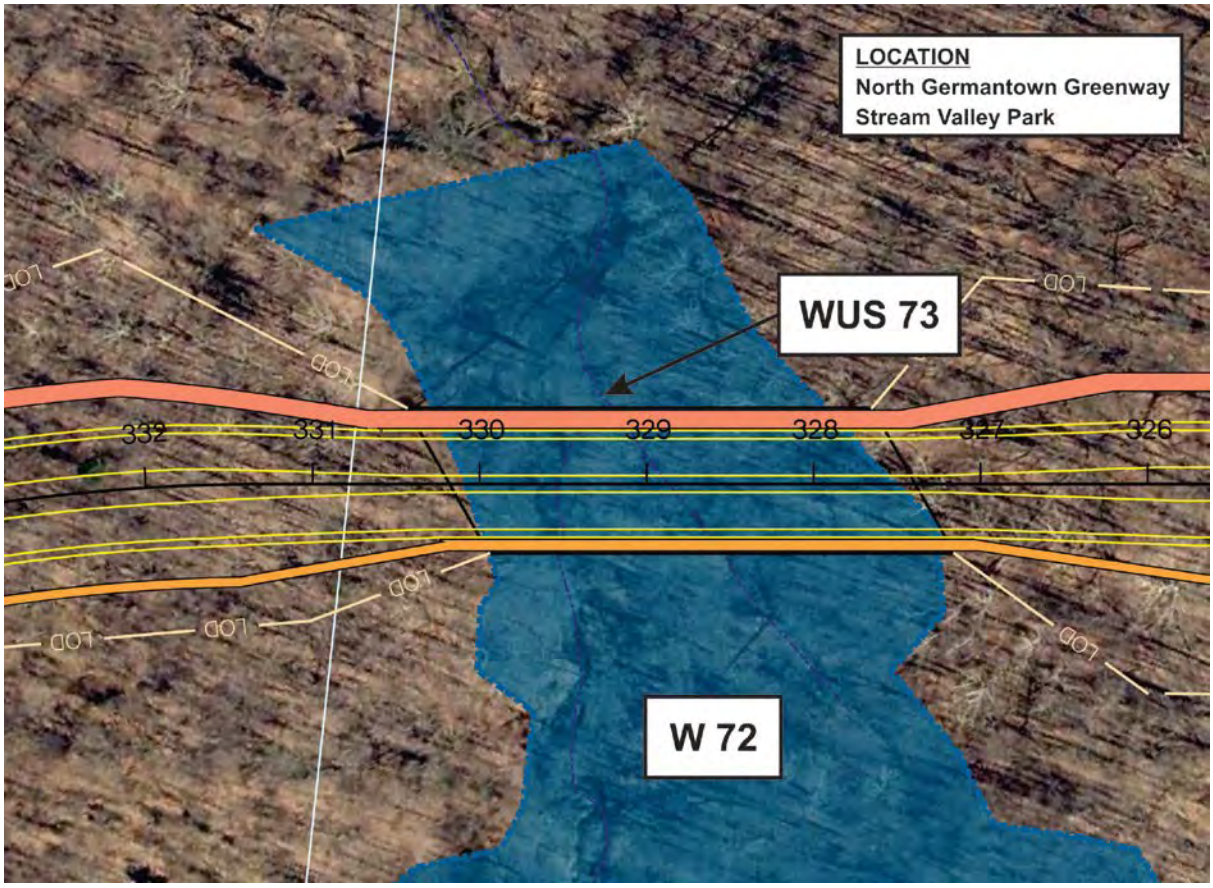


Figure 5-20: Location W72, WUS 73

Alternative 8 and 9 – Northern Terminus Option A

WUS 69, W 70, WUS 71, W 72, WUS 73

Wetlands and waters impacted by Option A include WUS 69 (Wildcat Branch Tributary), wetland W70, and WUS 71, in addition to previously listed wetland W72 and WUS 73 (Dayspring Creek). Option A crosses portions of the above listed wetlands, bridging Wildcat Branch Tributary and Dayspring Creek. Eight amphibian species were identified within the alignment of Option A including green frog (*Rana clamitans*), dusky salamander (*Desmognathus fuscus*), wood frog (*Lithobates sylvaticus*), gray treefrog (*Hyla versicolor*), spring peeper (*Pseudacris crudifer*), redback salamander (*Plethodon cinereus*), pickerel frog (*Lithobates palustris*), and American toad (*Anaxyrus americanus anericanus*). Refer to **Table 5-22** for a wetland and waters impact summary.

Table 5-22: Impacts - WUS 69, W70, WUS 71, W72, WUS 73

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 69	NA	NA	0	Fair
W 70	0	4,175	NA	Fair
WUS 71	NA	NA	229	Fair
W 72	851(F)	21,519	NA	Good
WUS 73	NA	NA	0	Excellent

WUS 69

Feature WUS 69, Wildcat Branch Tributary, is a small ephemeral/intermittent stream beginning at the top of the drainage divide (Ridge Road) as an ephemeral channel, and flows into a perennial tributary of Wildcat Branch (see **Figure 5-21**). The Wildcat Branch subwatershed is contained within the Upper Great Seneca Creek watershed. The channel has a natural channel shape 8 to 12 feet wide, was dry during the July, 2012 field evaluation, and is characterized by moderate erosion. Channel substrate includes silts, sands, gravel, and cobble. WUS 69 is buffered by a wide riparian forest dominated by tulip poplar, red maple, white oak, Japanese stiltgrass, garlic mustard, and false nettle. Observed indicators of the ordinary high water mark include sediment deposition, the presence of litter and debris, sediment sorting, and scour. Feature WUS 69 is a jurisdictional waterway, consisting of a non-Relatively Permanent Water (RPW), which flows into an RPW (Wildcat Branch). Due to the ephemeral/intermittent nature of the channel, the feature provides very limited, if any, aquatic habitat, and fish passage is unnecessary. The wildlife habitat upstream of Option A is confined to a 300-foot wide forest conservation easement recently planted in the All Souls Cemetery property, terminating at Ridge Road. Ridge Road, which is proposed for widening by developers to 6 lanes, would form a barrier to wildlife crossings. Therefore, the wildlife habitat upstream of the Option A alignment is very limited. Currently, an 80-foot long single-span bridge with 18 feet of underclearance, is proposed at this location, avoiding impacts to waters.

W70

Feature W70 is a wetland feature along Wildcat Branch (see **Figure 5-21**), verified by the USACE in August 2005. The alignment of Option A was shifted slightly outside of the highway reservation in an effort to reduce the wetland impact by 0.015 acres. The bridge

proposed at this location would avoid wetland fill impacts. Wetland conversion impacts of 4,175 SF (0.10 acre) would occur with a proposed bridge. However, based on the July, 2012 field reconnaissance, this feature may no longer be considered a jurisdictional wetland. Following a public hearing, W70 will be revisited with USACE to determine whether W70 continues to be a jurisdictional wetland. If not, the structure type and size will be re-evaluated, since a bridge would not be necessary for wetland avoidance, and fish and wildlife habitat are not sufficient to warrant a bridge for passage.

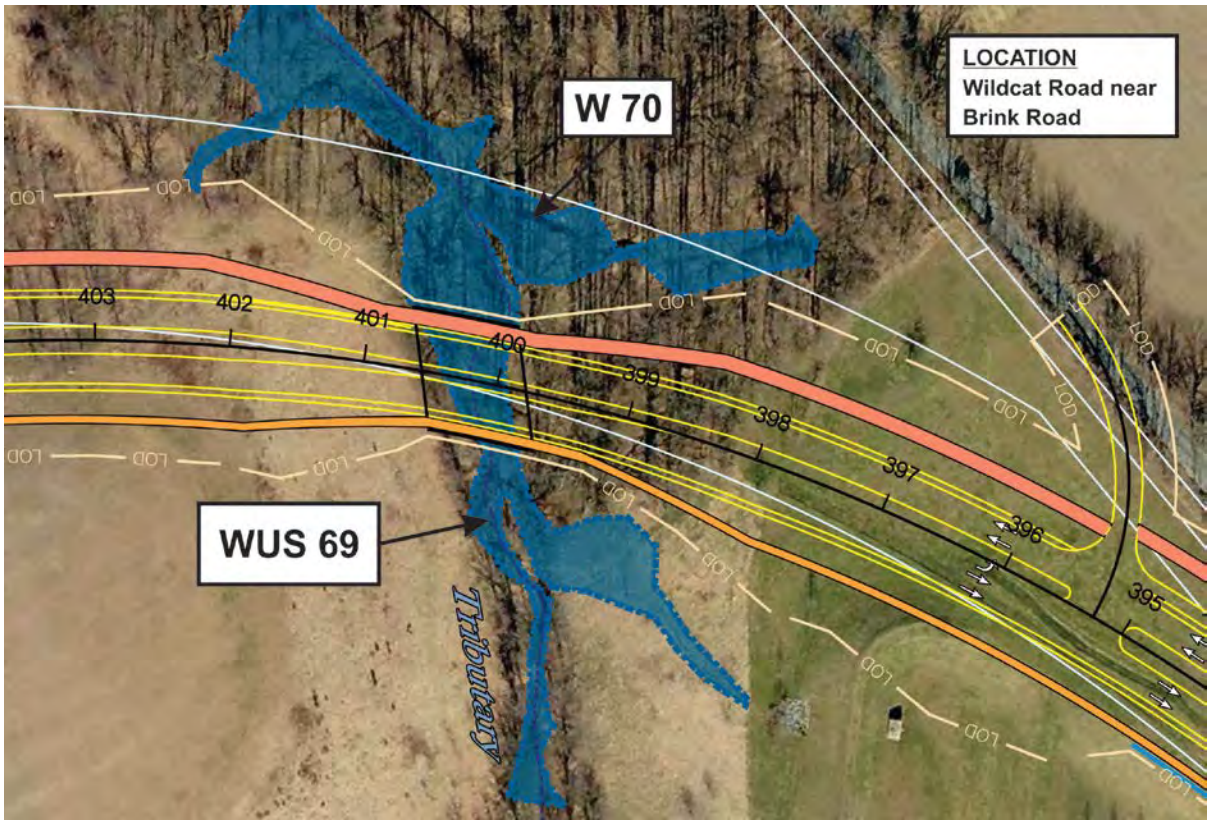


Figure 5-21: Location WUS 69, W70

WUS 71

Feature WUS 71, the Brink Road Tributary to Dayspring Creek (see **Figure 5-22**), is an ephemeral tributary within the Middle Great Seneca Creek Watershed. This area is southeast of an existing WSSC pumping station and is near the Seneca Crossing and Henderson Corner residential communities. The channel has a natural channel shape 8 to 10 feet wide, and the channel depth is approximately 2 feet, with erosion in some areas. Channel substrate includes cobbles and gravel. WUS 71 is buffered by a riparian forest dominated by tulip poplar, red maple, black walnut, spice bush, Japanese barberry (*Berberis thunbergii*), Oriental bittersweet (*Celastrus orbiculatus*), and Japanese stiltgrass. Observed indicators of the ordinary high water mark include vegetation matted down, bent or absent, the presence of litter and debris, and scour. Feature WUS 71 is a jurisdictional waterway since it is a non-RPW (Relatively Permanent Water) with adjacent wetlands and it flows into RPW WUS 73, Day Spring Creek. The abutting wetlands result from groundwater seeps emanating from the

steep slopes along the tributary. Due to the ephemeral nature of the channel, the feature does not provide aquatic habitat, and fish passage is unnecessary. The alignment was adjusted in this area to avoid the forested wetlands abutting WUS 71. Stream impacts here total 229 LF.

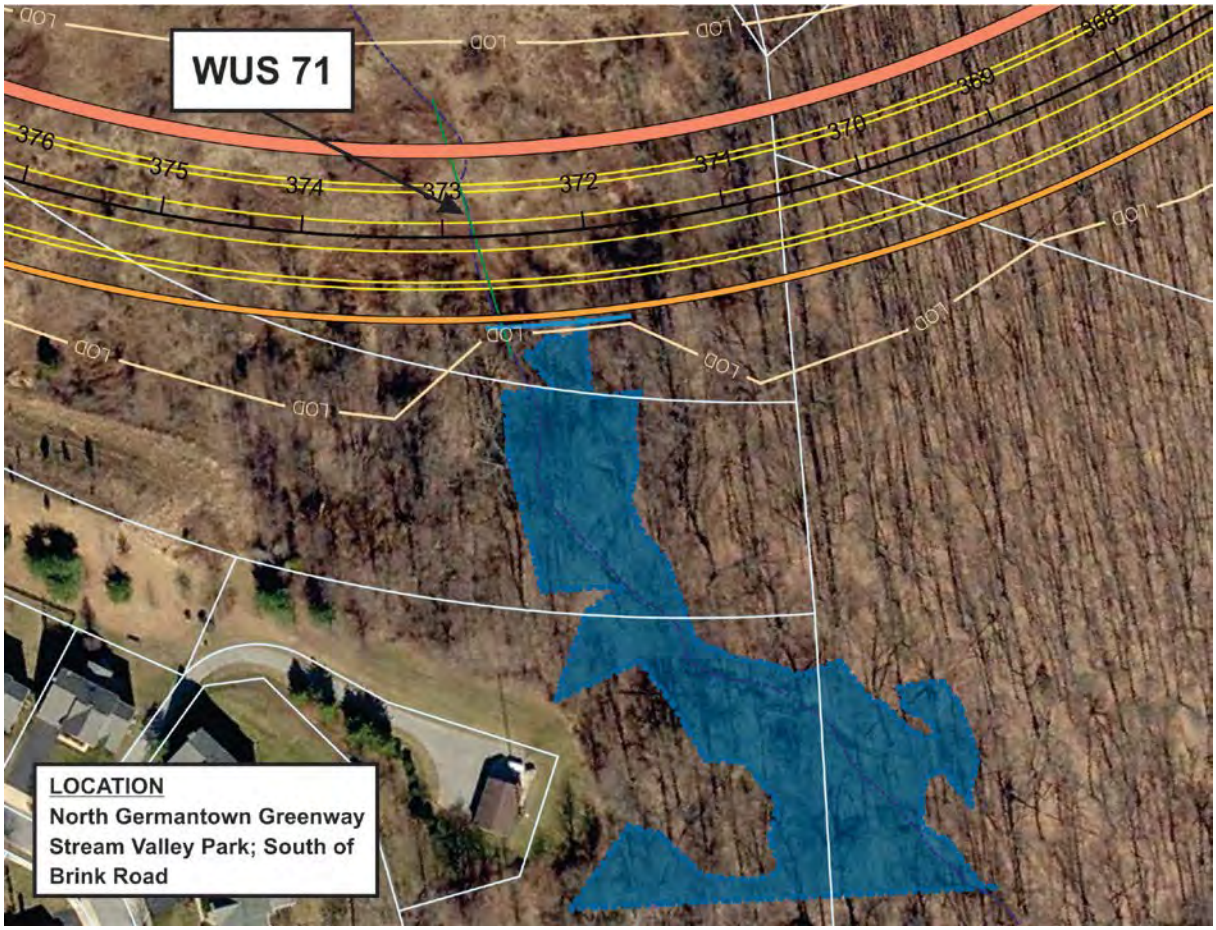


Figure 5-22: Location WUS 71

Alternative 8 and 9 – Northern Terminus Option D

WUS 1, WUS 69, W72, WUS 73

Wetlands and waters impacted by Option D include WUS 1, an unnamed tributary (see **Figure 5-23**), and the previous listed wetland W72 and WUS 73 Dayspring Creek (see **Figure 5-20**). The Option D crossing of Wildcat Branch Tributary was chosen at a location where the stream has no associated wetlands. WUS 1 is described below and other features were described under Option A. Refer to **Table 5-23** for a wetland and waters impact summary.

WUS 1

Feature WUS 1, an unnamed, perennial tributary to Great Seneca Creek (see **Figure 5-20**). This area is just north of Brink Road. The channel has a natural channel shape 3 to 8 feet wide, water depth of 1-5", with few eroding banks. Channel substrate includes silts, sands, cobbles and gravel. WUS 1 is buffered by a riparian forest dominated by red maple, red cedar

Table 5-23: Impacts - WUS 1, WUS 69, W72, WUS 73

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 1	NA	NA	229	Fair/Good
WUS 69	NA	NA	165	Fair
W 72	851(F)	21,519	NA	Good
WUS 73	NA	NA	0	Excellent

(*Juniperus virginiana*), black cherry, common greenbrier, grape vine, and Christmas fern (*Polystichum acrostichoides*). Observed indicators of the ordinary high water mark include the presence of litter and debris, sediment sorting, and sediment deposition. Feature WUS 1 is a jurisdictional waterway since it is a Relatively Permanent Water (RPW) with abutting wetlands and flows into Great Seneca Creek, a TNW. Stream Waders collected benthic macro-invertebrate samples at a site (860-3-2001) downstream of Feature WUS 1 in 2001. The site had a total of 14 macro-invertebrate families with 10 EPT taxa and 3 dipterans, resulting in a Fair IBI score of 3.00. Ephemeropterans made up 43% of the macro-invertebrates in the sample, indicating healthy stream conditions. Pipe culverts that can accommodate fish passage are necessary at this location due to the high quality habitat available upstream of the proposed alignment. Stream impacts total 229 LF in this area.

Figure 5-23: Location WUS 1

WUS 69

Under Option D, WUS 69 Wildcat Branch Tributary (previously described), would be impacted at a location approximately 900 feet downstream of the crossing proposed under Option A (see **Figure 5-24**). At this location, Wildcat Branch Tributary is currently piped to convey the stream under Wildcat Road. Option D would form an at-grade intersection with Wildcat Road, necessitating the replacement of the existing pipe with a new culvert that would be 165 feet longer.

Figure 5-24: Location WUS 69

Alternative 9 - Summit Avenue North to Watkins Mill Road

WUS 52, WUS 68, W67, WUS 66, W57A, and WUS 53

Wetlands and Waters of the U.S. impacted by Alternate 9 from south to north in this area include WUS 52, WUS 68, W67, WUS 66, and WUS 53. (WUS 52 consists of the upper Whetstone Run under existing Midcounty Highway and WUS 53 is the lower section of Whetstone Run). Whetstone Run would be impacted by the widening of existing Midcounty Highway at Sta 124+50 near the intersection with Goshen Road and the expansion of the Goshen Road intersection. From Sta 160-165, an ephemeral tributary (WUS 68) would be relocated and a small wetland (W67) would be filled. At Sta 165, Walkers Run (WUS 66) would be culverted. Immediately south of Watkins Mill Road, Alternative 9 would be located close to the west bank of WUS 53 (Whetstone Run), from Sta 181 to 184+50, and would impact a small portion of W57A. Refer to **Table 5-24** for a wetland and waters impact summary followed by descriptions of the affected resources.

Table 5-24: Impacts - WUS52, WUS66, W67, WUS68, WUS53, W57A

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 52	NA	NA	70	Fair/poor
WUS 66	NA	NA	186	Fair/poor
W67	3,463 (F)	NA	NA	Fair
WUS 68	NA	NA	243 Reloc	Poor
WUS 53	NA	NA	0	Fair
W57A	1,857(F)	910	NA	Fair

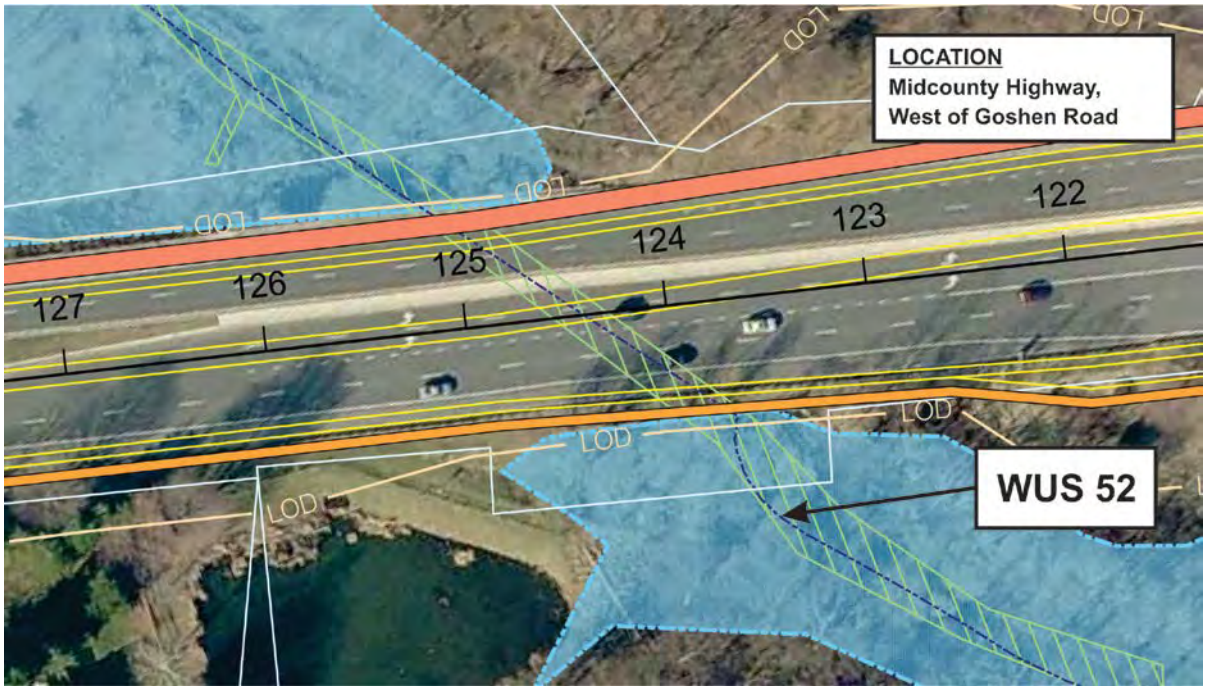


Figure 5-25: Location WUS 52 west of Goshen Road

WUS 52

WUS 52, (upper Whetstone Run), is located approximately one mile upstream of the previously described Whetstone Run, WUS 53. WUS 52 is classified as an RPW by USACE and is conveyed in a series of pipe culverts under existing Midcounty Highway at Sta 124+50 (see **Figure 5-25**) and under Goshen Road (see **Figure 5-26**). The stream width varies from 10 to 20 feet at Midcounty Highway and 20 to 25 feet at Goshen Road, with an average channel depth of 1 to 3 feet. Normal flow appears to be contained within the channel and observed ordinary high water marks include matted vegetation, disturbed leaf liter, sediment deposition, water staining, presence of litter and debris and wrack line, and scour. Dominant plants in WUS 52 include sycamore, black willow, boxelder, and Japanese stiltgrass. DNR's Maryland Biological Stream Survey collected benthic macro-invertebrate and fish samples from a site (SENE-113-R-2001) upstream of Feature WUS 52 in 2001. The site had a total of 15 macro-invertebrate families, with 2 EPT taxa and 9 Diptera taxa, resulting in a poor IBI score of 1.50. EPT taxa made up only 2.3% of the macro-invertebrates in the sample, indicating unhealthy stream conditions. The site also received a poor fish IBI score of 2.00, with only 4 tolerant fish species. Despite the upstream site's poor IBI scores, the stream still provides adequate habitat for fish and macro-invertebrates due to its perennial flow and stable instream habitat. Fish passage is recommended at the culverts due to the available aquatic habitat upstream of the proposed alignment. If a decision is made during final design to replace the existing pipes, the new culvert would employ measures to facilitate fish passage through the conveyance. High headwalls would be employed to limit the stream impact. The length of impact is estimated to be 10 LF for the construction of new headwalls at Midcounty Highway and 60 LF for the Goshen Road widening.

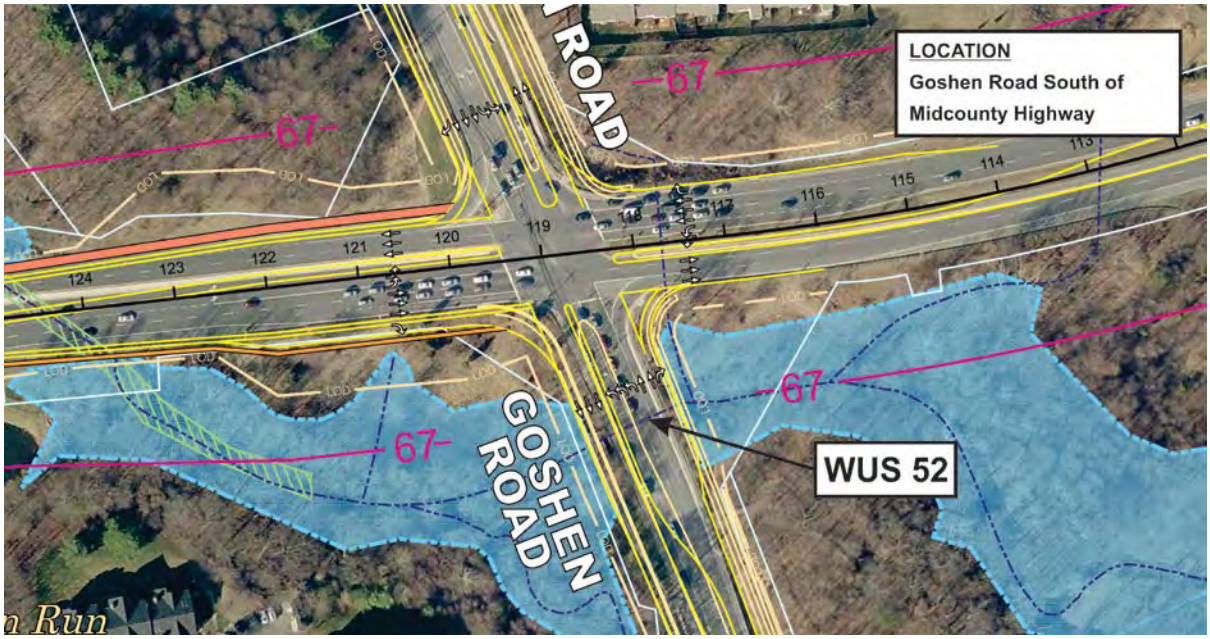


Figure 5-26: Location WUS 52 under Goshen Road

Features WUS 66, W67, and WUS 68 are connected to the perennial stream WUS 66 (Walkers Run).

WUS 66

Feature WUS 66, Walkers Run, is a perennial stream and a tributary to Whetstone Run within the Middle Great Seneca Creek Watershed (see **Figure 5-27**). The channel has a natural channel shape is 10 to 15 feet wide, water depth of 2 to 10 inches, with moderate erosion in some areas. Channel side slopes are approximately 3:1 and channel substrate includes sands, gravel, cobble, and riprap. WUS 66 is buffered by a riparian forest dominated by sycamore, box elder, flowering dogwood, grape vine, and multiflora rose. Observed indicators of the ordinary high water mark include sediment deposition, the presence of litter and debris, vegetation matted down, bent, or absent, leaf litter disturbed, destruction of terrestrial vegetation, and scour. Feature WUS 66 is a jurisdictional waterway since it is a Relatively Permanent Water (RPW) with adjacent wetlands and flows into Whetstone Run. There are no DNR or MCDEP biological monitoring records for Walkers Run. The feature provides poor, yet adequate habitat for fish and benthic macro-invertebrates due to its perennial flow and the presence of riffle-pool sequences. Fish passage at the feature is recommended due to the available aquatic habitat upstream of the proposed alignment. The crossing of Walkers Run and its floodplain (Sta 164+50 to 166+50) would be accomplished with a new culvert, using high headwalls to limit the culvert to 150 feet in length. The hydraulic opening of the culvert would be somewhat larger than the 8-foot diameter culvert located immediately upstream under Christopher Avenue. Including the impact associated with construction of the headwalls, Waters of the U.S. impacts at this location would total 186 LF.

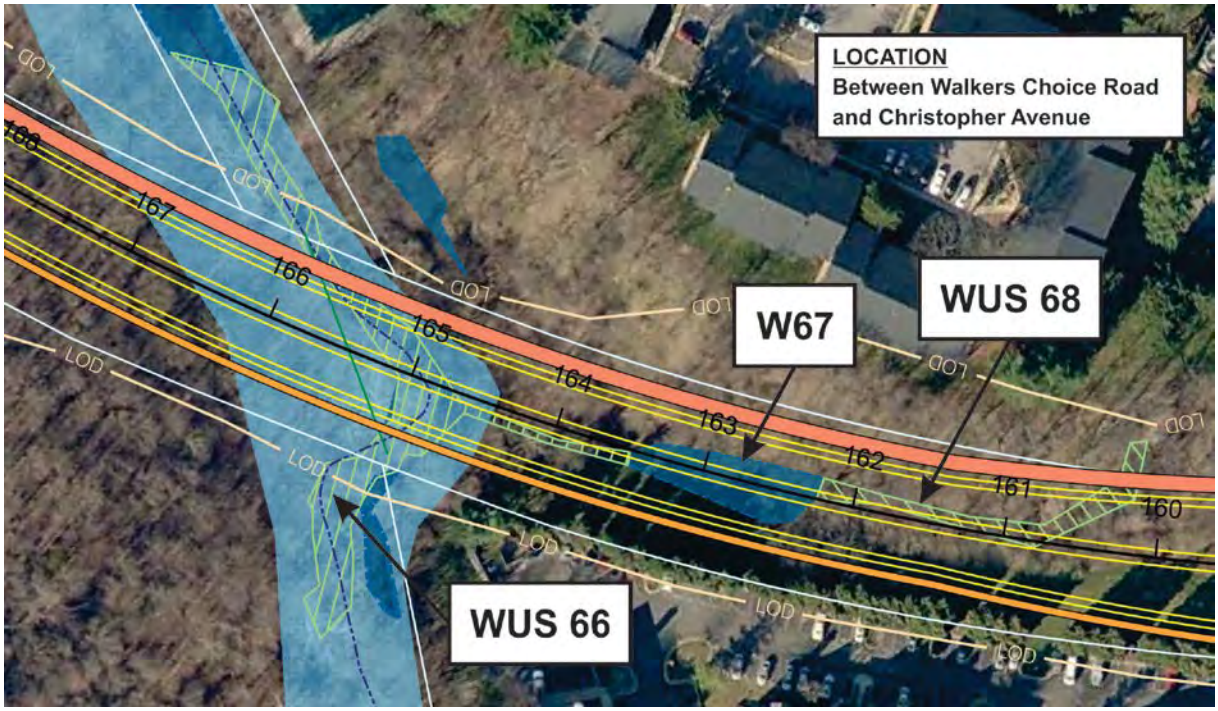


Figure 5-27: Location WUS 66, W67, WUS 68

W67

Feature W67 is a small, low-lying depressional, palustrine forested wetland abutting WUS 68 and adjacent to perennial RPW, WUS 66, Walkers Run. W67 appears to receive hydrology from WUS 68 during storm events. Primary hydrology indicators observed include water-stained leaves and a secondary hydrology indicator includes drainage patterns. W67 is dominated by red maple, false-nettle, and ground ivy (*Glecoma hederaceae*). Soils in W67 meet the criteria for hydric soil indicator F3: Depleted Matrix. Wetland W67 is a jurisdictional wetland since it meets the three-parameter definition of a wetland and is adjacent to WUS 66, an RPW water (Walkers Run). Alternative 9 would completely fill in this small wetland, resulting in an impact of 3,463 SF.

WUS 68

Feature WUS 68 is an ephemeral channel with an abutting wetland, W67. Classified as a Non-RPW, the channel width varies between 3 to 12 feet, with an average channel depth of 6 to 12 inches. WUS 68 originates at a slumping pipe-outfall and is eroded along most of its southeast to northwest course before emptying into Walkers Run. Normal flow appears to be contained within the channel and observed ordinary high water mark includes matted vegetation, destruction of terrestrial vegetation, and abrupt change in plant community. Dominant plants in WUS 68 include boxelder, black walnut, red maple, sycamore, multiflora rose, and Morrow's honeysuckle (*Lonicera morrowii*). Due to the ephemeral nature of the channel, the feature does not provide aquatic habitat and fish passage is unnecessary. Feature WUS 68 is a jurisdictional water since it is a Non-RPW with an abutting wetland and flows into Walkers Run. This channel would be replaced with a swale alongside the proposed roadway, resulting in 243 LF of new ephemeral channel.

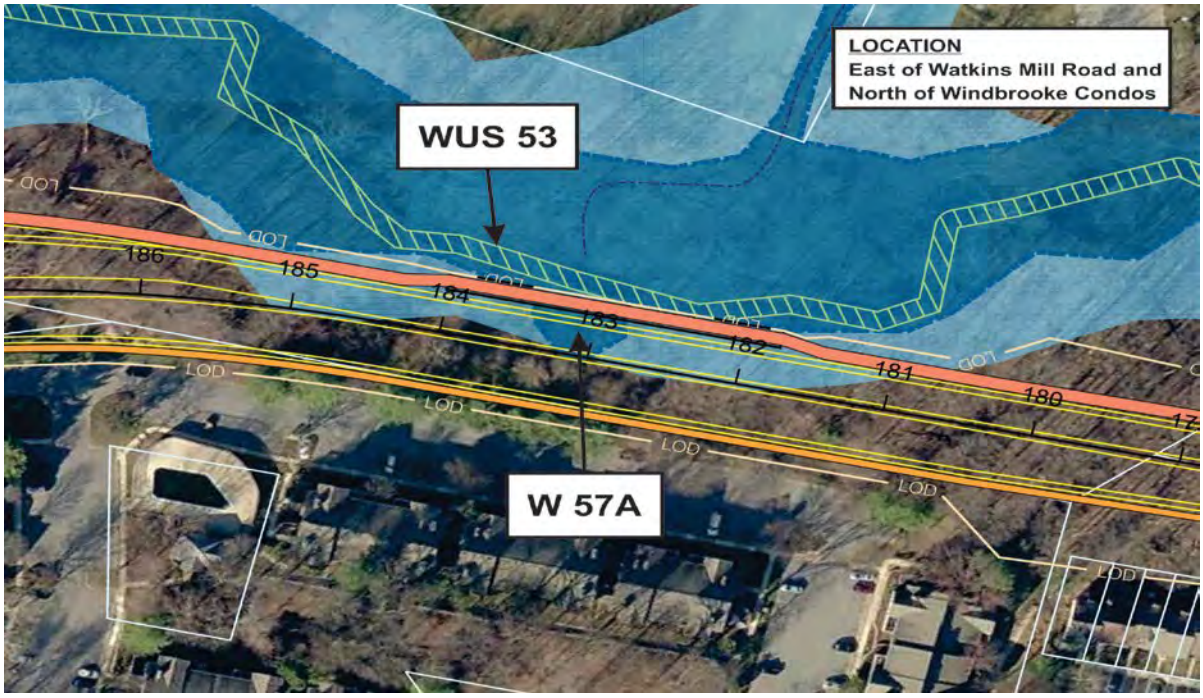


Figure 5-28: Location WUS 53, W57A

WUS 53 (East of Watkins Mill Road)
WUS 53, Whetstone Run, was previously described under **Alternative 8**. To avoid impacts to the stream, wetlands, and floodplain, the alignment of Alternative 9 was shifted further west, retaining walls were proposed along both sides of the alternative, and a 225-foot long, 14-foot wide pedestrian bridge was proposed to convey the shared use path over Whetstone Run (WUS 53) between Sta 181+80 and Sta 184+05 (**Figure 5-28**). The pedestrian bridge would have five feet of underclearance to allow streambank vegetation to receive morning sunlight.

W57A
Feature W57A is a forested area, located at Sta 183 and delineated as part of the 2004 wetland delineation (**Figure 5-28**). The footprint of Alternative 9 would displace 1857 SF.

Alternative 9 - Watkins Mill Road to PEPCO ROW

WUS 53, W 57, W 58, W 61/W62, W 63, and W 64
Wetlands and Waters of the U.S. impacted by Alternate 9 in this area include WUS 53 (Whetstone Run), and wetlands W57, W58, W61/W62, W63, and W64. Alternative 9 would include widening of the existing Watkins Mill Road bridge over Whetstone Run (**Figure 5-29**), and a proposed bridge over Whetstone Run and portions of the above-listed wetlands (**Figure 5-27**). Refer to **Table 5-25** for a wetland and waters impact summary followed by descriptions of the affected resources.

WUS 53 (at Watkins Mill Road and north of Watkins Mill Road)

Refer to **Alternative 8 - Watkins Mill Road to PEPCO ROW** for the previous description of WUS 53, Whetstone Run. Impacts of Alternative 9 to Whetstone Run include the widening of the existing bridge on Watkins Mill Road (**Figure 5-29**) which would have no stream impact, and construction of a new two-span, 230-foot long bridge over Whetstone Run (**Figure 5-30**). The new bridge would include construction of a center pier to support the two-span bridge. The construction of this pier would necessitate the relocation of 746 feet of the existing stream. The stream at this location is highly unstable. Building a 220-foot long single-span bridge at this location (which is the longest single-span bridge that would be practicable), would have placed the abutments immediately adjacent to two unstable meanders, which would not be prudent. Therefore, the construction of a center pier and the relocation of the stream would enable a 230-foot long, two-span bridge to be constructed. The hydraulic opening beneath the bridge would pass the 100-year flood with no more than one-foot of backwater increase on existing wetlands and floodplains along Whetstone Run, and the provision of the center pier would enable girders of shorted height to be used, resulting in an underclearance of 11 feet for hikers and deer passage, instead of 7 feet that would be accommodated under a single span bridge. The stream would be relocated using Rosgen stream restoration techniques that leave the stream in a stable configuration.

Table 5-25: Impacts - WUS53, W57, W58, W61/W62, W63, W64

Feature Label	Wetland Fill (SF)	Wetland Conversion (SF)	Waters (LF)	Resource Quality
WUS 53	NA	NA	746 Reloc	Fair
W57	0	NA	NA	Fair/Good
W58	198 (F)	1,986	NA	Fair/Good
W61/W62	161 (F)	NA	NA	Fair/Good
W63	0	0	NA	Fair/Good
W64	372 (S/E)	NA	NA	Good

W57

Feature W57 is a small, closed-contour depression, palustrine forested wetland abutting Whetstone Run, located on a forested floodplain terrace. This wetland appears to receive hydrology from a high water table (soils nearly saturated) and overbank flooding during storm events. Primary hydrology indicators include sediment deposits and drift deposits and secondary hydrology indicators include drainage patterns and geomorphic position since it abuts Whetstone Run. W57 is dominated by black willow, clearweed (*Pilea pumila*), and Asiatic tearthumb. Soils in W57 meet the hydric soil indicator F3: Depleted Matrix. Wetland W57 is considered a jurisdictional wetland since all three wetland parameters are met, and since it abuts an RPW water (Whetstone Run). This wetland would not be impacted by the proposed bridge. The proposed 230-foot bridge over Whetstone Run and W57 would not result in a discharge of fill in wetland 57. However, because the bridge would have only 11 feet of underclearance, the vegetation is expected to be impacted. Therefore, this wetland would undergo a conversion impact that would be mitigated in accordance with MDE requirements.

W58

Feature W58 is a small, closed contour depression, palustrine forested wetland abutting Whetstone Run in a flat oxbow area between two stream meanders. W58 appears to receive hydrology from a high water table and overbank flooding during storm events. Primary hydrology indicators observed include sediment deposits and secondary hydrology indicators include drainage patterns, geomorphic position, and micro-topographic relief. W58 is dominated by black willow, Asiatic tearthumb, and deertongue grass. W58 soils meet the hydric soil indicator F3: Depleted Matrix. Wetland W58 is considered a jurisdictional wetland since all three wetland parameters are met, and since it is abutting an RPW water (Whetstone Run). The proposed 230-foot bridge with Alternative 9 would span most of W58, with fill impacts of 198 SF for construction of the center pier. Wetland conversion impacts at this location would be 1,986 SF. The bridge for this area would accommodate both fish and wildlife passage, and flooding from the 100-year storm event would be confined to existing wetlands/floodplains abutting Whetstone Run, on property owned by the City of Gaithersburg. MDE would require written permission from the property owner because MCDOT would be increasing flooding on land which they do not own.

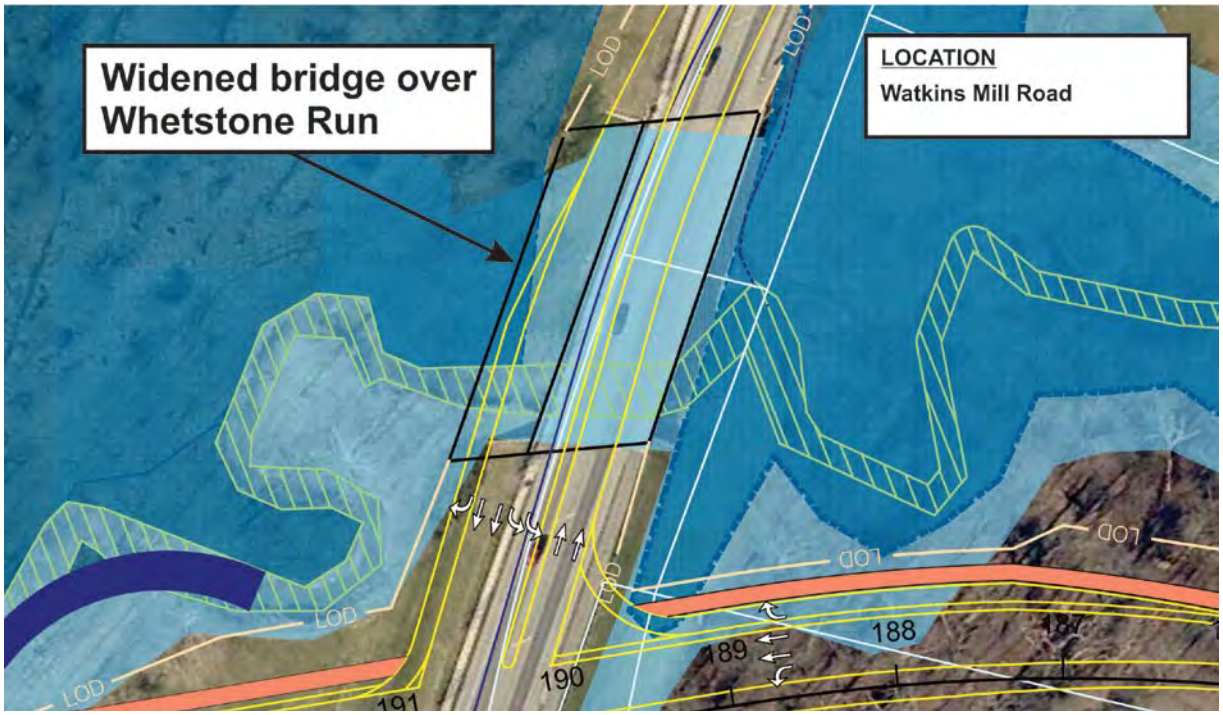


Figure 5-29: Widened Bridge on Watkins Mill Road over Whetstone Run

W61/W62

Features W61/ W62 are depressional wetlands delineated separately then later joined together as one wetland system, located east of Whetstone Run and north of the Watkins Mill Road bridge. W61 (west portion of wetland abutting Whetstone Run) appears to receive hydrology from overbank flooding during storm events. Primary wetland hydrology indicators for W61 include: saturation, sediment deposits, drift deposits and water stained leaves and secondary indicators include drainage patterns and geomorphic position

(adjacency to Whetstone Run). Dominant plants include black willow, Japanese stiltgrass, and Rye. W61 soils meet the hydric soil indicator F3: Depleted Matrix.

W62 (easternmost portion of wetland) appears to receive hydrology from adjacent slopes and overbank flooding during storm events. Primary wetland hydrology indicators including surface water, high water table, and soil surface saturation. Standing water was present in the westernmost portion of the wetland. Secondary hydrologic indicators include drainage patterns, and geomorphic position. Dominant plants in W62 include black walnut, green ash, northern arrow-wood, reed canarygrass, deertongue, and muscadine grape. Soils in W62 meet the hydric soil indicator F3: Depleted Matrix.

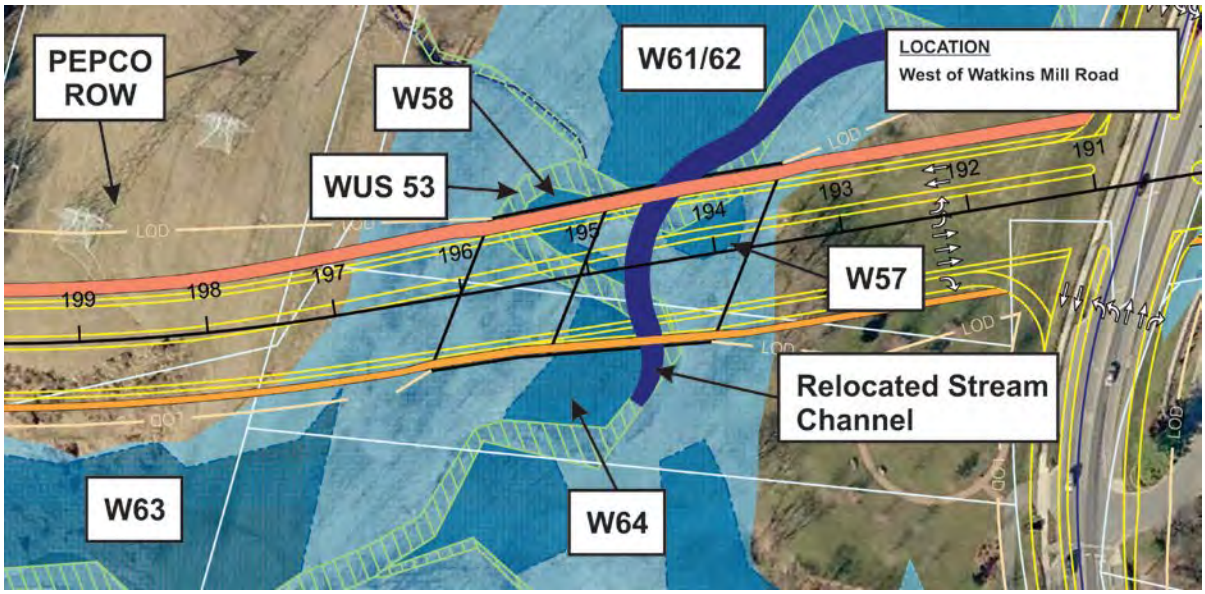


Figure 5-30: Location WUS 53, W57, W58, W61/62, W63, W64

Wetland W61/W62 are considered jurisdictional wetlands since the three wetland parameters are met and they abut a RPW water of the U.S. (WUS 53). Wetland W61/W62 would be impacted by a discharge of fill to construct a pier supporting the two-span bridge, resulting in 161 SF of impact. In addition, the relocation of the stream would necessitate constructing a new stream channel through a portion of this wetland. If this alternative were subsequently selected, MCDOT would mitigate the stream relocation by restoring the stream to a stable meander pattern. Any wetlands that would be excavated to create the new stream channel could be replaced in the abandoned portion of the existing stream.

W63
This wetland was previously described under Alternative 8, and would be avoided.

W64
See previous description of resource under **Alternative 8 – Watkins Mill Road to PEPCO ROW**. A small portion of this wetland would be excavated for the relocation of Whetstone Run. This resulting temporary impact would be offset by constructing a new wetland in the abandoned stream channel. In addition to the temporary impact, 372 SF would be permanently impacted by construction of the center bridge pier.

5.7 Floodplains

According to Federal Emergency Management Agency (FEMA) FIRM Map panels numbered 240049-0050 and 240049-0125 (Montgomery County (Unincorporated Areas) and City of Gaithersburg Maryland (Montgomery County), the project area is located within the 100-year floodplains of Great Seneca Creek, North Creek, Brandermill Tributary, Cabin Branch and its tributaries, Whetstone Run, and Walkers Run. Approximate 100-year floodplain boundaries are shown in light blue on **Figures 5-4** through **5-30**. FEMA has completed detailed floodplain studies for Great Seneca Creek and Whetstone Run. Impacts of fill within FEMA mapped floodplains are listed in **Table 5-30**.

Summary of Aquatic Impacts by Alternative
A summary of the aquatic impacts for each alternative is provided below.

Table 5-26: Permanent Wetland Impacts

Alternative	Total Wetland Fill SF (acre)	Total Wetland Conversion SF (acre)	Wetland Mitigation Required SF (acre)
Alt 2	0	0	None
Alt 4 Modified	11,154 (0.26)	11,837 (0.27)	34,145 (0.78)
Alt 5	0	0	0
Alt 8A	33,244 (0.76)	71,155 (1.63)	137,643 (3.16)
Alt 8B	33,244 (0.76)	66,980 (1.54)	133,468 (3.06)
Alt 8D	33,244 (0.76)	66,980 (1.54)	133,468 (3.06)
Alt 9A	38,093 (0.87)	73,909 (1.70)	151,042 (3.44)
Alt 9B	38,093 (0.87)	69,734 (1.60)	146,867 (3.34)
Alt 9D	38,093 (0.87)	69,734 (1.60)	146,867 (3.34)

Table 5-27: Permanent Waters Impacts

Alternative	Total WUS (LF) Perenn./Interm.	Total WUS (LF) Ephemeral	Stream Mitigation Required (LF)
Alt 2	0	0	0
Alt 4 Modified	1,035	247	1,282
Alt 5	85	0	85
Alt 8A	520	229	749
Alt 8B	520	0	520
Alt 8D	914	0	914
Alt 9A	256	229	485
Alt 9B	256	0	256
Alt 9D	650	0	650

Table 5-28: Temporary Wetland Impacts of Construction Access

Alternative	4 MOD	5	8A	8B	8D	9A	9B	9D
Impacts (Ac)	0.10	0	0.76	0.74	0.74	0.82	0.80	0.80

Table 5-29: Permanent Impacts of Stream Relocation

Alternative	Total WUS (LF) Perenn./Interm.	Total WUS (LF) Ephemeral	Mitigated in Place
Alt 9	746	243	989

Table 5-30: FEMA Floodplain Impacts*

Alternative	4 Mod	5	8A	8B	8D	9A	9B	9D
Impacts (Ac)	4.5	0.4	2.9	2.9	2.9	4.8	4.8	4.8

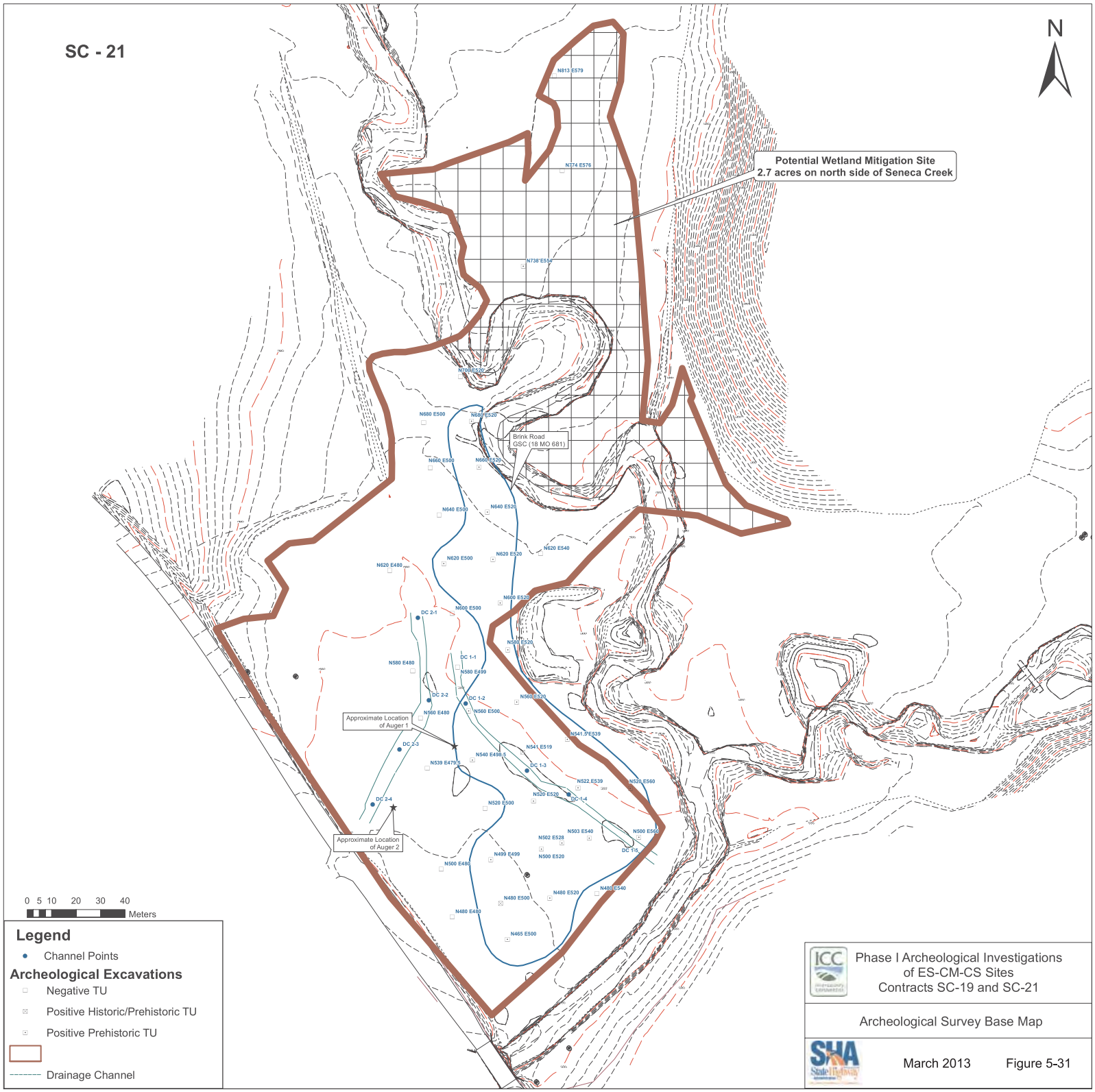
*Northern Terminus Options A, B, and D have identical floodplain impacts because there are no floodplain impacts associated with the Brandermill Tributary (floodplain is spanned), there is no FEMA floodplain at the Dayspring Creek crossing, and there is no FEMA floodplain at the Wildcat Branch crossing.

Proposed Aquatic Mitigation

Impacts to existing wetlands will be mitigated at the following ratios: forested wetlands will be mitigated at a 2:1 ratio, scrub-shrub wetlands at a 1.5:1 ratio, and emergent wetlands at a 1:1 ratio. One wetland mitigation site and one stream mitigation site, both within Montgomery County parkland, are under investigation as potential mitigation sites to offset the wetland and stream impacts for whichever alternative is ultimately chosen as the Preferred Alternative.

The potential wetland mitigation site (SC-21), located in the floodplain of Great Seneca Creek (see **Figure 5-31**), was previously investigated by SHA for ICC mitigation. The archeological investigation of this site revealed no potential for archeological artifacts within the 2.7-acre northern portion of the site. MCDOT, MDE and USACE reviewed the southern portion of this site on November 29, 2011. The site had also been reviewed earlier by M-NCPPC Parks Department and others during the mitigation site search for the ICC project. No agency has indicated a concern with the potential for success of a wetland restoration project at this location. The northern portion of this site will be investigated further during the next phase of project development, and the results coordinated with the environmental resource agencies. The site has potential for 1.5 acres of wetland creation.

On January 12, 2012, seven potential stream mitigation sites within the Seneca Creek watershed were reviewed in the field with representatives from USACE, EPA, USFWS, MCDP, MCDEP, and City of Gaithersburg. The agencies agreed that site GSMS 413-12 on the North Creek, which flows into Seneca Creek just north of Watkins Mill Road, would be an appropriate mitigation site for impacts to perennial and intermittent streams, regardless of the alternative selected as the Preferred Alternative. Stream mitigation at this site would involve re-grading approximately 500 feet of stream channel immediately upstream of the confluence with Seneca Creek to create a bank-full bench abutting the stream channel. Impacts to ephemeral streams will be mitigated by restoring eroded gullies that were created by discharges of uncontrolled stormwater runoff from neighborhoods constructed prior to the requirement for stormwater management. There are numerous such sites located in the study area, and the search for an appropriate location will continue.


SC - 21
N
Potential Wetland Mitigation Site
2.7 acres on north side of Seneca Creek
Brink Road
GSC (18 MO 681)
Approximate Location of Auger 1
Approximate Location of Auger 2
N813 E579
N774 E576
N738 E554
N700 E520
N680 E500
N680 E520
N660 E500
N660 E520
N640 E500
N640 E520
N620 E500
N620 E520
N620 E540
N620 E480
N600 E520
N600 E500
N580 E520
N580 E480
N580 E499
N560 E520
N560 E480
N560 E500
N541.9 E539
N541 E519
N540 E498.5
N539 E479.5
N522 E539
N520 E560
N520 E520
N520 E500
N503 E540
N502 E528
N500 E560
N500 E520
N500 E480
N499 E499
N480 E540
N480 E520
N480 E500
N480 E480
N465 E500
DC 2-1
DC 1-1
DC 2-2
DC 1-2
DC 2-3
DC 1-3
DC 2-4
DC 1-4
DC 1-5
0 5 10 20 30 40
Meters
Legend
Channel Points
Archeological Excavations
Negative TU
Positive Historic/Prehistoric TU
Positive Prehistoric TU
Drainage Channel
Phase I Archeological Investigations
of ES-CM-CS Sites
Contracts SC-19 and SC-21
Archeological Survey Base Map
March 2013
Figure 5-31

Regardless of the alternative selected, structures will be designed to satisfy MDE and FEMA requirements for limiting upstream increases in flooding and downstream increases in velocity. Impacts to rivers/streams are generally perpendicular on all alternatives with the exception of the longitudinal impact to the Whetstone Run floodplain on Alternative 9 south of Watkins Mill Road and along Whetstone Run north of the PEPCO powerline. MCDOT conducted a detailed Hydrologic and Hydraulic analysis that indicates the floodplain encroachment south of Watkins Mill Road would have only minimal effect on flooding of properties along this stream reach, and would not increase flooding on the Watkins Mill Elementary School. In addition, with Alternative 8 or 9, the structure proposed over Whetstone Run in Blohm Park would increase the backwater elevation by up to one foot during the 100-year storm event. However, the only property that would be affected is the portion of Blohm Park along Watkins Mill Road which is already a floodplain.

5.8 Terrestrial Habitat and Forests

A forest inventory was conducted in 2004 and 2011. In July and August 2004, inventory occurred within a 600-foot wide corridor along the Master Plan alignment, and in April and August 2011 within a 600-foot wide corridor along Northern Terminus Options B and D and within 200 feet from existing edge-of-roadway along Alternatives 4-Modified and 5. Descriptions of impacted forest resources for each Alternative are described below beginning at the south end of the project area and progressing northward. Impacted forests are characterized by their forest associations and ecological communities. Ecological communities are defined by similar groups of trees and shrubs growing under similar environmental conditions. Designation for forest associations are derived from *Maryland Forest Associations Species List* (Brush et al., 1977). In addition to the Brush derived forest associations, a "Pioneer-Invasive Association" was added to describe areas of very young trees 2-6" DBH with over 70% invasive tree species. **Figure 5-32** is a study area map showing the forest stand locations.

The forest inventory included dominant canopy and understory species, dominant size class, percent canopy closure, stand successional stage, stand condition, invasive cover, woody debris, presence of Montgomery County Watchlist Species (Alleghany Chinkapin and Shingle Oak), wildlife passage, impacts to Forest Interior Dwelling Species Habitat (FIDS), impacts to Green Infrastructure, and forest Retention Value. **Table 5-31** lists characteristics for determining forest Retention Value ratings.

Descriptions of forest resources are combined if they are from the same association or are located together.

Alternative 2
No impacts are associated with this alternative since it would not impact forests.

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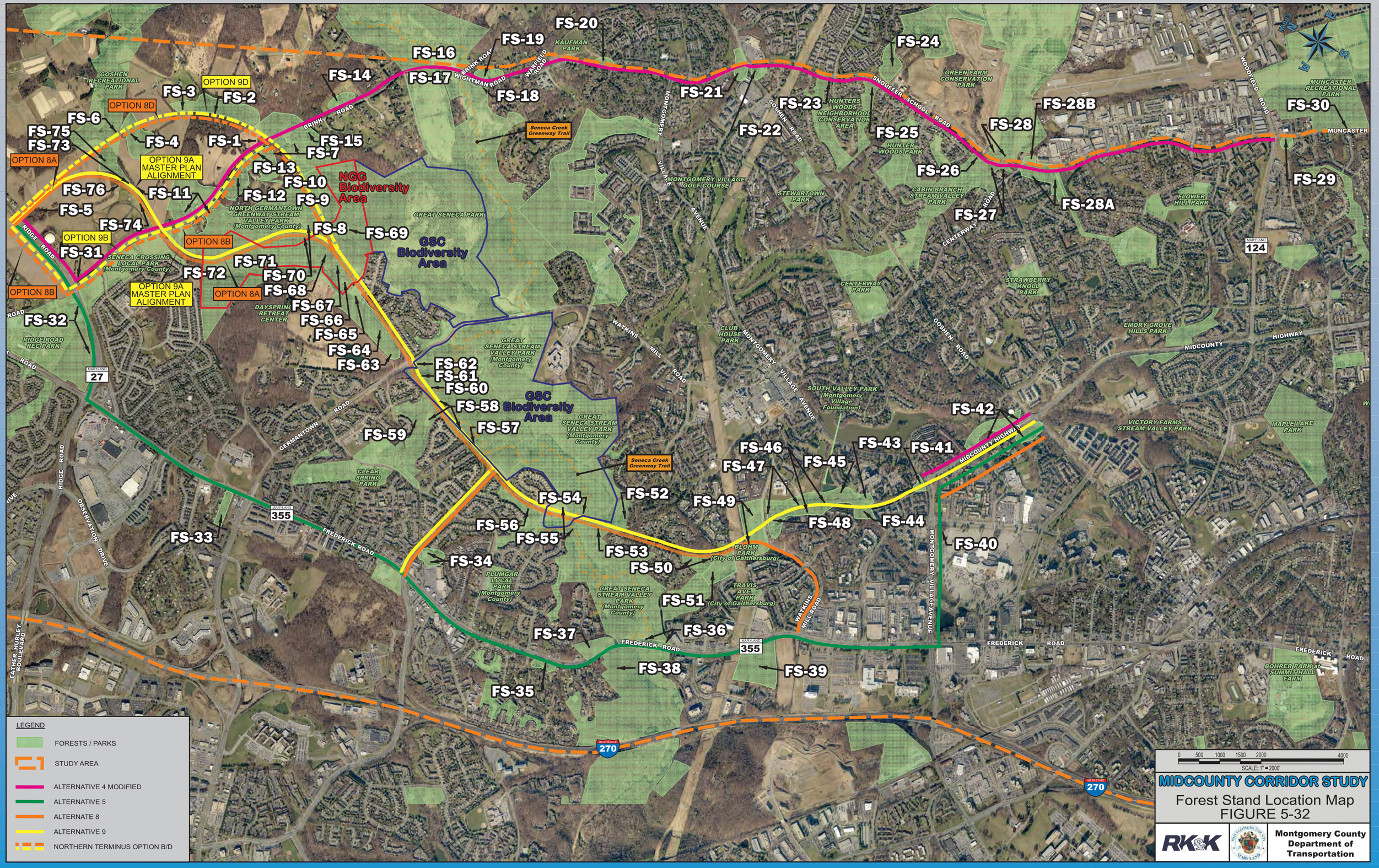

FS-20
FS-19
FS-16
FS-17
FS-14
FS-18
FS-24
FS-21
FS-23
FS-22
FS-25
FS-28B
FS-28
FS-30
FS-29
FS-26
FS-28A
FS-27
FS-3
FS-2
FS-6
FS-75
FS-73
FS-4
FS-1
FS-15
FS-7
FS-13
FS-10
FS-9
FS-12
FS-11
FS-76
FS-5
FS-74
FS-31
FS-8
FS-69
FS-71
FS-72
FS-70
FS-68
FS-67
FS-66
FS-65
FS-64
FS-63
FS-62
FS-61
FS-60
FS-58
FS-57
FS-59
FS-32
FS-42
FS-46
FS-47
FS-45
FS-43
FS-41
FS-52
FS-54
FS-49
FS-48
FS-44
FS-56
FS-55
FS-53
FS-50
FS-40
FS-33
FS-34
FS-51
FS-37
FS-36
FS-38
FS-39
FS-35
OPTION 9D
OPTION 8D
OPTION 8A
OPTION 9A MASTER PLAN ALIGNMENT
OPTION 9B
OPTION 8B
OPTION 8A
OPTION 9A MASTER PLAN ALIGNMENT
OPTION 8B
NGG Biodiversity Area
GSC Biodiversity Area
GSC Biodiversity Area
BRINK ROAD
WIGHTMAN ROAD
WARFIELD ROAD
SNOUFFER SCHOOL ROAD
WOODFIELD ROAD
MUNCASTER
MONTGOMERY VILLAGE AVENUE
GOSHEN ROAD
CENTERWAY ROAD
MIDCOUNTY HIGHWAY
WATKINS MILL ROAD
GERMANTOWN ROAD
RIDGE ROAD
OBSERVATION DRIVE
FREDERICK ROAD
FATHER HURLEY BOULEVARD
MONTGOMERY VILLAGE AVENUE
MARYLAND 27
MARYLAND 355
MARYLAND 124
INTERSTATE 270
GOSHEN RECREATIONAL PARK
KAUFMAN PARK
Seneca Creek Greenway Trail
MONTGOMERY VILLAGE GOLF COURSE
HUNTERS WOODS NEIGHBORHOOD CONSERVATION AREA
HUNTER WOODS PARK
GREEN FARM CONSERVATION PARK
MUNCASTER RECREATIONAL PARK
CABIN BRANCH STREAM VALLEY PARK
STEWARTOWN PARK
FLOWER HILL PARK
NORTH GERMANTOWN GREENWAY STREAM VALLEY PARK (Montgomery County)
GREAT SENECA PARK
SENECA CROSSING LOCAL PARK (Montgomery County)
DAYSPRING RETREAT CENTER
RIDGE ROAD REC PARK
CENTERWAY PARK
STRAWBERRY KNOLL PARK
CLUB HOUSE PARK
EMORY GROVE HILLS PARK
MIDCOUNTY HIGHWAY
GREAT SENECA STREAM VALLEY PARK (Montgomery County)
SOUTH VALLEY PARK (Montgomery Village Foundation)
VICTORY FARMS STREAM VALLEY PARK
MAPLE LAKE PARK
CLEAR SPRING PARK
BLOHM PARK (City of Gaithersburg)
PLUMGAR LOCAL PARK (Montgomery County)
TRAVIS AVE. PARK (City of Gaithersburg)
BOHRER PARK at SUMMIT HALL FARM
LEGEND
FORESTS / PARKS
STUDY AREA
ALTERNATIVE 4 MODIFIED
ALTERNATIVE 5
ALTERNATE 8
ALTERNATIVE 9
NORTHERN TERMINUS OPTION B/D
0 500 1000 1500 2000 4000
SCALE: 1" = 2000'
MIDCOUNTY CORRIDOR STUDY
Forest Stand Location Map
FIGURE 5-32
RK&K
Montgomery County Department of Transportation

Table 5-31: Forest Retention Value Rating Characteristics

High Retention Value	Intermittent and perennial streams and their forest buffers
	Slopes > 25%
	Nontidal wetlands and buffers
	Erodible soils on slopes > 25%
	100-year floodplains
	Habitat for rare, threatened and endangered (RTE) species or County Watchlist Species
	Large contiguous forest tracts especially those w/ FIDS habitat
	Forest stands w/ multiple specimen trees
	Forest with County Green infrastructure
Moderate Retention Value	Stands with good structural diversity
	Corridor +300' foot wide
	Forest stream buffers
	Tree buffers between incompatible land uses
	Trees w/ >24" dbh
Low Retention Value	Stands with poor structural diversity
	Stands with moderate to high exotic/ invasive plant quantities

Alternative 4 Modified

FS-30 is a River Birch – Sycamore Forest Association associated with the wetland complex along the east side of Muncaster Mill Road south of Woodfield Road (see **Figure 5-32**). Dominant trees here include white oak, tulip poplar, slippery elm, and red maple in the 12-20" DBH size class. Invasive species cover is low and Retention Value is moderate due to high-quality tree species, the size of trees, and the abutting wetland complex and stream.

FS-29, another River Birch – Sycamore Forest Association, is a woodland located on the western side of Muncaster Mill Road at the intersection with Woodfield Road. Dominant trees here include white oak and red maple in the 6-12" DBH size class. Invasive species cover is moderate and Retention Value is moderate to low due to high-quality tree species, "fair" stand condition, and moderate invasive cover.

FS-28A, also a River Birch – Sycamore Association, is located west of Snouffer School Road and north of the entrance to Nike Missile Park. This early successional forest association is dominated by mature white pine and red maple in the canopy, in the 10-18" DBH range. Red maple and green ash are the dominant sub-canopy trees with individuals in the 2-6" range. The shrub layer is sparse and the vine/herbaceous layers are dominated by invasive species. This stand contains a wetland and perennial WUS feature, both draining to Cabin Branch. Retention Value for this stand is high due to the wetland and stream and location within a floodplain.

FS-28B is a Pioneer-Invasive Association located east of Snouffer School Road and north of Corrigan Square. This early successional stage forest is dominated by immature white pine, eastern cottonwood, sycamore and pear in the 10-18" DBH range. The shrub, vine, and

herbacious layers are dominated by invasive species. Retention Value is low due to the small tree size, a lack of water resources, and the presence of invasive species.

Forest Stands, FS-26 thru FS-28, are located in the wetland complex at the Cabin Branch crossing of Snouffer School Road. FS-27 and FS-28 are Sycamore-Green Ash-Box Elder-Silver Maple Association located on the both sides of Snouffer School Road surrounding Cabin Branch. FS-26 is a Tulip Poplar Association on the west side of Snouffer School Road and north of FS-27. Dominant trees in the Sycamore-Green Ash-Box Elder-Silver Maple Association include sycamore, black walnut, red oak, and red maple in the 12-20" DBH size class (with some specimen trees present). Invasive cover is moderate to high and Retention Value is high due to the stream, floodplain, abutting wetland complex and size of trees. Dominant trees in Tulip Association include tulip poplar, red oak, and red maple in the 20-30" DBH size class. Invasive species cover is moderate and Retention Value is moderate to high due to the "fair" stand condition rating, size of the trees, and proximity to the floodplain.

FS-24 and FS-25 are located south of Chesley Knoll Drive and encompass an in-line stormwater pond, wetland complex, and a tributary to Cabin Branch. A Chestnut-Oak Association, FS-24, located on the east side of Snouffer School Road, has dominant trees species including red oak, white oak, and red maple in the 12-20" DBH size class (with some specimen trees present). No invasive species cover is present and Retention Value is moderate to high due to stand condition, diversity, adjacent in-line stormwater pond, and lack of invasives. A River Birch-Sycamore Association, FS-25, located on the west side of Snouffer School Road, has dominant tree species including red maple in the 6-12" DBH size class. Invasive species cover is low to moderate and Retention Value is high due to abutting wetland and stream, and the adjacent in-line stormwater pond.

FS-23 is a Chestnut-Oak Association located north of Chesley Knoll Drive surrounding an in-line stormwater pond and a tributary to Cabin Branch. Located on the east side of Snouffer School Road, dominant trees species in the Chestnut-Oak Association include red oak, white oak, black cherry, and red maple in the 6-11" DBH size class (with some larger trees present). Invasive species cover is moderate (mostly along roadway) and Retention Value is high due to abutting perennial stream and adjacent in-line stormwater pond.

FS-21 and FS-22, located immediately north and south of Goshen Road, are a River Birch-Sycamore and Pioneer-Invasive Association. FS-21 is a River Birch-Sycamore Association, located north of Goshen Road and on the west side of Wightman Road with dominant trees species including red maple, black cherry, and black willow in the 12-20" DBH size class. Invasive cover is low and Retention Value is high due to the abutting perennial stream, wetlands, and floodplain. The Pioneer-Invasive Association, FS-22, located on the south side of Goshen Road and on the west side of Snouffer School Road, has dominant tree species including red maple, black locust, and white pine in the 6-11" DBH size class. Invasive species cover is high and Retention Value is low due to stand condition and high invasive species.

FS-20 is a Pioneer-Invasive Stand north of Aspenwood Lane and adjacent to an in-line stormwater pond and a tributary to Great Seneca Creek. Located on the east side of

Wightman Road, dominant trees species include black cherry, black locust, and tree of heaven in the 6-11" DBH size class. Invasive species cover is high and Retention Value is low to moderate due to adjacent in-line stormwater pond, high invasive species, and overall stand condition.

FS-19 is a Chestnut-Oak Association located on the east side of Wightman Road near the Brink Road intersection and adjacent to Great Seneca Creek. Dominant trees species include red oak, shingle oak, black cherry, and red cedar in the 6-11" DBH size class. Invasive species cover is high and Retention Value is moderate due to presence of Shingle Oak (would otherwise be low due to invasive cover and "fair to poor" forest condition rating).

FS-17 and FS-18, are located on the west side of Wightman Road on either side of Great Seneca Creek. FS-17 is a River Birch-Sycamore Association on the north side of Great Seneca Creek with dominant trees species including walnut, sycamore, black locust, and red cedar in the 12-20" DBH size class with some specimen trees. Invasive species cover is moderate and Retention Value is moderate due to the adjacent perennial stream, floodplain, and specimen trees. FS-18 is a Sycamore-Green Ash-Box Elder-Silver Maple Association located on the south side of Great Seneca Creek with dominant tree species including box elder and black locust in the 6-11" DBH size class. Invasive species cover is low and Retention Value is high due to the abutting Great Seneca Creek, the floodplain, and low invasive species.

FS-16 and FS-17 are Pioneer-Invasive Stands located along Wightman Road between Great Seneca Creek and Blunt Road. FS-16 occurs in an elevated area on the east side of Wightman Road within Great Seneca Park with dominant trees species including pin oak, black walnut, black cherry, and black locust in the 6-11" DBH size class. Two shingle oaks were noted in this area. Invasive species cover is low to moderate and Retention Value is moderate due to "fair" stand condition rating, the presence of Shingle Oak, and low invasive species cover. FS-17, also located in Great Seneca Park is located in lowlands on the west side of Wightman Road with dominant trees species including black walnut, sycamore, red cedar, and black locust in the 12-20" DBH size class with some specimen trees. Invasive cover is moderate and Retention Value is moderate due to specimen trees and proximity to floodplain.

Three Chestnut-Oak Stands, FS-11, FS-12, and FS-14, are located along Brink Road near Kaul Lane, Glendevon Court, Leaman Lane, and Trevia Court. Dominant trees species include red oak, white oak, chestnut oak, and hickory in the 12-20" DBH size class. Invasive cover is none to moderate and Retention Value is moderate due to good stand condition and species composition.

Two Pioneer-Invasive Stands, FS-13 and FS-15 are located on the west side of Brink Road near Cog Wheel Way (FS-15) and Glendevon Court. Dominant trees species include tulip poplar, black cherry, tree of heaven, black walnut, and black locust in the 6-12" DBH size class. Invasive cover is high and Retention Value is low due to "fair" stand condition rating and heavy invasive species cover.

FS- 7 is a Tulip Poplar Association located on the west side of Brink Road, north and south of Lowland Court with dominant trees including tulip polar, black cherry, red oak, and red

maple in the 12-20" DBH size class with some specimen trees. Invasive cover is moderate and Retention Value is moderate due to a "good" stand condition rating and specimen trees.

FS-31 is a Pioneer-Invasive Stand located on the east side of Brink Road at its intersection with Ridge Road and is part of the County Seneca Crossing Park. A monoculture tree stand of Bradford pear populate the site in the 12-181" DBH size class. Invasive cover is 100% and Retention Value is low due to monoculture of invasive species.

Alternative 5

FS-42 is a Sycamore-Green Ash-Box Elder-Silver Maple Association located on both sides of the existing Midcounty Highway on the west side of the Goshen Road/Summit Avenue North intersection. FS-42 is part of large stand of contiguous riparian forest for W52 and W53, Whetstone Run, with dominant tree species including box elder, sycamore, black walnut, red oak, and white oak in the 12-18" DBH size class. Invasive cover is low and Retention Value is high due to the floodplain, abutting perennial stream, and impact to significant, contiguous Green infrastructure.

FS-41 is a Sycamore-Green Ash-Box Elder-Silver Maple Association located at the current terminus of Midcounty Highway at the intersection with Montgomery Village Avenue. The 200-foot wide linear forest contains dominant tree species including box elder, red maple, and Bradford pear in the 6-12" DBH size class. Invasive cover is high and Retention Value is low due to the "poor" stand condition rating, small size of the trees, and high invasive species.

FS-40 is a Chestnut Oak Association, approximately two-acres in size, located at the Montgomery Village Avenue and Lost Knife Road intersection abutting the Lakeforest Regional Shopping Center. Dominant tree species include red oak, white oak, and red maple in the 12-18" DBH size class. Invasive cover is low and Retention Value is moderate due to "good" stand condition rating, low invasive species, and diverse tree assemblage.

FS-39 is a River Birch – Sycamore Forest Association located on the west side of Frederick Road across from its intersection with Travis Avenue. A stream passes through the center of this approximately 17-acre forest with dominant tree species including tulip poplar and red maple in the 18-24" DBH size class. Retention Value is moderate to low due to the stream and moderate invasive species count, and isolated nature of the forest stand.

FS-36 is a Sycamore-Green Ash-Box Elder-Silver Maple Association located on both sides of Frederick Road where it crosses Great Seneca Creek. FS-36 is part of large stand of contiguous, riparian, floodplain forest along Great Seneca Creek. Dominant tree species including box elder, sycamore, and tulip poplar in the 6-12" DBH size class. Invasive cover is low to moderate and Retention Value is high due to its location within the floodplain, its abutting of Great Seneca Creek, presence of FIDS habitat, and since it is a large tract of contiguous Green infrastructure within Great Seneca Stream Valley Park.

FS-38 is a Tulip Poplar Forest Association located on the west side of Frederick Road. It is a large, contiguous tract of forest with dominant tree species including tulip poplar and white oak in the 18-24" DBH size class. Invasive cover is low and Retention Value is high since

it's a large contiguous forest tract, contains large quality trees with low invasive species, and is also located within Great Seneca Stream Valley Park.

FS-37 is a Chestnut Oak Forest Association on the east side of Frederick Road north of FS-36. It is a large contiguous tract of forest with dominant tree species including white oak, black gum, and tulip poplar in the 18-24" DBH size class. Invasive cover is moderate and Retention Value is moderate to high since it is a large contiguous forest tract, contains large quality tree species, and it lies within Great Seneca Creek Stream Valley Park.

FS-35 is a River Birch – Sycamore Forest Association located on the west side of Frederick Road south of its intersection with Plummer Drive. This approximately one-acre, isolated forest contains dominant tree species including green ash, black cherry, and black locust in the 6-12" DBH size class. Invasive cover is low and Retention Value is low to moderate due to "fair" stand condition rating, small trees size, and isolated nature of the forest stand.

FS-34 is a Sycamore-Green Ash-Box Elder-Silver Maple Association located on the east side of Frederick Road at its intersection with Middlebrook Road abutting the Fox Chapel Shopping Center. This two-three acre isolated forest contains dominant tree species including box elder and black locust in the 6-12" DBH size class. Invasive cover is high and Retention Value is low due to small trees size, high invasive species, and isolated nature of the forest stand.

FS-33 is also a Sycamore-Green Ash-Box Elder-Silver Maple Association located on the east side of Frederick Road and north of the Germantown Road intersection. This three-four acre isolated forest parcel surrounds an ephemeral channel with dominant tree species including box elder and silver maple in the 6-12" DBH size class. Invasive cover is high and Retention Value is low to moderate due to riparian channel vegetation, small trees size, high invasive species, and isolated nature of the forest stand.

FS-32 is a Chestnut Oak Stand making up the approximately 16-acre Ridge Road Recreation Park located at Ridge Road and Frederick Road. Dominant tree species include chestnut oak, white oak, black gum, and red maple in the 12-18" DBH size class. Invasive cover is low and retention value is moderate to high due to "good" stand condition rating, low invasive species, presence of diverse tree species, and location in a County Park.

Alternatives 8 and 9 (including Northern Terminus Option A)

The Alternatives 8 and 9 right-of-way corridor is 150-feet-wide and totals approximately 94 acres. Approximately 55 acres of the corridor is forested, or approximately 59%. The 2004 forest inventory recorded 674 significant trees (greater than 24" diameter at breast height [DBH]) along the study alignment, 307 of which are specimen trees (greater than 30" DBH).

Existing stream valley buffers and conservation easements for the protection of streams, wetlands, steep slopes or forest areas were identified within the Alternative 8 and 9 alignments. These conservation areas were established through the subdivision review process with the M-NCPPC for development projects, and impacts to conservation easements are required to be mitigated at a 2:1 ratio. Existing conservation easements adjacent to or within the Alternative 8 and 9 alignments include:

- The Blunt Commons subdivision north of Middlebrook Road on the west side of the Alternatives 8 and 9 contains a Category I conservation easement established for the Brandermill Tributary.
- The Dayspring Church of the Savior property adjacent to Wayfarer/Blunt Road abutting the Alternative 8 and 9 alignments contains a Category I conservation easements created for the wetlands, streams and forest.
- The All Souls Cemetery contains a Category I conservation easement area established around the tributary streams to Wildcat Branch.

FS-43 is a Sycamore-Green Ash-Box Elder-Silver Maple Association, located adjacent to Walkers Run within the 100-year floodplain. Dominant tree species include red maple, box elder, sycamore and tulip poplar in the 12-18" DBH size class, with invasive species present in the understory. Retention Value is moderate due to abutting wetlands and the perennial stream.

FS-44, FS-45, and FS-46 are Tulip Poplar Associations along the west bank of Walkers Run, northeast of Tanyard Hill Road in the Woodland Hills Development. FS-44 is dominated by red maple and tulip poplar trees in the 18-24" DBH size class with some significant/specimen trees present. Invasive species are present in the understory and the Retention Value is moderate due to the abutting perennial stream and location in a floodplain. FS-45 is a younger forest stand dominated by 4-8" DBH black locust, black cherry, and white pines with low to moderate Retention Value due to stand age and numerous gaps in the canopy. FS-46 is adjacent to the confluence of Whetstone Run and Walkers Run, near wetland W67 and WUS 66, Walkers Run. This stand is dominated by tulip poplar, red maple, red oak, and white oak in the >30" DBH size class. Retention Value is high due to the abutting wetland, the perennial stream, and the abundance of significant/specimen trees.

FS-47 is a Sycamore-Green Ash-Box Elder-Silver Maple Association located along the east side of Whetstone Run, adjacent to Watkins Mill Elementary School. This stand is dominated by >24" DBH sycamore. Retention Value is high due to abutting stream, lack of invasive cover, and location in the floodplain.

FS-48 is a Tulip Poplar Association located east of Watkins Mill Road, on the west side of Whetstone Run to the east of Windbrooke Condo properties. This forest stand includes several significant/specimen trees and is dominated by white oak in the >30" DBH size class. Retention Value is high due to the abutting perennial stream, the abundance of significant/specimen trees, and lack of invasive species.

FS-49 is located in Blohm Park, east of the PEPCO right of way encompassing a large wetland complex abutting Whetstone Run. This Sycamore-Green Ash-Box Elder-Silver Maple Association is dominated by 24-36" DBH sycamore and red maple with some invasive species. Retention Value is high due to wetlands and abundance of significant/specimen trees.

Two contiguous forest stands, FS-50 and FS-51 are located within Blohm Park, north of the PEPCO right of way. FS-51is a Sycamore-Green Ash-Box Elder-Silver Maple Association

dominated by 12-18" DBH box elder and red maple. Retention Value is high since this stand surrounds Whetstone Run, is within the 100-year floodplain, and abuts wetlands. FS-50 is a Tulip Poplar Association dominated by tulip poplar, white oak, and red oak in the 24-30" DBH size class. Retention Value is high due to abundance of significant/specimen trees, lack of invasive species, and abutting wetlands.

Tulip Poplar Associations, FS-52 and FS-53, surround Game Preserve Road, adjacent to Great Seneca Creek Park. FS-52 is a young forest dominated by tulip poplar, red maple, and black cherry in the 6-12" DBH size class. This stand has a low to moderate Retention Value due to stand age and gaps in the forest canopy. FS-53 is a mature forest located within Great Seneca Stream Valley Park. This forest contains numerous significant/specimen trees and is dominated by >30" DBH tulip poplar, red oak, hickory, pin oak, and red maple. Retention Value is high due to abundance of significant/specimen trees, lack of invasive species, proximity to Great Seneca Creek, and location within Great Seneca Stream Valley Park.

FS-54 and FS-55 are Sycamore-Green Ash-Box Elder-Silver Maple Associations located along Great Seneca Creek, northeast of Game Preserve Road, within the Great Seneca Creek Stream Valley Park. FS-54 is dominated by >30" DBH red maple, green ash, and sycamore. Green dragon, an herbaceous plant formerly a Montgomery County RTE Watchlist species, has been identified within wetland W77 in this forest stand. Retention value is high due to abundance of significant trees, lack of invasive species, abutting stream and wetland, and presence of an RTE species. FS-55 includes a number of significant/specimen trees and is dominated by sycamore, white oak, and red maple in the 24-30" DBH size class. This forest has a high Retention Value due to presence of significant trees, abutting stream and wetland, and lack of invasive species.

FS-56 is a small, isolated forest south of Middlebrook Road. This Sycamore-Green Ash-Box Elder-Silver Maple Association is dominated by 12-18" DBH red maple, sycamore, and pin oak, with invasive species in the understory. Retention Value is low to moderate due to the quality of tree species and presence of invasive species.

FS-57 through FS-62 are six Tulip Poplar Forest stands located between Middlebrook Road and Germantown Road occurring within the Great Seneca Creek Stream Valley Park. These stands are located within a wide riparian corridor associated with Brandermill Tributary, WUS 78, and its abutting wetland, W79. Except for FS-57 and FS-61, dominant species include >30” DBH tulip poplar along with elm, red maple, and red oak. Retention Value for these forest stands is high due to their location within a large contiguous forest tract in a floodplain, large sized trees, geographic position adjacent to a stream and wetlands, and location in the Park. FS-57 is dominated by tree species including red maple, black cherry, and red cedar in the 1-4” DBH size class with only 40% canopy closure with a moderate Retention Value. FS-61 is dominated by black cherry, red oak and tulip poplar in the 6-12” DBH size class with a high Retention Value.

FS-63 is a Chestnut Oak Association located north of Neeslville Church Road in the Woodland Conservation area. This forest stand is dominated by mature chestnut oak ranging

from 24-46” DBH and black gum, red oak, tulip poplar and white oak. Retention Value is high due to stand age and presence of significant trees within a conservation area.

FS-64 is a Tulip Poplar Association north of FS-63 in the Woodland Conservation area west of Wayfarer Road. FS-64 is dominated by 12-18" DBH size class red oak, white oak and tulip poplar trees with high Retention Value due to good structure, lack of invasive species and location within a conservation area.

FS-65 is a Tulip Poplar Association located to the east of Wayfarer Road and Watkins Meadow Drive, behind the Watkins Meadow residential development area. This association is dominated by 4 to 12” DBH tulip poplar, black cherry, black locust, and red maple with moderate invasive species. Retention Value is moderate since the stand buffers residential properties from the Woodland Conservation Area, has sparse canopy cover, and contains invasive species.

FS-66 is a Tulip Poplar Association located north of Blunt Road and Watkins Meadow Drive in Great Seneca Stream Valley Park, adjacent to the wide forested floodplain of the North Germantown Tributary. This association is dominated by 4 to 12” DBH black cherry, tulip poplar, and black locust and has a moderate Retention Value since it’s part of a large contiguous forest in the Great Seneca Stream Valley Park and is adjacent to a floodplain and a stream.

FS-67 is a Tulip Poplar Association located north of FS-66 within the floodplain of the North Germantown Tributary in the Great Seneca Stream Valley Park. Dominated by 34-30” (up to 47”) DBH tulip poplar, red oak and white oak with a high Retention Value due to stand age, presence of significant trees, and location within a large, contiguous forest adjacent to a floodplain and stream in a county park.

FS-68 is a River Birch-Sycamore Association located north of FS-67 in Great Seneca Stream Valley Park. FS-68 is dominated by 24-30" DBH red maple, sycamore and pin oak and has a high Retention Value since it encompasses Dayspring Creek, a 100-year floodplain, wetlands, and is in a county park.

FS-69 is a narrow strip of Tulip Poplar Association forest northeast of FS-68 dominated by white oak, and red oak in the 18-24" DBH size class. Retention Value is high due to its location in a floodplain, since it is abutting a wetland, and is in a county park.

FS-70 is a Tulip Poplar Association, northwest of FS-68, within Great Seneca Stream Valley Park near Dayspring Creek. FS-70 is dominated by black cherry, pin oak, and walnut in the 8-12” DBH size class with canopy closure at 30% and with >30” DBH pin oak and red maple along the stream channel. Retention Value is high due to the large trees, its proximity to a stream, and location within contiguous forest, a floodplain, and within a county park.

FS-71 and FS-72, located west of FS-70, surround WUS 71, an ephemeral tributary to Dayspring Creek within Great Seneca Stream Valley Park. FS-71 is a Chestnut Oak Association dominated by large >30” DBH chestnut oak, red oak and tulip poplar. FS-72 consists of a Tulip Poplar Association, with 24-30” DBH size class tulip poplar, red maple,

white oak, and red oak. Retention Value for both forest stands is high due to stand age, presence of large trees, and its location within a large contiguous forest, a floodplain, abutting a stream and wetlands, and in a county park.

FS-73, FS-74, FS-75 and FS-76 are Tulip Poplar Stands located along Wildcat Road and Wildcat Branch Tributary, WUS 69, and its surrounding wetlands. FS-73 and FS-74 are dominated by 30-36" DBH tulip poplar, red oak, red maple, green ash and white oak. FS-75 is dominated by tulip poplar, red oak and white oak with a 24-30" DBH size class. FS-76 is dominated by black walnut, black cherry and tulip poplar with a 2-8" DBH size class. These stands have a high Retention Value due to their location within an existing forest conservation area, a floodplain abutting a stream with wetlands, and since they contain significant/specimen trees.

Northern Terminus Option D

FS-8, a large Tulip Poplar Association is located north of the Blunt Road alignment crossing. This association is characteristic of the majority of the forest between the Blunt Road and Brink Road alignment crossings. FS-8 is part of a large contiguous forest tract including riparian and floodplain forest for Dayspring Creek in the North Germantown Greenway Stream Valley Park. Dominant trees include tulip poplar, black cherry, black walnut, and red maple in the 6-11" DBH size class with moderate to high invasive species cover. Retention Value is moderate to high within the floodplain of Dayspring Creek due to the "fair" stand condition rating, high invasive species cover, the stream, and floodplain. The Retention Value is moderate to low outside the floodplain of the stream due to the "fair" stand condition rating, small tree size, and high invasive species cover.

FS-9 is a Pioneer-Invasive Stand located north of Dayspring Creek and sandwiched between two areas of FS-8. Dominant trees include black cherry, red cedar, and persimmon in the 6-11" DBH size class. Invasive cover is high and Retention Value is low due to the "fair" stand condition rating, small tree size, and high presence of invasive trees.

FS-7 is a Tulip Poplar Association with the same trees species as FS-8 but with a larger size classes of 12-20" DBH and some specimen trees. Retention Value here is moderate due to the "good" stand condition rating and larger trees, including some specimens.

FS-1 is a Chestnut Oak Forest Association located north of Brink Road and continuing to W1, Brink Tributary (a tributary to Great Seneca Creek). This contiguous forest is dominated by chestnut oak, white oak, red oak, black cherry, and red maple in the 12-20" DBH size class. No invasive species were present and retention value is high due to "good" stand condition rating, presence of diverse tree species, absence of invasive species, and since it abuts a perennial stream.

FS-2 and FS-3, both Tulip Poplar stands, comprise an approximately 25-acre contiguous forest beginning on opposite side of Brink Tributary (as FS-1), extending northward, and terminating at agricultural fields. Dominant species include tulip poplar and red maple in the 6-11" DBH size class in the southern section (FS-2) and 12-20" DBH size class in the northern section. Invasive cover is low in the southern section and moderate in the northern section. Retention value is high for FS-2 due to the presence of the stream, wetlands, and low

invasives cover. Retention value is moderate to low for FS-3 since the alignment is outside the stream and wetland areas here and invasive species are moderate.

FS-4, a Chestnut Oak Forest Stand of approximately 7-acres, is located east of Wildcat Road. Almost entirely surrounded by agricultural fields, this stand abuts FS-6. Dominant tree species in FS-4 include chestnut oak, red oak, black cherry, hickory, and tulip poplar in the 12-20" DBH size class. Minor invasive species were present and retention value is moderate due to "good" stand condition rating, presence of diverse tree species, and absence of invasives.

FS-6, abutting FS-4 to the north, is a Sycamore-Green Ash-Box Elder-Silver Maple Association encompassing the Wildcat Branch Tributary with Wildcat Road passing through it. FS-6 is a large, contiguous forest parcel connected to Great Seneca Stream Valley Park. Dominant tree species include green ash, white oak, tulip poplar, and red maple in the 12-20" DBH size class. Invasive cover is low and retention value is high since it is riparian forest abutting Wildcat Branch Tributary and its floodplain, has "good" stand condition rating, low invasive species, and is part of contiguous forest.

FS-5 is a Pioneer-Invasive Stand located on the east side of Ridge Road north of the water tower. FS-5 5 is an isolated 3 to 4-acre forest with dominant trees include black cherry, Norway maple, and white mulberry in the 6-11" DBH size class. Invasive cover is high and Retention Value is low due to a "fair to poor" stand condition rating, high invasive species, and small tree size.

Table 5-32 summarizes the forest and parkland impacts for the ARDS.

Table 5-32: Forest and Park Impact Summary

ARDS	Total Forest Impacts (acres)	Total Parkland Impacts (acres)	Impacts to Mont. County/M-NCPPC Owned Parkland (acres)
Alt 2	0	0	0
Alt 4 Modified	31.0	19.4	15.4
Alt 5	2.0	0.2	0.2
Alt 8A	57.6	45.2	43.3
Alt 8B	52.5	30.6	28.7
Alt 8D	61.4	29.6	27.7
Alt 9A	72.9	48.1	45.5
Alt 9B	67.7	33.5	30.9
Alt 9D	76.7	32.5	29.9

MCDOT has identified a large tract of land that could potentially mitigate both the forest and park impacts. The parcel under consideration is primarily farmland, but includes some mature forest. The proposed mitigation site would have a riparian connection to an existing wildlife hub that is located in parkland. Montgomery County DOT and the M-NCPPC Parks

Department have initiated discussions about the potential mitigation site, and preliminary indications are that the site is favorable.

5.9 Special Protection Areas

Montgomery County Council designates geographic areas as Special Protection Areas (SPAs) for the purpose of protecting and maintaining high-quality or sensitive water resources and related environmental features where a higher level of environmental protection is warranted due to proposed development. The purpose of SPA requirements is to maximize protection of natural resources through site design features such as limitations on imperviousness, accelerated forestation, and provision of expanded wetland buffers. The objectives of the additional protection are as follows:

- Protect, restore, and maintain the chemical, physical, and biological integrity of streams, wetlands, springs, seeps, and other water resources;
- Help maintain stream base flow;
- Provide infiltration of runoff;
- Reduce erosion and control sedimentation;
- Provide riparian wildlife habitat;
- Provide organic matter to support the food web of aquatic organisms;
- Provide spawning and nursery areas for aquatic life;
- Filter overland and non-concentrated stormwater flows through the buffer; and
- Provide a separation between physical disturbance and sensitive water resources.

The Clarksburg Special Protection Area includes a portion of the Wildcat Branch watershed in the northeast quadrant of the Ridge Road/Brink Road intersection within the WSSC, M-NCPPC, and All Souls Cemetery properties. To afford greater protection to Wildcat Branch, a Use III-P stream, M-NCPPC previously designated a stream buffer of 150 feet on each side of the stream, consistent with Montgomery County's SPA regulations. The All Souls Cemetery was required to plant a 300-foot forested stream buffer along Wildcat Branch as a condition of development approval. Most of Wildcat Branch downstream to its confluence with Seneca Creek now has a forested buffer along both sides of the stream.

Water quality data previously collected by Montgomery County DEP at monitoring stations along Wildcat Branch is summarized in **Table 5-33**.

Table 5-33: Range of DEP's Water Quality Data Collected Along Wildcat Branch

Montoring Station	Dissolved O_2 (mg/l)	pH	Temperature (ºC)	Sampling Dates
Use III-P Water Quality Standards	>5 at all times, min daily avg >6	6.5 – 8.5	≤ 20ºC	
GSWB 201	8.7 - 12.36	6.24 – 8.05	8.5 – 18.9	1999 - 2010
GSWB 203 B	9.4 – 11.58	5.39 – 7.29	6.6 – 15.2	1996 - 2006
GSWB 204	9.47 – 11.79	6.71 – 7.31	6.4 – 16.8	1997 - 2006

Northern Terminus Option A and D would traverse the SPA on the All Souls Cemetery property, while Northern Terminus Option B would impact a sliver of the SPA due to the widening of Ridge Road and Brink Road. Alternative 8-Option A, Alternative 8-Option D, Alternative 9-Option A, and Alternative 9-Option D would pose concerns for the aquatic health and water quality of Wildcat Branch resulting from increased impervious surface (which can cause reduced infiltration and increased runoff), thermal impacts of stormwater discharges, clearing of forest vegetation within the 300-foot stream buffer, and erosion and sedimentation during construction.

To reduce the potential effects of the Midcounty Corridor project on the SPA, the alignment of Option A was shifted slightly upstream of the Master Plan alignment to reduce the impact to mature forested stream buffer, and linear stormwater management is proposed with all Northern Terminus Options to facilitate infiltration of stormwater runoff. In addition, erosion and sediment controls would be stringently employed during construction to reduce stream siltation. Other measures that would be considered to reduce impervious surface include the following:

- construction of pervious pavement for the proposed sidewalk and shared use path;
- consideration of elimination of the sidewalk along Alternatives 8 and 9 within the SPA, in favor of construction of a proposed sidewalk along Brink Road (along Seneca Crossing Local Park) and possibly along Ridge Road;
- consideration of additional BMPs beyond those required by MDE stormwater guidelines;
- provision of spring boxes if existing springs are identified in the path of the alternative;
- avoid impacting natural springs for stormwater facilities and E&S controls.

Should Alternative 8 or Alternative 9 be identified as the Preferred Alternative, one of the Northern Terminus Options would also be chosen. It should be noted that Option B would result in operations and safety issues, and therefore, is not recommended by MCDOT (see **Section 2.5**). Option D was proposed by MCDP to avoid the more sensitive environmental resources in the North Germantown Greenway Stream Valley Park. Option D would result in less impervious surface within the SPA than Option A (see **Table 5-34**).

If either Alternative 8 or Alternative 9 should subsequently be identified as the Preferred Alternative, MCDOT would coordinate with MCDEP and MCDPS to identify appropriate measures to minimize impacts to the aquatic health and water quality of Wildcat Branch.

Table 5-34: Increased Impervious Surface within the SPA

Northern Option	Option A	Option B	Option D
Impervious Surface within SPA	7.2 acres	1.7 acres	4.8 acres

5.10 Biodiversity Areas

The Biodiversity Area designation by Maryland-National Capital Park and Planning Commission (M-NCPPC) is applied to portions of their park system that contain at least one of the following features: areas of contiguous, high quality forest and/or wetland which

show little evidence of past land-use disturbance; rare, threatened, endangered, or watch-list species; exceptional examples of notable plant communities found in Montgomery County; and areas of exceptional beauty. Portions of North Germantown Greenway Stream Valley Park and Great Seneca Creek Stream Valley Park have been designated as Biodiversity Areas (see **Figure 5-32**).

The North Germantown Biodiversity Area boasts a very scenic streamside forest (along Dayspring Creek) and several large seepage swamps among its many assets. In addition, the area includes rock outcrops and glades, which are unusual habitat in Montgomery County parklands. Forest interior dwelling birds such as the Wood thrush and Acadian flycatcher are known to be present in this area. The forest understory contains shrubs and an herb layer that, while not rare, are uncommon for the county.

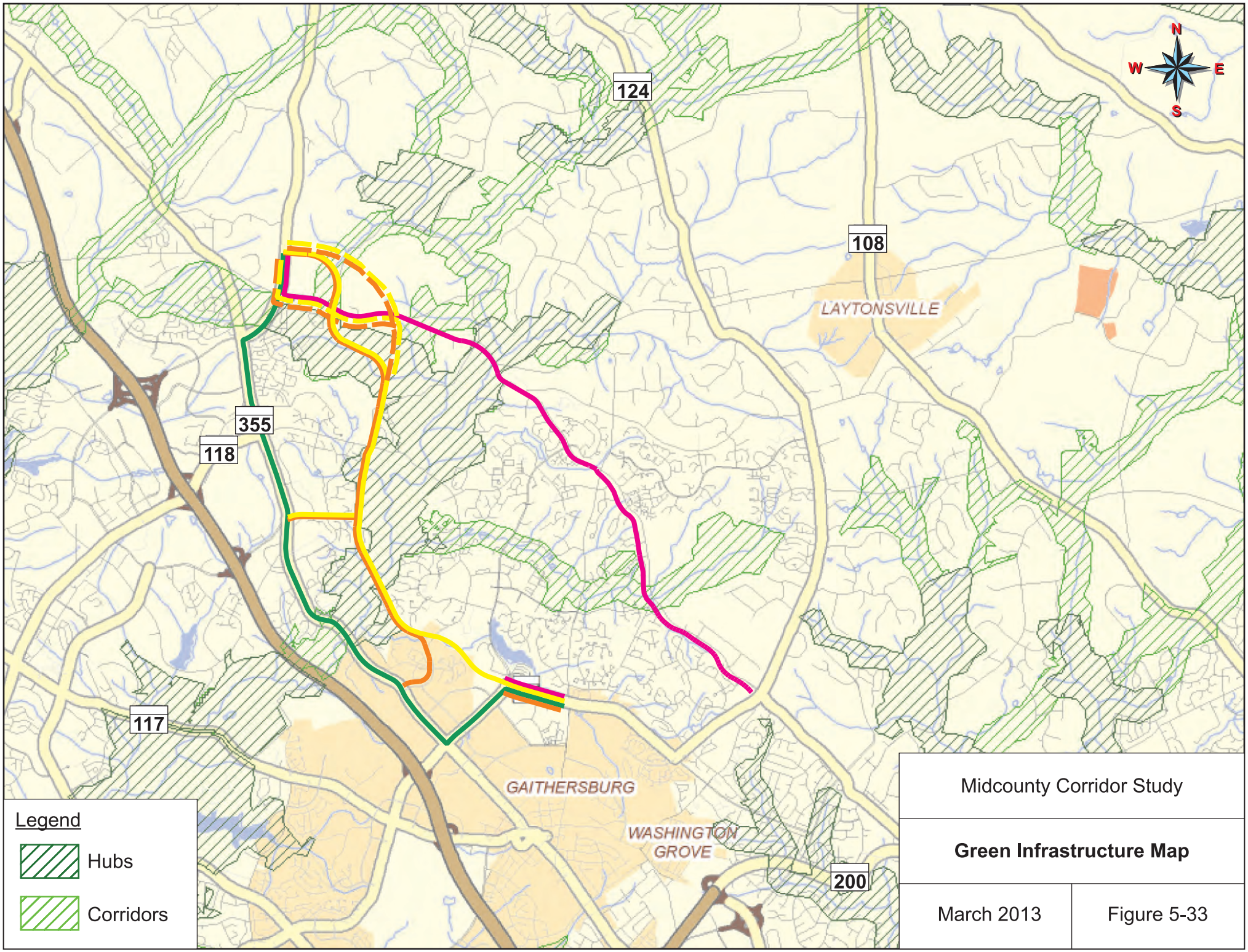
The Great Seneca Creek Biodiversity Area contains *Arisaema dracontium* (Green dragon), *Castanea pumila* (Chinquapin), and *Quercus imbricaria* (Shingle oak) with Green dragon being especially well-developed along the floodplain south of Upper Watkins Mill Road. This is one of only several occurrences of Green dragon in Montgomery County away from the Potomac River floodplain. Shingle oak is found in the bottomland woods and on north-facing slopes above the creek. *Betula nigra* (Black birch), a tree usually found in the mountains in Western Maryland, is a dominant tree on the northwest-facing slope just north of Upper Watkins Mill Road. This is the largest known Black birch population in the county.

All options of Alternatives 8 and 9 would traverse the North Germantown Biodiversity Area and the Great Seneca Creek Biodiversity Area, with Options B and D resulting in less impact than Option A.

5.11 Green Infrastructure

Forest cover is being lost to development throughout Maryland. The scattered pattern of modern development not only consumes an extensive amount of land, it fragments the landscape, converting a once near-continuous stretch of forest to small isolated islands of habitat. In the late 1990's, Maryland's Department of Natural Resources (DNR) began an effort to identify the most ecologically important natural lands in the state, Maryland's Green Infrastructure. The result of this effort is a mapped network of hubs and corridors (see **Figure 5-33** for Green Infrastructure within the project study area). Hubs provide large blocks of intact forest encompassing 250 acres or more. Many species require large parcels of forest for breeding/rearing and to reduce the threat of predation, such as forest interior dwelling bird species. Corridors are linear features, such as ridgelines, stream valleys, or other natural areas, which link the hubs together. An essential characteristic of Green Infrastructure is the interconnection of its features, which provides an ecosystem that supports diversity of plant and wildlife populations, as well as species interaction to increase the gene pool.

In Montgomery County, Green Infrastructure is provided by the County's system of stream valley parks. These parks provide large, interconnected, linear habitats which are fragmented only by highway and utility crossings. Many of the existing highways that cross Great Seneca Park are bridged and have sufficient under-clearance and a floodplain terrace that can accommodate deer passage beneath the highway (e.g., I-270, Frederick Road,



Midcounty Corridor Study

Green Infrastructure Map

March 2013

Figure 5-33

Watkins Mill Road, and Brink Road). In addition to protecting plant and wildlife, Montgomery County's Green Infrastructure also provides flood attenuation, water quality, stormwater management, and recreational benefits.

To avoid further fragmentation of wildlife habitat and to reduce collisions between wildlife and motorists, new highways crossing stream valleys would include bridges that are high enough and long enough to allow wildlife, including deer, to pass beneath the highway. Along Alternatives 8 and 9, the major stream crossings and their respective underclearance include Wildcat Branch (18 feet with Option A), Dayspring Creek (16 feet), Brandermill Tributary (25 feet), Seneca Creek (17 feet), and Whetstone Run (11 feet). With Alternative 4 Modified, the existing bridge over Cabin Branch would be widened, and the existing bridge over Seneca Creek would be replaced (11 foot underclearance). Therefore, wildlife passage would be accommodated beneath both bridges. With Alternative 5, the existing bridge over Seneca Creek would not be altered, and wildlife passage would not be altered.

5.12 Hazardous Materials

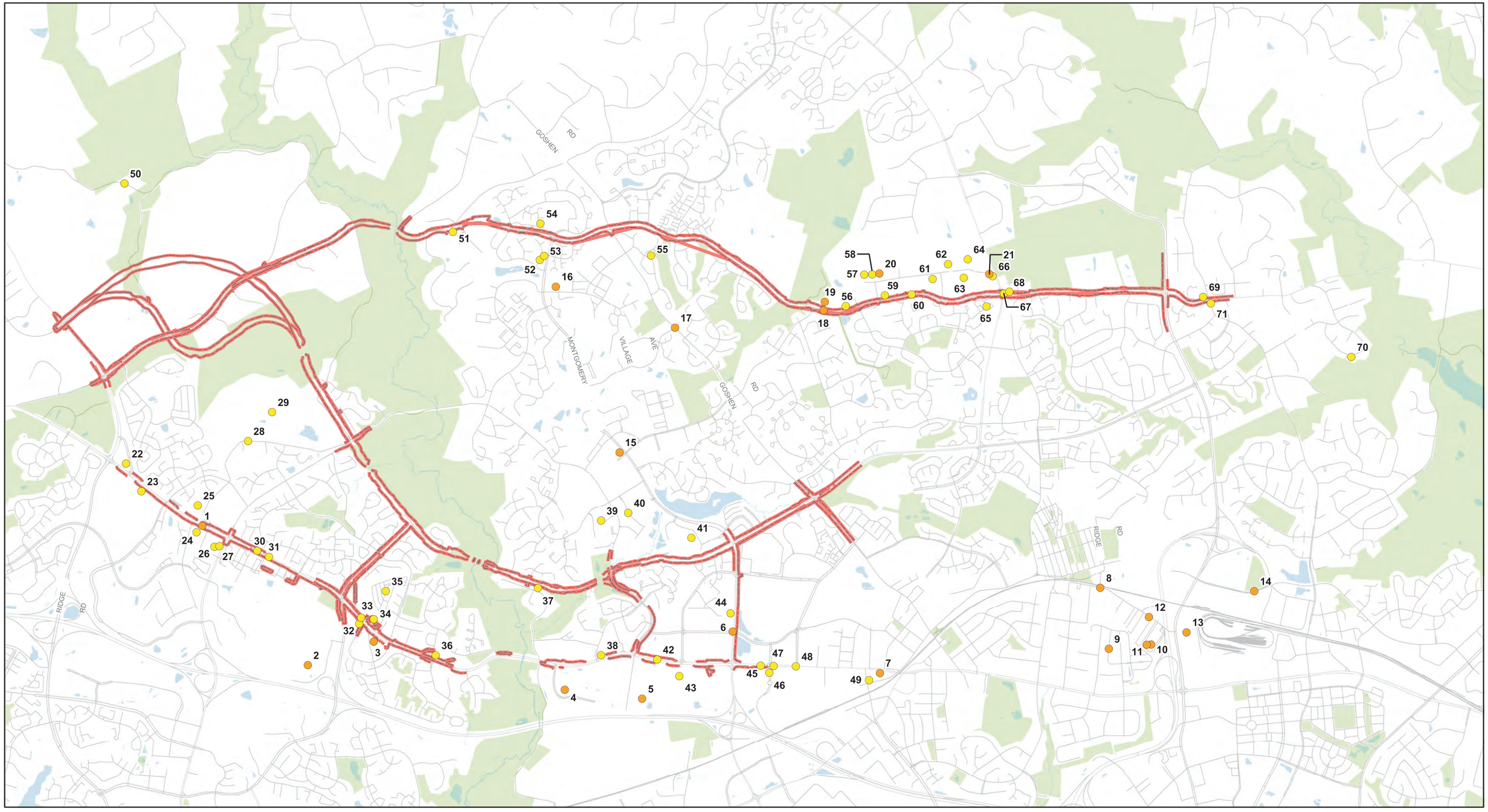
A review of regulatory databases was conducted by Environmental Data Resources (EDR), a vendor that specializes in identifying potential hazardous waste sites within the approximate search distances specified by ASTM guidelines. **Table 5-35** is a list of the regulatory databases that were reviewed by EDR. The review identified regulated facilities and past spills of hazardous substances or petroleum products. The intent of this effort is to support a planning study; it is not intended to directly support any potential future property, easement, or right-of-way acquisitions, and does not constitute a Phase I Environmental Site Assessment as defined by the American Society for Testing and Materials (ASTM, 2005).

Based on the sites identified by EDR, and their proximity to the project alternatives, **Table 5-36** was compiled to list the sites of potential concern for each alternative. The information included in **Table 5-36** includes the name of the site, its location, and a summary of the status of each site.

The locations of the identified sites are shown in **Figure 5-34.** During final design, a Phase I Environmental Site Assessment will be conducted for the Preferred Alternative to assess whether any remedial measures are required to properly manage any possible residual hazardous materials which could be encountered during construction.

Table 5-35: Hazardous Waste Site Databases

DATABASE	ACRONYM	APPROX. SEARCH DISTANCE (MILES)
Federal National Priorities List	NPL	1.0
Federal Comprehensive Environmental Response, Compensation, & Liability Information System List	CERCLIS	0.5
Federal CERCLIS-No Further Remedial Action Planned	CERCLIS NFRAP	0.5
Records of Decision (pertaining to a NPL site)	RODS	1.0
Federal Resource Conservation & Recovery Information System Generators (small and large quantity) and Federal RCRIS Treatment, Storage, and Disposal Sites	RCRIS-SQG/LQG/TSD	Study area and adjoining properties
RCRA Corrective Action Facilities	CORRACTS	1.0
Federal Emergency Response Notification System	ERNS	Study area only
Facility Index System/Facility Registry System	FINDS	Study area only
Integrated Compliance Information System	ICIS	Study area only
RCRA Administrative Action Tracking System	RAATS	1.0
Toxic Chemical Release Inventory System	TRIS	Study area only
PCB Activity Database System	PADS	Study area only
State-equivalent NPL	SHWS	1.0
State-equivalent CERCLIS / State-Notice of Potential Hazardous Waste Sites	SHWS	0.5
State Voluntary Control Programs (VCPs)	VCP	1.0
State Permitted Solid Waste Disposal Facilities/ Recycling Facilities	SWF/SWRCY	0.5
Institutional/Engineering Control Registries	INST CONTROL/ ENG CONTROLS	Study area and adjoining properties
State Brownfields Properties	BROWNSFIELDS	0.5
State Registered Storage Tanks	UST/Historical UST	Study area and adjoining
Maryland Oil Control Program	MD OCPCASES	0.5
State Leaking Storage Tanks	LUST/ Historical LUST	0.5
Registered Drycleaning Facilities	Drycleaners	Study area only
Permitted Aboveground Storage Tanks	AST	Study area only



SCALE:

1 INCH = 3,000 FEET

0 1,500 3,000 6,000 FEET

SOURCES:

M-NCPPC. n.d. *Hydrographic Features*. Montgomery County, MD.
M-NCPPC. n.d. *Montgomery County Parks*. Baltimore, MD.
SHA. 2005. *Maryland Centerline*. Baltimore, MD.

Note: Hazardous waste locations identified from EDR. 2011.*Midcounty Highway DataMap Environmental Atlas*. Locations are approximate.

LEGEND:

- PROJECT AREA
- GENERATOR SITES WITH PAST VIOLATIONS
- CLOSED OCP CASES
- PARK
- WATER BODY
- N

FIGURE 5-34:

HAZARDOUS MATERIALS SITES

MIDCOUNTY CORRIDOR STUDY
MONTGOMERY COUNTY, MD

EDR ID	Name	Address	Map ID	Closest Alternative	Summary
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)					
98	Gaithersburg – Control	8510 Snouffers School Road Gaithersburg, MD 20879	**18**	4 Modified	The Gaithersburg Control was originally part of the Gaithersburg Nike Launch and Control (W-94) area, part of a missile system that was constructed in the continental United States between 1954 and the 1970s. Priority Level: No Further remedial action Planned – Site does not qualify for the NPL based on existing information Closed OCP-No release
201	Gaithersburg – Launch	Off Snouffers School Road Gaithersburg, MD 20879	**19**	4 Modified	Discovery completed 2/6/1986 Preliminary Assessment completed 12/15/1987 Status: MDE requested Phase II Environmental Assessment
Resource Conservation and Recovery Act – Large Quantity Generators (RCRA-LQG)					
351	Life Technologies Inc	8717 Grovemont Circle Gaithersburg, MD 20877	**10**	5, 8, 9	Large generator of hazardous materials. No violations found.
Resource Conservation and Recovery Act – Small Quantity Generators (RCRA-SQG)					
93	Montrose Motors	19560 Frederick Road Germantown, MD 20876	**3**	5, 8, 9	Facility has received notices of violations: 2009
199	Crystal Cleaners	18526 Woodfield Road Gaithersburg, MD 20879	**21**	4 Modified	Facility has received notices of violations: 2005
360	NIH Advanced Technology Center	8717 Grovemont Circle #B Gaithersburg, MD 20877	**11**	5	Facility has received notices of violations: 2000

Table 5-36: Sites of Potential Hazmat Concern Along Each Alternative

EDR ID	Name	Address	Map ID	Closest Alternative	Summary
113	Montgomery Village Amoco (currently Montgomery Village BP)	19300 Montgomery Village Amoco Gaithersburg, MD 20879	**15**	4 Modified, 8, 9	Leaking Underground Storage Tank Recover Type: Automatic 24 hour remediation system is on site Open/Closed: Open
284	Hershey's Cleaners Inc	106 N Frederick Avenue Gaithersburg, MD 20877	**7**	5	Facility has received notices of violations: 1988, 1997
Resource Conservation and Recovery Act – Conditionally Exempt Small Quantity Generators (RCRA-CESQG)					
154	C&C Industries	8255 Beechcraft Avenue Gaithersburg, MD 20879	**20**	4 Modified	Facility has received notices of violations: 1990
194	Gillette Capital Corp	401 Professional Drive Gaithersburg, MD 20879	**4**	5	Facility has received notices of violations: 1989, 1990
Resource Conservation and Recovery Act – Non Generators (RCRA-NonGen)					
80	Hughes Network Systems Inc	11717 Exploration Lane Germantown, MD 20876	**2**	5	Facility has received notices of violations: 1990 Currently not generating hazardous materials
113	New Windsor Cleaners Inc	19314 Montgomery Village Avenue Gaithersburg, MD 20879	**6**	4 Modified, 8, 9	Facility has received notices of violations: 1991 Currently not generating hazardous materials
353	Triton Engineering Inc	16879 Oakmont Avenue Gaithersburg, MD 20877	**8**	8, 9	Facility has received notices of violations: 1988 Currently not generating hazardous materials
353	Electro Mechanical Services Inc.	16616 Oakmont Avenue Gaithersburg, MD 20877	**12**	8, 9	Facility has received notices of violations: 1988, 1989 Currently not generating hazardous materials

EDR ID	Name	Address	Map ID	Closest Alternative	Summary
Recovery Sites (MD HIST LUST)					
113	Montgomery Village Amoco (Currently Montgomery Village BP)	19300 Montgomery Village Amoco Gaithersburg, MD 20879	**15**	4 Modified, 8, 9	Recover Type: Automatic 24 hour remediation system is on site Open/Closed: Open
361	Shell	Walnut Hill (near Frederick Avenue) Gaithersburg, MD	**9**	8, 9	Recover Type: Monitoring – No active remediation. Sampling of Monitoring wells only Open/Closed: Open
Oil Control Program Cases (OCPCASES)- OPEN STATUS					
21	Former Mobil (Currently Freestate)	20650 Frederick Road Germantown, MD 20876	**1**	5	Open Case - 2004 Release: Yes
45	Sunoco #0559-7869 (Currently Goshen Crossing Mobil)	20050 Goshen Road Gaithersburg, MD 20879	**17**	4 Modified	Open Case - 2007 Release: Yes
46	North Creek Community Center	20125 Arrowhead Road Montgomery Village, MD 20886	**16**	4 Modified	Open Case - 2011 Release: Yes
205	Kaiser Permanente	655 Watkins Mill Road Gaithersburg, MD 20879	**5**	5	Open Case - 2011 Release: No
363	Montgomery County Equipment Management Operations Center	16630 Crabbs Branch Way Derwood, MD 20855	**14**	Out of study area	Open Case - 2011 Release: No
368	USPS: VMF Gaithersburg	16501 Shady Grove Road Gaithersburg, MD 20898	**13**	Out of study area	Open Case - 2007 Release: Yes
Oil Control Program Cases (OCPCASES) - CLOSED cases involving releases ***Located within ¼ mile of alignment***					
84	7-Eleven	19700 Frederick Road Germantown, MD 20874	**32**	5	Year of release: 2004, 2009
86	Nu Look Cleaners	19609 Frederick Rd Gaithersburg, MD 20870	**34**	5	Year of release: 1995, 2001

Table 5-36: Sites of Potential Hazmat Concern Along Each Alternative

EDR ID	Name	Address	Map ID	Closest Alternative	Summary
133	Mobil Oil Corp SS#AF2 Sunoco	19235 Frederick Road Germantown, MD 20874	**36**	5	Year of release: 1990, 2004, 2006
137	Pepco (spill)	10812 Game Preserve Road Gaithersburg, MD 20879	**37**	8, 9	Year of release: 2003
150	Lake Forest Animal Hospital	18645 Frederick Rd Germantown, MD 20874	**38**	5	Year of release: 1997, No clean up reported
28	Private Residence	9412 Bethany Place Gaithersburg, MD 20879	**52**	4 Modified	Year of release: 1996, No clean up reported
28	Private Property	9436 Bethany Place Gaithersburg, MD 20879	**53**	4 Modified	Year of release: 2009
64	Private Residence	19925 Bramble Bush Dr Gaithersburg, MD 20879	**55**	4 Modified	Year of release: 2008
136	Pepco	10211 Kindly Ct Gaithersburg, MD 20886	**39**	9	Year of release: 2002
143	Heron Cove Condos	19101 Mills Choice Rd Gaithersburg, MD 20886	**40**	9	Year of release: 1998
119	Mobil Oil Corp	8441 Snouffer School Rd Gaithersburg, MD 20877	**56**	4 Modified	Year of release: 1990
127	NZI Construction Co.	Snouffer School/Centerway Rds Gaithersburg, MD 20879	**49**	4 Modified	Year of release: 2000
145	Henry's Wrecking	8321 Beechcraft Avenue Gaithersburg, MD 20879	**57**	4 Modified	Year of release: 2004
153	Formert BFI (currently United Rentals)	8301 Beechcraft Avenue Gaithersburg, MD 20879	**58**	4 Modified	Year of release: 1998
161	Metropolitan Fleet Service	8301 Snouffer School Rd Gaithersburg, MD 20879	**59**	4 Modified	Year of release: 1996
211	AAMCO Transmissions	943 N Frederick Avenue Gaithersburg, MD 20879	**42**	5	Year of release: 2004
236	IBM spill	800 N Frederick Avenue Gaithersburg, MD 20879	**43**	5	Year of release: 2004

Table 5-36: Sites of Potential Hazmat Concern Along Each Alternative

EDR ID	Name	Address	Map ID	Closest Alternative	Summary
247	Avenue Exxon	24-A W Montgomery Village Avenue Gaithersburg, MD 20879	**44**	5, 8, 9	Year of release: 2010
186	Walker Choice Apartments	18700 Walker Choice Road Gaithersburg, MD 20886	**41**	8, 9	Year of release: 2001
250	Gaithers Town Plaza	602 N Frederick Rd Gaithersburg, MD 20833	**45**	5	Year of release: 1997
255	Amoco	596 N Frederick Rd Gaithersburg, MD 20833	**47**	5	Year of release: 1996
260	Hilton hotel	620 Perry Parkway Gaithersburg, MD 20879	**46**	5	Year of release: 1998
262	Chevron Exxon	448 N Frederick St Gaithersburg, MD 20877	**48**	5	Year of release: 1989, 2000
178	Concrete General Inc	8000 Beechcraft Avenue Gaithersburg, MD 20879	**61**	4 Modified	Year of release: 1998, 2009
184	Capital Bldg Supply Co	7870 Beechcraft Avenue Gaithersburg, MD 20879	**63**	4 Modified	Year of release: 2004
184	James L Muscatello, Inc	7901 Beechcraft Avenue Gaithersburg, MD 20879	**62**	4 Modified	Year of release: 2007
184	Deneau Construction Inc	7861 Beechcraft Avenue Gaithersburg, MD 20879	**64**	4 Modified	Year of release: 1996
188	T.W. Perry	8131 Snouffer School Rd Gaithersburg, MD 20879	**60**	4 Modified	Year of release: 1998, 1999
199	Air Park 124 LLC	18524 Woodfield Rd Gaithersburg, MD 20879	**66**	4 Modified	Year of release: 2005, 2007
206	Dora Giraldo Residence	18405 Guildberry Drive Gaithersburg, MD 20879	**65**	4 Modified	Year of release: 2004
209	Exxon	7983 Muncaster Mill Rd Gaithersburg, MD 20877	67	4 Modified	Year of release: 1997, 2004

Table 5-36: Sites of Potential Hazmat Concern Along Each Alternative

EDR ID	Name	Address	Map ID	Closest Alternative	Summary
209	Laytona Auto Service	7979 Muncaster Mill Rd Gaithersburg, MD 20877	**68**	4 Modified	Year of release: 1989
268	Bozzuto Group	7229 Muncaster Mill Rd Rockville, MD 20855	**70**	Out of Study Area	Year of release: 2003
277	Former Chevron/Redland Amoco Station	7201 Muncaster Mill Rd Rockville, MD 20855	**69**	4 Modified	Year of release: 1996, 2000
282	Exxon	17651 Redland Road Rockville, MD 20855	**71**	4 Modified	Year of release: 2006
2	Butler Orchards	22299 Davis Mill Rd Germantown, MD 20876	**50**	8,9 Option A, D	Year of release: 2009
15	Exxon	21101 Frederick Rd Germantown, MD 20876	**22**	5	Year of release: 2007
17	Mobil	21000 Frederick Rd Germantown, MD 20876	**23**	5	Year of release: 2004
22	East Germantown Fire Station #34	20633 Boland Farm Rd Germantown, MD 20876	**24**	5	Year of release: 2010
20	McRirie Property	11315 Neelsville Church Rd Germantown, MD 20876	**28**	5, 8, 9	Year of release: 2005
20	Dayspring Church	11301 Neelsville Church Rd Germantown, MD 20876	**29**	5, 8, 9	Year of release: 1999
21	Neelsville Presbyterian Church	20701 Frederick Rd Germantown, MD 20876	**25**	5	Year of release: 2008
25	A & P Contractors	20516 Frederick Rd Germantown, MD 20876	**26**	5	Year of release: 1999
25	W Express - Germantown Germantown Texaco (Former Amoco)	20510 Frederick Rd Germantown, MD 20876	**27**	5	Year of release: 1992, 2008
19	Private Residence	9700 Wightman Rd Gaithersburg, MD 20879	**51**	4 Modified	Year of release: 2002
27	Pepco Spill	20521 Sterncroft Ct Gaithersburg, MD 20866	**54**	4 Modified	Year of release: 2003

Table 5-36: Sites of Potential Hazmat Concern Along Each Alternative

EDR ID	Name	Address	Map ID	Closest Alternative	Summary
38	Elms @ Germantown	20320 Frederick Road Germantown, MD 20876	**30**	5	Year of release: 2004
41	Gross Residence	20240 - A4 Frederick Rd Germantown, MD 20876	**31**	5	Year of release: 1999
67	Exxon	19825 Frederick Rd Germantown, MD 20876	**33**	5	Year of release: 1995, 1997
79	Wayne Residence	19515 Frederick Rd #190 Germantown, MD 20876	**35**	5, 8, 9	Year of release: 2000

Source: Environmental Data Resources, Midcounty Highway EDR DataMap ™ Environmental Atlas ™; November 8, 2011