Multi-Modal Corridor Study

Frederick and Montgomery Counties, Maryland

Natural Environmental Technical Report
June 2007

US Department of Transportation
Federal Highway Administration
Federal Transit Administration

Maryland Department of Transportation
State Highway Administration
Maryland Transit Administration

MTA
Maryland

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

SHA
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Natural Environmental Technical Report Errata - May 2009:

This I-270/US 15 Multi-Modal Corridor Study Technical Report supports the environmental technical analysis conducted of the various roadway and transit alternatives examined in the Alternatives Analysis / Environmental Assessment (AA/EA) document dated May 2009. This technical report was originally published on the date presented on its cover. Following its publication, changes were made to the alternatives description that affected the text used to describe the alternatives but not to change the transportation components or operations of the alternatives. The environmental technical analysis results remain as originally published but the description of the alternatives has been revised to reflect the description found in the AA/EA document.

I-270/US 15 Project Team

EXECUTIVE SUMMARY

PURPOSE AND NEED

The purpose of the I-270/US 15 Multi-Modal Corridor Study is to investigate options to address congestion and improve safety conditions along the I-270/US 15 Corridor. The I-270/US 15 Corridor provides an essential connection between the Washington, DC metropolitan area and both central and western Maryland and is an important Corridor for carrying local and long distance trips, both within and beyond the Corridor. The National Highway System (NHS) Designation Act of 1995 adopted both I-270 and US 15 as elements of the NHS. A variety of transportation modes are utilized in the I-270/US 15 Corridor (including interstate highway, high-occupancy vehicle lanes, commuter rail, and bus service) and intermodal opportunities (including park and ride lots and Metrorail). However, even with the variety of options available, the Corridor is currently highly congested at many locations. These problems are expected to become more severe as continued planned development occurs over the next quarter century.

ALTERNATIVES

No-Build Alternative

The No-Build Alternative includes the existing condition and elements adopted from the 2004 Metropolitan Washington Council of Governments (MWCOG) Constrained Long Range Transportation Plan (CLRP). No major capacity improvements would be made on I-270 or US 15. Only routine maintenance and spot improvements, such as resurfacing, restriping, signing and lighting, are included in the No-Build Alternative.

Build Alternatives (Alternatives 6 and 7)

This report addresses includes a discussion of two build alternatives, Alternatives 6A and 6B and Alternatives 7A and 7B. Each consists of a TSM/TDM component; a highway component with general-purpose, auxiliary and express toll lanes (ETL), proposed interchanges, and improvements to existing interchanges; and a transit component including either LRT (6A) or BRT (6B) on the CCT.

The basic highway component for Alternatives 6A and 6B and Alternatives 7A and 7B includes the completion of two general-purpose and two ETL lanes in each direction between I-370 and MD 85. Alternatives 6A and 6B include only one additional lane on I-270 between MD 121 and I-70; the proposed I-270 section between MD 121 and MD 85 would include two general-purpose lanes and one ETL in each direction.

The transit component includes 15 proposed stations (plus the existing station at Shady Grove) and an operations and maintenance facility located in one of five locations in the Shady Grove Metro area, Metropolitan Grove Station area or in the vicinity of COMSAT.

SUMMARY OF IMPACTS

Potential impacts to natural resources from each of the build alternatives are briefly summarized below and listed in Table S-1. Alternatives 6A/B and 7A/B will have identical impacts to natural resources within the project corridor, as both alternatives are on the same physical footprint. Alternative 1 (No-Build Alternative) will not have an impact on the natural resources within the project corridor.

Table S-1:
Summary of Impacts

Resource	Alternative 6A/B and Alternative 7A/B	
	Highway	Transitway[1]
Prime Farmland Soils (acres)	642	100.7
Soils of Statewide Importance (acres)	460	28.7
Linear Feet of Streams Impacted (not including ephemeral channels)	20,198	4,006
100-Year Floodplain (acres)	25.6	2.8
Wetlands (acres)	13	2.6
Forests (acres)	268.6	27.2

[1] Transitway impacts do not include potential operations and maintenance facility impacts. See below.

The highway alignment will impact approximately 642 acres of prime farmland soils, while the transitway alignment will impact 100.6 acres. Alternatives 6A/B and 7A/B will also impact approximately 460 acres of soils of statewide importance for the highway alignment and 28.7 acres for the transitway alignment. The build alternatives will not impact geology, as most of the construction will occur at-grade, reducing the depth of excavation needed to complete the highway and transitway components of the project. The build alternatives will impact topography through grading and placement of fill in various locations for ramps, bridge approaches and extensions, and other new roadway components. The transit component of the build alternatives will traverse a less manipulated landscape than that of the highway component, resulting in a greater impact to topography.

The build alternatives could potentially impact shallow groundwater levels in areas of new pavement. However, impacts to deeper groundwater aquifers or groundwater quality are not anticipated during construction of the build alternatives. Alternatives 6A/B and 7A/B will traverse the Piedmont sole source aquifer (SSA). Impacts to the SSA could occur in areas where new pavement is proposed, directly impacting recharge and stream flow zones.

Alternatives 6A/B and 7A/B will directly impact 20,198 linear feet of perennial and intermittent streams for the highway component and 4,006 linear feet for the transitway component. The transitway will also include potential impacts to streams from two of the five operations and maintenance facilities being investigated. The Metropolitan Grove Road Study Area would impact 486 linear feet of streams while the Game Preserve Road Study Area would impact 660 linear feet of streams. The highway component will impact a total of 77 tributaries of various sizes that drain to larger streams within the project corridor. Direct impacts to stream channels by the highway component would be associated with culvert or bridge extensions in portions of the stream already disturbed by the existing I-270/US 15 crossing. Due to the alignment of the transitway along existing roadways, only six streams will be bisected. These streams are more undisturbed than those associated with the highway component but will most likely be bridged to further reduce impacts to these systems.

Both of the build alternatives will adversely affect surface water quality during construction. The impacts could include physical disturbances or alterations, accidental spills, and sediment releases. An increase in sediment loads could destroy or damage fish spawning areas and macro-invertebrate habitat or could lead to fish and macro-invertebrate mortality. The removal of trees or riparian buffer vegetation could potentially alter the temperatures of streams (Class III or Class IV) within the project corridor that contain fish sensitive to fluctuations in temperature, such as brown trout and rainbow trout. MDE prohibits in-stream work, for the protection of aquatic species, in Use I streams from March 1 through June 15, Use III streams from October 1 through April 30, and Use IV streams from March 1 through May 31. Best Management Practices (BMPs) and erosion and sediment control measures would be employed to minimize adverse effects to surface waters.

The highway component of the build alternatives will impact approximately 25.6 acres of the 100-year floodplain along area streams, while the transitway component will impact 2.8 acres. The majority of floodplain encroachments will be from perpendicular crossings by the highway build alternatives and the transitway alignment.

The highway alignment of Alternatives 6A/B and 7A/B will impact approximately 13 acres of wetlands, while the transitway alignment could potentially affect 2.6 acres. Palustrine emergent (PEM) wetlands are the wetland class that would be most affected by the highway build alternatives followed by forested wetlands (PFO), respectively. The transitway alignment will most impact emergent wetlands followed by scrub-shrub wetlands (PSS). Many of the wetlands impacted by these build alternatives are connected to larger wetland systems that provide a diverse and interdependent collection of ecological functions. These systems include Great Seneca Creek, Little Seneca Creek, Monocacy River, Rock Creek, Carroll Creek, Tuscarora Creek, Monocacy River, and Little Seneca Creek.

Potential forest impacts associated with the build alternatives include 268.6 acres for the highway component and 27.2 acres for the transitway component. Potential impacts to forest habitat would also occur from three of the five operations and maintenance facilities. Forest impacts associated with the operations and maintenance facilities include 0.8 acre at the Observation Drive (also known as Old Baltimore Road) Study Area, 10.2 acres at the Metropolitan Grove Road Study Area, and 18.7 acres at the Game Preserve Road Study Area. In general, impacts to plant communities by project build alternatives include direct losses from clearing within rights-of way and changes in plant community structure and composition. Effects to terrestrial resources will involve the conversion of habitat to impervious road, rail, or other associated facility.

Coordination with the U.S. Fish and Wildlife Service indicates that there are no federally proposed or listed endangered or threatened species within the project area. The build alternatives have the potential to adversely affect the state threatened pearl dace and comely shiner, both of which were caught in project area streams. Impacts to the comely shiner and pearl dace would likely be similar to the impacts to other aquatic biota such as mortality and loss of habitat. In response to potential impacts to RTE fish species on other projects, MDE has extended stream closure periods during construction activities. In Use III streams, such as Carroll Creek, the mandatory stream closure period may be extended to October 1 through April 30 or July 31.

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SECTION I INTRODUCTION

This technical report is presented as a supplemental document to the July 2002, I-270/US 15 Multimodal Corridor Study Final Natural Environmental Technical Report (CRI 2002). The report presents two new alternatives that include a new highway component of the build alternatives known as Express Toll Lanes (ETLs), as well as the transit alternatives on the Corridor Cities Transitway (CCT). The report presents the results of the natural environmental inventory and assessment performed for the new ETL and CCT alternatives. Where possible, this report builds on the natural environmental analysis documented in the Final Natural Environmental Technical Report and the 2002 Draft Environmental Impact Statement (DEIS). Updates to any resource characteristics that may have changed since publication of those documents are discussed, as well as the potential effects of the new ETL alternatives and the transit alternatives on these resources. Information on highway and transit alternatives presented in the 2002 NETR and DEIS has been included in this document for reference purposes only and has not been re-assessed.

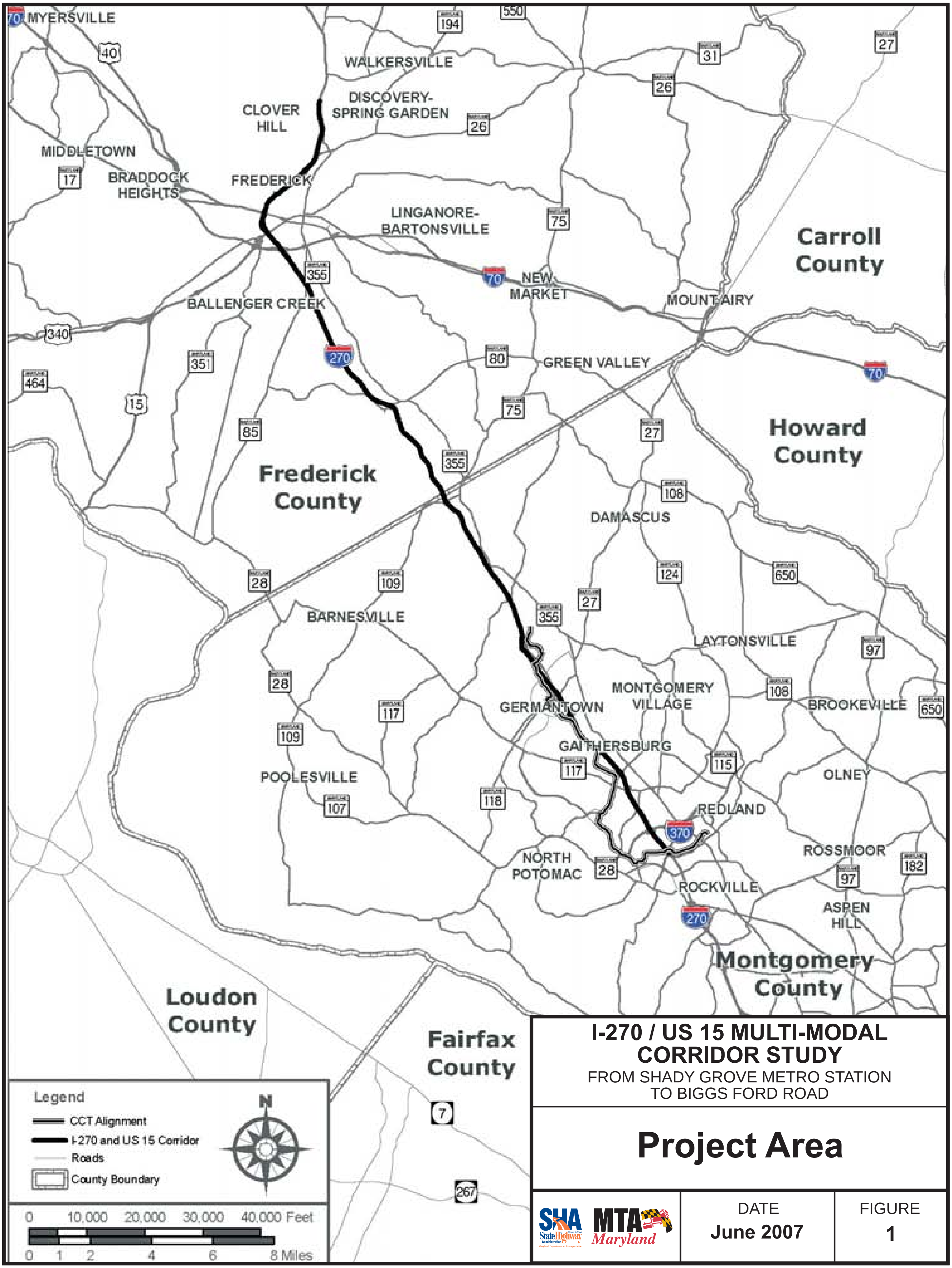
The document has been prepared in accordance with guidance from the United States Environmental Protection Agency (EPA), Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Maryland State Highway Administration (SHA), Maryland Transit Administration (MTA) and relevant local regulations of Frederick and Montgomery Counties.

Specifically, this report describes the alternatives under consideration, identifies the natural resources potentially affected by the project, reviews applicable standards and regulations, evaluates project-related effects to the natural environment, and discusses suitable mitigation options where appropriate.

A. DESCRIPTION OF PROJECT

The project area generally extends along the I-270/US 15 Corridor from the Shady Grove Metro Station south of I-370 in Montgomery County, Maryland, to the US 15/Biggs Ford Road intersection north of the City of Frederick in Frederick County, Maryland, as shown in **Figure 1**.

The project includes a Transportation System Management/Transportation Demand Management (TSM/TDM) component, a highway component (the addition of general-purpose and/or High Occupancy Vehicle (HOV) lanes, auxiliary lanes, and interchange improvements), a transit component (either Light Rail Transit (LRT) or Bus Rapid Transit (BRT) on the CCT or Premium Bus Service on managed lanes), and transit operations and maintenance facilities.



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

Project Area

	DATE	FIGURE
	June 2007	1

B. PROJECT BACKGROUND

The I-270 Corridor has been the subject of transit service studies since 1970, conducted by local and state agencies to address transportation needs in the corridor. The I-270/US 15 Multi-Modal Corridor Study Draft Environmental Impact Statement (DEIS) was approved by the FHWA, FTA, SHA, and MTA in May, 2002, and published for review and comment.

Following publication of the DEIS in May, 2002, Public Hearings were held to receive comments on the document on June 25, 2002 in Montgomery County and on June 27, 2002 in Frederick County. The public comment period ended on August 16, 2002.

In the fall of 2003, the Maryland Department of Transportation (MDOT) directed the SHA to consider the ETL concept as an alternative for the I-270/US 15 Corridor, and Public Workshops were held on June 29 and 30, 2004, to introduce the ETL concept for the project. Written comments were received from 22 citizens. An almost equal number of comments focused on transit and highway concerns, and comments were fairly equally divided in favor of or against the ETL concept.

1. Master Plan Context

In general, the master plan context for improvements in the I-270/US 15 Corridor is based on the Frederick and Montgomery County master planning documents, including:

- Montgomery County's *On Wedges and Corridors* master plan and the area plans within which the I-270 Corridor lies the Gaithersburg Vicinity, Germantown, Clarksburg and Hyattstown area plans, and
- Frederick City and County comprehensive plans and the area plans for the Frederick and Urbana Regions.

Three of these master plans are currently being updated the *Gaithersburg Vicinity-Shady Grove Master Plan Amendment* (November 1996), the *Gaithersburg Vicinity Master Plan Amendment* (July 1990) and the *Germantown Master Plan* (1990). Master plans that have been updated since the 2002 DEIS include

- The *Frederick Region Plan* (update adopted July 2002) supports the selection of any of the alternatives in the DEIS (including highway widening, and interchange improvements) and identifies additional recommendations for intersections on US 15 and the preservation of a transitway into downtown Frederick.
- The *Urbana Region Plan* (update adopted June 2004) recommends that I-270 be widened to six or eight lanes, construction of a new interchange on I-270 at MD 75, improvements to the MD 80 interchange and consideration of an additional interchange at Park Mills Road. The *Urbana Region Plan* also supports the preservation of a transitway in Frederick County.
- The *City of Frederick Comprehensive Plan* (update adopted September 2004) recommends the implementation of the improvements in the I-270/US 15 Multi-Modal Corridor Study DEIS, supports direct transit service to Montgomery County and Washington, DC employment centers as well as reverse commute service, and identifies an extension of Maryland Rail Commuter (MARC) service through the City.

There are no updates available for the *Clarksburg Master Plan and Hyattstown Special Study Area* or the Frederick County Comprehensive Plan.

The MTA MARC Master Plan/Strategic Plan is used as an internal document by MTA as a guide to capital project planning.

In winter 2005, MDOT developed *Maryland's Statewide Express Toll Lanes Network Initiative*, which provides an overview of the state's vision for regional connectivity through the implementation of managed lanes (including ETL, HOV, and High Occupancy Toll (HOT)) on major transportation routes. The implementation of ETLs on I-270 between the Capital Beltway (I-495) and I-70 is included in the regional plan.

2. Programmed Improvements

Programmed improvements associated with and within the I-270/US 15 Corridor are identified in the Metropolitan Washington Council of Government (MWCOG) 2004 Constrained Long Range Transportation Plan (CLRP) and in the Maryland Consolidated Transportation Program 2006 – 2011 (CTP) and listed in **Table 1**.

3. Project Changes

Since the 2002 DEIS, the following improvements have been completed in the Corridor

- I-270/MD 117 Interchange – An interchange improvement was completed that added a 368-space park and ride lot.
- US 15/MD 26 Interchange – An interchange improvement project was completed in 2006, adding a new northbound on-ramp to US 15 at this location.
- MD 124 from MD 28 to Longdraft Road – The roadway was reconstructed as a six-lane highway.
- MD 28 from Riffle Ford Road to Shady Grove Road – MD 28 was widened to a four or six-lane highway.
- Shady Grove Metro Station Parking Garage – A second garage opened in May 2003, adding 2,140 additional spaces for a total parking capacity of 5,865 spaces.
- Montgomery County Transit Centers - A 500-space park and ride lot and town center was opened at US 29 and MD 198 in Burtonsville and a 300-space park and ride lot was opened at Lakeforest Mall in Gaithersburg.
- Ride-On Express Bus from Germantown to Shady Grove – Bus Route 100 operates directly on I-270 and I-370 and was greatly expanded in 2006 to provide more frequent service in peak periods.

Changes in the project's description since the 2002 DEIS include Express Toll Lanes, interchanges, and transit elements as described in the following sections.

Table 1: Transportation Improvements Programmed for I-270/US 15 Corridor Included in 2030 Forecasts

Location	Description	Projected Completion Date
Highway Upgrade, Reconstruction, Extension and Widening Projects		
I-70 from Mt. Phillip Road to MD 144 (Baltimore National Pike)	Ramps EB I-70 to MD 355; relocated MD 85 at MD 355; widen MD 355 from S of I-70 for 2,000 feet	Under construction
	Extend MD 475 (East St) from South St to proposed Monocacy Blvd, including SWM ponds and new urban diamond interchange with I-70 and ramps to Walser Drive	2009
	Widen to 4-6 lanes, New Design Rd to Mt. Phillip Rd	2015
I-270 Interchange at Watkins Mill Rd	Widen and extend Watkins Mill Rd from 4-6 lanes; construct interchange; add 2-lane CD roads NB & SB on I-270	2025
MD 85 from English Muffin Way to N of Grove Rd	Upgrade, widen to 4 or 6 lanes	2025
MD 117 from Great Seneca Park to I-270	Improve roadway and reconstruct intersections to provide capacity and improve operations	2015
MD 118 from MD 355 to M-83/Watkins Mill Rd	Extend MD 118 as a 6-lane divided highway (includes bicycle/pedestrian accommodation)	2020
MD 355/MD 80 Urbana Bypass, east of I-270 north & south of Urbana	Construct to 4 lanes relocated east of I-270, from north of MD 80 to south of MD 80, including intersection (2 separate projects)	2005
Father Hurley Blvd from Wisteria Rd to MD 118 Relocated	Construct final link of Father Hurley as a 4- or 6-lane roadway (includes bridge over CSX; includes bicycle/pedestrian accommodation)	2010
Middlebrook Road Extended from MD 355 to M-83	Study to construct 6 lanes	2006
Intercounty Connector (ICC)	Construct toll freeway between I-270 and I-95/US1; engineering and row acquisition under way	2010
Transit Extensions and Parking Expansion Projects		
Montgomery County	Construction of transit center at Olney	2010
Montgomery County	Construction of transit center at Silver Spring	TBD
Point of Rocks MARC Station	Parking lot expansion –construction to begin December 2006	2008

Sources MWCOG 2004 CLRP (11/17/2004) Major Highway Improvements and Major HOV/Transit Improvements.

a. Express Toll Lanes

Express Toll Lanes (ETLs) are generally new capacity tolled highway lanes which can be combined with existing highway lanes, providing motorists a choice to pay a fee for a relatively congestion-free trip when travel time is critical. Tolls, collected electronically, would vary based on demand, and would provide alternative sources of funding for roadway construction and maintenance. Two alternatives are added that include the implementation of one or two ETLs and direct access ramps as part of the highway component.

b. *Interchanges*

The southbound ramps at the proposed interchange at I-270/Newcut Road have been reconfigured to the southwest quadrant based on environmental coordination with the US Army Corps of Engineers. The proposed interchange reconfiguration represents an alternative to be considered versus the configuration proposed in the DEIS.

The I-270/MD 121 interchange improvements have been broken out as a separate project planning study, led by a private developer. This study will investigate additional transportation movements that were not included in the DEIS, due to newly-approved development west of the existing interchange.

The I-270/MD 85 intersection has been reconfigured from the DEIS to address changes in traffic forecasts.

The US 15 interchange with Monocacy Boulevard/Christopher's Crossing has been broken out as a separate project planning study that will be led by the SHA.

c. *Transit Element Changes*

Since the publication of the 2002 DEIS, the MTA has dropped the proposed School Drive Station from further consideration. Montgomery County approved development in this area which, when built, prevented the use of the School Drive site for a station. Some of the proposed locations for the CCT Operations and Maintenance facilities have been eliminated through the screening process, and new sites have been added. Of the eight sites retained in the DEIS for additional study, only one site is still considered; four new sites have been identified. At this time, two sites in the Shady Grove area, two sites in the Metropolitan Grove area and one site in the COMSAT area are being studied. In some cases, these sites would be suitable for LRT or BRT only.

SECTION II ALTERNATIVES RETAINED FOR DETAILED STUDY

The I-270/US 15 Multi-Modal Corridor Study is considering the addition of both highway and transit improvements. The study looks at several ways to add capacity to the highway, including the addition of general purpose (GP) lanes or managed lanes – either HOV lanes or ETLs. Other proposed highway improvements include the addition of collector/distributor (CD) lanes, acceleration/deceleration lanes, auxiliary lanes, new and improved interchanges, and park and ride lots.

The transit alternatives being considered are LRT or BRT on the CCT, Premium Bus service operating on the highway's managed lanes, and a shared use path for bicyclists and pedestrians.

The various transportation modes and system improvements under consideration are defined as are the alternatives evaluated in the 2002 Draft Environmental Impact Statement (DEIS). This Natural Environmental Technical Report analyzes the AA/EA Alternatives 6A/B and 7A/B. Descriptions of both the DEIS and AA/EA alternatives are provided to assist the reader in understanding the entire proposed project.

1. Highway Improvement Descriptions

The I-270/US 15 highway alternatives propose various types of improvements. A brief description of the various lane types includes:

- ***General Purpose*** (GP) lanes are regular traffic lanes designed to accommodate all motor vehicle traffic on interstate and state highways, generally posted at speeds of 55 miles per hour or higher.
- ***High-Occupancy Vehicle*** (HOV) lanes are dedicated lanes which can only be used by vehicles with two or more occupants or by motorcycles. They may be separated from the GP lanes by striping or by a barrier. HOV lanes are managed lanes which are designed to encourage carpooling. I-270 currently has one HOV lane, designated as HOV-2, in both the northbound and southbound directions. HOV-2 requires at least two persons per vehicle.
- ***Express Toll Lanes*** (ETLs) are another type of managed lanes designed to alleviate congestion in GP lanes and provide relatively free-flowing traffic. ETLs are limited-access, tolled interstate highway lanes that are usually barrier-separated from GP lanes. Motorists who wish to travel in the less congested ETLs pay a toll that is collected at highway speeds by an *E-ZPass*™ transponder.
- ***Collector/Distributor*** (CD) lanes are one-way roads next to the interstate that operate similar to frontage roads. CD lanes provide relatively free-flowing lanes for shorter trips and are used to collect entering and exiting traffic at interchanges. This helps to eliminate weaving traffic in the main lanes of the interstate. CD lanes are barrier-separated from GP lanes and access between the CD and GP lanes is limited. I-270 currently uses a CD lane system designated as the "Local" lanes.
- ***Direct Access*** ramps provide direct, barrier-separated access to/from managed lanes at a limited number of locations along the highway. The direct access ramps provide continuity of travel and eliminate the necessity of merging managed lane and GP lane traffic at exits and entrances.

- ***Acceleration/deceleration*** lanes extend the length of entry and exit ramps to provide adequate distance for entering vehicles to reach highway speeds before merging with through traffic or allow exiting vehicles to slow to appropriate ramp speeds.
- ***Auxiliary*** lanes are acceleration and deceleration lanes connected between consecutive interchange ramps, so that vehicles traveling from one interchange to the next do not have to merge with the through highway lanes. They may eliminate some weaving between interchanges and provide a longer distance for vehicles entering the roadway to reach highway speeds.

2. Transit Descriptions

The following terms describe important elements of the transit alternatives:

- ***Corridor Cities Transitway*** (CCT) is a reserved transit corridor that is identified in Montgomery County and Frederick County master plans. The CCT alignment extends from the Shady Grove Metrorail Station in Gaithersburg, Montgomery County, to downtown Frederick in Frederick County. For the I-270/US 15 Multi-Modal Corridor Study, transit is only being considered between Shady Grove and the COMSAT area in Clarksburg, Montgomery County.
- ***Light Rail Transit*** (LRT) is an electric railway system that can operate single cars or short trains. The LRT system proposed for this project would operate completely on a dedicated right-of-way, or guideway, separated from traffic on local streets.
- ***Bus Rapid Transit*** (BRT) is a mode of transit that has characteristics common to both conventional bus systems and LRT. BRT for this project would use rubber-tired transit vehicles, most likely articulated buses, along a reserved transit guideway. Vehicles would be similar to LRT vehicles in performance and appearance. However they would be able to leave the transit guideway to access local destinations using the local road network.
- ***Premium Bus*** service would provide bus service using dedicated (managed) highway lanes and direct access ramps to travel from station to station. Premium bus provides limited stop service and non-stop service between origins and destinations.
- ***Corridor Cities Transitway Bike Path***, as denoted in Montgomery County planning documents, is a shared-use, hiker/biker trail that is an integral part of both the I-270/US 15 Multi-Modal Corridor Study and Montgomery County's bikeway network.

3. Alternatives

The alternatives being considered for the I-270/US 15 Multi-Modal Corridor Study include those presented in the 2002 DEIS (Alternatives 1, 2, 3A/B, 4A/B and 5A/B/C), two new build alternatives (Alternatives 6A/B and 7A/B), and the alternatives required to complete the FTA Alternatives Analysis (Alternatives 6.1 and 6.2). Brief descriptions of the alternatives are presented below.

a. Alternatives Evaluated in the 2002 DEIS

Nine alternatives, listed in **Table 2,** were retained and evaluated in the DEIS, including:

- Alternative 1: the No-Build Alternative;
- Alternative 2: TSM/TDM Alternative; and
- Build Alternatives 3A/B, 4A/B and 5A/B/C, each of which consisted of a highway component and a transit component.

Table 2: Alternatives Retained in the 2002 DEIS

Alternative	Description
1	No-Build Alternative
2	TSM/TDM Alternative
3A	Master Plan[1] HOV/LRT Alternative
3B	Master Plan[1] HOV/BRT Alternative
4A	Master Plan[1] General-Purpose/LRT Alternative
4B	Master Plan[1] General-Purpose/BRT Alternative
5A	Enhanced[2] Master Plan HOV/General-Purpose/LRT Alternative
5B	Enhanced[2] Master Plan HOV/General-Purpose/BRT Alternative
5C	Enhanced[2] Master Plan HOV/General-Purpose/Premium Bus Alternative

1 Master Plan refers to proposed alignments along I-270 & US 15 included in the current Frederick and Montgomery County approved master plans.

2 Enhanced Master Plan refers to proposed improvements that are greater than called for in the Montgomery County Clarksburg Area Master Plan.

Alternative 1: No-Build Alternative

The No-Build Alternative (Alternative 1) serves as a basis for comparing all other alternatives. The No-Build Alternative does not provide any major changes to the existing transportation network. The No-Build Alternative includes minor repairs, maintenance, and safety improvements, as well as programmed improvements identified in the State's fiscally-constrained long range transportation plan, with the exception of the proposed improvements in this study. The existing I-270 roadway is a fully access-controlled highway that provides a combination of CD, GP and HOV lanes in the northbound direction and between two and four GP lanes in the southbound direction. US 15 is a fully access-controlled highway through the City of Frederick and has limited access north of Frederick. US 15 has two GP lanes in each direction.

Alternative 2: TSM/TDM Alternative

The TSM/TDM Alternative (Alternative 2) includes a number of relatively low-cost measures that are meant to improve the overall operation of the existing transportation system without major capacity improvements. TSM measures include increased local bus service, enhanced feeder bus service to existing fixed guideway transit, the addition of intelligent transportation systems to improve traffic flow and incident management on I-270, and interactive transit information made available at major employment centers. TDM measures include adding park and ride lots, rideshare programs, vanpool, pedestrian and bicycle programs, and telecommuting and flexible work hours programs. The TSM/TDM alternative also includes programmed improvements. The elements of the TSM/TDM alternative are also included as a component of each of the build alternatives.

Alternatives 3A and 3B

Alternatives 3A and 3B, as retained in the 2002 DEIS, would add GP lanes, HOV lanes, auxiliary lanes, and direct access ramps along I-270 and GP lanes and auxiliary lanes along US 15. Alternative 3A would provide LRT on the CCT from the Shady Grove Metrorail station to the COMSAT area in Montgomery County, while Alternative 3B would provide BRT service on the CCT between the same destinations. Alternatives 3A/B are shown on **Figures 2** and **3** and can be reviewed in detail in the 2002 DEIS in Volume 2, Chapter XI.

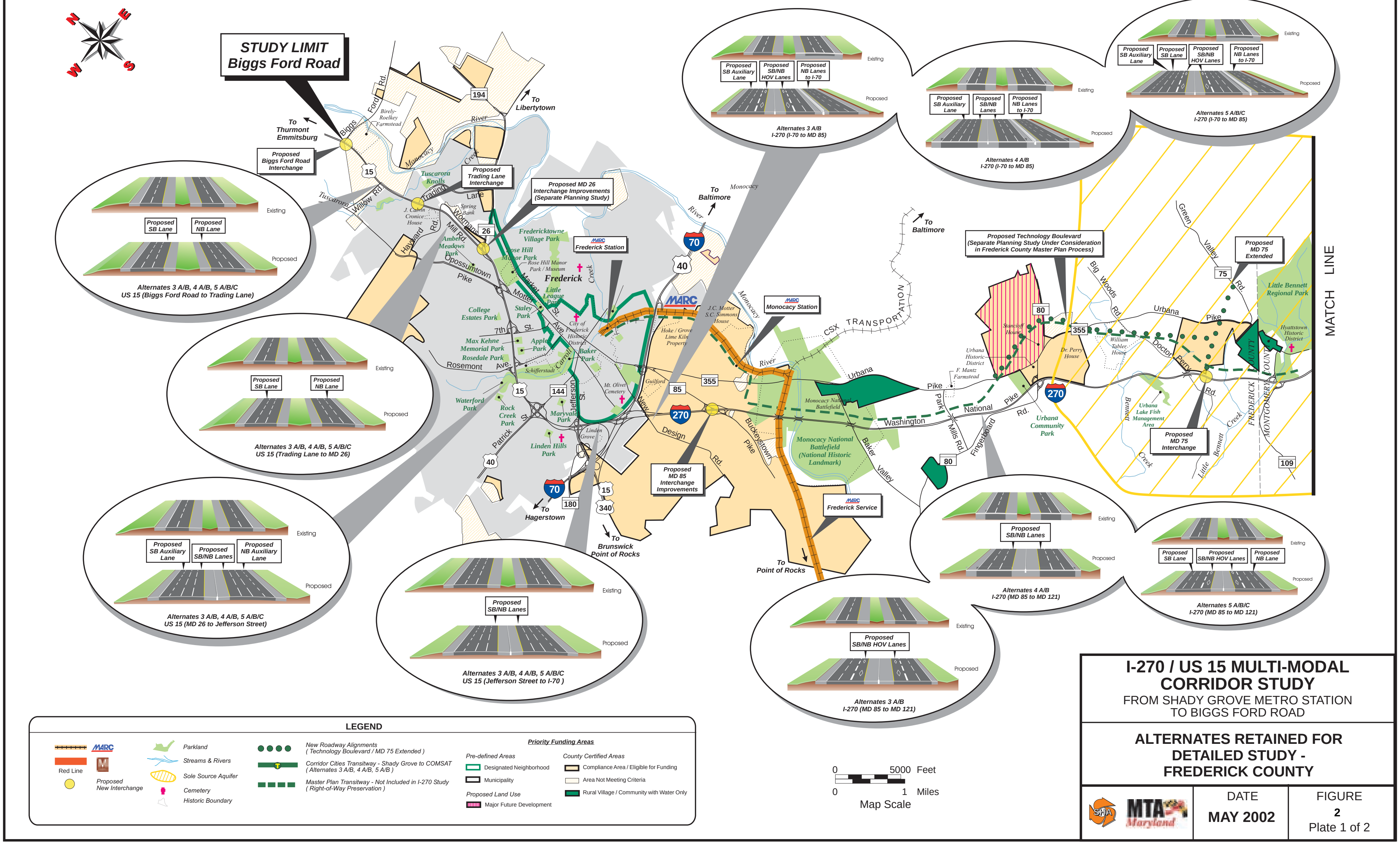
The highway improvements would include the following:

- Between I-370 and Father Hurley Boulevard, I-270 would have three GP lanes and one HOV lane in each direction, barrier-separated from CD and auxiliary lanes as necessitated by projected traffic volumes. GP lanes would be separated from HOV lanes by striping.
- Between Father Hurley Boulevard and MD 121, I-270 would have four GP lanes and one HOV lane in each direction, with GP lanes separated from HOV lanes by striping.
- From MD 121 to MD 85, I-270 would have two GP lanes and one HOV lane in each direction, with GP lanes separated from HOV lanes by striping.
- From MD 85 to I-70, I-270 would have two GP lanes and one HOV lane in each direction, with GP lanes separated from HOV lanes by striping. An auxiliary lane would be provided in the southbound direction, while a barrier-separated, three-lane ramp to I-70 would be provided in the northbound direction.
- Between I-70 and Biggs Ford Road, US 15 would have three GP lanes in each direction. An auxiliary lane would extend in both directions between Jefferson Street and MD 26.

Ramps providing direct access to the HOV lanes would be provided at the proposed Newcut Road and Watkins Mill Road interchanges to facilitate movements by buses and autos to transit stations at COMSAT and Metropolitan Grove.

New interchanges are proposed at I-270/Newcut Road, I-270/MD 75 Extended, US 15/ Trading Lane (now Monocacy Boulevard/Christopher's Crossing), and at US 15/Biggs Ford Road. Existing interchanges will be modified to accommodate all traffic movements and the improved highway section. Three park and ride lots are included in Alternatives 3A/B, located at US 15/MD 26, US 15/Monocacy Boulevard, and US 15/Biggs Ford Road.

The transit component of Alternatives 3A and 3B would provide either LRT or BRT on the CCT. Thirteen new station locations were initially identified for construction to service employment and mixed-use centers, with a proposed combined parking capacity of 4,500 to 5,150 spaces. Four additional future station locations were identified. Station locations include: Shady Grove Metrorail (existing station with over 5,800 parking spaces), East Gaither, West Gaither, Washingtonian, Crown Farm (future station), DANAC, Decoverly, School Drive *(dropped from consideration in 2007 due to property development),* Quince Orchard Park/Sioux Lane, NIST, First Field (future station), Metropolitan Grove, Middlebrook (future station), Germantown Center, Cloverleaf, Manekin (future station), Dorsey Mill, and COMSAT.



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

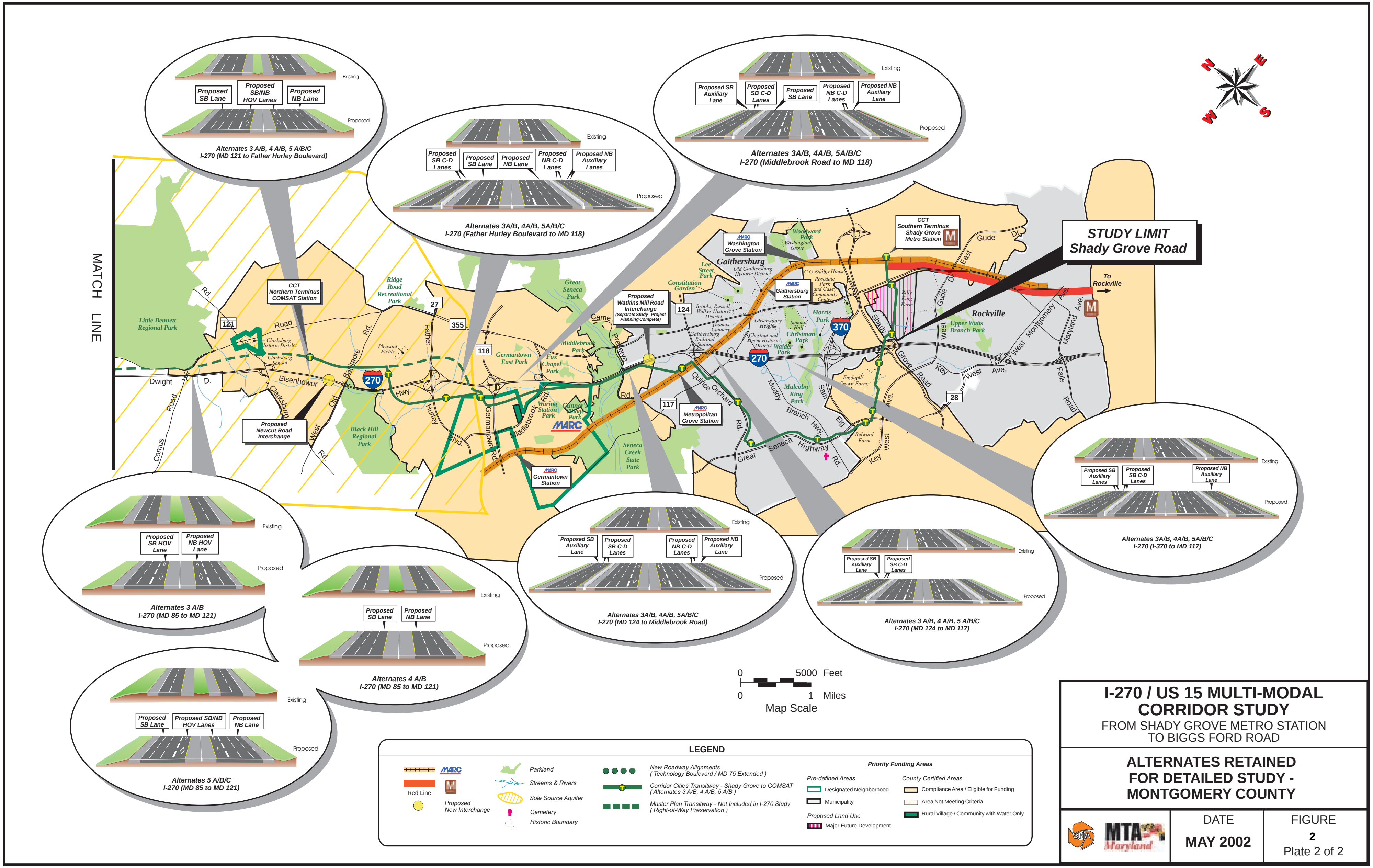
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

ALTERNATES RETAINED FOR DETAILED STUDY - FREDERICK COUNTY

SHA MTA Maryland

DATE
MAY 2002

FIGURE
2
Plate 1 of 2



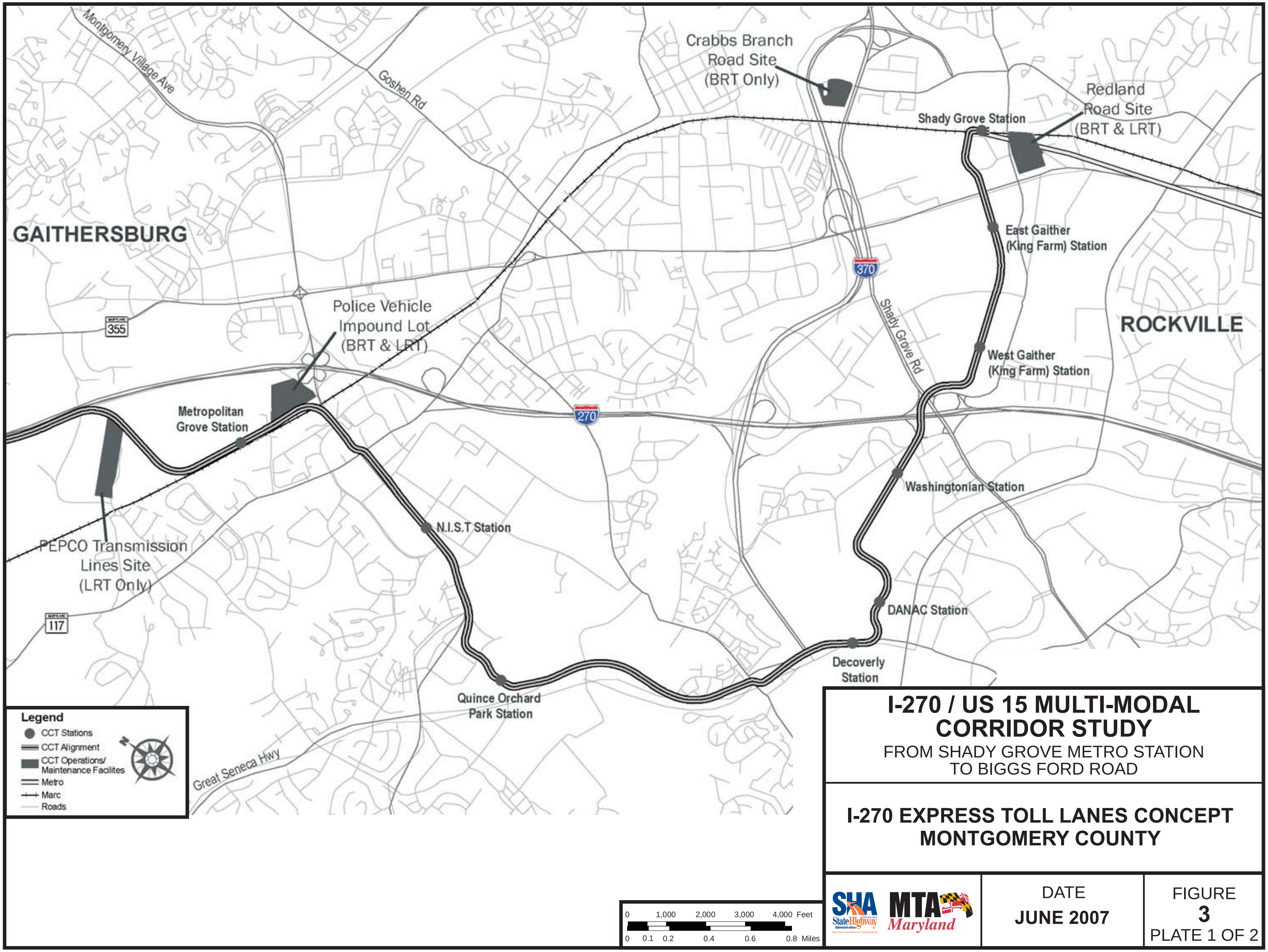
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

ALTERNATES RETAINED FOR DETAILED STUDY - MONTGOMERY COUNTY

DATE
MAY 2002

FIGURE
2
Plate 2 of 2



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

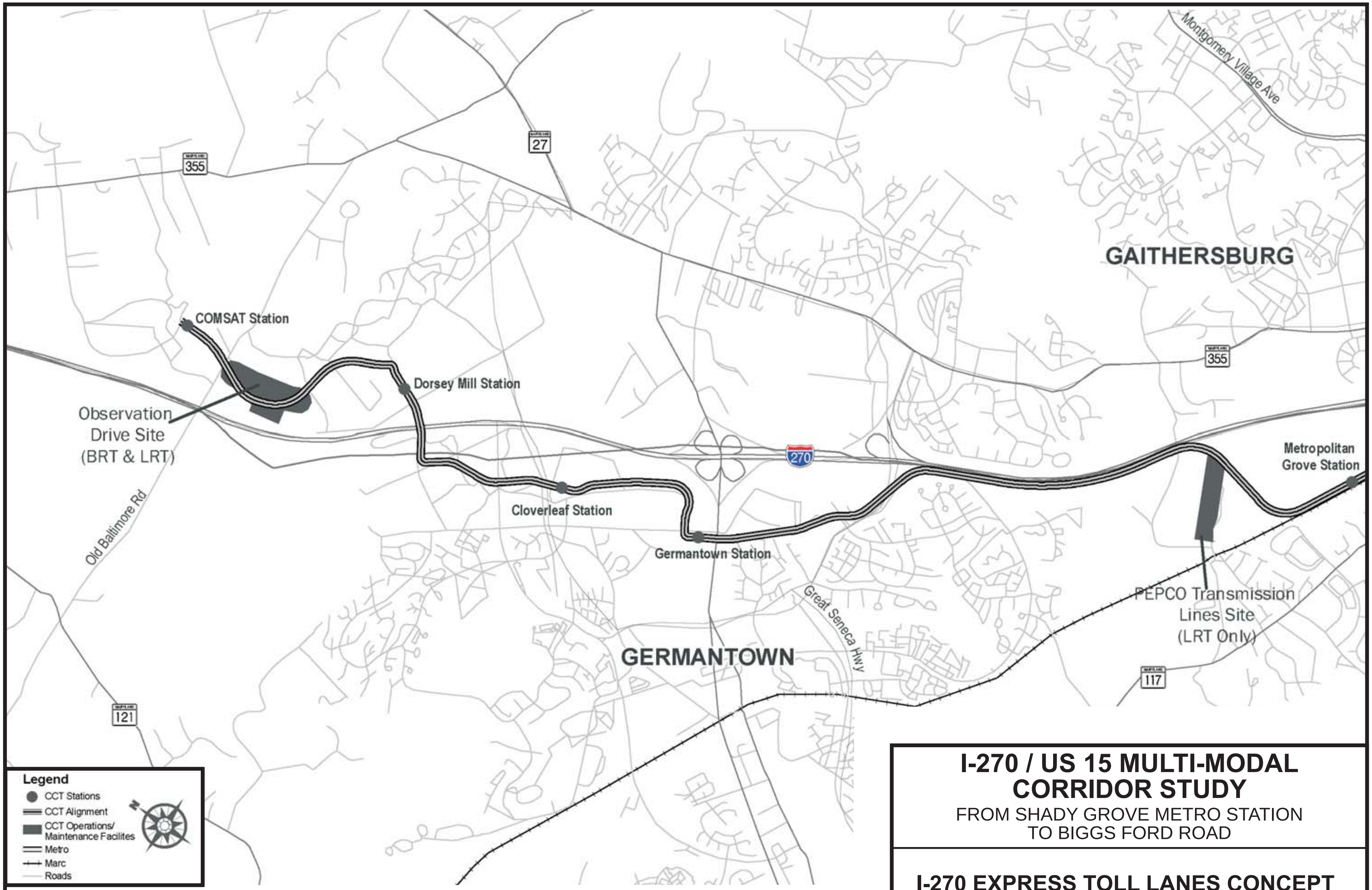
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

I-270 EXPRESS TOLL LANES CONCEPT
MONTGOMERY COUNTY

SHA State Highway Administration
MTA Maryland

DATE
JUNE 2007

FIGURE
3
PLATE 1 OF 2



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

I-270 EXPRESS TOLL LANES CONCEPT
MONTGOMERY COUNTY

DATE
JUNE 2007

FIGURE
3
PLATE 2 OF 2

An O&M facility for servicing light rail or bus rapid transit vehicles would be located in one of three identified areas: Shady Grove, Metropolitan Grove, or COMSAT. A shared use hiker/biker trail would also be constructed adjacent to the CCT.

Alternatives 4A and 4B

Alternatives 4A and 4B would add GP lanes, HOV lanes, auxiliary lanes, and direct access ramps along I-270 and GP lanes and auxiliary lanes along US 15. Alternative 4A would provide LRT on the CCT from Shady Grove to COMSAT, while Alternative 4B would provide BRT service on the CCT. Alternative 4A/B is shown on **Figures 2** and **3** and can be reviewed in detail in the 2002 DEIS in Volume 2, Chapter XI.

The highway component of Alternatives 4A/B would be the same for I-270 and US 15 as it is in Alternatives 3A/B, except for the section between MD 121 and MD 85. From MD 121 to MD 85, Alternatives 4A/B would have three GP lanes in each direction instead of two.

The transit component for Alternatives 4A/B is identical to the transit component for Alternatives 3A/B.

Alternatives 5A, 5B and 5C

Alternatives 5A, 5B, and 5C would add GP lanes, HOV lanes, auxiliary lanes, and direct access ramps along I-270 and GP lanes and auxiliary lanes along US 15. The highway component would be the same as Alternatives 3A/B, except for the section between MD 121 and I-70.

- Between MD 121 and MD 85, Alternative 5 would have three GP lanes and one HOV lane in each direction, with GP lanes separated from HOV lanes by striping. The HOV lanes would terminate at the proposed direct access ramps to/from MD 85.
- Between MD 85 and I-70, I-270 would have four GP lanes in each direction. An auxiliary lane would be provided in the southbound direction, while a barrier-separated, three-lane ramp to I-70 would be provided in the northbound direction.

Direct access ramps to HOV lanes would be provided at the proposed Watkins Mill Road (a separate SHA planning effort) and Newcut Road interchanges, as well as at the I-370, MD 118 and MD 85 interchanges.

Alternative 5A would provide LRT on the CCT from Shady Grove to COMSAT, while Alternative 5B would provide BRT service on the CCT. Alternative 5C would replace the CCT with Premium Bus service operating on the highway HOV lanes. Alternatives 5A/B/C are shown on **Figures 2** and **3** and can be reviewed in detail in the 2002 DEIS In Volume 2, Chapter XI.

b. New Alternatives Being Evaluated in the EA

This Natural Environmental Technical Report has been prepared to analyze the AA/EA Alternatives 6A/B and 7A/B. An AA is used by FTA to evaluate the costs and benefits of a range of transportation alternatives to make an informed selection of a preferred transit mode and alignment. The EA is used to evaluate the environmental impacts of the proposed highway and transit improvements of the alternatives and to make an informed selection of a Locally Preferred Alternative. The alternatives being evaluated by the AA and EA are shown in **Table 3.** Seven alternatives are listed, and six of these meet the FTA guidelines for an AA. Two alternatives, Alternative 6.1: No-Build Transit and Alternative 6.2: Transit TSM, are included solely for the assessment of transit performance and are not evaluated for resource impacts. Four alternatives, Alternatives 6A, 6B, 7A and 7B, are being evaluated for resource impacts in this document. Alternatives 6A/B and 7A/B include ETLs instead of HOV lanes as the managed lane component, plus the LRT or BRT transit mode on the CCT as the transit component. Alternative 1: No-Build is carried forward from the 2002 DEIS and is updated to reflect the latest demographic forecasts from the Metropolitan Washington Council of Governments (MWCOG) and the latest planned transportation improvements in the MWCOG Constrained Long Range Plan (CLRP).

Table 3: Alternatives Considered in the EA or AA

Alternative	Description	AA or EA
1: No-Build	No-Build Alternative carried from 2002 DEIS; includes latest Metropolitan Planning Organization (MPO) demographic forecasts	EA
6.1: No-Build Transit	Master Plan[1] ETL Alternative 6; no transit improvements beyond CLRP (with CCT removed)	AA
6.2: Transit TSM	Master Plan[1] ETL Alternative 6; with Transit TSM (enhanced bus service)	AA
6A	Master Plan[1] ETL/LRT Alternative	AA and EA
6B	Master Plan[1] ETL/BRT Alternative	AA and EA
7A	Enhanced[2] Master Plan ETL/LRT Alternative	AA and EA
7B	Enhanced[2] Master Plan ETL/BRT Alternative	AA and EA

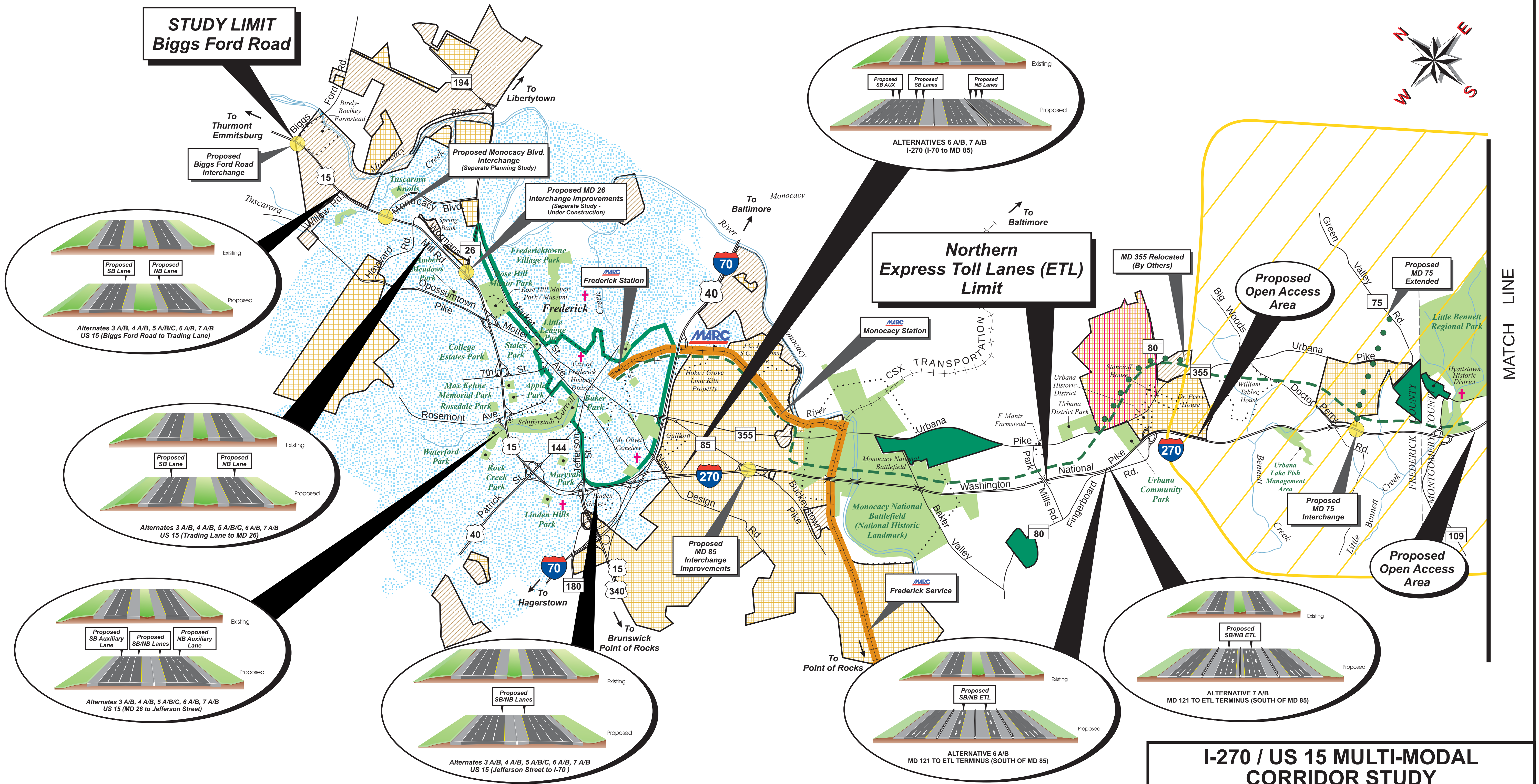
1 *Master Plan refers to alignments along I-270 & US 15included in current Frederick and Montgomery County approved master plans.*
2 *Enhanced Master Plan refers to proposed improvements that are greater than called for in the Montgomery County Clarksburg Area Master Plan.*

Alternatives 6A and 6B

The highway component of Alternatives 6A and 6B would add GP lanes, ETLs, auxiliary lanes, and direct access ramps along I-270 and GP lanes and auxiliary lanes along US 15. ETLs would terminate north of MD 80 at the direct access ramps south of the Monocacy National Battlefield in Frederick County. Alternative 6A would provide LRT on the CCT from Shady Grove to COMSAT, while Alternative 6B would provide BRT service on the CCT. Alternatives 6A/B are shown on **Figures 4 (Sheets 1 and 2), 4.1** and **4.2.**

Between I-370 and north of MD 80, Alternatives 6A and 6B would provide up to two ETLs in each direction in the median lanes, barrier-separated from highway GP lanes and served by direct access ramps at designated interchanges and open access areas. The highway component would provide:

- Four GP lanes and two ETLs each direction between Shady Grove Road and MD 124,
- Three GP lanes and two ETLs in each direction between MD 124 and proposed Newcut Road,



LEGEND

┼┼┼┼	MARC
🟥 Red Line	M metro
●	Proposed New Interchange

- Parkland
- Streams & Rivers
- Sole Source Aquifer
- ✝ Cemetery
- Historic Boundary

● ● ● ●	New Roadway Alignments (MD 355 Relocated / MD 75 Extended)
━Ⓣ━	Corridor Cities Transitway - Shady Grove to COMSAT (Alternates 3 A/B, 4 A/B, 5 A/B)
▬ ▬ ▬	Master Plan Transitway - Not Included in I-270 Study (Right-of-Way Preservation)

Priority Funding Areas

Pre-defined Areas

- ▭ Designated Neighborhood
- ▭ Municipality

Proposed Land Use

- ▥ Major Future Development

County Certified Areas

- ▦ Compliance Area / Eligible for Funding
- ▨ Area Not Meeting Criteria
- 🟩 Rural Village / Community with Water Only

0 5000 Feet
0 1 Miles
Map Scale

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

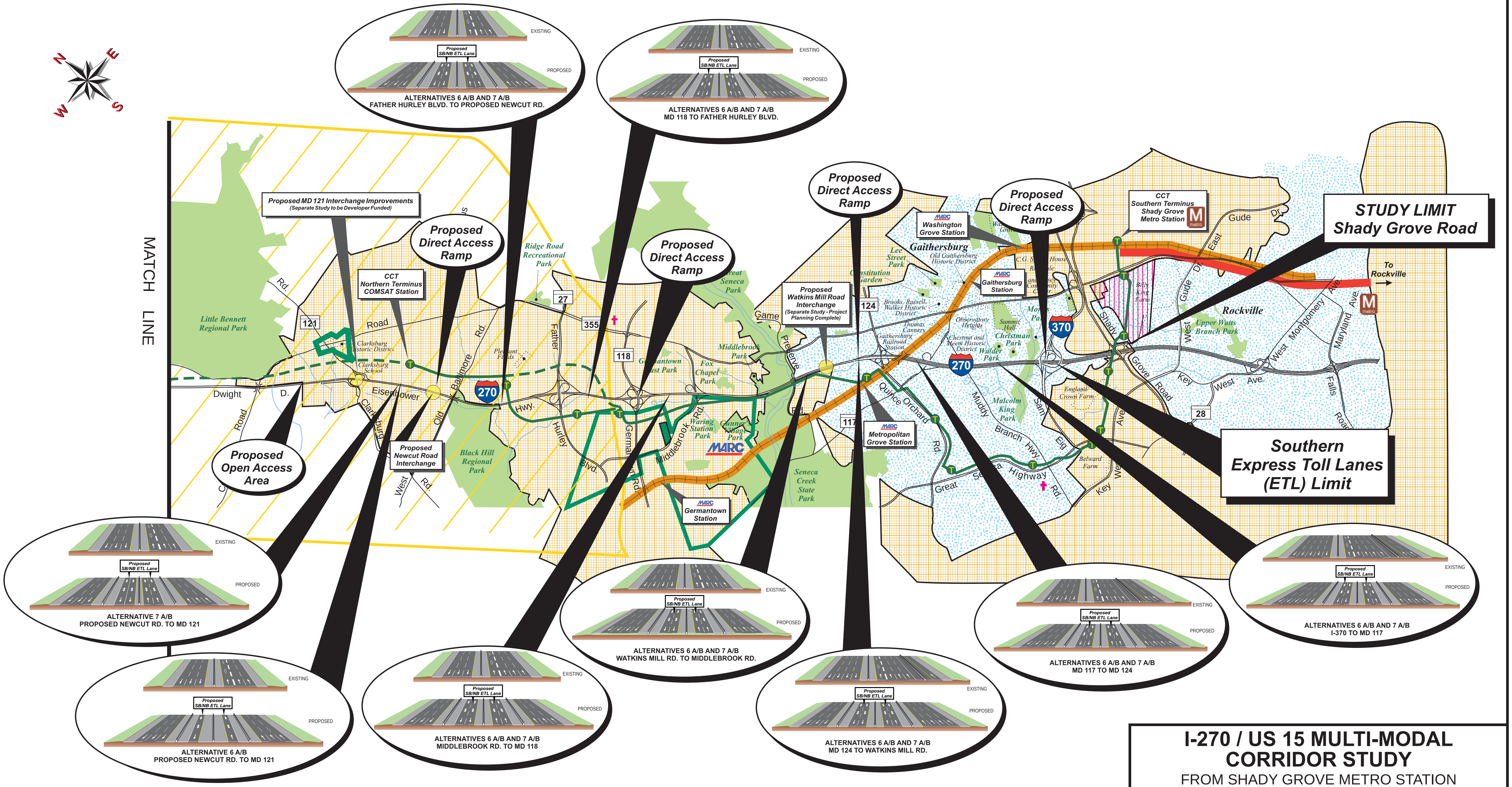
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

ALTERNATIVES 6 A/B, 7 A/B
FREDERICK COUNTY

SHA State Highway
MTA Maryland

DATE
JUNE 2007

FIGURE
4
PLATE 1 OF 2



LEGEND

┿┿┿┿ MARC	Parkland
Red Line	Streams & Rivers
Proposed New Interchange	Sole Source Aquifer
	Cemetery
	Historic Boundary

● ● ● ● New Roadway Alignments
(Technology Boulevard / MD 75 Extended)

Corridor Cities Transitway - Shady Grove to COMSAT
(Alternates 3 A/B, 4 A/B, 5 A/B)

▬ ▬ ▬ ▬ Master Plan Transitway - Not Included in I-270 Study
(Right-of-Way Preservation)

Priority Funding Areas

Pre-defined Areas
- Designated Neighborhood
- Municipality

Proposed Land Use
- ▥ Major Future Development

County Certified Areas
- ▦ Compliance Area / Eligible for Funding
- ▨ Area Not Meeting Criteria *(none on this figure)*
- 🟩 Rural Village / Community with Water Only

0 5000 Feet
0 1 Miles
Map Scale

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

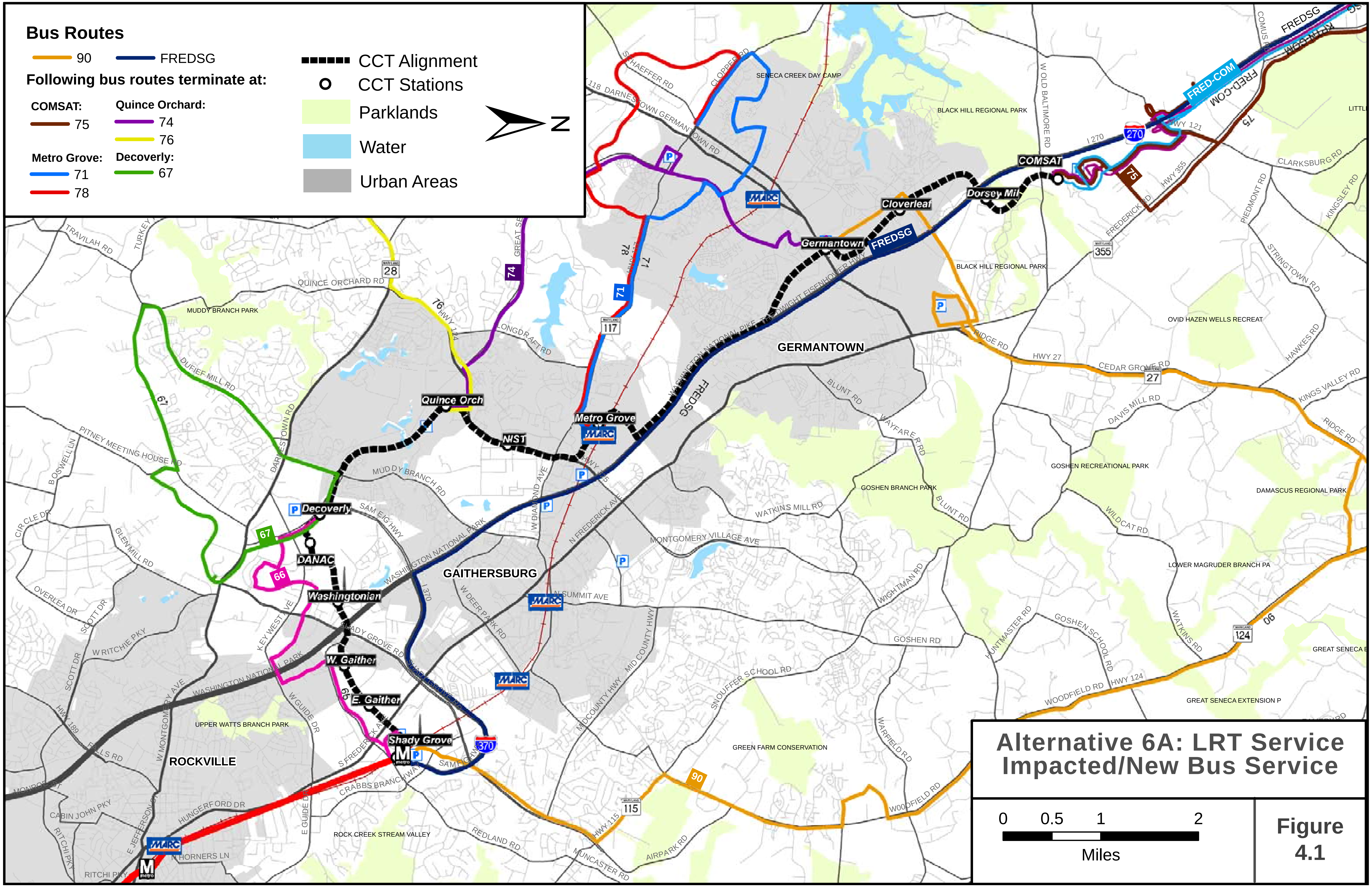
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

ALTERNATIVES 6 A/B, 7 A/B
MONTGOMERY COUNTY

SHA State Highway Administration
MTA Maryland

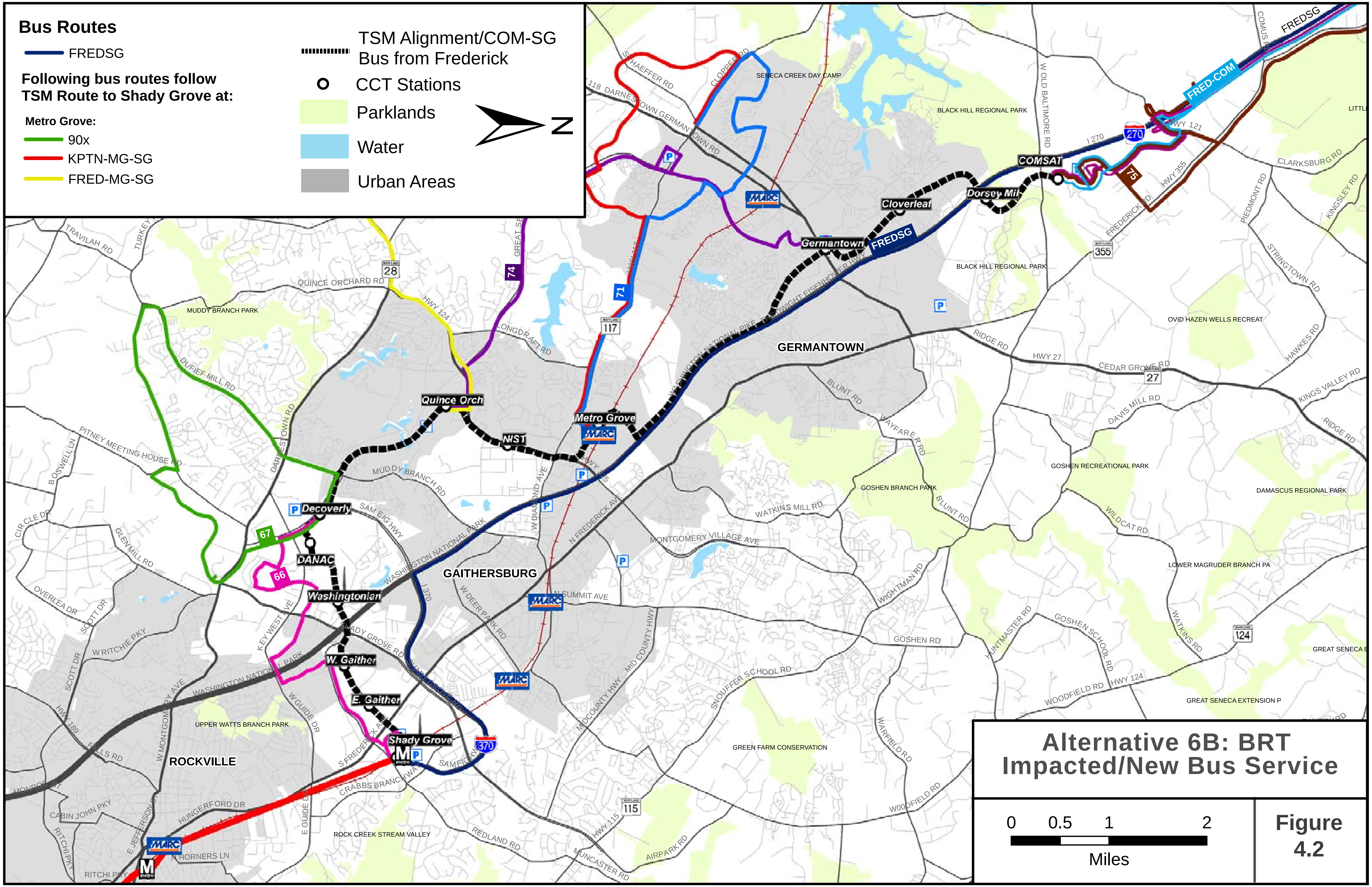
DATE
JUNE 2007

FIGURE
4
PLATE 2 OF 2



Alternative 6A: LRT Service Impacted/New Bus Service

Figure 4.1



Alternative 6B: BRT Impacted/New Bus Service

Figure 4.2

- Three GP lanes and one ETL in each direction between proposed Newcut Road and MD 121,
- Two GP lanes and one ETL in each direction between MD 121 and north of MD 80, where the ETLs will terminate in the vicinity of Park Mills Road , and
- Three GP lanes in each direction from north of MD 80 to Biggs Ford Road.

Auxiliary lanes would provide additional travel lanes between interchanges as needed to provide capacity. The typical sections are also shown on **Figure 4 (Sheets 1 and 2)**.

Direct access ramps for ETLs only would be provided south of I-370 and north of MD 80 at the ETL termini; at the interchanges of I-270 with I-370, MD 118, and proposed Newcut Road; from proposed Metropolitan Grove Road Extended; and via open access ramps between MD 121 and MD 109 and between MD 75 and MD 80.

New interchanges are proposed at I-270/Newcut Road, I-270/MD 75 Extended, and at US 15/Biggs Ford Road. Existing interchanges will be modified to accommodate all traffic movements and the improved highway section. Two interchanges, at I-270/Watkins Mill Road and at US 15/Monocacy Boulevard/Christopher’s Crossing, are being developed by SHA as separate planning projects that should accommodate future changes in the I-270/US 15 roadway. One park and ride lot at US 15 and Biggs Ford Road is included in Alternatives 6A and 6B.

The transit component of Alternatives 6A and 6B would provide either light rail or bus rapid transit on the CCT. Twelve new station locations were identified for initial construction to service employment and mixed-use centers, with a proposed combined parking capacity of 4,700 spaces. Four additional future station locations were identified. Station locations include: Shady Grove Metrorail (existing station with over 5,800 parking spaces), East Gaither, West Gaither, Washingtonian, Crown Farm (future station), DANAC, Decoverly, Quince Orchard, NIST, First Field (future station), Metropolitan Grove, Middlebrook (future station), Germantown Center, Cloverleaf , Manekin (future station), Dorsey Mill, and COMSAT.

In addition to transit service on the CCT, transit measures include the following:

- New feeder bus routes to serve the CCT stations
- New premium bus routes from Frederick County serving major activity centers
- Park and ride facilities at key CCT stations
- Interactive transit information at major employment centers in the Corridor and at CCT stations

In addition to BRT or LRT service, Alternatives 6A and 6B will include Premium Bus service between Frederick County and corridor park and ride lots, major activity centers, and transit stations operating on the managed lanes of I-270. These include the FREDSG, FREDMGSG and KPTNMGSG routes that also appear in Alternative 6.2: Transit TSM.

An Operations and Maintenance (O&M) facility for servicing light rail or bus vehicles would be located in one of three identified areas: Shady Grove, Metropolitan Grove, or COMSAT. A shared use hiker/biker trail would also be constructed adjacent to the CCT.

Alternatives 7A and 7B

Alternatives 7A and 7B would add GP lanes, ETLs, auxiliary lanes, and direct access ramps along I-270 and GP lanes and auxiliary lanes along US 15. ETLs would terminate north of MD 80 at the direct access ramps south of the Monocacy National Battlefield in Frederick County. Alternative 7A would provide LRT on the CCT from Shady Grove to COMSAT, while Alternative 7B would provide BRT service on the CCT. Alternatives 7A/B are shown on **Figures 4 (Sheets 1 and 2), 4.1** and **4.2.**

The highway typical section for Alternatives 7A/B is identical to the section for Alternatives 6A/B except between MD 121 and north of MD 80. In this section, Alternatives 7A/B would have two ETLs per direction, with a four-foot inside offset to the median barrier.

The transit component of Alternatives 7A and 7B is identical to the transit component of Alternatives 6A and 6B.

Alternative 6.1: No-Build Transit

The highway component of the No-Build Transit Alternative is identical to the highway improvements in Alternative 6A/B. The highway build is included as part of the No-Build Transit Alternative to facilitate the analysis of the transit alternatives. By using an identical highway network baseline in the travel demand modeling of the No-Build Transit, Transit TSM, and transit build alternatives, the analysis is able to isolate the benefits attributable solely to the transit components, without having to compensate for changes in the underlying traffic patterns.

The transit component of Alternative 6.1: No-Build Transit consists of the existing transit services in the corridor plus any improvements programmed in the fiscally constrained long-range transportation plan for the Metropolitan Washington Region. **Table 3.1** summarizes the routes, termini, and frequency of transit services in Montgomery and Frederick Counties for the No-Build Transit Alternative.

Alternative 6.2: Transit TSM

The Transit TSM Alternative serves as the baseline for analyzing transportation performance among the transit alternatives, as required by the FTA. The Transit TSM Alternative represents the best transit service that can be achieved for the purposes of meeting the project Purpose and Need without investing in major capital improvements, such as the construction of an LRT or BRT fixed guideway. The Transit TSM Alternative is designed to provide comparable quality and levels of transit service at lower cost that Alternatives 6A/B, without major investment in a transit fixed guideway and using the same assumptions for the highway network as Alternatives 6A/B. Alternative 6.2 includes the operation of high quality transit service to a comparable level as the CCT, but without the construction of the exclusive transitway.

The highway component of Alternative 6.2 is identical to the highway improvements in Alternative 6A/B. The highway build is included in Alternative 6.2 to isolate the transit improvements and determine the benefits attributable solely to the transit components.

Table 3.1: 2030 No-Build Transit Service

Route	Current Terminals		2006 Headways		Notes	Proposed 2030 No-Build Headways	
	Start	End	Peak	Off-Peak		Peak	Off-Peak
43	Travillah Transit Center	Shady Grove	15	20		15	20
54	Lake Forest	Rockville	20	30		15	30
55	Germantown Transit Center	Rockville	15	30		10	20
56	Lake Forest	Rockville	20	30		15	30
61	Germantown Transit Center	Shady Grove	30	30		15	30
63	Shady Grove	Rockville	30	30		20	30
66	Travillah Transit Center	Shady Grove	30	-	off-peak dir only	20	30
67	Travillah Transit Center	Shady Grove	30	-	peak direction only	20	30
70	Milestone	Bethesda Medical Center	15	-	not all stops	15	
71	Kingview Park and Ride	Shady Grove	30	-	peak direction only	20	
74	Germantown Transit Center	Shady Grove	30	30		20	30
75	Urbana	Germantown Transit Center	30	30	not all stops in off-peak	20	30
76	Poolesville	Shady Grove	30	-	not all stops in off-peak	20	30
78	Kingview P&R	Shady Grove	30	-	peak direction only	20	-
79	Milestone	Shady Grove	30	-	peak direction only	20	-
82	Clarksburg	Germantown Transit Center/DOE	30	-	peak direction only	20	-
83	Milestone	Germantown Transit Center	15	30	MARC station in peak	15	30
90	Milestone	Shady Grove	30	30	different routes throughout day	20	30
97	Germantown Transit Center	Germantown MARC	15	30	loop	15	30
98	Germantown Transit Center	Seabreeze Court	15	30	loop	15	30
100	Germantown Transit Center	Shady Grove	5	15	express via I-270	5	15
124	MD 124 Park and Ride (MD 117 Park and Ride)	Shady Grove	30	-	express via I-270	20	-
MTA 991	Hagerstown	Shady Grove/Rock Spring Park	15	-		15	-
FT10	Frederick Towne Mall	Francis Scott Key Mall	30	40		30	40
FT20	Francis Scott Key Mall	Frederick Transit Center	30	60		30	60
FT30	Frederick Towne Mall	Frederick Transit Center	30	60	loop	30	60
FT40	Frederick Towne Mall	Frederick Transit Center	30	60		30	60
FT50	Frederick Towne Mall	Frederick Transit Center	30	60	loop	30	60
FT60	Frederick Community College	Frederick Transit Center	30	60	loop	30	60
FT70	College Park Plaza	Frederick Transit Center	60	60	loop	60	60
FT80	Frederick Community College	Frederick Towne Mall	30	60		30	60
FT-EC Shuttle	Spring Ridge Apartments	Department of Aging			4 round trips/day		
FT-BJ Shuttle	Frederick Transit Center	Brunswick MARC Station	180	-	4 round trips/day	180	-
FT-ET Shuttle	Emmitsburg	Frederick Transit Center	120	-	2 round trips/day	120	-
FT-85 Shuttle	Bowmans Industrial Park	Frederick Transit Center			2 round trips/day		
FT-POR Shuttle	Frederick Shopping Center	Point of Rocks MARC Station	40		peak direction only	40	
FT-Fd/ MARC Shuttle	Frederick Towne Mall	Frederick Transit Center	60	-	peak direction only	60	-
FT-Walk/ MARC Shuttle	Walkersville	Frederick Transit Center	60	-	peak direction only	60	-
FT-Walk Shuttle	Walkersville	Frederick Transit Center	60	120		60	120

The transit TSM measures in this alternative include the following:

- New Premium Bus service operating on local roads and serving stops comparable to CCT transit stations
- New stations and park and ride facilities in the same locations as proposed for Alternatives 6A and 6B
- Premium bus service from Frederick County to major activity centers using managed lanes with direct access ramps to park and ride lots, major activity centers and transit stations.
- Enhanced feeder bus service to Metrorail and MARC stations
- Interactive transit information at major employment centers in the Corridor.

The primary improvement in Alternative 6.2 is the construction of new station facilities that are connected via a new limited stop bus route between the Shady Grove Metrorail station and COMSAT. This bus route would operate on existing streets at a peak headway of six minutes (busiest travel times) and a non-peak headway of 10 minutes. Headway is the interval of time between buses. In addition to the new limited stop bus route providing service to the proposed stations, new service is also proposed from Frederick County to the Shady Grove Metrorail station and to the CCT area in Gaithersburg. **Table 3.2** describes the new bus routes, where they start and end, and their frequency of service for the Transit TSM Alternative.

Table 3.2: 2030 Alternative 6.2 Additions to No-Build Transit Service

Route	Terminals		Proposed 2030 TSM Headways	
	Start	End	Peak	Off-Peak
FREDSG	Frederick Transit Center	Shady Grove	15	-
FREDMGSG	Frederick Transit Center	Shady Grove	20	30
KPTNMGSG	Kemptown	Shady Grove	30	-
COM-MGSG	COMSAT	Shady Grove	6	10

SECTION III. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

As stated in Section I, the purpose of this report is to document the existing conditions and potential impacts to natural resources within Alternative 1 (No-Build Alternative) and new Alternatives 6A/B and 7A/B of the I-270/US 15 Multimodal Corridor study. Due to the overlap in project areas and minor variations between the DEIS right-of-way (ROW) and the ROW for the new ETL and transitway alternatives, the information presented in the I-270/US 15 Multimodal Corridor Study Final Natural Environmental Technical Report (CRI 2002) can be cited when describing the existing conditions of natural resources for the alternatives presented in the ETL study. However, because four years have passed since the 2002 NETR/DEIS was published, the existing conditions sections of the I-270/US 15 Multimodal Corridor Study Final Natural Environmental Technical Report (CRI 2002) have been updated where the ETL highway ROW or transitway ROW extends outside of the DEIS ROW, or where new or updated information exists for natural environmental resources. In general, only the updated information is included in this document. The resources that occur on a larger scale and are less likely to change over a short amount of time such as geology, soils, topography, and groundwater may not have any new data to update in this report; however, they are discussed so that an analysis of effects from Alternatives 6 and 7 could be performed. Conversely, data for site-specific resources such as surface waters; waters of the U.S., including wetlands; and aquatic and terrestrial species and habitat, which are subject to change more frequently based on the actions occurring within the project corridor, have been updated in this document where needed to more accurately reflect the current baseline conditions.

Information on effects from those alternatives described in the DEIS has not been updated in this report. Thus, environmental resource data or analysis methodology may have changed since 2002, and the evaluation of DEIS alternatives may no longer be the most up-to-date assessment. In some cases, this could result in an unreasonable comparison between the new ETL alternatives and the DEIS alternatives. Where this occurs, a description of the change in resource or methodology is provided in this text. The Final Environmental Impact Statement for this project will update the effects evaluation for all alternatives so that a more precise comparison can be made.

Impacts in this document have been calculated using several methods. For all resource impacts associated with the highway alignment, the study team calculated impacts assuming a limit of disturbance that is located 25 feet beyond the limit of proposed grading (the cut/fill line). All impacts associated with the transitway alignment assume a limit of disturbance 10 feet beyond the limit of proposed grading. In most cases, except floodplains, any portion of the resource located within the limit of disturbance was considered to be impacted. For floodplains, the limit of disturbance was assumed to be only the area affected by grading (i.e., within the cut/fill line), and did not include the additional 25- or 10-foot “buffer” beyond cut/fill that was assumed for other resources.

A. TOPOGRAPHY, GEOLOGY, AND SOILS

1. Methods

The methods stipulated in the 2002 NETR as they pertain to topography, geology, and soils have not changed since the 2002 NETR. The soil associations mapped for Frederick County have been renamed since the 2002 NETR. However, the individual soil mapping units found within the Frederick County project limits have not changed. Therefore, this document discusses the revised soil associations within the Frederick County portion of the project area, but does not list each soil mapping unit found within the project area. The soil mapping units within the overall project area are listed in the 2002 NETR.

Prime farmland soils for the Montgomery and Frederick county portions of the project area are the same as reported in the 2002 NETR with two notable additions within the Montgomery County portion of the CCT alignment. The soils of statewide importance for Montgomery County are also reflected in the 2002 NETR. However, the Frederick County soils of statewide importance had not been released by the Frederick County Soil Conservation District until after the NETR/DEIS was issued. The Frederick County Soil Conservation District was contacted to obtain a list of Frederick County soils of statewide importance and the revised mapped soil associations for Frederick County.

Prime farmland soils and soils of statewide importance have been identified using soil classifications from the Montgomery County and Frederick County Soil Surveys, as well as associated GIS layers developed by NRCS. At this time, no attempt has been made to modify the coverage of these areas based on recent or proposed development, which may affect the function of prime farmland soils.

2. Results

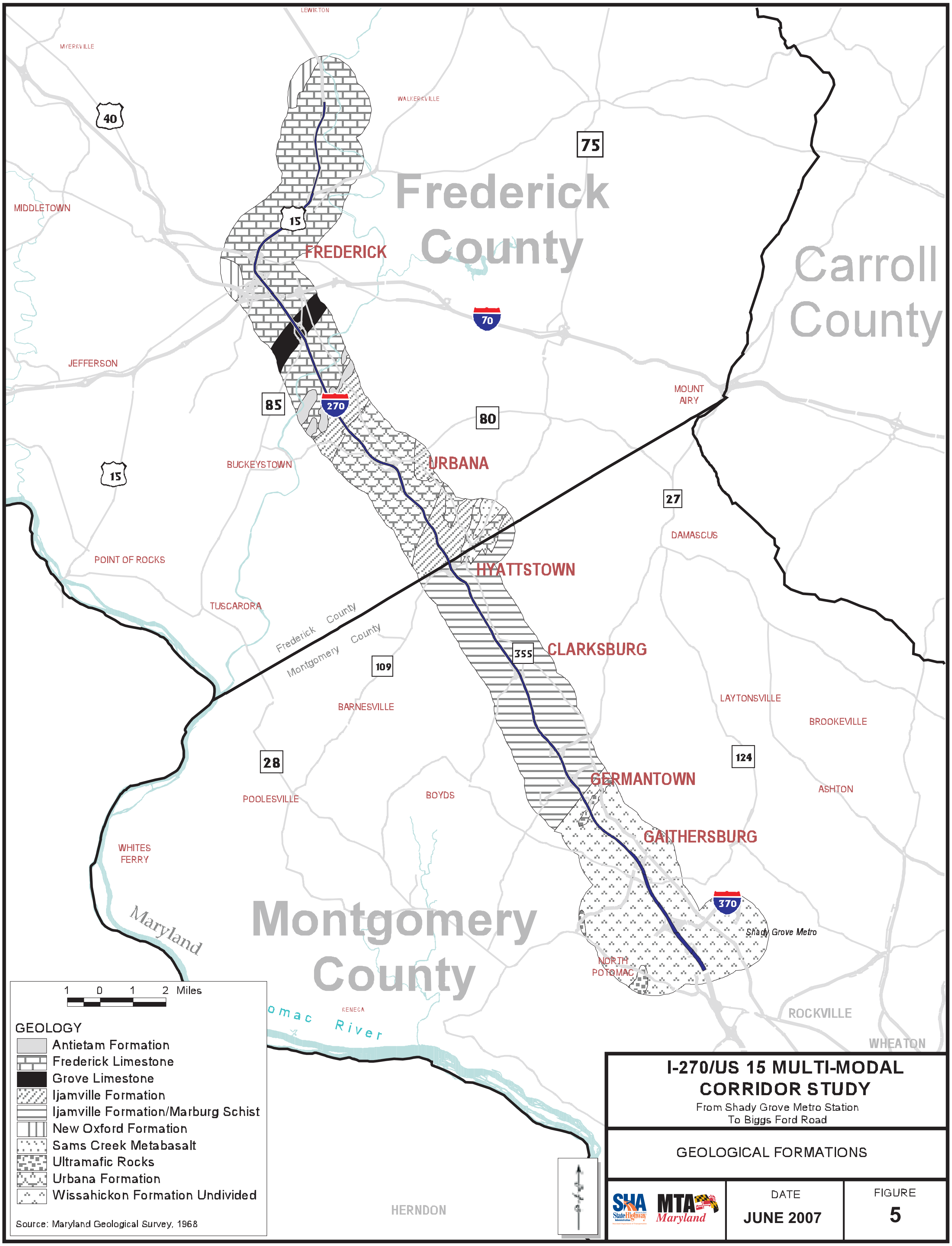
The results associated with topography and geology have not changed since the 2002 NETR; however, project area geology is shown on **Figure 5** for reference purposes. The soils discussion for Montgomery County remains unchanged, but the Frederick County soil associations have been renamed since the 2002 NETR and a new list has been published of the Frederick County soils of statewide importance.

a. *Soils*

Soil Associations - The portion of the I-270/US 15 Corridor that extends into Frederick County bisects several soil associations within the Piedmont Plateau. The soil associations, from south to north, in this area include Mt. Airy-Glenelg-Blocktown, Linganore-Hyattstown-Conestoga, Bagtown-Stumptown-Edgemont, Codorus-Hatboro-Combs, Myersville-Catoctin-Mt. Zion, Cardiff-Whiteford, Penn-Klinesville-Reaville, Rowland-Bermudian-Bowmansville, and Duffield-Hagerstown-Ryder. **Figure 6** provides a map of the soil associations within both the Montgomery and Frederick county portions of the project area.

Soils in the Mt. Airy-Glenelg-Blocktown association occur on ridges and side slopes of high dissected landforms of the Piedmont Plateau. These soils are nearly level to very steep, shallow, moderately deep, and very deep, well drained soils that formed from residuum or micaceous schist and phyllite. Minor soils within this association include Baile, Glenville, Occoquan, and Gaila soils.

The Linganore-Hyattstown-Conestoga soil association is found in the area centered around Urbana. These soils are nearly level to steep, shallow to very deep, well drained soils that formed from micaceous and calcareous schist, phyllite, slate, and limestone. Minor soils within this association include Benevola, Wiltshire, and Letort soils.



Source: Maryland Geological Survey, 1968

I-270/US 15 MULTI-MODAL CORRIDOR STUDY

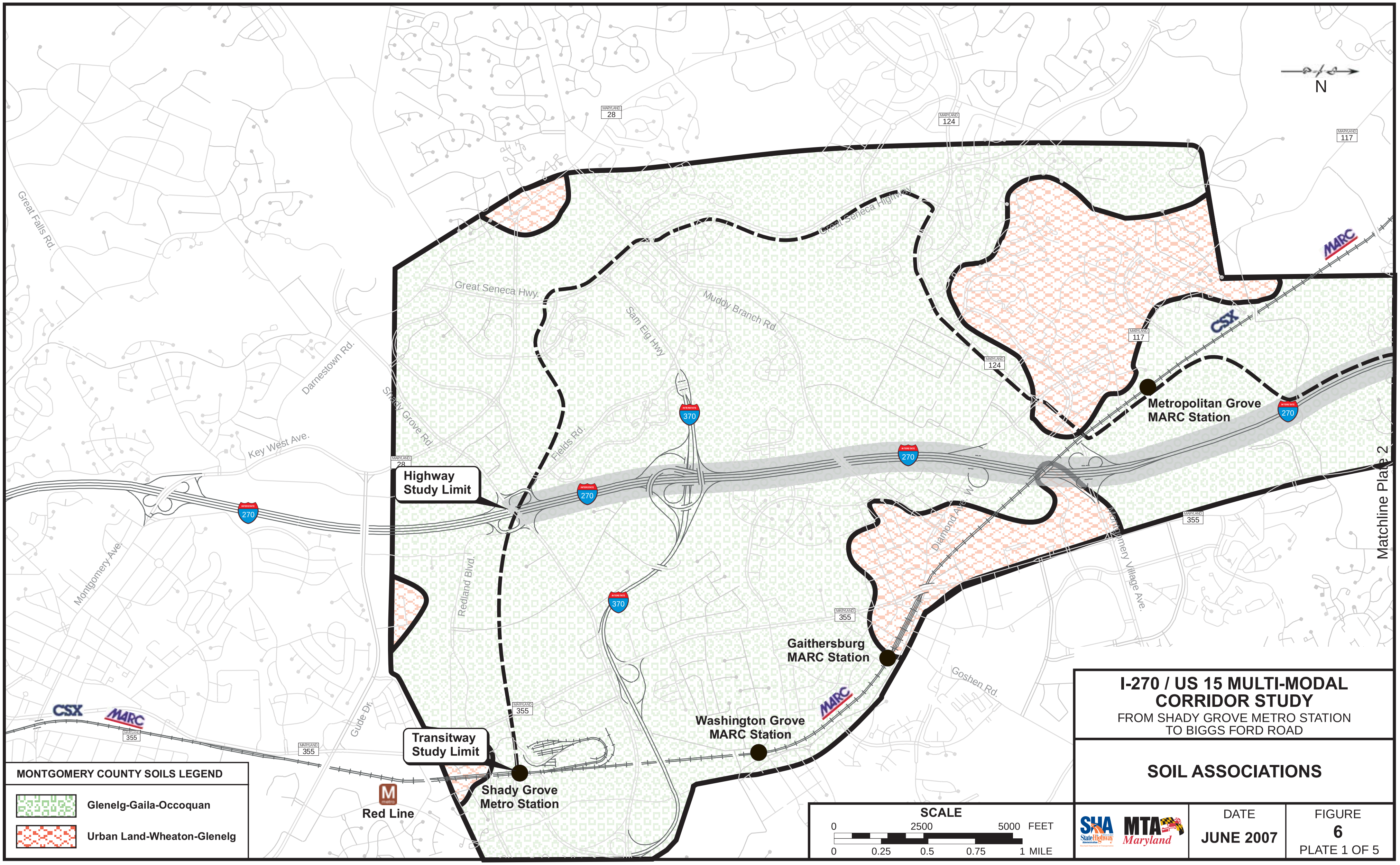
From Shady Grove Metro Station
To Biggs Ford Road

GEOLOGICAL FORMATIONS

SHA State Highway Administration MTA Maryland

DATE
JUNE 2007

FIGURE
5



MONTGOMERY COUNTY SOILS LEGEND

🟩 Glenelg-Gaila-Occoquan

🟥 Urban Land-Wheaton-Glenelg

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

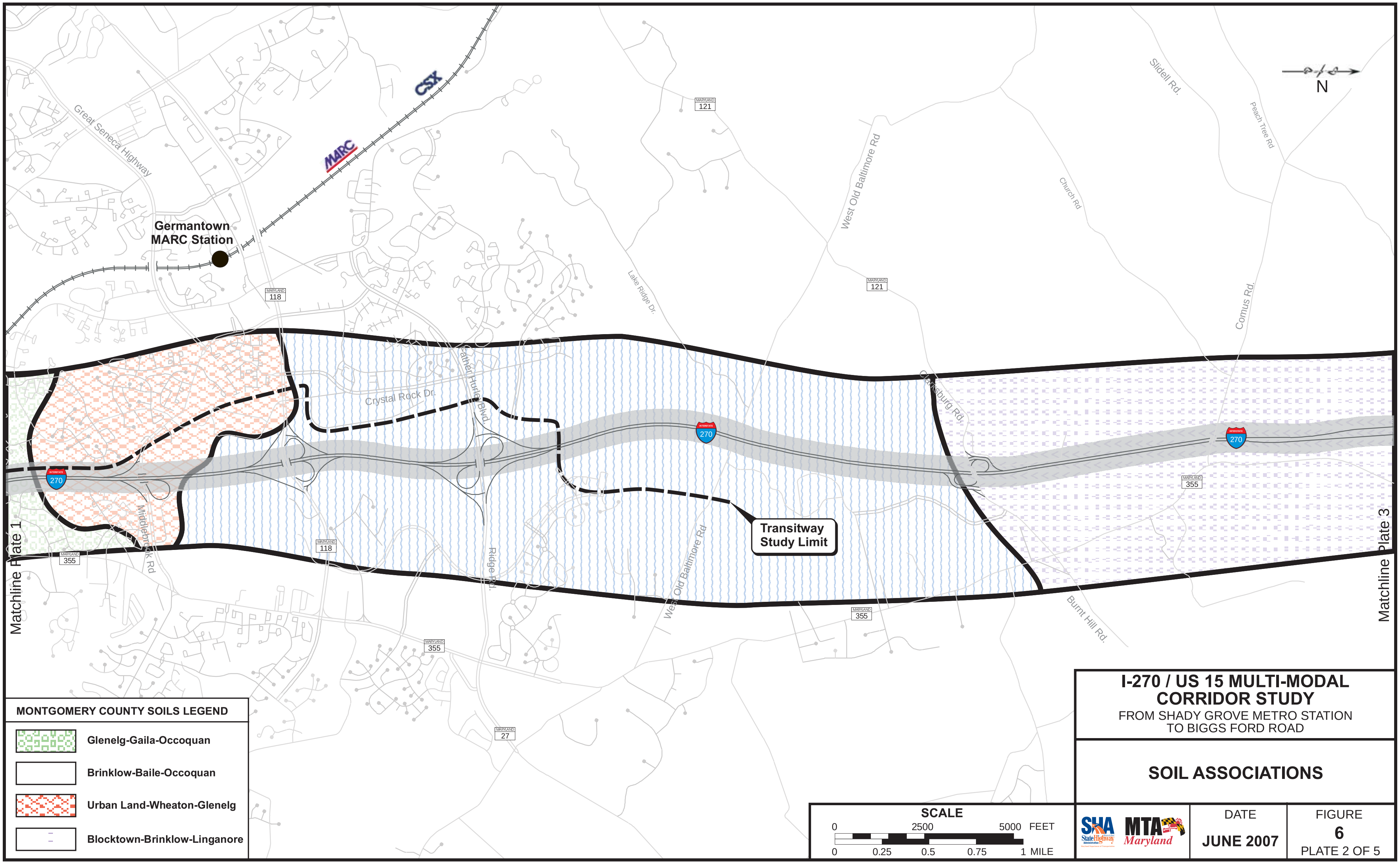
SOIL ASSOCIATIONS

SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE

SHA MTA Maryland

DATE
JUNE 2007

FIGURE
6
PLATE 1 OF 5



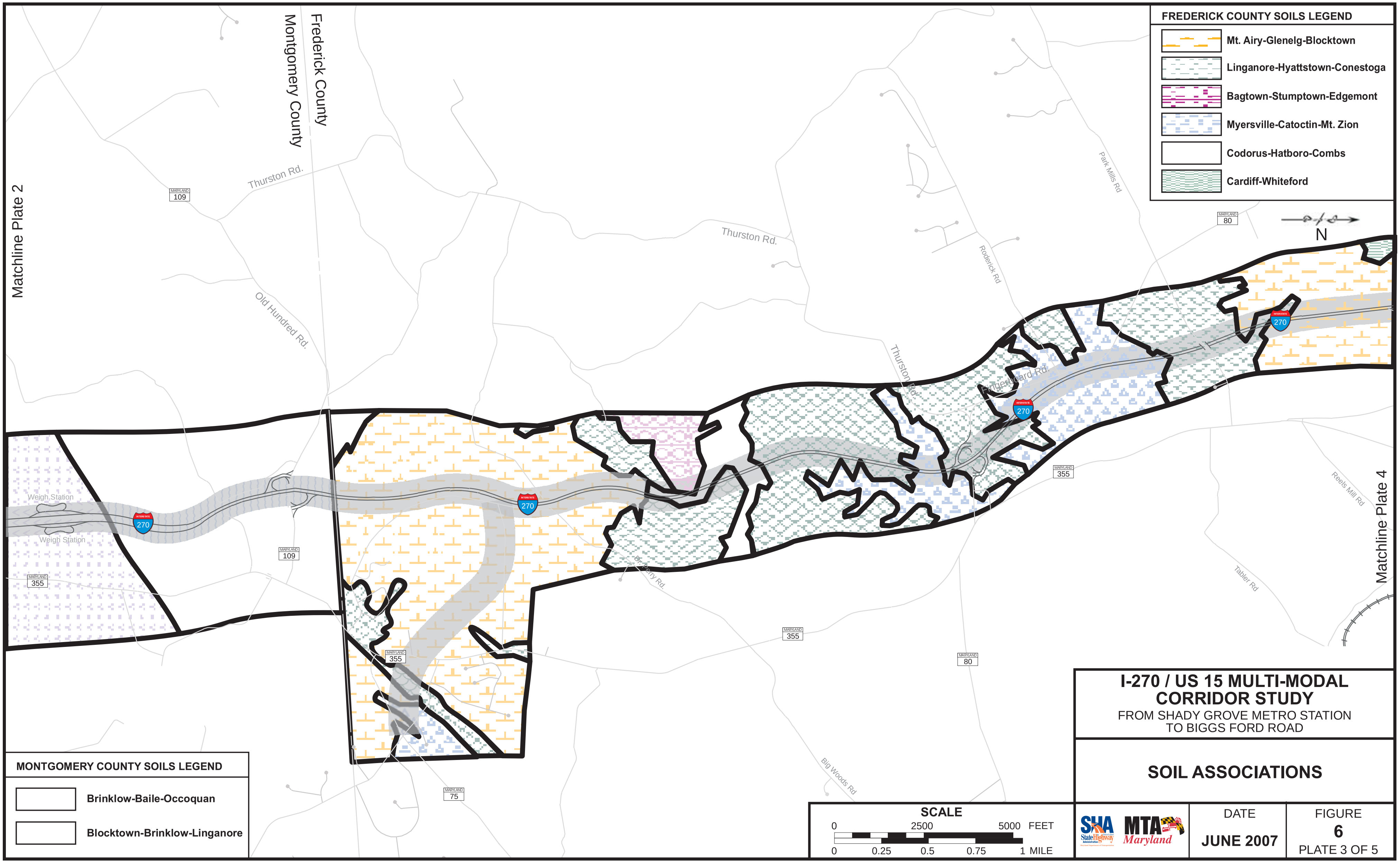
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

SOIL ASSOCIATIONS

DATE
JUNE 2007

FIGURE
6
PLATE 2 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

SOIL ASSOCIATIONS

SHA State Highway Administration
MTA Maryland

DATE
JUNE 2007

FIGURE
6
PLATE 3 OF 5

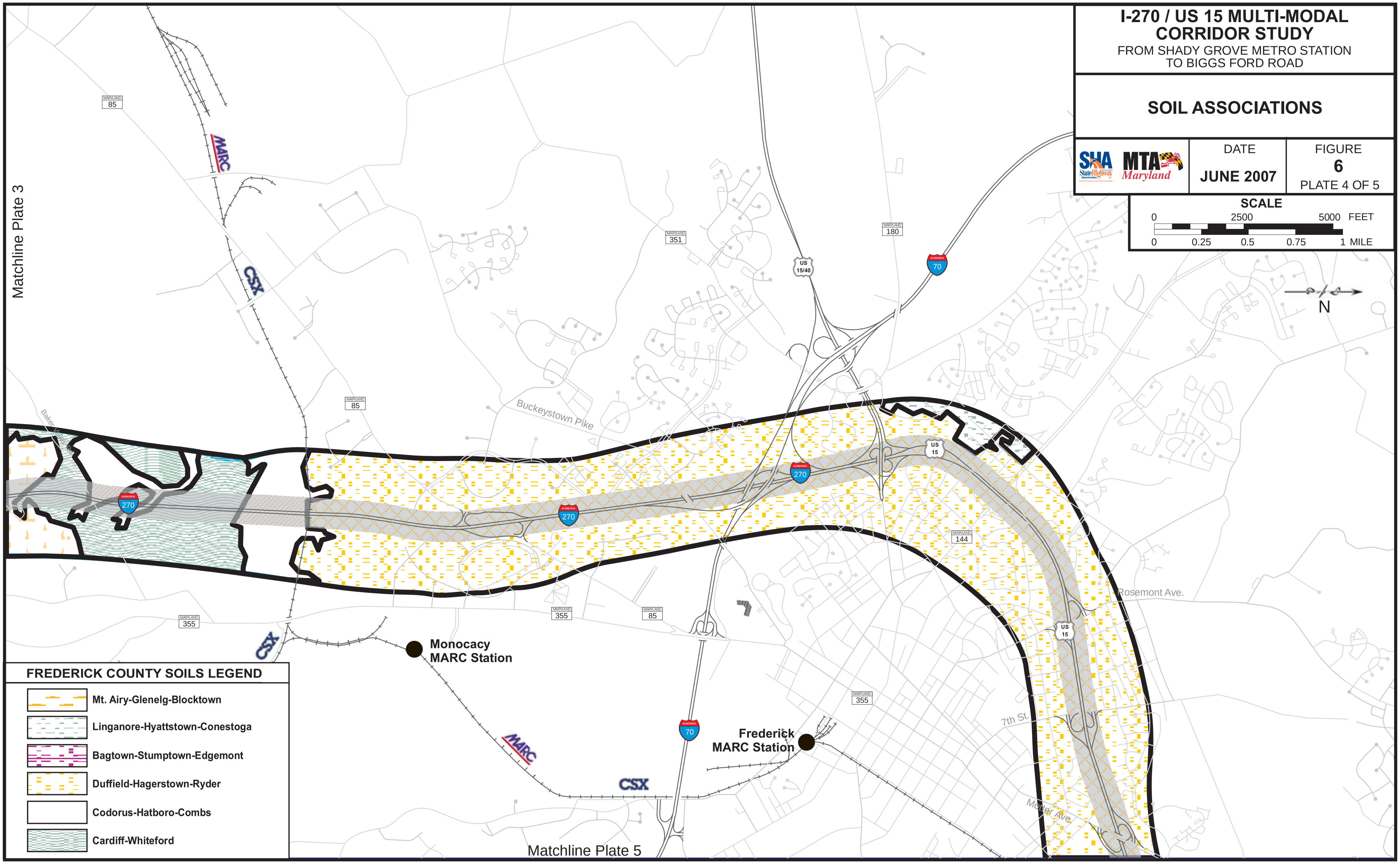
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

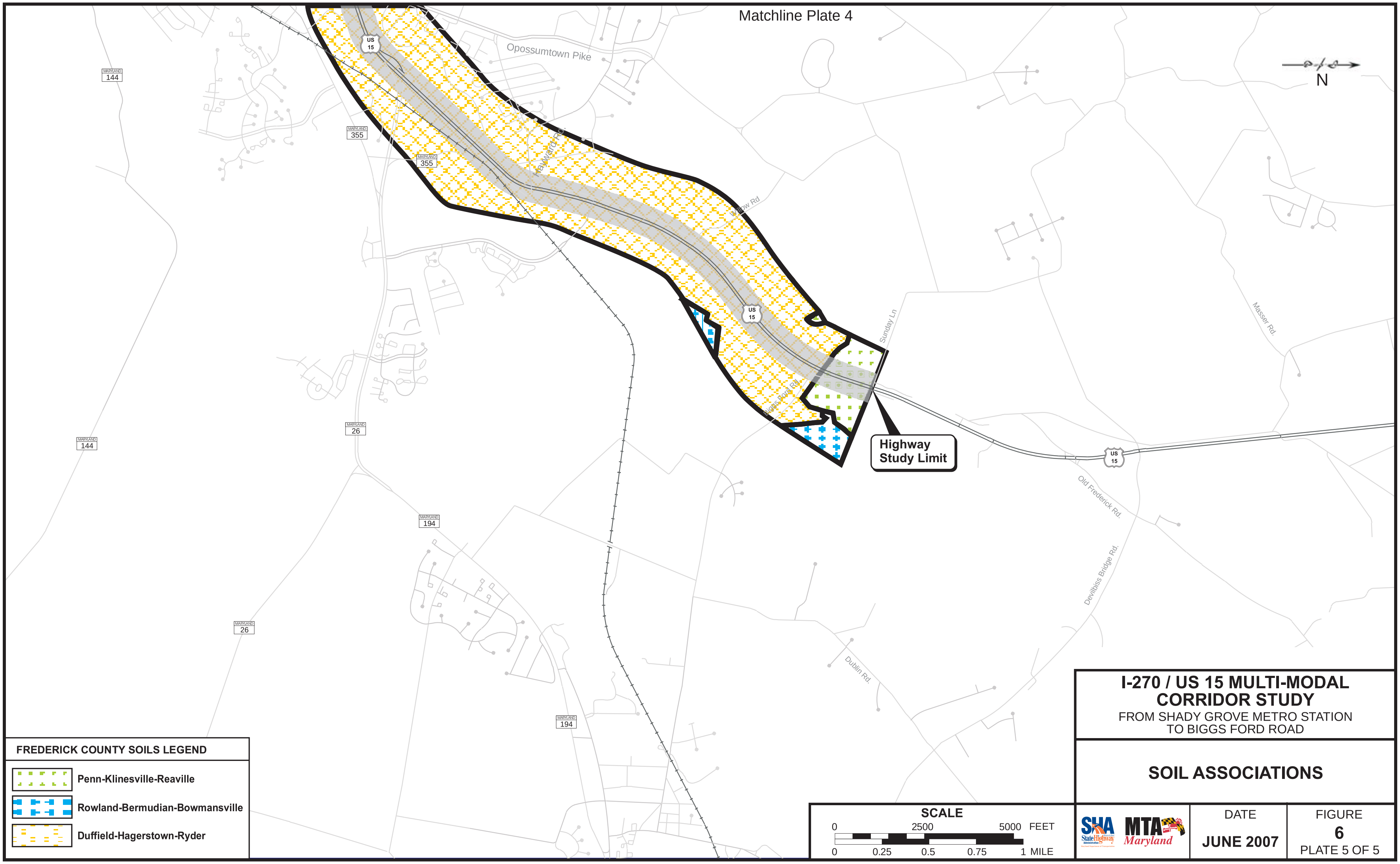
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

SOIL ASSOCIATIONS

DATE
JUNE 2007

FIGURE
6
PLATE 4 OF 5





I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

SOIL ASSOCIATIONS

DATE
JUNE 2007

FIGURE
6
PLATE 5 OF 5

Soils in the Codorus-Hatboro-Combs soil association are nearly level and gently sloping, very deep, well drained to poorly drained soils that formed in alluvium from limestone and mica bearing igneous and metamorphic rocks. This association is primarily focused around perennial stream and major rivers. Minor soils within this association include Melvin and Lindside soils.

The Myersville-Catoctin-Mt. Zion association has soils that are nearly level to steep, moderately deep and very deep, well drained and moderately well drained that formed from a mixture of colluvium and alluvium of quartzite, metabasalt, and meta-andesite. This map unit occurs on backslopes, footslopes, and in drainageways of the Blue Ridge. Minor soils within this association include Rohrersville and Lantz soils.

Soils in the Cardiff-Whiteford soil association are nearly level to steep, moderately deep and deep, well drained soils that have formed from slate and phyllite. These soils occur on a narrow ridge known as the Araby Ridge that runs from Woodsboro in the north to the Potomac River in the south.

The Penn-Klinesville-Reaville soil association is made up of nearly level to steep, moderately well drained and well drained, shallow and moderately deep soils that formed in residuum from Triassic red shale, siltstone, and sandstone. This association occurs on the part of the Frederick Valley known as the Triassic Basin. Soils of minor extent include Legore, Montalto, Springwood, and Readington soils.

Soils in the Rowland-Bermudian-Bowmansville association are nearly level, very deep, well drained to poorly drained soils that formed in alluvium from red shale, sandstone, and conglomerate. This association is located along perennial streams in parts of the Frederick Valley. Soils of minor extent include Birdsboro soils.

The Duffield-Hagerstown-Ryder soil association has soils that are nearly level to steep, moderately deep to very deep, and well drained that have formed from limestone. This association occurs in the Frederick Valley. Minor soils within this association include Adamstown, Funkstown, and Buckeystown soils.

b. *Prime Farmland Soils and Soils of Statewide Importance*

Table 4 provides a list of the Montgomery and Frederick county prime farmland soils mapped within the I-270/US 15 Corridor, including the two newly added soils (Glenelg silt loam, 3 to 8 percent slopes (2A) and Occoquan loam, 3 to 8 percent slopes (17B)). **Table 5** provides a list of the Montgomery County and newly published Frederick County soils of statewide importance within the I-270/US 15 Corridor.

Table 4:
Prime Farmland Soils within the I-270/US 15 Corridor

Map Unit	Soil Series
4B	Elioak silt loam, 3 to 8 percent slopes
2A	Glenelg silt loam, 0 to 3 percent slopes
2B	Glenelg silt loam, 3 to 8 percent slopes
17B	Occoquan loam, 3 to 8 percent slopes
27B	Neshaminy silt loam, 3 to 8 percent slopes
1B	Gaila silt loam, 3 to 8 percent slopes
AdB	Adamstown silt loam, 3 to 8 percent slopes
AfB	Adamstown-Funkstown complex, 0 to 8 percent slopes
BfA	Bermudian silt loam, 0 to 3 percent slopes
BtB	Buckeystown loam, 3 to 8 percent slopes
DtA	Duffield-Ryder silt loams, 0 to 3 percent slopes
DtB	Duffield-Ryder silt loams, 3 to 8 percent slopes
DuB	Duffield and Ryder channery silt loams, 3 to 8 percent slopes
GoB	Glenville silt loam, 3 to 8 percent slopes
GvB	Glenville-Codorus complex, 3 to 8 percent slopes
HaB	Hagerstown loam, 3 to 8 percent slopes
HbB	Hagerstown silt loam, 3 to 8 percent slopes
LgB	Legore gravelly silt loam, 3 to 8 percent slopes
LsA	Lindside silt loam, 0 to 3 percent slopes
MuB	Myersville gravelly silt loam, 3 to 8 percent slopes
MvA	Myersville silt loam, 0 to 3 percent slopes
MvB	Myersville silt loam, 3 to 8 percent slopes
SpA	Springwood gravelly loam, 0 to 3 percent slopes
SpB	Springwood gravelly loam, 3 to 8 percent slopes

Table 5:
Soils of Statewide Importance within the I-270/US 15 Corridor

Map Unit	Soil Series
16B	Brinklow-Blocktown channery silt loam, 3-8% slopes
16C	Brinklow-Blocktown channery silt loam, 8-15% slopes
1C	Gaila silt loam, 8-15% slopes
2C	Glenelg silt loam, 8-15% slopes
9B	Linganore-Hyattstown channery silt loam, 3-8% slopes
9C	Linganore-Hyattstown channery silt loam, 8-15% slopes
17C	Occoquan loam, 8-15% slopes
BfA	Bermudian silt loam, 0-3% slopes
HaC	Hagerstown loam, 8-15% slopes
RmA	Reaville silt loam, 0-3% slopes
DtC	Duffield-Ryder silt loams, 8-15 % slopes
HcB	Hagerstown-Opequan silty clay loams, 3-8% slopes, rocky
SpC	Springwood gravelly loam, 8-15% slopes
BtC	Buckeystown loam, 8-15% slopes
BuB	Buckeystown sandy loam, 3-8% slopes
HaC	Hagerstown loam, 8-15% slopes
CgA	Codorous and Hatboro silt loams, 0-3% slopes
WrB	Whiteford-Cardiff channery loams, 3-8% slopes
WrC	Whiteford-Cardiff channery loams, 8-15% slopes
GmB	Glenelg-Mt. Airy channery loams, 3-8% slopes
LyB	Linganore-Hyattstown channery silt loams, 3-8% slopes
GuB	Glenville-Baile silt loams, 3-8% slopes
MeC	Mt. Airy channery loam, 8-15% slopes
GoC	Glenville silt loam, 8-15% slopes
SdC	Spoolsville-Catoctin complex, 8-15% slopes
LyC	Linganore-Hyattstown channery silt loams, 8-15% slopes
GhC	Glenelg-Blocktown gravelly loams, 8-15% slopes

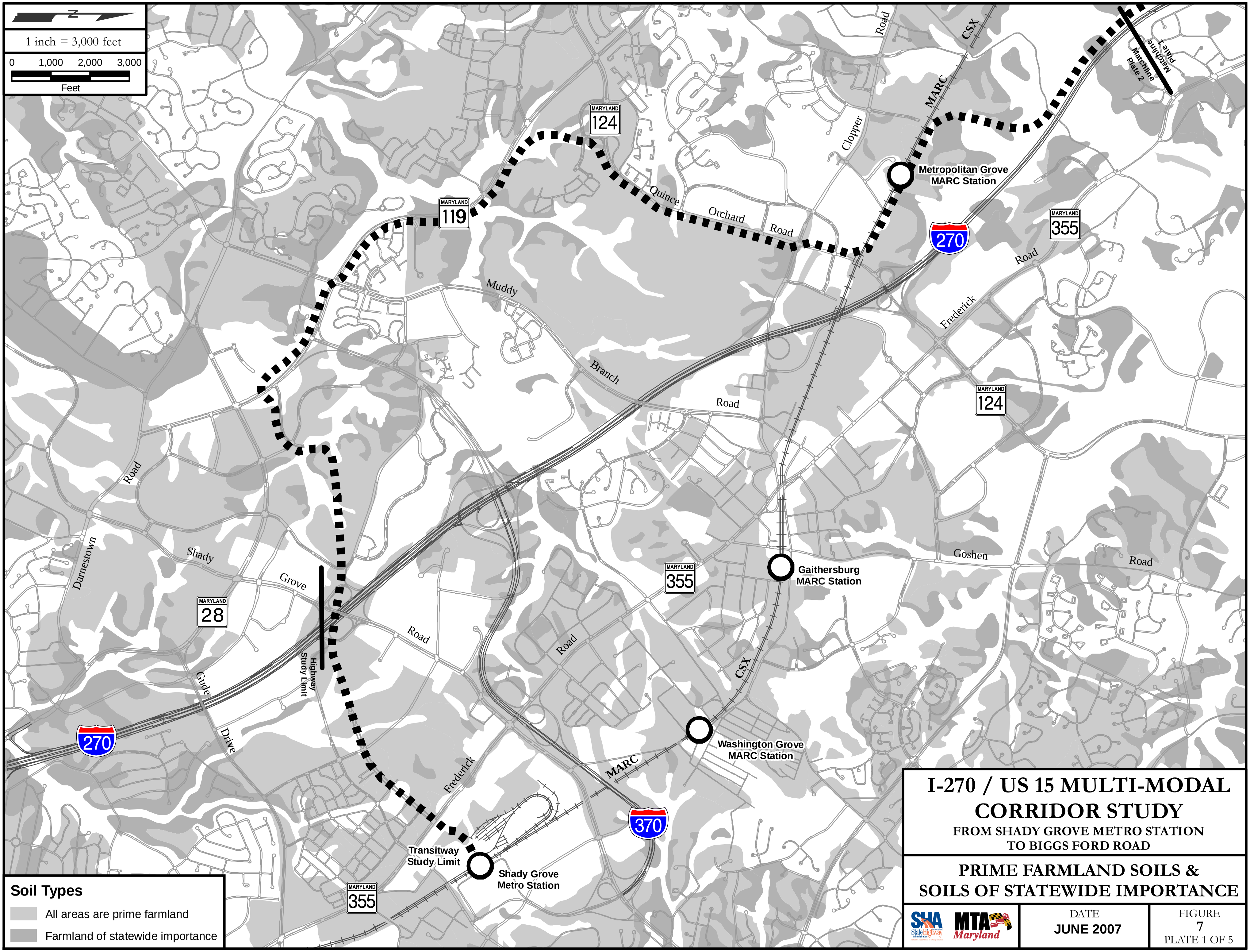
Figure 7 shows a map of the prime farmland soils and soils of statewide importance with the highway and transitway portions of the project study area.

3. Impacts

The topography, geology, and soils of the I-270/US 15 Corridor will not be affected by Alternative 1 (No-Build Alternative).

The geology within the project corridor will not be affected by the build alternatives. However, the build alternatives will impact the topography and soils within the I-270/US 15 Corridor. The highway components of ETL Alternatives 6A/6B and 7A/7B will require grading of existing land surface and the placement of fill in various locations for ramps, bridge approaches and extensions, and other new roadway components. In addition, removal of existing fill may also occur as existing facilities are removed or reconfigured. The transit component of the build alternatives will traverse a less manipulated landscape than that of the highway component, resulting in a greater impact to topography. Soils disturbances will also occur for all build alternatives due to grading for the proposed highway and transitway alignments and their associated components.

Potential indirect impacts could occur with any of the build alternatives, depending on the level of earthmoving required. These may include small changes to drainage patterns within or adjacent to the right-of-way associated with redirecting surface runoff. In addition, unpredictable changes in topography could result in minor localized changes in shallow groundwater movement. However, these effects should be minimal and remedied by proposed stormwater management (SWM) facilities.



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

PRIME FARMLAND SOILS & SOILS OF STATEWIDE IMPORTANCE

SHA State Highway Administration
MTA Maryland

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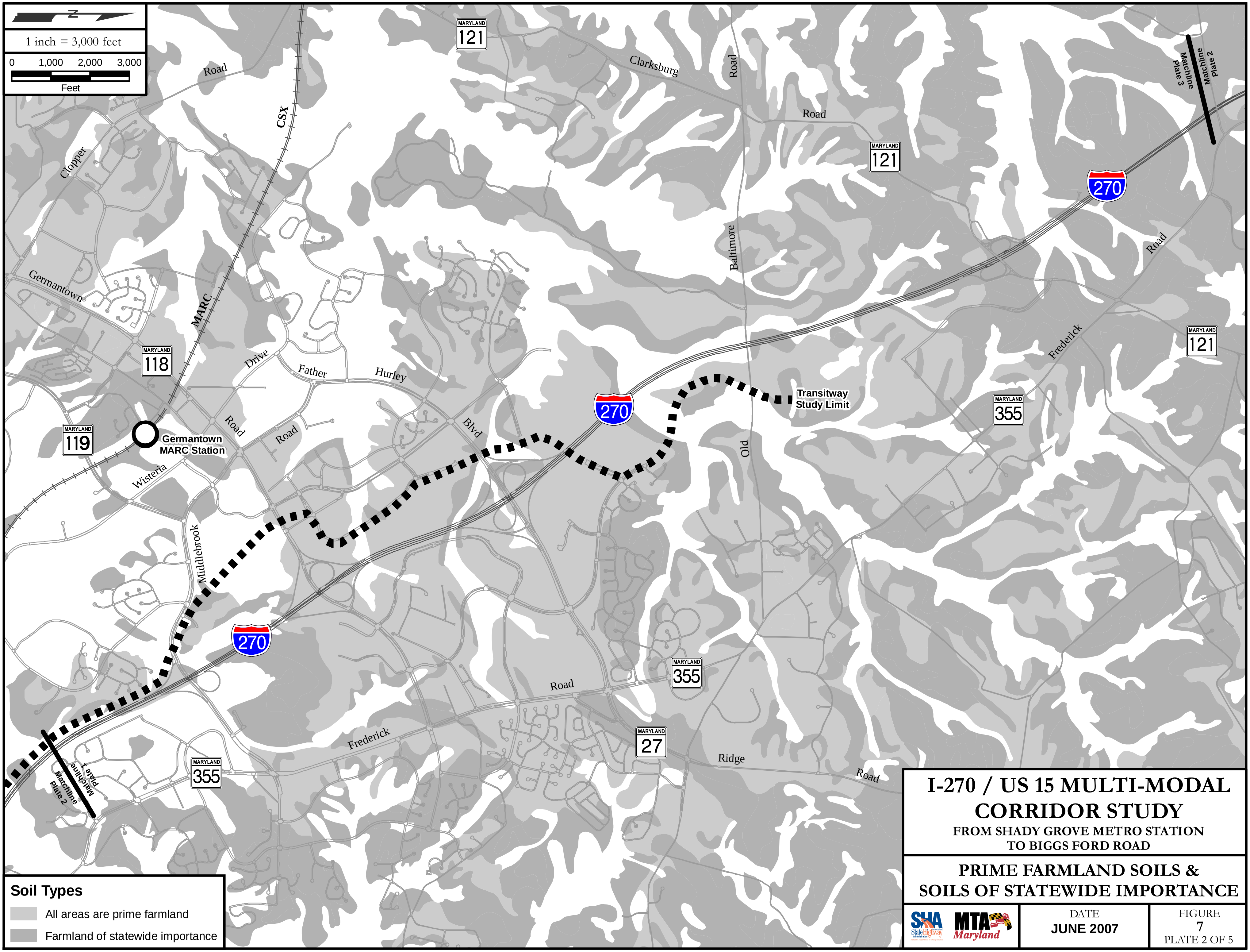
FIGURE
7
PLATE 1 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

PRIME FARMLAND SOILS & SOILS OF STATEWIDE IMPORTANCE

SHA State Highway Administration
MTA Maryland

DATE
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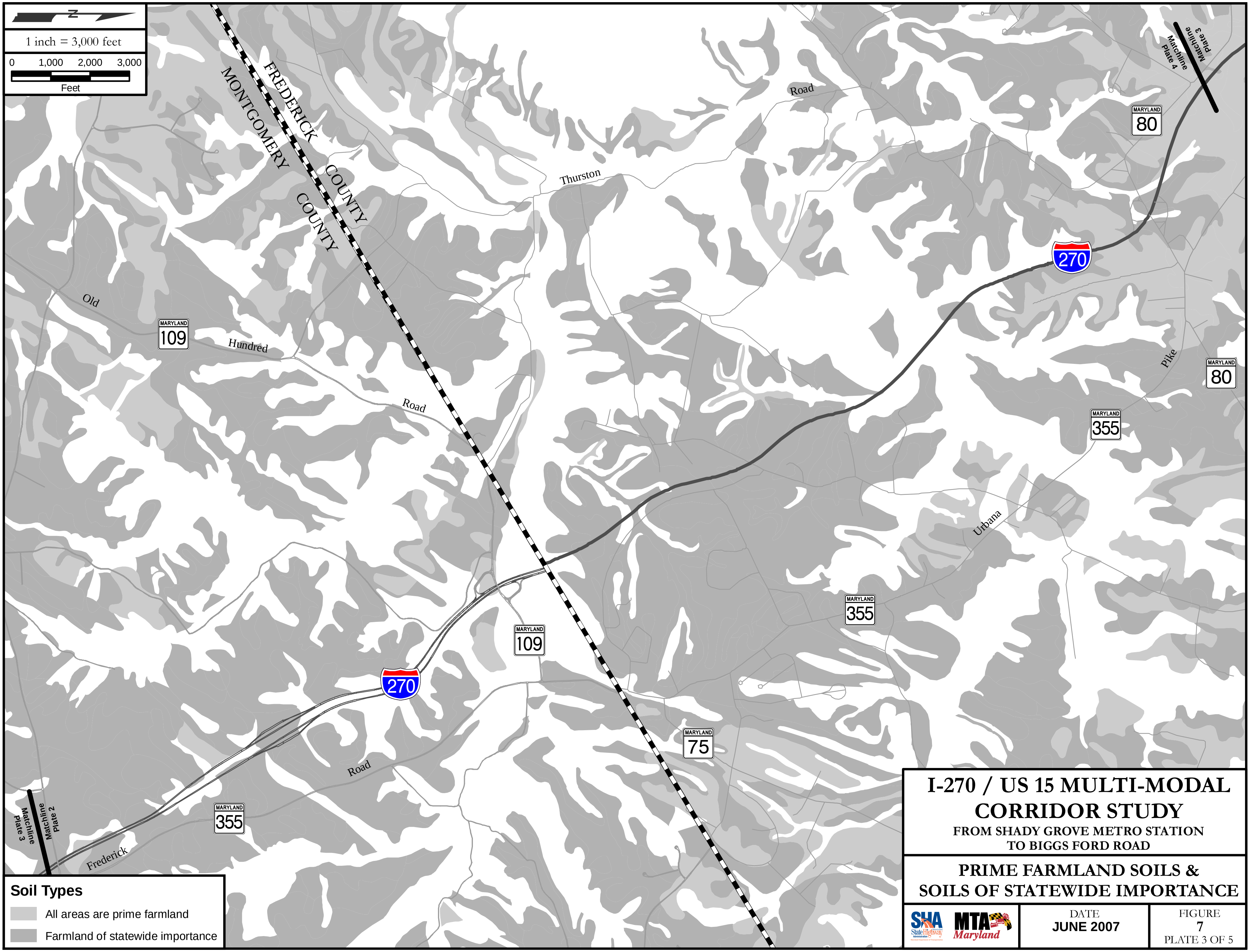
FIGURE
7
PLATE 2 OF 5



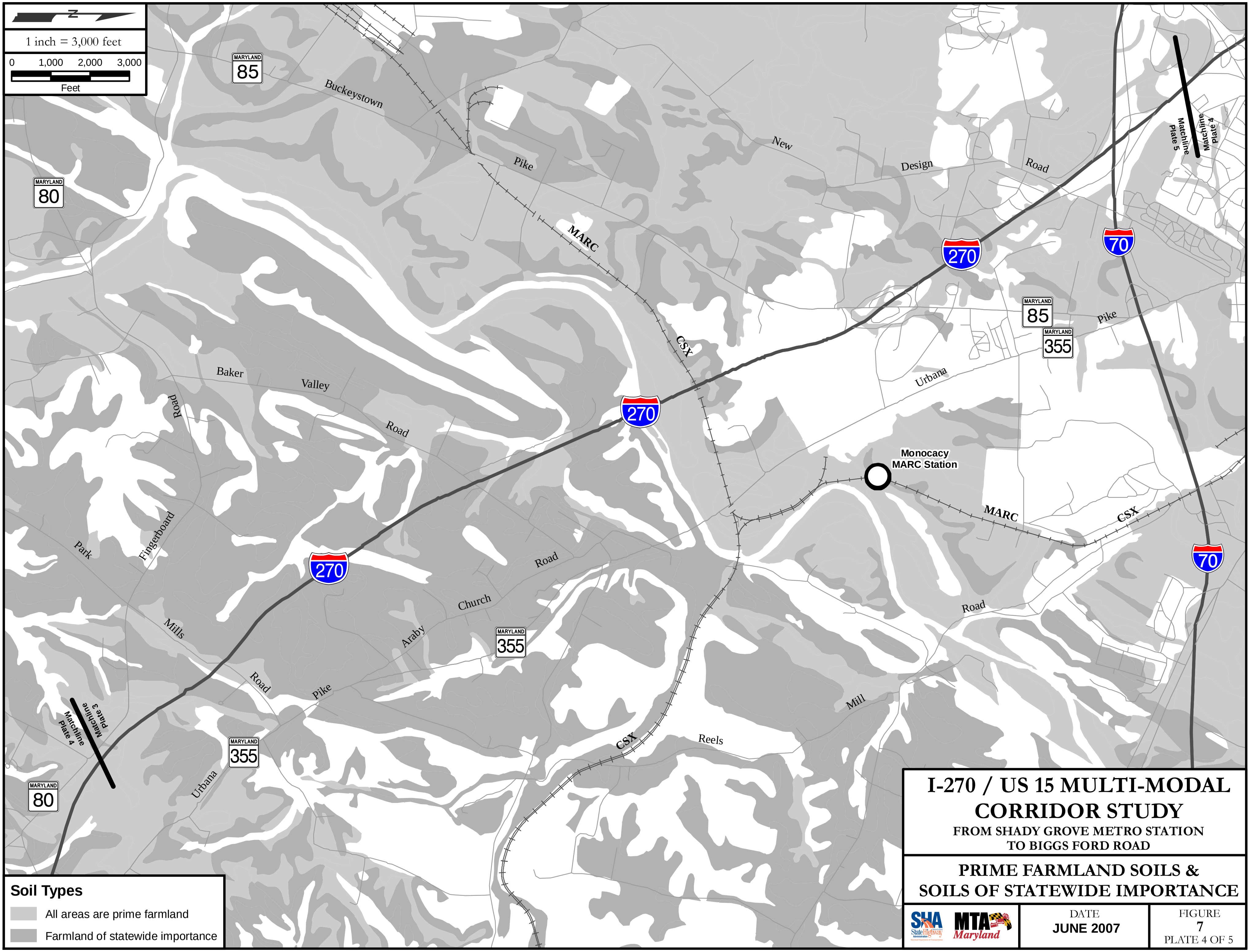
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

PRIME FARMLAND SOILS & SOILS OF STATEWIDE IMPORTANCE

DATE
JUNE 2007

FIGURE
7
PLATE 3 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

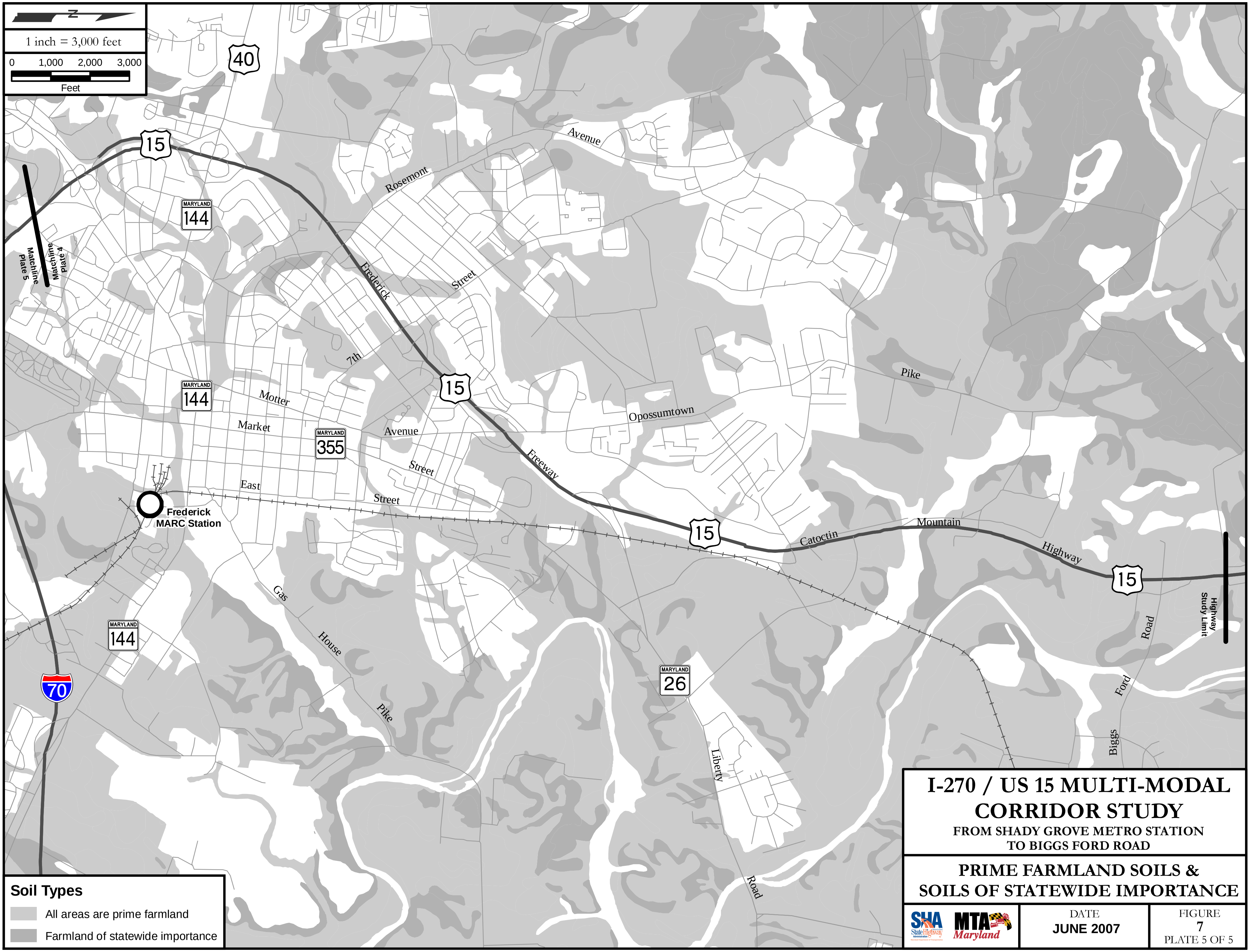
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

PRIME FARMLAND SOILS & SOILS OF STATEWIDE IMPORTANCE

SHA State Highway Administration
MTA Maryland

DATE
JUNE 2007

FIGURE
7
PLATE 4 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

PRIME FARMLAND SOILS & SOILS OF STATEWIDE IMPORTANCE

DATE
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FIGURE
7
PLATE 5 OF 5

Alternatives 6A/B and 7A/B will have the same impact, as both alternatives are on the same physical footprint (See Section II for a discussion of the Alternatives Retained for Detailed Study). The Highway component of the alternatives will impact approximately 642 acres of farmland soils and 460 acres of soils of statewide importance. The transitway component of the alternatives will impact 100.6 acres of prime farmland soils and 28.7 acres of Soils of Statewide Importance. These values represent an increase over the impacts identified for other alternatives in the DEIS because prime farmland soils and Soils of Statewide Importance that are located under I-270 and other developed areas are being included in the calculation.

The operations and maintenance facilities sites associated with the transitway would have varying levels of impact to prime farmland soils, depending on the option chosen. Impacts to prime farmland soils and soils of statewide importance would be as follows:

- Observation Drive Site: 12.9 ac. prime farmland, 4.2 ac. soils of statewide importance
- Game Preserve Road Site: 2.6 ac. prime farmland, 11.7 ac. soils of statewide importance
- Metropolitan Grove Road Site: 14.9 ac. prime farmland, 1.9 ac. soils of statewide importance
- Crabbs Branch Way Site: 9.2 ac. prime farmland, 0.8 ac. soils of statewide importance
- Shady Grove Site: 0.7 ac. prime farmland, 0.0 ac. soils of statewide importance

In accordance with the Farmland Policy Act (FPPA), a Farmland Conversion Impact Rating (FCIR) will be completed for this project prior to the completion of the environmental document and submitted to the Natural Resources Conservation Service (NRCS) for both Montgomery and Frederick counties.

4. Avoidance and Minimization

Proper slope and soil stabilization techniques will be used in work areas, both during and after construction, to prevent sedimentation of nearby waterways. Sediment and erosion controls and SWM facilities will be implemented in the project area in accordance with the Maryland Department of Environment *2000 Maryland Stormwater Design Manual, Volumes I & II* (MDE 2000).

With respect to prime farmland soils and Soils of Statewide Importance, the long, linear nature of the proposed highway and transitway components of both alternatives and extensive coverage of the study area by these soils, make complete avoidance impossible. The impacts associated with the build alternatives are not anticipated to interrupt viable farm operations or jeopardize the financial stability of these businesses. It should be noted that master plan documents for Montgomery and Frederick counties show that many areas presently in agricultural use are zoned for development.

B. GROUNDWATER

1. Methods

The methods presented in the 2002 NETR as they pertain to groundwater have not changed since the 2002 NETR.

2. Results

The principal aquifers found within the project area are the same as was published in the 2002 NETR and are shown in **Figure 8**. However, the boundaries of the Maryland Piedmont SSA have been extended by the U.S. Environmental Protection Agency (USEPA) since the 2002 NETR. The extended area includes a portion of the Piedmont aquifer system, designated as the Poolesville Area Aquifer System that underlies Poolesville and the surrounding area in lower western Montgomery County (**Figure 9**). These aquifers now extend from MD 28 west to the Potomac River, between the Little Monocacy River and Seneca Creek's confluence with the Potomac River. These SSAs serve as the primary sources of drinking water for this area.

The EPA's designation of the Poolesville aquifer as an SSA was based on several factors that included:

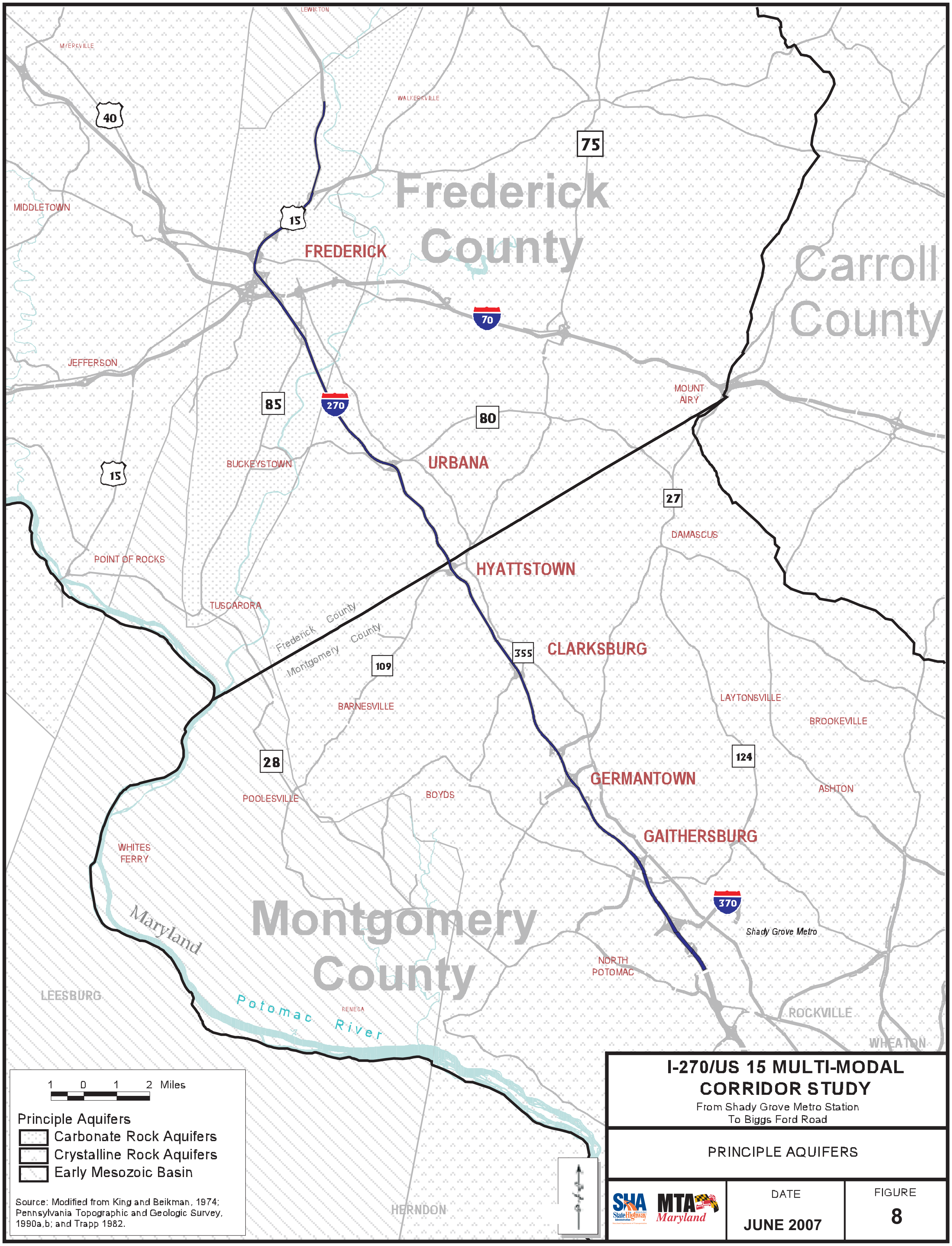
- The aquifer system underlying the Poolesville area supplies the service area with 50% or more of its drinking water needs.
- No economical alternative drinking water sources are available.
- The quality of the groundwater in the area is considered to be good, but it is vulnerable to contamination due to the rapid movement of groundwater in fractured rock and increasing development and other land uses in the area.

As indicated in the 2002 NETR, groundwater levels of the Piedmont aquifers within the project area are measured by the United States Geological Survey (USGS) within deep monitoring wells. Wells screened within the project area are shown on **Figure 10**. Data for the wells was presented in the 2002 NETR.

3. Impacts

Alternative 1 (No-Build Alternative) will not have an impact on groundwater within the project corridor.

The build alternatives for the highway alignment will occur at-grade with the existing I-270 / US 15 roadway, reducing the depth of excavation needed to construct these road improvements. The construction of the build alternatives could reduce infiltration into the shallow groundwater table in areas where an increase in pavement occurs, potentially reducing or redirecting available hydrology for local wetlands and streams. The amount of impervious surfaces will be the same for Alternative 6A/B and 7A/B and are not expected to change the overall watershed hydrology within the project area, as the relative amount of pavement being added for each alternative is minimal.



Source: Modified from King and Beikman, 1974; Pennsylvania Topographic and Geologic Survey, 1990a,b; and Trapp 1982.

I-270/US 15 MULTI-MODAL CORRIDOR STUDY

From Shady Grove Metro Station
To Biggs Ford Road

PRINCIPLE AQUIFERS

SHA State Highway Administration MTA Maryland	DATE	FIGURE
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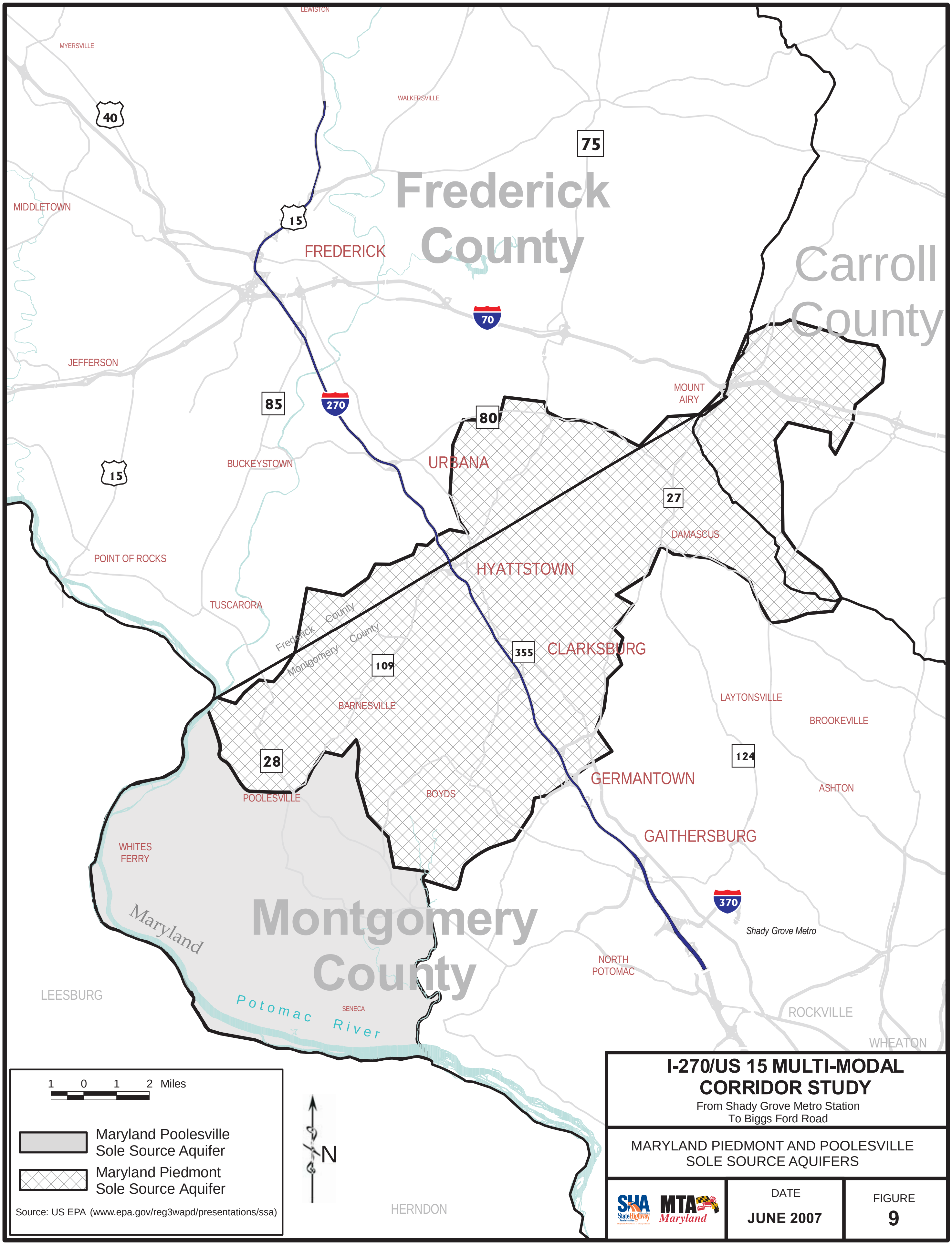

🔲 Maryland Poolesville Sole Source Aquifer

▨ Maryland Piedmont Sole Source Aquifer

Source: US EPA (www.epa.gov/reg3wapd/presentations/ssa)

I-270/US 15 MULTI-MODAL CORRIDOR STUDY

From Shady Grove Metro Station
To Biggs Ford Road

MARYLAND PIEDMONT AND POOLESVILLE SOLE SOURCE AQUIFERS

DATE	FIGURE
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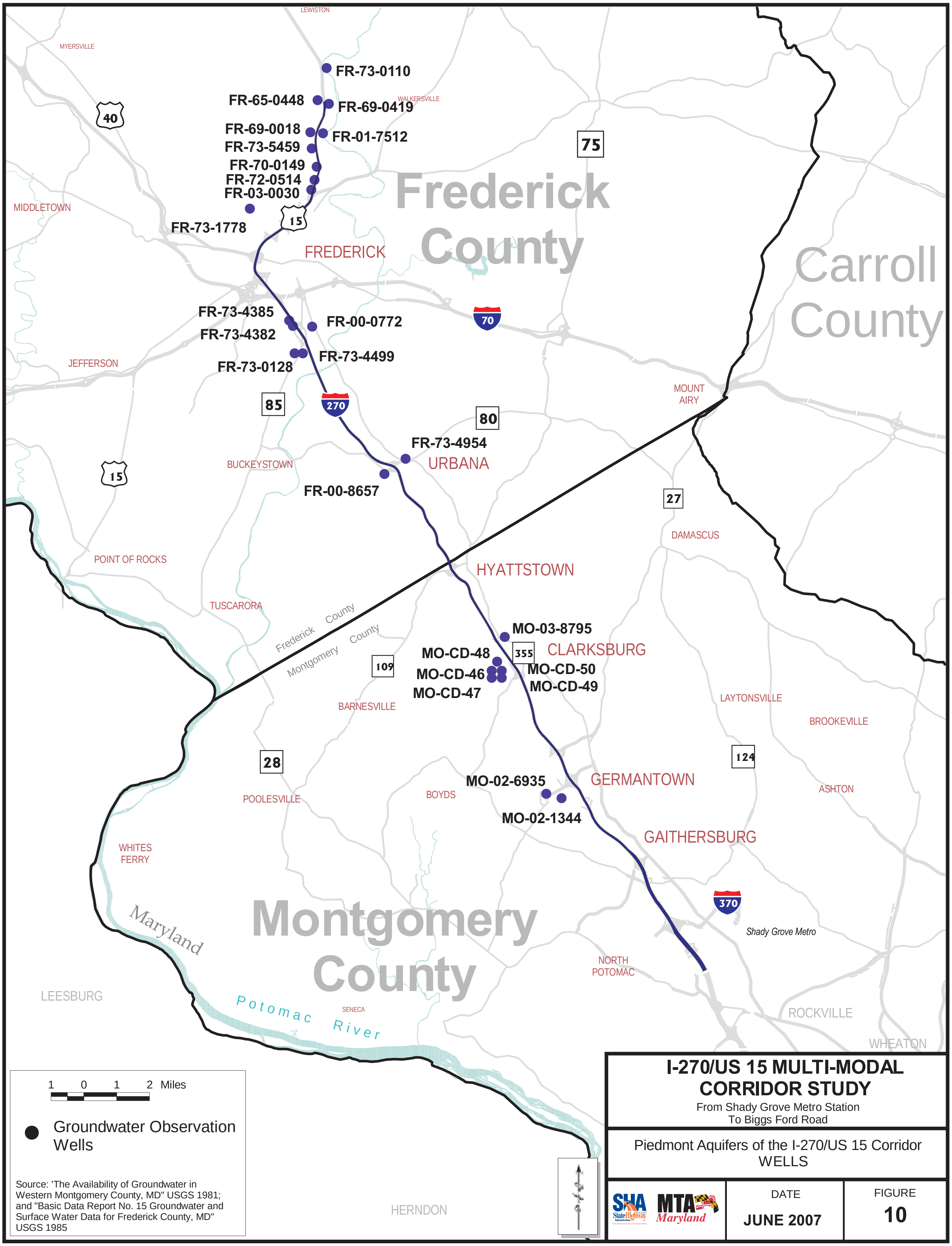


● Groundwater Observation Wells

Source: 'The Availability of Groundwater in Western Montgomery County, MD" USGS 1981; and "Basic Data Report No. 15 Groundwater and Surface Water Data for Frederick County, MD" USGS 1985

I-270/US 15 MULTI-MODAL CORRIDOR STUDY

From Shady Grove Metro Station
To Biggs Ford Road

Piedmont Aquifers of the I-270/US 15 Corridor
WELLS

SHA MTA Maryland

DATE	FIGURE
JUNE 2007	10

The transitway components of the build alternatives will require a greater depth of excavation as it traverses a less manipulated terrain, especially in the area north of MD 124 where the transitway alignment spans the headwaters of several tributaries to Great Seneca Creek. These tributaries originate from groundwater seeps that are located within deep rock fractures of the crystalline rock aquifers. The construction of the transitway alignment through this section of the project area could slightly reduce infiltration into these aquifers and reduce the available groundwater in these areas, which could ultimately reduce discharge rates for stream flow.

All of the build alternatives for both the highway and transitway alignments will traverse the Piedmont SSA. Impacts to the SSA could occur in areas where new pavement is proposed, directly impacting recharge and stream flow zones. However, as indicated above, the limited amount of new impervious surfaces from the highway and transitway alignments will not likely affect groundwater quantity. Impacts to groundwater quality may occur due to chemical spills, deicing, and urban runoff that could potentially infiltrate into the subsurface. The contaminant transport in the piedmont aquifers occurs rapidly because the molecular structure of the rock does not provide the environment for the sorption and decay process to occur. Organic solvents and light petroleum products could be directly discharged to a surface water or infiltrate into the deeper aquifer zone. Filtration of these chemicals through bioretention facilities and the implementation of MDE stormwater management practices will help to reduce the level of contaminant entering the groundwater systems.

The proposed transitway operations and maintenance facilities will require larger areas of pavement than the proposed stations. The types of constituents entering groundwater resources are similar to those described in the highway alignment. However, a larger volume of pollutants is expected due to the proportional increase in surface area. The transitway operations and maintenance facilities will have more of an impact on local recharge areas due to the large impervious cover proposed for these sites. Similar to the highway component, filtration of these chemicals through bioretention facilities and the implementation of MDE stormwater management practices will help to reduce the level of contaminant entering the groundwater systems. Impacts to the Piedmont SSA are similar to those described in the Highway alignment.

4. Avoidance and Minimization

Properly placed and designed SWM facilities along the highway and transitway alignments would be used to minimize potential impacts to groundwater. Recharge levels to streams and wetland hydrology would be maintained if SWM facilities are designed to infiltrate a portion of the runoff. Materials that reduce the amount of nutrients, metals, and heavier petroleum products from entering the subsurface would be used in SWM facilities to prevent groundwater quality impacts.

Roadside ditches would also be constructed as part of this project and designed with storm drain inlets that convey runoff to storm drains and larger SWM facilities. Some of the ditches may be vegetated which would provide a filtering function that would trap toxicants before they could reach SWM ponds.

C. SURFACE WATERS

As specified in the 2002 NETR, the I-270/US 15 Corridor traverses the Washington Metropolitan and Middle Potomac River sub-basins. There are 13 major surface water bodies along the I-270/US 15 Corridor, which are shown on plan sheets in **Appendix A**.

1. Major Streams/Hydrology

a. *Methods*

The methods presented in the 2002 NETR as they pertain to the physical characteristics of the major streams have not changed since the 2002 NETR.

b. *Results*

Only one major stream system potentially impacted by the I-270/US 15 Corridor, Mill Creek, was not included in the 2002 NETR. This new system is described below.

Mill Creek is classified as Use Class I, riverine intermittent with a streambed substrate composed of cobble and gravel (R4SB3). Bank full width is 2.5 feet and bank full depth is four inches. There were two inches of water flowing in the channel during the site visit. Habitat complexity is low as the stream is intermittent and is comprised of gravelly and cobbly runs interspersed with dry segments of streambed. Bank erosion is moderate with slumping banks being armored with riprap in most places. The banks of the stream are forested with *Acer rubrum* (red maple), *Salix nigra* (black willow), *Rosa multiflora* (multiflora rose), and *Lonicera japonica* (Japanese honeysuckle).

The flow related physical habitat assessment parameters presented in the 2002 NETR have been updated with new information available from the Maryland Biological Stream Survey (MBSS). **Figure 11** shows the location of MBSS sampling stations within the I-270/US 15 Corridor. These parameters are generally completed alongside aquatic community assessments. These updated parameters are shown in **Table 6**.

Table 6:
Flow Related Physical Habitat Assessment Parameters

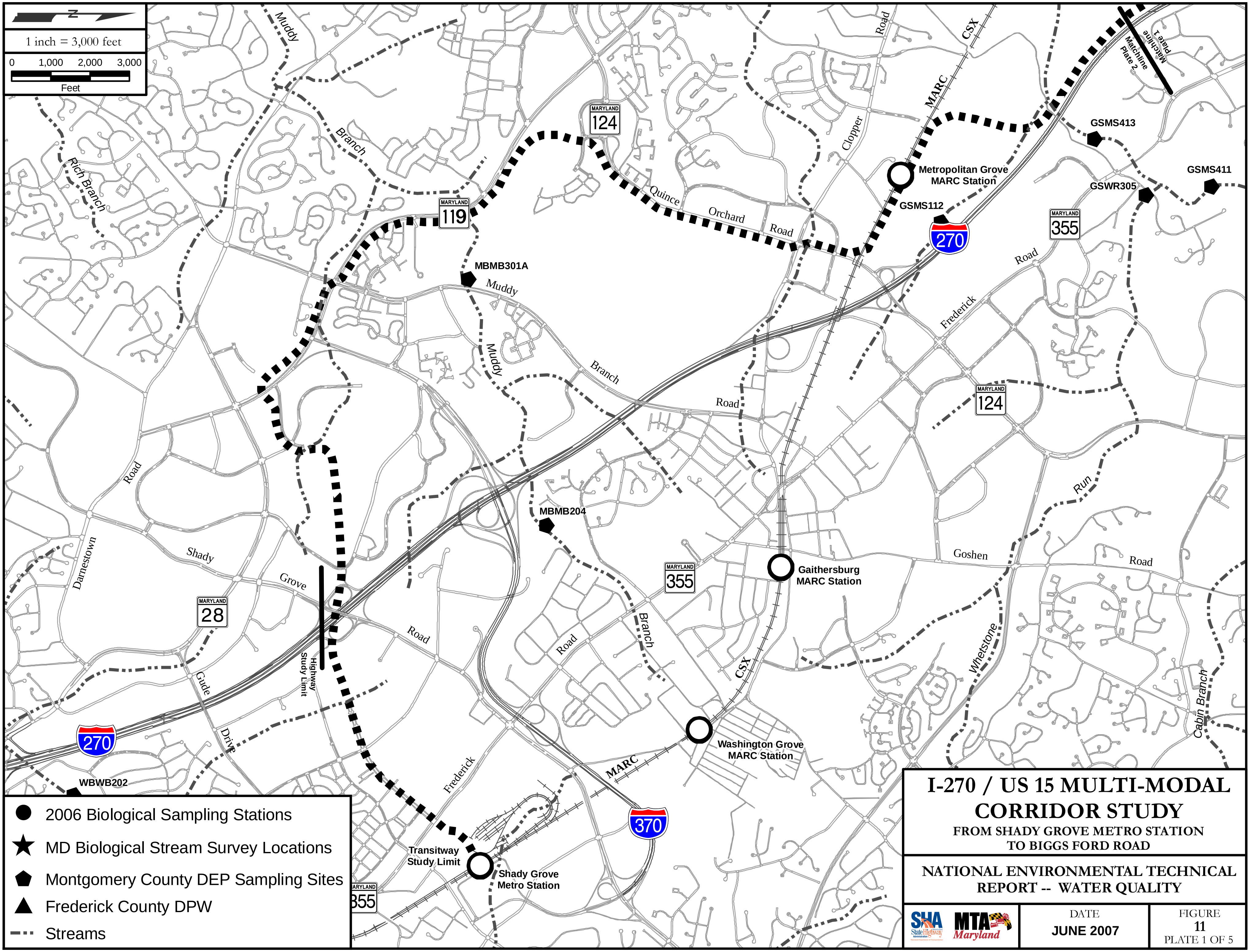
	Average Gradient (% slope)	Average Thalweg Depth (cm)	Average Flow (cfs)
Carroll Creek	0.13	41.2	3.21
Tuscarora Creek	0.68	25.3	2.16
Muddy Run	0.72	17	0.87
Bennett Creek	0.01	95	29.36
Little Bennett	0.87	24.7	3.36
Little Seneca	1.18	25.3	1.20
Great Seneca	1.33	27.1	3.86
Muddy Branch	0.26	48.6	21.3

Source : MBSS site data 2006

c. *Impacts*

Direct Impacts

Alternative 1 (No-Build Alternative) will not have an impact on major stream systems within the project corridor.



- ● 2006 Biological Sampling Stations
- ★ MD Biological Stream Survey Locations
- ⬟ Montgomery County DEP Sampling Sites
- ▲ Frederick County DPW
- -·- Streams

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

NATIONAL ENVIRONMENTAL TECHNICAL
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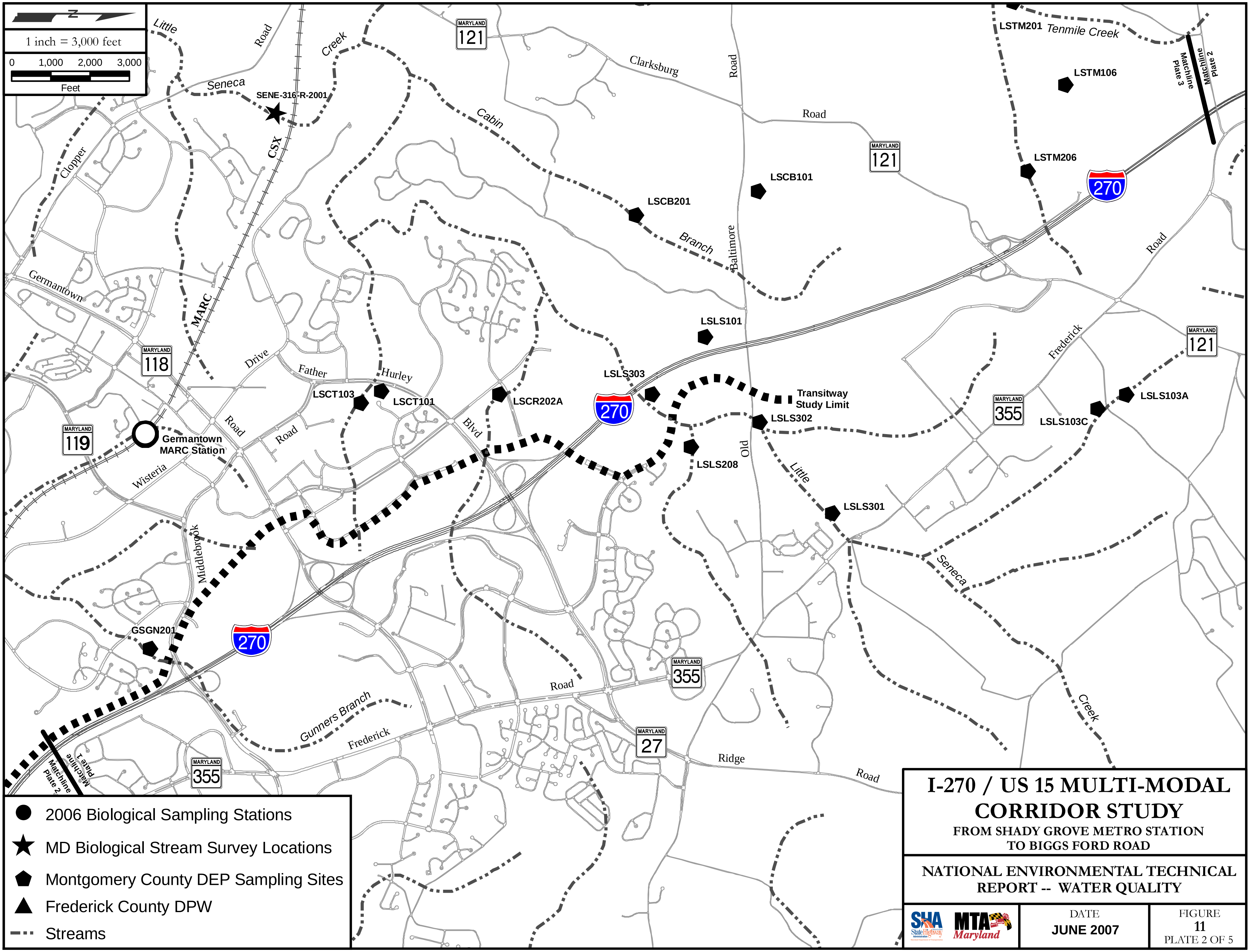
FIGURE
11
PLATE 1 OF 5



- ● 2006 Biological Sampling Stations
- ★ MD Biological Stream Survey Locations
- ⬟ Montgomery County DEP Sampling Sites
- ▲ Frederick County DPW
- ‐ ‐ · Streams

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

NATIONAL ENVIRONMENTAL TECHNICAL
REPORT -- WATER QUALITY

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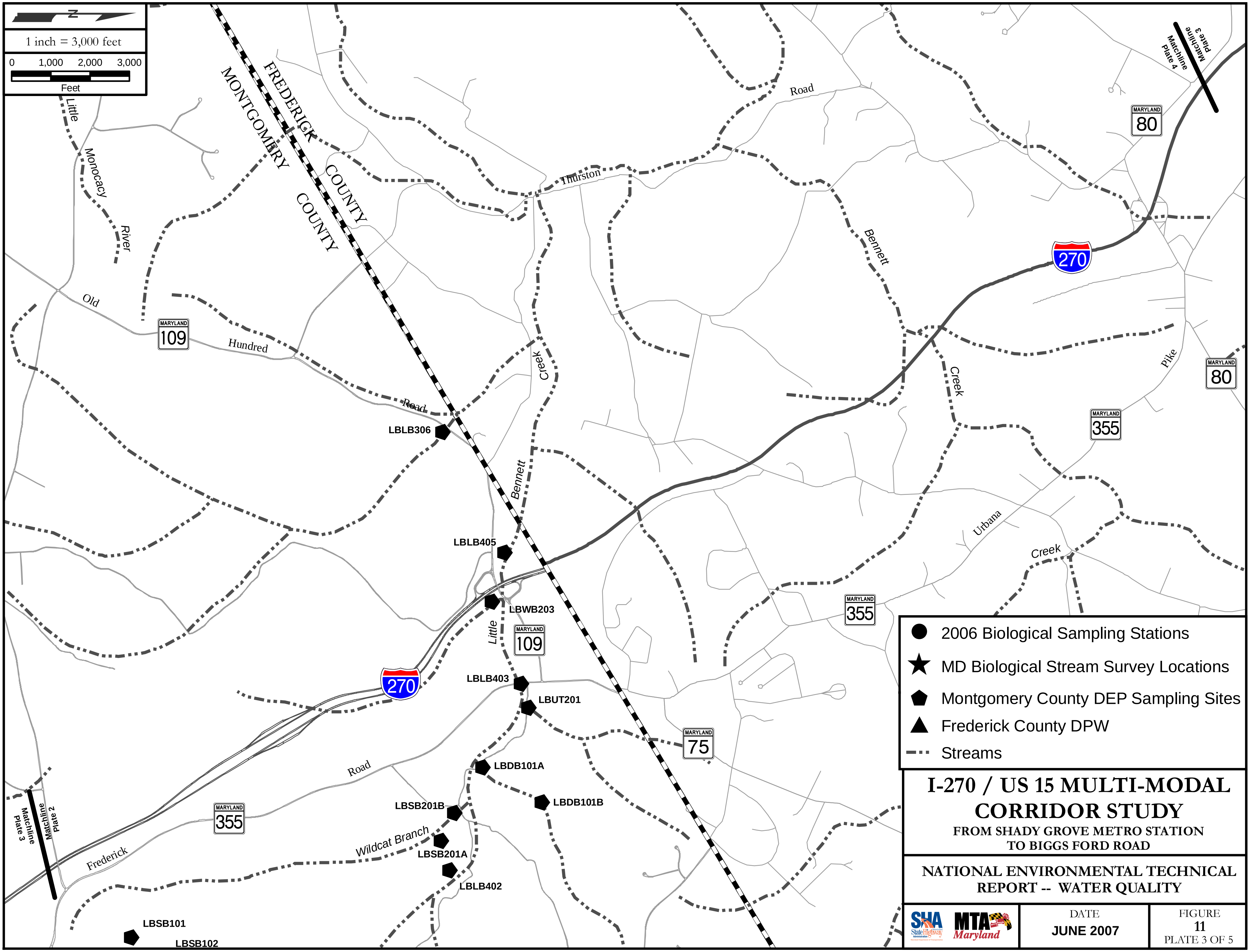
FIGURE
11
PLATE 2 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

NATIONAL ENVIRONMENTAL TECHNICAL REPORT -- WATER QUALITY

DATE
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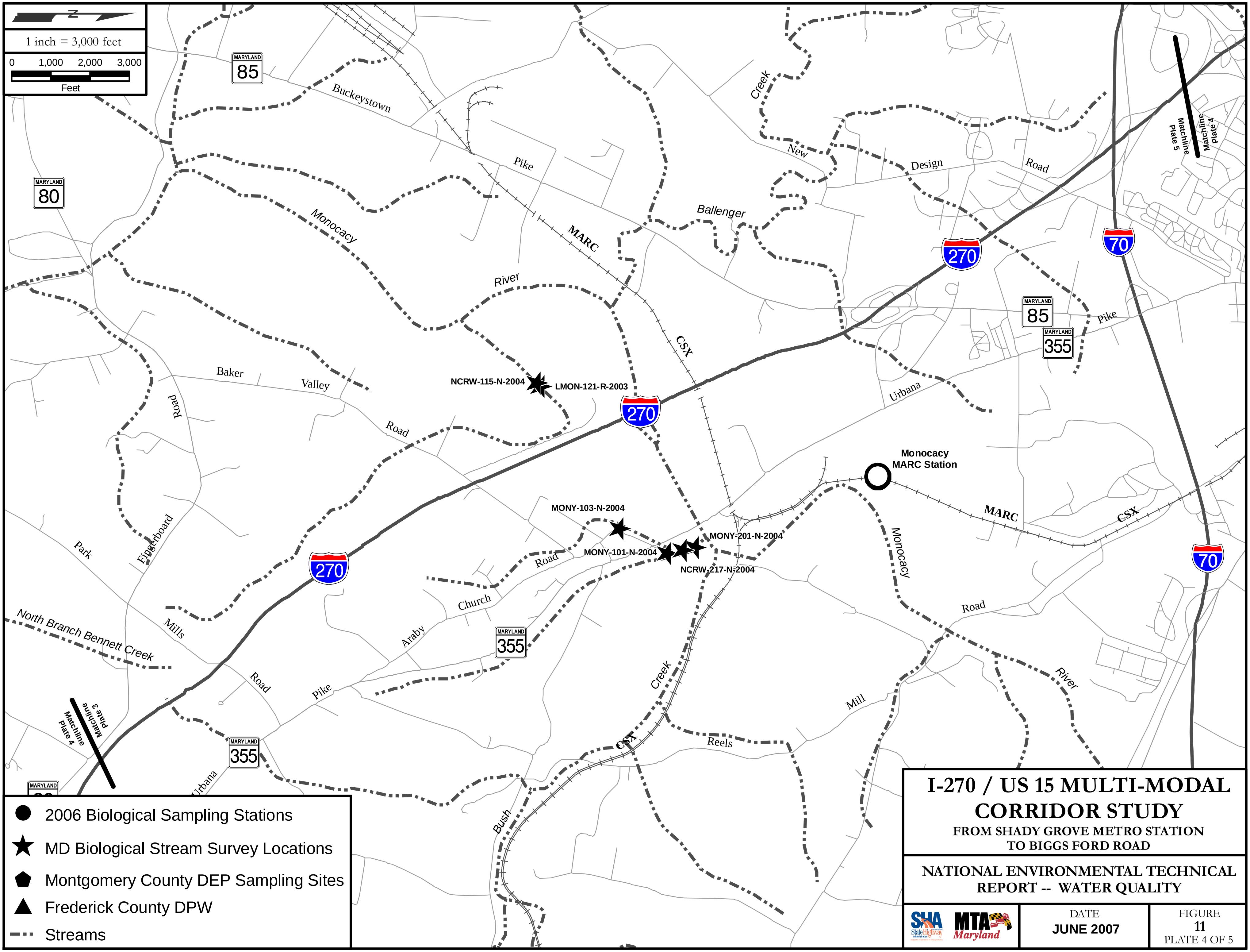
FIGURE
11
PLATE 3 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

NATIONAL ENVIRONMENTAL TECHNICAL
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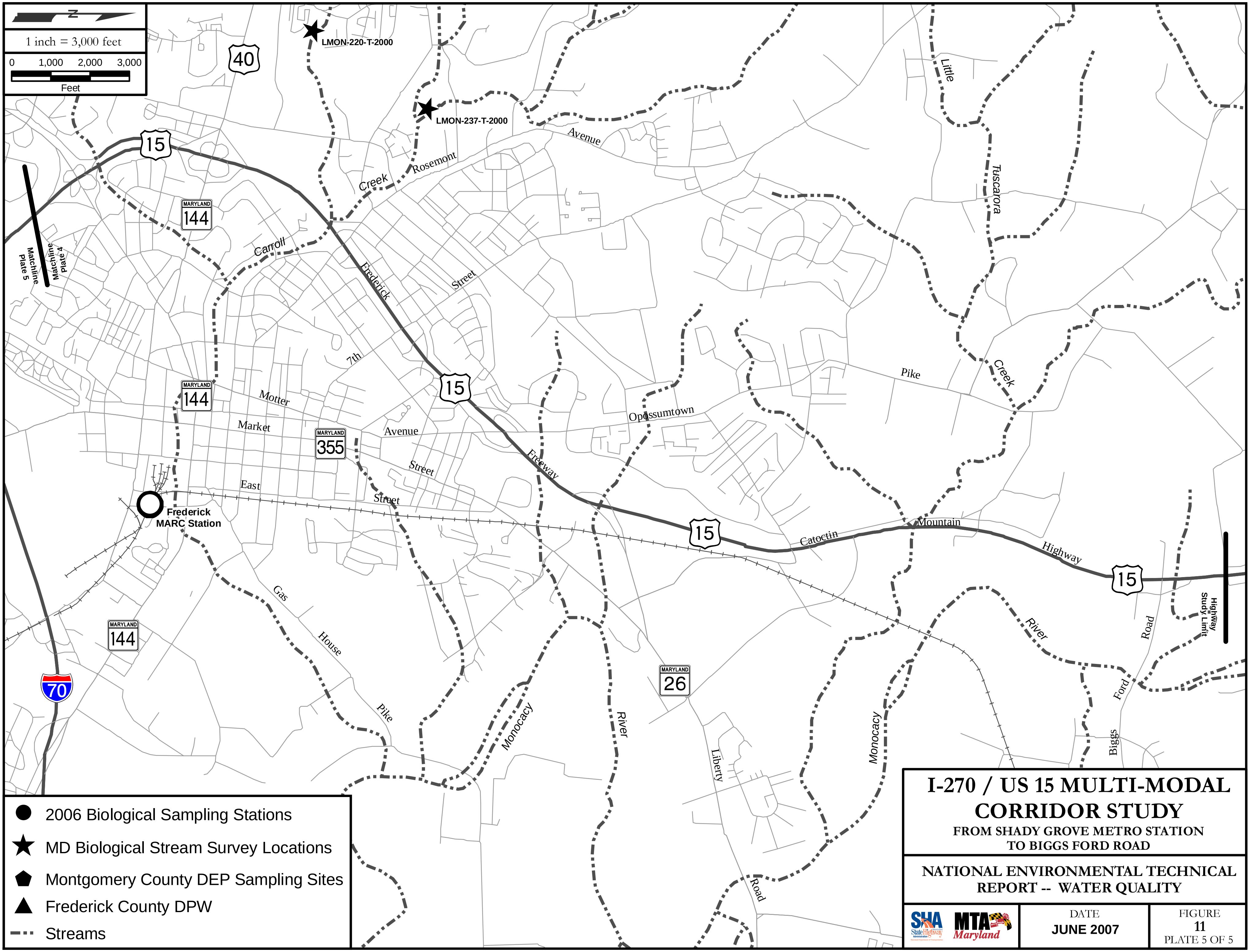
FIGURE
11
PLATE 4 OF 5



- ● 2006 Biological Sampling Stations
- ★ MD Biological Stream Survey Locations
- ⬟ Montgomery County DEP Sampling Sites
- ▲ Frederick County DPW
- ┅ Streams

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

NATIONAL ENVIRONMENTAL TECHNICAL
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FIGURE
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PLATE 5 OF 5

Alternatives 6A/B and 7A/B will have the same impacts to the major stream systems within the project study area, as both alternatives have the same physical footprint (See Section II). The direct impact to streams is greater for both of these ETL alternatives than compared to the alternatives assessed in the 2002 NETR, as the footprint for the ETL alternatives is greater to accommodate the ETLs.

Highway

There will be 20,198 linear feet of impacts to riverine systems, including perennial and intermittent streams within the highway alignment. These alignments impact a total of seventy-seven streams of various sizes. Most of the impacts will occur to smaller tributaries of the major stream systems. Some systems, due to their proximity to the highway, may have to be relocated or piped through culverts. In particular, two tributary streams of Great Seneca Creek (W-B63W and W-184), two tributary streams of Little Seneca Creek (W-51W and W-48), and Wildcat Branch are located parallel to the existing I-270/US 15 roadway, within the construction right-of-way.

Implementation of the build alternatives for the highway component of this project will occur within or parallel to the existing I-270/US 15 roadway. Most of the surface waters within the I-270/US 15 Corridor have already been impacted by existing bridge and culvert crossings for the highway. It is possible that some of the existing crossing structures may require replacement if they are considered to be undersized or in poor condition. However, it is anticipated that new structures will generally not be required to support additional lanes; instead, extensions of current bridges and culverts within the roadway are needed. Direct impacts to stream channels, therefore, would be associated with culvert or bridge extensions in portions of the stream already disturbed by the existing crossing. If total replacement of structures is required, impacts to Waters of the US may increase from those listed in this document.

Direct impacts could include the filling of stream substrates, altering of stream flow, and blocking of fish movements. Within the existing I-270/US 15 Corridor, most first order and many second order streams have experienced serious channel scour at the downstream end of the culvert crossing, effectively creating blockages to upstream fish passage.

Transitway

Within the transitway alignment, 4,006 linear feet of stream impact would occur from the alignment itself and transit stations resulting from the crossing of sixteen streams. An additional 486 or 660 linear feet of impact could occur from transitway operations and maintenance facilities at the Metropolitan Grove Study Area or Game Preserve Road Study Area, respectively. The remaining facilities locations did not impact streams.

The transitway alignment generally follows existing roadways. However, sections of the proposed transitway alignment do bisect streams, which would require placement of bridges, culverts, or pipes. All impacted waters are classified as Use I or Use IV surface waters.

Indirect Impacts

Various indirect effects on stream channels from extended culvert and bridge crossings and increased impervious surfaces of both the highway and transitway alignments could also occur. Indirect effects could include increased runoff from impervious surfaces causing backwater or increased downstream scour, sediment deposition, over-widening, and bank erosion. Increased runoff could also transport pollutants from road surfaces to downstream receiving waters or could lower stream base flows by reducing infiltration of rainwater. During construction, stream channels could be indirectly affected by sediment discharges and temporary channel diversions. Best Management Practices (BMPs) should be used during culvert or bridge construction to minimize sediment and pollutant discharges and temporary stream diversions should maintain proper channel substrates for aquatic habitat and species.

d. *Avoidance and Minimization and Mitigation*

Complete avoidance of impacts to surface waters is not possible due to the number of these systems in the project area and their orientation perpendicular to the proposed alternatives. However, impacts have been avoided or minimized wherever possible through the realignment of the transitway and the shift of lane additions to one side of the existing highway or another. Investigations of further avoidance and minimization measures are ongoing and will continue throughout all phases of engineering design for the project. Additional measures currently being assessed include alignment shifts, elimination of proposed interchanges, and relocation of roads based on resource agency coordination.

During the final design phases of the project, bridges and culverts will be sized to maintain the geomorphic stability of the stream channels as bankfull and flood-prone elevations are evaluated. Consideration will be given to the full range of crossing options including bridging and culvert designs such as depressed culverts that allow for the maintenance of a natural stream bottom and reduce the risk of creating barriers to fish movement.

Short-term construction impacts will be minimized through strict adherence to SHA erosion and sediment control procedures and MDE stormwater management regulations. These procedures include the use of BMP and structural controls such as the minimization of exposed soils through vegetative cover, use of contouring and diversion to reduce water velocities, routing of runoff to retention basins and installation of control structures such as silt fences. For Class I surface waters, in-stream work may not be conducted during the period March 1 through June 15, inclusive, during any year, while Class III waters have a restriction for in-stream construction between October 1 and April 30. Surface waters designated as Class IV have an in-stream restriction during the period March 1 through May 31. Long-term impacts to water quality will be minimized to the extent possible through the use of an SHA and MTA approved stormwater management plan. Stormwater management plans will be in compliance with MDE requirements and will be designed to treat both quantity and quality of stormwater runoff prior to discharge into receiving waters.

Direct impacts to stream channels will require a Section 404 permit from the U.S. Army Corps of Engineers (USACE) and a waterway construction permit from MDE. Mitigation for stream channel impacts will require a one to one replacement ratio as discussed in the wetland mitigation section of this document. Mitigation is typically provided in the form of water quality improvements such as stormwater retrofits, riparian plantings or stream restoration/enhancement. Mitigation planning, including coordination with state and federal regulatory agencies, was begun during the 2002 NETR process, and included preparation of a mitigation site search report. This process will continue in later design phases, following selection of a preferred alternative.

2. Surface Water Quality

a. Methods

Maryland surface water quality regulations regarding surface water quality designated uses have changed since the 2002 NETR was published. This section has been updated to reflect the most recent Code of Maryland Regulations (COMAR), dated August 2006.

In-situ water quality analysis is generally completed by state and local agencies alongside benthic macroinvertebrate and fish community field assessments. New aquatic community assessment locations were sampled by the Maryland Department of Natural Resources (MDNR) Maryland Biological Stream Survey (MBSS), the Montgomery County Department of Environmental Protection (MCDEP), and the Frederick County Department of Public Works (FCDPW) since the 2002 NETR was published. In addition, new in-situ water quality analyses were conducted by SHA with the fish community sampling done during the summer of 2006. These new SHA sampling stations are shown in **Figure 10**. Additional in-situ water quality analyses will be conducted during the benthic macroinvertebrate sampling projected for completion during the spring of 2007. These data will be included in the Final Environmental Impact Statement (FEIS).

b. Results

COMAR sets forth water quality criteria specific to designated uses (Maryland Regulations. Code tit. 26, §08.02.02 - 02 (2006)). The streams within the project area have the following designated Use Classes.

> **Use Class I-P** *Water contact recreation and the protection of aquatic life and public water supplies.* These streams are maintained for water contact sports, play and leisure time activities where individuals may come in direct contact with surface water, the growth and propagation of fish (other than trout), other aquatic life and wildlife, agricultural water supply, industrial water supply, and public water supply.
>
> **Use Class III-P** *Natural trout waters and the protection of public water supplies.* These streams are or have the potential to be suitable for the growth and propagation of trout and are capable of supporting self-sustaining trout populations and their associated food organisms. These streams are protected for public water supply.
>
> **Use Class IV-P** *Recreational trout waters and the protection of public water supplies.* These streams are cold or warm water streams that have the potential for or are capable of holding or supporting adult trout for put-and-take fishing and are managed as a special fishery by periodic stocking and seasonal catching. These streams are protected for public water supply.

All stream segments within the project study area are classified as I-P, III-P, or IV-P. **Table 7** shows the project area stream class designations and their parameters.

Based on available water quality data, the streams located within the project study area were all within Maryland state standards for temperature and turbidity while a few readings for pH and dissolved oxygen fell just outside Maryland standards (**Table 8**). Several pH readings within Little Bennett Creek, Little Seneca Creek, Muddy Branch, and Mill Creek were slightly more acidic than the 6.5 Maryland standard. The average pH for all these watersheds was well within the acceptable range. One site, located within Tuscarora Creek, had a dissolved oxygen reading just below the 5 mg/L minimum standard. Average dissolved oxygen values for Tuscarora Creek, within the project study area, were well above the standard. Conductivity values within the project study area ranged from 0.144 mS/cm to 0.550 mS/cm. The higher conductivity values were generally found in more impervious, urbanized watersheds.

Table 7:
Maryland Stream Class Designation Water Quality Parameters

Use Class	Streams	pH	Temp (ºC)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
I-P	Muddy Branch Great Seneca Creek Little Bennett Creek Bennett Creek Monocacy River mainstem Muddy Run Rock Creek (Monocacy River Tributary) Mill Creek	6.5 – 8.5	< 30	> 5	< 150 at any time or 50 monthly average
III-P	Carroll Creek Tuscarora Creek Ballenger Creek	6.5 – 8.5	< 20	> 5 min. daily average > 6	< 150 at any time or 50 monthly average
IV-P	Monocacy River Tributaries (above Rt 40) Little Seneca Creek	6.5 – 8.5	< 23.9	> 5	< 150 at any time or 50 monthly average

Source Md. Regs. Code tit. 26, § .08.02.03 - 3 (2005)

Table 8: In-Situ Water Quality Parameters for Major Streams within the I-270/US 15 Corridor

Watershed	pH			Temp (ºC)		Dissolved Oxygen (mg/L)			Conductivity (mS/cm)	Turbidity (NTU)	
	Avg.[1]	Out.[2]	%.[3]	Avg.[1]	Out.[2]	Avg.[1]	Out.[2]	%.[3]	Avg.	Avg.[1]	Out.[2]
Carroll Creek	7.71	0	0	16.4	0	10.0	0	0	0.550	12.8	0
Tuscarora Creek	7.29	0	0	19.6	0	8.09	1	16.6	0.417	12.2	0
Muddy Run	7.38	0	0	21.8	0	9.03	0	0	0.285	48.3	0
Bennett Creek	7.44	0	0	19.5	0	11.3	0	0	0.196	9	0
Little Bennett	7.16	5	19.2	13.8	0	9.79	0	0	0.144	-	-
Little Seneca	7.30	2	1.3	14.6	0	10.2	0	0	0.314	-	-
Great Seneca	7.19	0	0	9.24	0	15.3	0	0	0.294	-	-
Muddy Branch	7.66	1	20	15.7	0	7.22	0	0	0.512	-	-
Mill Creek	7.44	1	25	10.6	0	11.1	0	0	0.275	37.1	0
Ballenger Creek	6.94	0	0	13.06	0	10.29	0	0	0.368	3.03	0

[1] Average of all readings for the watershed
[2] Number of readings outside of COMAR range
[3] Percent of readings outside of COMAR range

c. *Impacts*

The No-Build Alternative will have no effect on the surface water quality of the study area watersheds and therefore will not be discussed in the following sections.

Both of the build alternatives evaluated in this report, Alternative 6A/B and Alternative 7A/B, have the potential to affect the surface water quality in the project area. These impacts can be categorized as direct and indirect. Direct impacts are those associated with construction of the highway. These impacts consist mainly of accidental spills and sediment releases. Indirect impacts are those associated with the use of the highway and with increased impervious areas. These impacts are attributed to roadway maintenance and stormwater runoff carrying particulates, metals, oil and grease, organics, nutrients, and other substances.

Direct Impacts

Impacts during construction include physical disturbances or alterations, accidental spills, and sediments releases. These impacts affect aquatic life and have the potential to contaminate public drinking water supplies. Direct stream channel impacts associated with each alternative are compared and quantified in the Waters of the U.S. including wetlands section of this report. The potential negative water quality results of these impacts are discussed below.

Both build alternatives may cause adverse effects to surface water quality during construction of the additional lanes and direct access ramps. Grading operations could expose large areas of soil that can be severely eroded by wind and rain when the vegetation and naturally occurring soil stabilizers are removed, leading to sedimentation of project area waterways. These increased sediment loads can destroy or damage fish spawning areas and macroinvertebrate habitat. An accidental sediment release in a stream can clog the respiratory organs of fish, macroinvertebrates, and other members of their food web (Barrett, 1998). Many metal contaminants bound to the small soil particles are transported during accidental releases of sediment. **Table 9** and **Table 10** show the impacts of suspended and deposited sediment, respectively, in the aquatic environment.

Table 9:
Summary of Impacts of Suspended Sediment

Abrades and damages fish gills, increasing risk of infection and disease
Scouring of periphyton from stream
Loss of sensitive or threatened fish species when turbidity exceeds 25 NTU
Shifts in fish community toward more sediment-tolerant species
Decline in sunfish, bass, chub, and catfish when monthly turbidity exceeds 100 NTU
Reduced sight distance for trout, with reduction in feeding efficiency
Reduced light penetration causing a reduction in plankton and aquatic plant growth
Adverse impacts to aquatic insects, which are the base of the food chain
Slightly increases stream temperature in the Summer
Suspended sediments can be a major carrier of nutrients and metals
Reduces anglers chance of catching fish

Source CWP, 2003

Table 10:
Summary of Impacts of Deposited Sediment

Physical smothering of benthic aquatic insect community
Reduced survival rates for fish eggs
Destruction of fish spawning areas and eggs
Embeddedness of stream bottom reduces fish and macroinvertebrate habitat value
Loss of trout habitat when fine sediments are deposited in spawning or riffle-runs
Sensitive or threatened darters and dace may be eliminated from fish community
Increase in sediment oxygen demand can deplete dissolved oxygen in streams
Contributing factor in the decline of freshwater mussels
Reduced channel capacity, exacerbating downstream bank erosion and flooding
Reduced flood transport capacity under bridges and through culverts
Deposits diminish scenic and recreational values of waterways

Source CWP, 2003

Barrett (1995) found that the initial response to increased sedimentation due to construction was a reduction in numbers and species of fish and macroinvertebrates. This reduction in fish numbers in areas of siltation was generally repopulated within twelve months of construction activity cessation.

Studies have shown conflicting conclusions about the effectiveness of erosion control methods to reduce the negative effects of sediment release. These erosion prevention methods have been shown to be less effective at mitigating the effects of the early construction stages and more effective at reducing long term stress to the local aquatic biota (Barrett, 1995).

An additional impact associated with the construction phase of the highway and transitway is the removal of trees and other riparian buffer vegetation. Tree removal during the construction process can reduce the amount of shade provided to a stream, thereby raising the water temperature. The effect that the temperature change would have on a stream would depend on stream size, existing temperature regime, the volume and temperature of stream baseflow, and the degree of shading remaining.

An increase in sediment and removal of forested buffers could contribute to thermal loading of the stream, altering in-stream habitat, especially in streams designated as Class III or Class IV. Class III or IV streams have cooler temperature requirements in order to sustain sensitive fish species that include brown trout and rainbow trout. These species are also sensitive to fluctuations in temperature and dissolved oxygen levels, which are heavily influenced by the surrounding land use.

Indirect Impacts

Impacts associated with the use of the road after construction would mainly result from the potential for contamination of surface waters by run-off and from new impervious roadway surfaces. These runoff constituents can be grouped as heavy metals, salt, organic molecules, and nutrients (Trombulak 1999). **Table 11** contains a list of common highway runoff constituents and their sources.

Table 11:
Common Highway Runoff Constituents and Their Primary Sources

Constituent	Primary Sources
Particulates	Pavement wear, vehicles, atmosphere, maintenance
Nitrogen, Phosphorous	Atmosphere, roadside fertilizer application
Lead	Leaded gasoline (auto exhaust), tire wear (lead oxide filler material), lubricating oil and grease, bearing wear
Zinc	Tire wear (filler material), motor oil (stabilizing additive), grease
Iron	Auto body rust, steel highway structures (guardrails, etc.), moving engine parts
Copper	Metal plating, bearing and bushing wear, moving engine parts, brake lining wear, fungicides and insecticides applied by maintenance operations
Cadmium	Tire wear (filler material), insecticide application
Chromium	Metal plating, moving engine parts, brake lining wear
Nickel	Diesel fuel and gasoline (exhaust), lubricating oil, metal plating, bushing wear, brake lining wear, asphalt paving
Manganese	Moving engine parts
Bromide	Exhaust
Cyanide	Anticake compound (ferric ferrocyanide, Prussian Blue or sodium ferrocyanide, Yellow Prussiate of Soda) used to keep deicing salt granular
Sodium, Calcium	Deicing salts, grease
Chloride	Deicing salts
Sulfate	Roadway blends, fuel, deicing salts
Petroleum	Spills, leaks or blow-by of motor lubricants, antifreeze and hydraulic fluids, asphalt surface leachate
Polychlorinated Biphenyls (PCBs)	Spraying of highway ROWs, background atmospheric deposition, PCB catalyst in synthetic tires

**Table 11:
Common Highway Runoff Constituents and Their Primary Sources**

Constituent	Primary Sources
Pesticides, Pathogenic Bacteria (indicators)	Soil, litter, bird droppings and trucks hauling livestock and stockyard waste
Rubber	Tire wear
Asbestos	Clutch and brake lining wear

Source Kobriger, 1984

An increase in impervious cover and vehicle use can contribute to an increase in heavy metal concentration in nearby surface waters. The most common heavy metals contaminants are lead, aluminum, iron, cadmium, copper, manganese, titanium, nickel, zinc, and boron. Most of these contaminants are related to gasoline additives and regular highway maintenance or transitway use. Other sources of metals include mobilization by excavation, vehicle wear, combustion of petroleum products, historical fuel additives, and catalytic-converter emissions.

Increased highway runoff generated from the build alternatives could result in pollutant loadings of streams within the project Corridor. Large areas of impervious cover associated with the Operations and Maintenance facilities would have more of an impact on surface water quality than the rest of the build alternatives due to the volume of pollutants entering stormwater runoff in relatively undisturbed landscapes. The additional highway lanes and interchanges associated with the ETL alternatives will contribute small amounts of pollutants to streams that are currently receiving chemical inputs from the existing roadway. The concentration of these pollutants from stormwater discharge is determined by average highway runoff flow, average highway runoff concentration, average stream flow from upstream of the highway input, and average pollutant concentration upstream of the highway input. The intensity and duration of a precipitation event may impact the water quality of highway runoff. The pollutants associated with suspended solids including metals, organic compounds, and total organic carbon, are more easily moved by high-intensity storms.

d. *Avoidance and Minimization and Mitigation*

Total avoidance of impacts to surface water quality cannot be avoided because of the large area of watershed affected by the project and the numerous stream systems that cross the project corridor. However, effects can be minimized and mitigated by employing the same methods that are discussed under the Surface Water section, including strict adherence to SHA erosion and sediment control procedures and MDE stormwater management regulations. Long-term impacts to water quality will be minimized to the extent possible through the use of an SHA and MTA approved stormwater management plan. Mitigation through stormwater management will be in compliance with MDE requirements and will be designed to treat both quantity and quality of stormwater runoff prior to discharge into receiving waters.

3. Wild and Scenic Rivers

a. *Methods*

The methods presented in the 2002 NETR as they pertain to the Wild and Scenic Rivers have not changed since the 2002 NETR.

b. *Results*

The information presented for this resource in the 2002 NETR remains unchanged. The Monocacy River, which flows perpendicular to the I-270/US 15 Corridor near Urbana in Frederick County, is designated as a State Wild and Scenic River. The Monocacy River is identified on the plan sheets provided in **Appendix A**.

c. *Impacts*

Alternatives 6 and 7 will require additional roadway width in areas that are already cleared or maintained for the existing bridge over the Monacacy River. An instream pier may not be necessary if the existing pier is extended to support an additional lane. The natural character of the stream and its surroundings will not be altered from its human-induced condition near or adjacent to the existing bridge. Therefore, no impacts are anticipated to the Monocacy River under the Wild and Scenic Rivers Act.

4. Floodplains

a. *Methods*

Since the 2002 NETR, FEMA has developed a Draft Floodplain Mapping Study for Frederick County in which some of the 100-year floodplain boundaries for project area streams have changed. The draft study was revised in 2006 and will be finalized in the near future. The mapping was updated through the use of an improved USGS Digital Elevation Model (DEM) and FEMA's contractor’s review of properties that were appealed through the Frederick County Zoning Administrators Office to FEMA. The revised mapping provides a more accurate delineation of the FEMA 100-Year Floodplain in Frederick County, Maryland.

b. *Results*

The FEMA designated 100-year floodplain lines have changed for the following streams within the I-270/US 15 Corridor:

- Carroll Creek. The 100-year floodplain line that parallels the north bank of Carroll Creek on the west side of U.S. 15 has been revised and now extends northwest to include a portion of the interchange clover for Exit 7.
- Monocacy River. The 100-year floodplain line that parallels the north bank of the stream on both the east and west side of I-270 has been extended to the south side of the CSX railroad.
- Bennett Creek. The 100-year floodplain line that parallels the south bank of the stream on the west side of I-270 does not extend as far south as stipulated in the 2002 NETR.

A 100-year floodplain not previously identified in the 2002 NETR has been established for Urbana Branch. The 100-year floodplain begins within the Exit 26 interchange, within the southbound ramp of I-270 to Fingerboard Road west and follows both sides of Urbana Branch. Boundaries for 100-year floodplains are shown on the plan sheets in **Appendix A**.

c. *Impacts*

The significance of floodplain encroachment was evaluated with respect to the criteria in Executive Order 11988 (Floodplain Management). Floodplain encroachment was also analyzed according to the Federal Aid Highway Program Manual which recommends that longitudinal encroachment (encroachment that parallels the stream channel) be avoided whenever possible. Alternatives 6A/B and 7A/B are similarly configured to those evaluated in the 2002 NETR, and will occur in such a manner that major longitudinal floodplain encroachments will not occur. The majority of floodplain encroachments will be from perpendicular crossings by the highway build alternatives and the transitway alignment.

The total floodplain impacts associated with Alternatives 6A/B and 7A/B will be the same, because the physical footprint for each alternative is the same (Section II). The floodplain impact for the highway component of the alternatives is 25.6 acres, while the transitway component impact is 2.8 acres. The specific floodplains impacted by the ETL highway alternatives are the same as those described in the 2002 NETR with the addition of Urbana Branch. The floodplain impacts associated with the transitway are also the same as was described in the 2002 NETR with one additional floodplain impact along a tributary to Gunners Branch.

d. Avoidance and Minimization

Efforts to minimize and avoid impacts to 100-year floodplains will continue throughout the planning and engineering process. Techniques that will be investigated to further minimize or avoid impacts may include alignment shifts to ensure the narrowest possible crossing, and bridging of floodplains to further reduce encroachment and allow for unrestricted passage of floodwaters. Hydrologic and hydraulic (H&H) studies will be conducted to determine the appropriate bridge or culvert opening sizes for the various alternatives that will not appreciably raise flood levels. Should culverts need to be replaced, additional impacts to waters of the U.S. could occur.

All construction occurring within the FEMA designated 100-year floodplain must comply with FEMA approved local floodplain construction requirements. These requirements consider structural elevations, fill levels, and grading elevations. If, after compliance with the requirements of Executive Order 11988 and 11990 Floodplain Management, new construction of structures or facilities are to be located in a floodplain, accepted flood proofing and other flood protection measures shall be applied to new construction or rehabilitation. To achieve flood protection, wherever practicable, structures should be elevated above the base flood level rather than filling for culvert placement. If H&H studies indicate that impacts to flood levels will occur, project designs will be changed to avoid the impact or mitigation of the affect will be provided.

5. Waters of the U.S., including Wetlands

a. Methods

All waters of the U.S., including wetlands, were identified and flagged within the I-270/US 15 Alternatives 6A/B and 7A/B ETL ROW and transitway alignments. In addition, using the methods detailed in the 2002 NETR, associated components such as park and ride lots, stations, and operations and maintenance facilities were also identified and flagged. Due to the overlap in the design between the ETL alternatives and the DEIS alternatives from I-370 to near I-70, a majority of the waters of the U.S. previously flagged during the 1998 wetland delineation and included in the 2002 NETR, are also located within the ETL ROW. This scenario is also true for the transitway alignment, which has had some alignment shifts since 2002.

The previously assessed wetlands and waterways were field reviewed during the delineation for the current ETL and transitway project to determine if any changes had occurred to these systems since the 1998 wetland delineation. These changes could include expanding the flag limits of previously delineated systems for new wetland or waterways within the ETL ROW or reclassifying wetlands that have transitioned to a different vegetative condition (i.e., emergent wetland that has since converted to a scrub-shrub condition). A majority of the wetlands and waterways identified in the 2002 NETR are listed in this document but not discussed in detail unless the limits of these numbered systems were extended or unless the classification changed. The 2002 NETR includes a detailed discussion of those wetlands and waterways that have remained unchanged since the 1998 wetland delineation.

The information presented in the 2002 NETR for the highway alignment park and ride lots and transitway alignment transit stations and operations and maintenance facilities did not include detailed descriptions of the wetlands and waterways, as these facilities were not designed or located until after publication of the DEIS. The designs for the highway and transitway facilities were made available during preparation of this report, which allowed for a wetland delineation to be conducted during the review of the ETL ROW and the transitway alignments.

Existing SWM ponds within the project corridor have been identified but were not delineated in the field. A wetland delineation was not conducted within potential SWM pond locations within the ETL ROW for this project, as these facilities are still under design. The USACE regulates only SWM facilities that are situated in-line with a regulated waterway, while MDE does not regulate SWM facilities designed specifically to treat stormwater.

Since the 2002 issue of the NETR, the USACE has broadened the definition of regulated waters of the U.S. to include ephemeral streams. Ephemeral streams are loosely defined by the USACE as channels whose primary source of stream flow is runoff from rainfall or snowmelt. Ephemeral channels also exhibit an ordinary high water mark (OHWM). The MDE does not regulate ephemeral channels. All ephemeral channels located within the I-270/US 15 Corridor were delineated.

The wetland delineation for this supplemental report was conducted from June 2006 to December 2006. All waters of the U.S., including wetlands and ephemeral channels, were flagged with pink survey ribbon labeled “SHA Wetland.” The flag points were surveyed in the field using a Global Positioning System (GPS) receiver. The survey files were then processed, downloaded into a Geographic Information System (GIS) database, and plotted. For all systems larger than ½ acre, an assessment of functions was performed using the Evaluation for Planned Wetlands (EPW) (Bartoldus et. al. 1994) method for all new wetlands/waterways identified within the highway and transitway alignments. Channel depth and width of all ephemeral channels were recorded on the field maps. All other methods associated with the wetland delineation and waterway identification are discussed in detail in the 2002 NETR.

The survey of wetlands and waterways within the I-270/US 15 Corridor are under review by the USACE and MDE. However, a formal Jurisdictional Determination (JD) will not be completed for the project at this time in light of a recent U.S. Supreme Court decision that the USACE no longer has jurisdiction over ephemeral and intermittent streams and any wetlands adjacent to these waterways. Until further guidance on conducting JDs is received from the USACE headquarters, the USACE and MDE will conduct only an informal review of the delineated wetlands and waterways.

b. *Results*

A total of 143 numbered wetlands/waterways were flagged within the highway alignment and park and ride areas, while a total of 54 systems were flagged within the transitway alignment, transit stations, and operation and maintenance facilities. The locations of the wetlands and waterways along the highway and transitway alignments are shown on plan sheets included in **Appendix A**. A summary of each wetland/waterway within the highway alignment are included in **Appendix B**. The wetlands and waterways within the transitway alignment, transit stations, and operations and maintenance facilities are also summarized in **Appendix B**. Routine wetland delineation field data sheets and stream features sheets for each numbered wetland and waterway are included in **Appendix C**, while functional assessment forms are included in **Appendix D**.

Highway Alignment

Previously Flagged Wetlands and Waterways

All wetlands and waterways previously flagged as part of the 2002 NETR, whose limits were not extended during the current ETL study or whose classification has not changed, are identified in **Appendix B**. However, a detailed discussion of these systems is not repeated in this document, but can be found in the 2002 NETR.

Previously Flagged Wetlands and Waterways Extended or Reclassified

All wetlands and waterways previously flagged as part of the 2002 NETR, whose limits have been extended to the new ETL ROW or who have been reclassified, are discussed in detail below. Where absent in this report, complete descriptions of each system are included in the 2002 NETR.

Wetland/Waterway 6E is located on the east side of I-270 just south of MD 80 (**Appendix A, Plan Sheet 8**). The system was identified as an upper perennial stream with a sand substrate (R3UB2) and an associated palustrine emergent wetland (PEM1C). During this study, the wetland system was extended to include two ephemeral channels that flow northeast into this wetland. The ephemeral channels are approximately two feet wide and one foot deep.

Waterway 6W is located on the west side of I-270 opposite Waterway 6E (**Appendix A, Plan Sheet 8**). The system was classified as an upper perennial stream with a gravel substrate (R3UB1). The classification of the stream remains unchanged, but the limits of the stream were extended to the ETL ROW.

Waterway 14E is located on the east side of I-270 just south of the scenic overlook adjacent to the Monocacy National Battlefield (**Appendix A, Plan Sheet 9**). The system was initially identified as an intermittent stream with a gravel substrate (R4SB1). This waterway was extended to include two ephemeral channels located on the east side of the road that flow west to the head of the streams associated with Waterway 14E. The ephemeral channels are approximately three feet wide and two feet deep.

Wetland/Waterway 15E is located just south of Waterway 14E (**Appendix A, Plan Sheet 9**). The system was classified as an intermittent stream with a gravel substrate (R4SB1) and a palustrine emergent wetland (PEM1C/E). The classification of this wetland system remains unchanged but the limits of this system were extended to the ETL ROW to include an ephemeral channel that flows south into the wetland.

Wetland/Waterway 18W is located on the west side of I-270 just north of MD 80 (**Appendix A, Plan Sheet 8**). The system is an extensive wetland system that contains an intermittent stream with a mud substrate (R4SB3), upper perennial stream with a gravel substrate (R3UB1), and adjacent forested (PFO1E) and emergent (PEM2B/E) wetlands. During the ETL study, a palustrine forested wetland with a seasonally saturated water regime (PFO1E) was identified just outside of the ETL ROW on the east side of the stream, and adjacent to the forested wetland that was flagged during the 1997 field reconnaissance. The newly flagged system is not an extension of the previously flagged wetland, but retains the same vegetative, hydrologic, and soil characteristics. This system was included within this discussion as it may be impacted during construction of the ETL alternative.

Wetland/Waterway 19N is located just south of Wetland/Waterway 18W (**Appendix A, Plan Sheet 8**). The system was previously classified as a lower perennial stream with a sand substrate (R2UB2) and adjacent palustrine scrub-shrub wetland (PSS1E). The limits of the stream were extended to connect to Wetland/Waterway 18W within the ETL ROW.

Waterway 22E is located on the east side of I-270 just south of Wetland/Waterway 6E (**Appendix A, Plan Sheet 8**). The system was identified as an intermittent stream with a gravel substrate (R4SB1) during the previous study. Two new ephemeral channels were identified as part of this project. The channels are approximately five feet wide and two feet deep.

Wetland/Waterway 22W is located on the opposite side of I-270 from Waterway 22E (**Appendix A, Plan Sheet 8**). The system was identified as an upper perennial stream with a gravel substrate (R3UB1) and adjacent palustrine scrub-shrub wetland (PSS1E). The limits of both the stream and wetland were extended to the ETL ROW to include an ephemeral channel that flows from the east.

Wetland 23W is located on the west side of I-270 within the northern floodplain of Bennett Creek (**Appendix A, Plan Sheet 8**). The system was identified as a palustrine emergent wetland (PEM1B) during the 1997 field reconnaissance. The limits of the wetland were extended to the ETL ROW.

Waterway 24W is the mainstem of Bennett Creek (**Appendix A, Plan Sheet 8**). The system was classified as a lower perennial stream with a sand/mud substrate (R2UB2/3). The limits of the stream were extended to the ETL ROW on both the east and west sides of I-270. An ephemeral channel that extends north into Waterway 24 on the east side of I-270 was flagged as part of this project. The ephemeral channel is approximately two feet wide and one foot deep.

Waterway 27E is located on the east side of I-270 just north of Doctor Perry Road (**Appendix A, Plan Sheet 8**). The system was flagged as an upper perennial stream with a gravel substrate (R3UB1) during the previous study. The limits of this waterway were extended to include an ephemeral channel. The ephemeral channel is approximately two feet wide and three feet deep.

Wetland/Waterway 28W is located on the west side of I-270 just south of Doctor Perry Road (**Appendix A, Plan Sheet 7 and MD 75 Plan Sheet 1**). The system was previously flagged as palustrine open water (POW) with a palustrine emergent fringe wetland (PEM2C/E). A palustrine scrub-shrub wetland with a temporary water regime (PSS1A) and an ephemeral channel were flagged as part of this study. The ephemeral channel extends south into the scrub-shrub wetland that now surrounds the outer edge of the pond. The ephemeral channel is approximately two feet wide and one foot deep. During the site visit in July 2006, the soils in the wetland were saturated in the upper 12 inches of the soil profile and oxidized rhizospheres were present. Dominant vegetation in the wetland includes *Salix babylonica* (weeping willow), *Lolium pratense* (meadow fescue), and *Boehmeria cylindrica* (false nettle). Soils in the wetland are mapped as Glenville-Baile silt loam. Hydric inclusions may be included within the Baile series of this mapped soil type. Soil samples exhibited a low chroma matrix color of 10YR3/2 within one inch of the ground surface. Below one inch, the matrix color transitioned to 10YR4/2 with common, distinct mottles of 7.5YR3/4. Principal functions associated with this wetland ranked high for water quality and intermediate for sediment stabilization. Wildlife functions ranked very low.

Wetland/Waterway 29W is located just south of Wetland/Waterway 28 (**Appendix A, Plan Sheet 7 and MD 75 Plan Sheet 1**). The system was previously identified as a palustrine emergent wetland (PEM2B) on the west side of I-270. An ephemeral channel drains north into Wetland 29 at the culvert. The ephemeral channel is approximately four feet wide and 3.5 feet deep.

Wetland/Waterway 30W is located just south of Wetland/Waterway 29 (**Appendix A, Plan Sheet 7 and MD 75 Plan Sheet 1**). The system was identified as an upper perennial stream with a gravel substrate (R3UB1) and a palustrine forested wetland (PFO1E). The limits of both the stream and wetland were extended to the ETL ROW. An ephemeral channel that extends northwest into the stream was also identified as part of this project. The ephemeral channel is approximately two feet wide and one foot deep.

Waterway B35 is located on the east side of I-270 about 1,200 feet south of Old Hundred Road (**Appendix A, Plan Sheet 7**). The system was identified during this study as an ephemeral channel. The ephemeral channel is approximately three feet wide and five feet deep.

Waterway C35 is located immediately south of Waterway B35 (**Appendix A, Plan Sheet 7**). The system was flagged as an upper perennial stream with a sand substrate (R3UB2) during the previous study. The limits of this stream were extended to the ETL ROW line.

Waterway D35 is a continuation of Waterway C35 (**Appendix A, Plan Sheet 7**). The system was identified as an upper perennial stream with a sand substrate (R3UB2). As part of this study, an ephemeral channel that drains north into Waterway D35 was identified. The channel is approximately two feet wide and one foot deep.

Waterway G35 is located on the east side of I-270 about 1,900 feet north of Comus Road (**Appendix A, Plan Sheet 6**). The system was identified as an upper perennial stream with a gravel substrate (R3UB1). The limits of this stream were extended within the ETL ROW project limits.

Wetland/Waterway F35 is located just north of Waterway G35 (**Appendix A, Plan Sheet 6**). The system was identified as a palustrine emergent wetland (PEM2C/E). The limits of this wetland were extended to include an ephemeral channel that flows north into the wetland. The channel is approximately two feet wide and one foot deep.

Waterway 38 is located on the west side of I-270 between Comus Road and the weigh station (**Appendix A, Plan Sheet 6**). The system was previously flagged as an intermittent stream with a gravel/mud substrate (R4SB1/3). The limits of the stream were extended to the ETL ROW and include an ephemeral channel that flows north into Waterway 38. The channel is approximately two feet wide and one foot deep.

Wetland 39 is located on the west side of I-270 between Comus Road and Wetland 38 (**Appendix A, Plan Sheet 6**). The system was initially flagged as a palustrine emergent wetland (PEM2E). The limits of this wetland were extended to the ETL ROW.

Waterway 43 is located on the east side of I-270 about 3,600 feet south of Old Hundred Road (**Appendix A, Plan Sheet 7**). The system was initially flagged as an upper perennial stream with a gravel substrate (R3UB1). The limits of this stream were extended to the ETL ROW.

Waterway 44 is located just north of Waterway 43 (**Appendix A, Plan Sheet 7**). The system was initially flagged as an upper perennial stream with a gravel substrate (R3UB1). The limits of this stream were extended to the ETL ROW.

Wetland/Waterway 45E is located on the east side of I-270 about 1,000 feet south of Comus Road (**Appendix A, Plan Sheet 6**). The system was originally identified as an intermittent stream with a gravel substrate (R4SB1) and an adjacent palustrine emergent wetland (PEM2E). The limits of the stream were extended to the ETL ROW and include an ephemeral channel that flows south into the stream. The ephemeral channel is approximately two feet wide and one foot deep.

Wetland/Waterway 46E is located on the east side of I-270 opposite the Montgomery County Correctional Facility (**Appendix A, Plan Sheet 6**). The system was previously flagged as a lower perennial stream with a gravel substrate (R2UB1) and a palustrine emergent wetland (PEM1/2E). This wetland was not extended nor has the classification changed as part of this study. However, a wetland/waterway system that eventually drains south into Wetland/Waterway 46E was included as the same numbered system designation.

The wetland/waterway system begins as an intermittent stream with a gravel substrate (R4SB1) that flows south along the east side of I-270 to join the mainstem of Wetland/Waterway 46E, just outside of the study area. The average channel width is seven feet with a depth of 2.5 feet. The habitat complexity of the stream is characterized by shallow pools and riffles with low in-stream woody debris. Moderate erosion is occurring in the stream as evidenced by undercut banks along bends and downcutting of the stream. The riparian buffer of the stream is forested with some disturbance due to clearing for a utility easement. Dominant species in the riparian buffer include red maple, *Liriodendron tulipifera* (tulip poplar), spicebush, and *Symplocarpus foetidus* (skunk cabbage).

Two ephemeral channels are located at the head of the intermittent stream and flow south along the east side of I-270. The ephemeral channels are approximately two feet wide and one foot deep.

Palustrine scrub-shrub wetlands with a seasonally saturated water regime (PSS1E) are located along the fringes of the stream. During the site visit, soils in the wetland were saturated to the surface and water was present in an unlined bore hole at four inches below the ground surface. Drainage patterns and drift lines were also observed in the wetland. The dominant vegetation in the wetland includes *Impatiens capensis* (jewelweed), *Glyceria striata* (fowl manna grass), *Lindera benzoin* (spicebush), *Fraxinus pennyslvanica* (green ash), and *Acer rubrum* (red maple). Soils in the wetland are mapped as Hatboro silt loam, which is listed as a hydric soil by NRCS.

Soil samples exhibited a low chroma matrix color of 10YR5/1. Principal functions associated with the wetland ranked high for sediment stabilization and intermediate for water quality and wildlife.

A palustrine emergent wetland with a saturated water regime (PEM1/2B) drains west into Wetland/Waterway 46E. During the site visit, the wetland was inundated with less than 0.5 inches of water and soils were saturated to the surface. Water was present at 0" in an unlined bore hole. Dominant vegetation in the wetland includes *Typha latifolia* (broad-leaf cattail), jewelweed, *Polygonum sagittatum* (arrowleaf tearthumb), *Carex lurida* (shallow sedge), and *Leersia oryzoides* (rice cutgrass). Soils in the wetland are mapped as Hatboro silt loam, which is listed as a hydric soil by NRCS. Soil samples exhibited a low chroma matrix color of 10YR3/1. Principal functions associated with this wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked low.

Wetland/Waterway 47E is located on the east side of I-270 about 1,300 feet north of MD 121 (**Appendix A, Plan Sheet 5**). The system was previously flagged as an upper perennial stream with a gravel substrate (R3UB1) and a palustrine forested/emergent wetland system (PFO/PEM1/2E). The stream was extended to the ETL ROW and an ephemeral channel that extends south along the east side of I-270 into Wetland/Waterway 47 was identified. The ephemeral channel is approximately two feet wide and one foot deep.

Wetland/Waterway 48W is located on the west side of I-270 about 2,500 feet south of MD 121 (**Appendix A, Plan Sheet 5**). The system was previously flagged as an upper perennial stream with a gravel substrate (R3UB1). As part of this study, an ephemeral channel was flagged along the west side of I-270 beginning just south of MD 121 and draining south into Wetland/Waterway 48. The ephemeral channel is approximately two feet wide and one foot deep.

A palustrine emergent wetland with a seasonally saturated/flooded water regime (PEM2C/E) was also identified as part of this study. During the site visit, the soils were saturated at five inches below the ground surface. Drainage patterns were observed in the wetland and water was present in an unlined bore hole at six inches below the ground surface. The dominant vegetation in the wetland includes jewelweed, arrowleaf tearthumb, Asiatic tearthumb, *Microstegium vimineum* (Nepalese browntop), lady's thumb, and Japanese honeysuckle. Soils in the wetland are mapped as Baile silt loam, which is listed as a hydric soil. Soil samples exhibited a low chroma matrix color of 10YR4/2 with common, distinct mottles of 7.5YR3/4. Soil samples below four inches exhibited a matrix color of 10YR4/3 with common, distinct mottles of 7.5YR3/4. Principal functions associated with this wetland ranked high for water quality and intermediate for sediment stabilization. Wildlife functions ranked very low.

An intermittent stream with a gravel substrate (R4SB1) flows southeast into the emergent wetland. The average channel width of the stream is three feet with a channel depth of one foot. The habitat complexity of the stream is characterized by shallow runs and a lack of deep pools. The stream banks are moderately eroded as evidenced by undercut banks and entrenchment of the channel. The riparian buffer of the stream is forested with dominant species of red maple, green ash, *Platanus occidentalis* (sycamore), and spicebush.

Wetland/Waterway 50W is located on the west side of I-270 about 1,700 feet south of West Old Baltimore Road (**Appendix A, Plan Sheet 5**). The system was initially flagged as an upper perennial stream with a gravel substrate (R3UB1) and a palustrine scrub-shrub wetland (PSS1B). The limits of the scrub-shrub wetland were extended to the ETL ROW. An ephemeral channel was also identified on the west side of I-270, draining west into the perennial stream associated with Wetland 50. The ephemeral channel is approximately two feet wide and two feet deep.

Wetland/Waterway 53W is located on the west side of I-270 about 3,200 feet south of West Old Baltimore Road (**Appendix A, Plan Sheet 4**). The system was identified during the previous study as a palustrine forested wetland (PFO1C). An ephemeral channel was flagged as part of this study on the west side of the road flowing north into the wetland. The ephemeral channel was approximately 1.5 feet wide and one foot deep.

Waterway 54E is located on the east side of I-270 opposite Wetland/Waterway 53 (**Appendix A, Plan Sheet 4**). The system was identified during the previous study as an intermittent stream with a gravel substrate (R4SB1). The limits of the intermittent stream were extended to include two ephemeral channels. One ephemeral channel flows east from the east side of I-270 into Waterway 54, while the other ephemeral channel extends from the southern limits of the intermittent stream outside of the study area. Both ephemeral channels are approximately two feet wide and one foot deep.

Wetland 55E is located on the east side of I-270 about 2,000 feet north of West Old Baltimore Road (**Appendix A, Plan Sheet 5**). The system was classified as a palustrine emergent wetland (PEM1/2C/E) on the east side of I-270. The wetland limits were extended as the size of this wetland has expanded since the 1997 reconnaissance of this area.

Wetland/Waterway 56E is located just south of the exit ramp to MD 121 from northbound I-270 (**Appendix A, Plan Sheet 5**). The system was initially flagged as a palustrine emergent wetland (PEM1E). During this study, an intermittent stream and ephemeral channel were identified. The ephemeral channel begins just south of the MD 121 interchange and flows south along the east side of I-270. The ephemeral channel is approximately two feet wide and one foot deep. The ephemeral channel transitions to an intermittent stream with a gravel substrate (R4SB1) and continues to flow south into the wetland. The average channel width of the stream is two feet with a channel depth of 0.5 inches. The habitat complexity of the stream is low due to shallow flows. The riparian buffer of the stream is forested with dominant species of green ash, *Pinus virginiana* (Virginia pine), and *Lonicera tatarica* (bush honeysuckle).

Wetland/Waterway 60W is located on the west side of I-270 just north of Middlebrook Road (**Appendix A, Plan Sheet 3**). The system, Gunners Branch, was classified as an upper perennial stream with a gravel substrate (R3UB1). The limits of the stream were extended to connect between the culverts at I-270 and Middlebrook Road. In addition, a tributary stream was flagged perpendicular to the main perennial stream. This stream was classified as upper perennial with a gravel substrate (R3UB1). The channel averaged nine feet wide and 3.5 feet deep and there was an average of three inches of water flowing in the channel during the site visit. This tributary stream drains south, parallel to I-270, and joins the mainstem at Middle Brook Road. The channel is culverted where an access driveway to a car dealership crosses it just north of the project study area. Downcutting and widening of the stream channel has occurred, and erosion was determined to be moderate. The banks of the stream are mostly forested with poplar, maple, green ash, and spicebush. A short segment of intermittent stream channel connects to this tributary stream within the study area. This segment contained a stream bed composed of gravel (R4SB1). The channel was four feet wide and 1.5 feet deep and had an inch of water flowing during the site visit. The banks of the stream had similar vegetation to that described above. Three small ephemeral channels were also delineated within this system. These channels drain directly into Gunners Branch. Two of the channels drain runoff from I-270. The channel on the south side of Gunners Branch was 2.5 feet wide and 1.5 feet deep with a substrate of sand and woody debris. No water was present in the channel at the time of the site visit. The channel on the north side of Gunners Branch was four feet wide where it connects to Gunners Branch and up to eight feet wide where it exits a culvert along the base of the fill slope of I-270. The channel substrate was riprap. The third ephemeral channel was located just downstream of I-270 and collected sheet flow runoff from the upland forested slopes north of Gunners Branch. The channel was 4.5 feet wide and 1.5 feet deep with a sand substrate. Some snow melt was flowing within the channel at the time of the site visit.

In addition to the streams, two new wetland areas were identified within this W60W complex. Both wetlands were classified as palustrine forested with broad-leaved deciduous vegetation and a seasonally flooded/saturated water regime (PFO1E). One small area is hydrologically supported by runoff from an adjacent parking lot and an outfall from a SWM pond. Up to one half inch of water was present within the wetland during the site visit. Dominant vegetation included red maple, spicebush, multiflora rose, false nettle, *Cinna arundinacea* (stout woodreed), and soft rush. Soils within the wetland are mapped as Baile silt loam, which is listed as hydric. Soil samples exhibited a low-chroma matrix color of 2.5Y4/2 with common, prominent mottles of 7.5YR4/6 between three and 12 inches of the soil profile. The other wetland occurs within the northern floodplain of Gunners Branch. Approximately 10 percent of the wetland had up to one half inch of water during the site visit. Other indicators of hydrology included water within one inch of the surface in an unlined bore hole, soil saturation within the upper 12 inches, and oxidized root channels. Dominant vegetation included red maple, green ash, spicebush, *Smilax rotundifolia* (common greenbrier), Nepalese browntop, and skunk cabbage. Soils within the wetland are mapped as Hatboro silt loam, which are hydric. Soil samples exhibited a low-chroma matrix color of 2.5Y4/2 with common, prominent mottles of 7.5YR4/6 between one and seven inches of the soil profile. Principal functions associated with the wetland ranked high for water quality while wildlife functions ranked intermediate.

Waterway A63W is located on the northeast side of the ramp from westbound MD 124 to northbound I-270 (**Appendix A, Plan Sheet 2**). The system was classified as an upper perennial stream with a gravel/mud substrate (R3UB1/3). The limits of the stream were extended within the ETL ROW.

Waterway B63E is located on the east side of I-270 just north of Wetland A63E (**Appendix A, Plan Sheet 2**). The system was initially flagged as an upper perennial stream with a gravel substrate (R3UB1). An ephemeral channel that drains south along the east side of I-270 into Waterway B63E was identified as part of this study. The ephemeral channel is approximately two feet wide and two feet deep.

Waterway 66W is the mainstem of Muddy Branch (**Appendix A, Plan Sheet 1**). The system was identified as an upper perennial stream with a gravel substrate (R3UB1) during the initial study. An ephemeral channel that was identified during this study flows north along the west side of I-270 and into the mainstem of Muddy Branch at the culvert. The ephemeral channel is approximately four feet wide and one foot deep.

Newly Identified Wetlands and Waterways within the ETL ROW

The wetlands/waterways discussed below are for newly identified systems that were not previously flagged as part of the 2002 NETR. Most of these numbered systems are hydrologically connected to previously flagged wetlands/waterways.

Wetland 24N is located east of I-270, within the southern floodplain of Bennett Creek (**Appendix A, Plan Sheet 8**). During the previous study, only the mainstem of Bennett Creek was identified as Waterway 24. The extended ROW includes this floodplain wetland. The system is classified as a palustrine emergent wetland with a temporarily flooded water regime (PEM2A) that was identified as part of the ETL project. During the site visit, drift lines and sediment deposits were observed in the wetland. The dominant vegetation in the wetland includes jewelweed, *Phalaris arundinaceae* (reed canary grass), *Humulus lupulus* (common hop), *Polygonum perfoliatum* (Asiatic tearthumb), and *Polygonum persicaria* (lady's thumb). Soils in the wetland are mapped as Hatboro silt loam, which is listed as a hydric soil by NRCS. Soil samples within zero to four inches of the ground surface exhibited a matrix color of 10YR3/4. Below four inches, the matrix color transitioned to a 10YR4/3 with few, faint mottles of 10YR4/6. This wetland is considered a potential problem area because the soils do not meet the alluvial depleted matrix criteria for depth, but the soil is obviously frequently flooded due to the dominance of FACW vegetation and the hydrologic indicators. Principal functions for this wetland ranked high for water quality and intermediate for sediment stabilization. Wildlife functions ranked very low.

Waterway B35 is located on the east side of I-270 about 1,200 feet south of Old Hundred Road (**Appendix A, Plan Sheet 7 and MD 75 Plan Sheet 1**). The system was considered non-jurisdictional during the previous study, but was identified during this study as an ephemeral channel. The ephemeral channel is approximately three feet wide and five feet deep.

Waterway 46W is a tributary to Ten Mile Creek that flows southwest from the west side of I-270 along the south side of the Montgomery County Correctional Facility (**Appendix A, Plan Sheet 5**). This tributary is classified as upper perennial with a gravel substrate (R3UB1). The average channel width of the stream is 12 feet and the depth is two feet. The habitat complexity of the stream is characterized by a few deep pools and shallow riffle/run complexes. Moderate erosion is occurring in the stream, as evidenced by undercut banks on bends and exposed tree roots. The riparian buffer of the stream is forested with dominant species of tulip poplar, red maple, and spicebush.

Two ephemeral channels flow into Waterway 46W from the south and north near the culvert located along Whelan Lane. The ephemeral channels are approximately two feet wide and one foot deep.

Waterway 47W is located just south of Waterway 46W (**Appendix A, Plan Sheet 5**). The system is an upper perennial stream with a gravel substrate (R3UB1) that flows west to join the mainstem of Wetland 46W. The average channel width is ten feet with a depth of 2.5 feet. The habitat complexity of the stream is low due to shallow pools along meanders. The stream banks are moderately eroded as evidenced by slumping. A mature forested riparian buffer is associated with the stream with dominant vegetation of tulip tree, red maple, and green ash.

Two ephemeral channels flow along the west side of I-270 into the perennial stream near the culvert. The two channels are approximately two feet wide and one foot deep.

Waterway 59E is located on the east side of I-270 just south of the ramp to MD 118 from northbound I-270 (**Appendix A, Plan Sheet 3**). The system is an ephemeral channel that flows west under I-270 to Waterway 59W. The ephemeral channel is approximately three feet wide and one foot deep.

Waterway 157 is located east and west of US 15 between MD 26 and Hayward Road (**Appendix A, Plan Sheet 14**). The system is a tributary to the Monocacy River that flows east from a SWM pond under US 15 into a pipe located under the railroad tracks. This stream is classified as lower perennial with a rip-rap substrate (R2UBx) on the west side of the roadway. The average channel width of the stream is 12 feet with a channel depth of one foot. This portion of the stream has been reinforced with rip-rap as it flows from the pond. The habitat complexity is very low due to lack of structure and altered substrate. The riparian buffer of the stream consists of mowed grass.

As the stream flows through the culvert to the east side of the road, the channel dimensions are reduced to a width of 3.5 feet, with a channel depth of three feet. The substrate also transitions into sand substrate (R2UB2). The habitat complexity of the stream remains low due to the lack of clean riffles and deep pools. The riparian buffer on the left bank of the stream is a field with dominant species of *Toxicodendron radicans* (poison ivy), *Rubus* sp. (blackberry species), and *Lonicera tartarica* (tartarian honeysuckle), while the right bank is forested with dominant species of red maple and *Ailanthus altissima* (tree-of-heaven).

Waterway 158W is located on the west side of US 15 along the southern edge of the Frederick Shopping Center (**Appendix A, Plan Sheet 13**). This stream is classified as intermittent with a concrete-lined substrate (R4SBx). The average channel width of the stream is four feet with a channel depth of one foot. Habitat complexity of the stream is very low due to the unnatural substrate. The riparian buffer of the stream is maintained grass, providing no shading to the channel.

Waterway 159W is located along the west side of US 15, just south of West Patrick Street (MD 144) (**Appendix A, Plan Sheet 12**). The system is an ephemeral channel with an average channel width of 1.5 feet and a depth of one foot.

Waterway 160W is located on the west side of US 15 north of Jefferson Street (**Appendix A, Plan Sheet 12**). The system is an ephemeral channel that drains south to Waterway 8 along the ramp from southbound US 15 to westbound Jefferson Street. The average channel width is one foot and the depth is eight inches.

Wetland/Waterway 161W is located on the west side of I-270 just south of Buckeystown Pike (**Appendix A, Plan Sheet 11**). The system includes an ephemeral channel that extends west along the south side of Buckeystown Pike. The channel flows under the ramp leading to southbound I-270. The average channel width is ten feet with a depth of two feet.

A palustrine emergent wetland with a temporary water regime (PEM1A) is located within the western portion of the ephemeral channel. Hydrologic indicators include sediment deposits and drainage patterns in the wetland. During the site visit, soils were saturated at 12 inches. Dominant vegetation in the wetland consists of *Polygonum hydropiper* (marsh pepper) and lady's thumb. Soils in the wetland are mapped as Adamstown-Funkstown complex. Soil samples exhibited a low chroma matrix color of 2.5Y3/1 with no mottles between 0 and 2 inches of the ground surface. At six inches, the soils exhibited a low chroma matrix color of 2.5Y3/2 with few, distinct mottles of 7.5YR4/6. The wetland ranked low for sediment stabilization and wildlife functions, while water quality functions ranked intermediate.

Wetland 162E is located on the west side of Holiday Drive, on the eastern edge of Francis Scott Key Mall (**Appendix A, Plan Sheet11**). This area is classified as a palustrine emergent wetland with a seasonally flooded water regime (PEM1/2C) that eventually extends into a palustrine open water pond (POWx). During the site visit, the wetland was inundated with two inches of water and soils were saturated to the surface. Dominant vegetation in the wetland includes *Eleocharis obtusa* (blunt spikerush), lady's thumb, marsh pepper, *Scirpus validus* (soft-stem bulrush), *Carex vulpinoidea* (fox sedge), and *Ludwigia palustris* (marsh seedbox). Soils in the wetland are mapped as Udorthents. Soil samples exhibited a low-chroma matrix color of 2.5Y4/2 with few, distinct mottles of 10YR6/6. Principal functions associated with the wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked low.

Waterway 163 is located east and west of I-270 about 1,800 feet north of Baker Valley Road (**Appendix A, Plan Sheet 10**). The system is an ephemeral channel that begins on the east side of I-270 and flows west under the road to join an intermittent stream associated with Waterway 164. The average channel width is four feet with a channel depth of two feet.

Waterway 164W is located west of Waterway 163 (**Appendix A, Plan Sheet 10**). The system is located approximately 400 feet west of I-270 near Waterway 11. This area is classified as an intermittent stream with a gravel/sand substrate (R4SB1/2). The average channel width of the stream is ten feet with a depth of 3.5 feet. The habitat complexity of the stream is low. Due to the stream's location within a farm field, a high percentage of cow manure is present within the stream. The riparian buffer of the stream consists of a narrow forested swath surrounded by agricultural fields on both sides. Dominant species within the buffer include *Prunus* sp. (cherry) and *Ulmus* sp. (elm).

Wetland/Waterway 165W begins in a farm field, adjacent to Waterway 11, and flows northwest into the intermittent stream associated with Waterway 164 (**Appendix A, Plan Sheet 10**). The stream in this portion of the study area exhibits the same characteristics as Waterway 164. An ephemeral channel approximately two feet wide and two feet deep serves as a connection between the stream and an emergent wetland. The wetland is classified as palustrine emergent with a seasonally saturated water regime (PEM1E). During the site visit, soils were saturated to the surface. Dominant vegetation in the wetland includes shallow sedge, *Juncus effusus* (soft rush), rice cutgrass, *Nasturtium officinale* (true water-cress), fox sedge, *Agrostis gigantea* (redtop), and marsh pepper. Soils in the wetland are mapped as Cordorus and Hatboro silt loam, which are listed as a hydric soil by NRCS. Soil samples exhibited a low-chroma matrix color of 2.5Y3/1 with many, faint mottles of 2.5Y4/4 within two inches of the ground surface. Below two inches, soils exhibited a low chroma matrix of 10YR4/1 with few, faint mottles of 10YR4/6. At six inches, the soils transition to 5Y5/1 with common, distinct mottles of 2.5Y5/6. The mottles become many and prominent at ten inches with a color of 10YR4/6, but the soil color matrix remains the same. Principal functions associated with the wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked low.

Waterway 166E is an ephemeral channel located on the east side of I-270, along the west side of Fire Tower Road (**Appendix A, Plan Sheet 7 and MD 75 Plan Sheet 1**). The average channel width is two feet with a depth of two feet.

Waterway 166W is located on the west side of I-270 about 1,500 feet south of Baker Valley Road (**Appendix A, Plan Sheet 10**). The system is an ephemeral channel that eventually flows southwest into Waterway 12W. The average channel width is two feet with a depth of one foot.

Waterway 167E is located just south of Waterway 166E (**Appendix A, Plan Sheet 7 and MD 75 Plan Sheet 1**). The system is a lower perennial stream with a sand substrate (R2UB2). This stream is a tributary to Bennett Creek that begins on the east side of Fire Tower Road and flows southwest under I-270. The average channel width of the stream is eight feet with a depth of four feet. The habitat complexity of the stream is low due to the lack of riffle/pool complexes and lack of available cover. The riparian buffer of the stream is forested with dominant species of spicebush, multiflora rose, *Juglans nigra* (black walnut), red maple, and Japanese honeysuckle.

Waterway 168E is located just south of Waterway 167E (**Appendix A, Plan Sheet 7 and MD 75 Plan Sheet 1**). The system is an intermittent stream with a sand substrate (R4SB2) that begins on the east side of Fire Tower Road and flows east to join a tributary that flows into Waterway 167. The average channel width of the stream is 2.5 feet wide, with a channel depth of 4.5 feet. The habitat complexity of the stream is low due to shallow flows. The stream banks are moderately eroded as evidenced by unvegetated stream banks. The riparian buffer of the stream is forested with dominant species of red maple, spicebush, *Alliaria petiolata* (garlic mustard), and Lady’s thumb.

Waterway 169E is located just south of Waterway 168E (**Appendix A, Plan Sheet 7 and MD 75 Plan Sheet 1**). The system is an intermittent stream with a sand substrate (R4SB2) that begins on the east side of Fire Tower Road and drains east to join a tributary that flows into Waterway 167. The average channel width of the stream is three feet with a depth of five feet. The habitat complexity of the stream is low due to shallow flows. The stream banks are moderately eroded as evidenced by unvegetated stream banks. The riparian buffer of the stream is forested with dominant species of red maple, spicebush, tree-of-heaven, and multiflora rose.

Wetland 171W is located within the floodplain of Wetland/Waterway 22W on the west side of I-270 (**Appendix A, Plan Sheet 8**). This area is classified as a palustrine scrub-shrub wetland with a seasonally flooded water regime (PFO1C). During the site visit, the wetland was inundated with less than 0.2 inches of water, and soils were saturated to the surface. Water was also present in an unlined bore hole at 12 inches below the ground surface. Dominant vegetation in the wetland includes spicebush, rice cutgrass, jewelweed, arrowleaf tearthumb, Nepalese browntop, and shallow sedge. Soils in the wetland are mapped as Rohrersville-Lantz silt loam. Soil samples exhibited a low-chroma matrix color of 2.5Y3/2 with many, prominent mottles of 5Y4/6 in the upper 10 inches of the soil profile. Below 10 inches, the soils exhibited a low-chroma matrix color of 5Y4/2 with many, prominent mottles of 10YR4/4. Principal functions associated with the wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked low.

Wetland 173E begins on the east side of I-270 and flows northeast into Wetland 26E (**Appendix A, Plan Sheet 8**). The system is a palustrine emergent wetland with a seasonally saturated water regime (PEM1E). During the site visit, soils were saturated at 10 inches below the ground surface. The dominant vegetation in the wetland includes soft rush, redtop, and shallow sedge. Soils in the wetland are mapped as Linganore-Hyattstown channery silt loam. Soil samples exhibited a low chroma matrix color of 5Y5/2 with many, prominent mottles of 10YR5/8.

Below six inches, the soils exhibited a matrix color of 5Y5/1 with few, distinct mottles of 2.5Y5/6 and common, prominent mottles of 10YR5/8. Principal functions associated with this wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked low.

Wetland 174E is located adjacent to Wetland 173 and flows northwest under a berm and into a stormwater management facility located adjacent to Wetland 173E (**Appendix A, Plan Sheet 8**). The system is a palustrine emergent wetland with a seasonally saturated water regime (PEM1E). During the site visit, the soils were saturated at four inches below the ground surface and oxidized root channels were present in the soil profile. The dominant vegetation in the herbaceous layer consists of soft rush, sweet flag, *Mentha* sp. (mint), and shallow sedge. Soils in the wetland are mapped as Linganore-Hyattstown channery silt loam. Soil samples exhibited a low-chroma matrix color of 2.5Y4/2 with many, prominent mottles of 7.5YR4/6. Below six inches, the soil samples exhibited a matrix color of 5Y4/1 with many, prominent mottles of 7.5YR3/4. Principal functions associated with this wetland ranked high for water quality and intermediate for sediment stabilization. Wildlife functions ranked low.

Waterway 175E is located on the east side of I-270 and flows into Wetland/Waterway 25E (**Appendix A, Plan Sheet 8**). The system is an ephemeral channel that is approximately two feet wide and three feet deep.

Waterway 176E is located on the east side of I-270 and flows into Wetland/Waterway 25E from the south (**Appendix A, Plan Sheet 8**). The system is an ephemeral channel that is approximately three feet wide and two feet deep.

Waterway 177W is located on the west side of I-270 and flows north into Waterway 26W (**Appendix A, Plan Sheet 8**). The system is an ephemeral channel that is approximately three feet wide and one foot deep.

Waterway 178E flows south into Wetland/Waterway 25E just upstream of where the stream flows under the roadway (**Appendix A, Plan Sheet 8**). The system is an ephemeral channel that is approximately one foot wide and two feet deep.

Waterway 179W is located on the west side of I-270 south of Peach Tree Road (**Appendix A, Plan Sheet 7**). The system is an ephemeral channel located. The ephemeral channel is approximately two feet wide and one foot deep.

Wetland 180W is located on the west side of I-270 just south of the weigh station (**Appendix A, Plan Sheet 6**). This wetland is classified as a palustrine emergent wetland with a seasonally flooded water regime (PEM1C). During the site visit, the wetland was inundated with one inch of water and soils were saturated to the surface. Drainage patterns were also observed within the wetland. The dominant vegetation in the herbaceous layer includes jewelweed, shallow sedge, broadleaf cattail, arrowleaf tearthumb, and marsh seedbox. Soils in the wetland are mapped as Brinklow-Blocktown channery silt loam. Soil samples exhibited a low chroma matrix color of 10YR4/1 within four inches of the ground surface. Below four inches, the soil sample exhibited a matrix color of 10YR4/6 with few, distinct mottles of 7.5YR4/6. Principal functions associated with this wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked low.

Waterway 182E is located on the east side of I-270 between MD 124 and Great Seneca Creek (**Appendix A, Plan Sheet 2**). The system is an ephemeral channel that flows south towards I-270. The ephemeral channel is approximately two feet deep and two feet wide.

Waterway 183E is located just north of Waterway 182 (**Appendix A, Plan Sheet 2**). The system is an ephemeral channel that flows south along the east side of I-270. The ephemeral channel is approximately two feet wide and one foot deep.

Waterway 184W flows south along the west side of I-270 and into Waterway A61W (**Appendix A, Plan Sheet 3**). The system is an ephemeral channel that is approximately three feet wide and one foot deep. This channel serves as a connection between Wetland 185W, Wetland/Waterway 186W, and Waterway A61W.

Wetland 185W is located at the head of Waterway 184W on the west side of I-270 (**Appendix A, Plan Sheet 3**). This area is classified as a palustrine emergent wetland with a seasonally saturated water regime (PEM1E). During the site visit, the soils were saturated to the surface. The dominant vegetation in the herbaceous layer includes reed canary grass, marsh pepper, blunt spikerush, soft rush, *Scirpus cyperinus* (woolgrass), and shallow sedge. Soils in the wetland are mapped as Baile silt loam, which is listed as a hydric soil by NRCS. Soil samples exhibited a low chroma matrix color of 2.5Y5/2 within two inches of the ground surface. Below two inches, the soil samples exhibited a matrix color of 5Y5/2 with common, prominent mottles of 10YR4/8. Principal functions associated with this wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked intermediate.

Wetland/Waterway 186W is located on the west side of I-270 and flows into Waterway A61W via the ephemeral channel (**Appendix A, Plan Sheet 3**). The ephemeral channel is approximately three feet wide and one foot deep. The wetland portion is classified as palustrine emergent with a seasonally saturated water regime (PEM1E). During the site visit, the soils were saturated to the surface and water was present at 12 inches below the ground surface in an unlined bore hole. The dominant vegetation in the wetland includes rice cutgrass, soft rush, shallow sedge, *Arthraxon hispidus* (hairy jointgrass), and *Dichanthelium clandestinum* (deertongue witchgrass). Soils in the wetland are mapped as Baile silt loam, which is listed as a hydric soil by NRCS. Soil samples exhibited a low chroma matrix color of 2.5Y4/1 for all horizons with different mottle abundances and contrasts. Between zero and two inches, the soil samples exhibited few, distinct mottles of 10YR5/8. Below two inches, the mottles were common and prominent with a color of 7.5YR4/6. At ten inches, the mottles were many and prominent with the same color as the preceding profile layer. Principal functions associated with this wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked intermediate.

Waterway 187W is located on the west side of I-270 and flows north into Waterway B61W (**Appendix A, Plan Sheet 3**). The system is an ephemeral channel approximately three feet wide and one foot deep.

Waterway 188W is located on the west side of I-270 and flows south into Waterway B61W (**Appendix A, Plan Sheet 3**). The system is an ephemeral channel approximately three feet wide and one foot deep.

Waterway 189W is located on the west side of I-270 just north of Wetland 62A (**Appendix A, Plan Sheet 3**). The system is an ephemeral channel that flows west outside of the study area. The ephemeral channel is approximately three feet wide and one foot deep.

Waterway 190W is located on the west side of I-270 adjacent to Waterway 105 (**Appendix A, Plan Sheet 2**). The system is an ephemeral channel that flows west into Waterway 105. The ephemeral channel is approximately two feet wide and two feet deep.

Waterway 191W is located on the west side of I-270 just north of MD 124 (**Appendix A, Plan Sheet 2**). The system is an ephemeral channel that flows west into Wetland/Waterway B63W. The ephemeral channel is approximately five feet wide and five feet deep.

Wetland/Waterway 192W is located on Department of Energy property west of I-270 just west of Waterway 59 (**Appendix A, Plan Sheet 3**). The system includes a perennial stream, ephemeral channel, and vegetated wetlands that extend from Waterway 59. This system begins as an ephemeral channel that flows south to join an upper perennial stream with a boulder substrate (R3UB1). The ephemeral channel is approximately two feet wide and two feet deep. The perennial stream flows northwest into a stormwater management pond. The average channel width of the stream is 15 inches with a depth of two inches. The habitat complexity of the stream is low due to placement of rip-rap within the channel. The riparian zone of the stream is composed of grass and forest. The forested portion of the riparian buffer provides 95% shading to the channel. Dominant species in the riparian buffer include tulip tree, red maple, spicebush, *Viburnum dentatum* (southern arrowwood), and *Athyrium felix-femina* (lady fern).

A palustrine scrub-shrub wetland with a seasonally saturated/flooded water regime (PSS1C/E) is located within the floodplain of this system. During the site visit, the wetland was inundated with one inch of water and soils were saturated to the surface. Drainage patterns were also observed in the wetland. Dominant vegetation in the wetland includes spicebush, southern arrowwood, poison ivy, sedge species and fowl manna grass. Soils in the wetland are mapped as Occoquan loam. Soil samples between zero and four inches exhibited a low chroma matrix color of 2.5Y4/2 with common, faint mottles of 10YR3/6. Below four inches, the soil samples exhibited a matrix color of 5Y4/1 with common, prominent mottles of 10YR3/4. The principal functions associated with this wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked low.

Waterway 193E is located on the east side of I-270 and flows north into Wetland/Waterway 15E (**Appendix A, Plan Sheet 9**). The system is an ephemeral channel approximately two feet wide and three feet deep.

Waterway 194E is located on the east side of I-270 just south of Waterway 193 (**Appendix A, Plan Sheet 9**). The system is an ephemeral channel approximately five feet wide and two feet deep.

Wetland 195E is located on the east side of I-270 adjacent to Waterway 14E (**Appendix A, Plan Sheet 9**). The system is a palustrine emergent wetland with a seasonally saturated/flooded water regime (PEM1E). The wetland flows southwest into the ephemeral channel associated with Waterway 14E. During the site visit, drainage patterns were observed in the wetland. Dominant vegetation in the wetland includes jewelweed, fowl manna grass, sedge species, and *Pilea pumila* (Canadian clearweed). Soils in the wetland are mapped as Glenville-Baile silt loam, which has hydric inclusions due to the Baile soil series. Soil samples between zero and six inches of the ground surface exhibited a low chroma matrix color of 5Y4/1 with common, prominent mottles of 10YR4/6. Below six inches, the soils exhibited a matrix color of 2.5Y5/2. The mottle color remains the same with abundance and contrast changing to many and distinct. Principal functions associated with this wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked very low.

Waterway 196W is located on the west side of I-270 just north of I-370 (**Appendix A, Plan Sheet 1**). The system is an ephemeral channel that drains north into Waterway 66. The channel is approximately four feet wide and one foot deep.

Transitway Alignment

Previously Flagged Wetlands and Waterways

All wetlands and waterways previously flagged as part of the 2002 NETR, whose limits were not extended during the current ETL study or whose classification has not changed, are identified in **Appendix B**. However, a detailed discussion of these systems is not repeated in this document, but can be found in the 2002 NETR.

Previously Flagged Wetlands and Waterways Extended or Reclassified

All wetlands and waterways previously flagged as part of the 2002 NETR, whose limits have been extended to the new transitway ROW or who have been reclassified, are discussed in detail below.

Waterway A61W is located on the west side of I-270 just north of Great Seneca Creek (**Appendix A, Plan Sheet 3**). The system was originally defined as intermittent with a cobble/gravel substrate (R4SB1). The classification remains unchanged, but the limits of the stream were extended to the confluence of W-B61W.

Waterway B61W is located on the west side of I-270 just south of A61W (**Appendix A, Plan Sheet 3**). The system was previously identified as a lower perennial with a cobble/gravel substrate (R2UB1). The classification of the stream remains unchanged, but the limits were extended to the transitway ROW.

Wetland 62A is located on the west side of I-270 immediately north of Great Seneca Creek (**Appendix A, Plan Sheet 2**). The system encompasses the floodplain of Great Seneca Creek and consists of emergent and forested wetlands. The wetland limits were extended as the size of this wetland has expanded towards I-270 since the 1997 survey. The limits of this system were also expanded south to the transitway ROW.

Wetland 108 is located just east of Great Seneca Highway and north of Muddy Branch (**Appendix A, Plan Sheet Tran 3**). The system consists of an in-stream SWM pond identified as Lake Elysium. This area is classified as a palustrine scrub-shrub wetland with a seasonally flooded/saturated water regime (PSS1C/E). The classification of this system remains unchanged, but the limits of this system were extended to the transitway ROW.

Wetland/Waterway 153 is located along an unnamed tributary of Muddy Branch just southeast of Diamondback Drive and approximately 1,000 feet east of Key West Highway (**Appendix A, Plan Sheet Tran 2**). The system was previously classified as a lower perennial stream with a mud substrate (R2UB3). The floodplain of the stream previously contained forested and emergent wetlands (PFO1C/E, PEM1C/E). Due to the extension of Decoverly Drive, the stream has been straightened to accommodate a twin structural steel plate pipe culvert crossing. A large portion of the wetland system has also been filled because of this. The wetland limits were modified to reflect the size decrease of this wetland since the 1998 delineation.

Waterway 154 is located on the south side of Decoverly Drive just east of Great Seneca Highway (**Appendix A, Plan Sheet Tran 3**). The original system was flagged from the north side of Decoverly Drive to Great Seneca Highway, and was comprised of an intermittent stream (R4SB1) and a small scrub-shrub wetland (PSS1E). The newly delineated portion was classified as a forested wetland and an ephemeral channel within the headwaters of the system. The wetland component was located just upstream of the culvert and was classified as palustrine forested with broad-leaved deciduous vegetation and a seasonally flooded water regime (PFO1C). During the site visit, hydrologic indicators included drainage patterns and saturated soils within the upper 12 inches. Dominant vegetation included black willow, *Cornus amomum* (silky dogwood), jewelweed, *Eupatorium perfoliatum* (boneset), and tartarian honeysuckle. Soil samples between zero and eight inches of the ground surface exhibited a low chroma matrix color of 2.5Y3/2 with few, prominent mottles of 7.5YR3/4. Wetland functions were not assessed, as this wetland is only 128 square feet in area. The ephemeral channel was 2.5 feet wide and 1.5 feet deep with a gravel substrate. The banks of the stream were mostly forested with red maple.

Newly Identified Wetlands and Waterways within the Transitway ROW

The wetlands/waterways discussed below are for newly identified systems that were not previously flagged as part of the 2002 NETR. Most of these numbered systems are hydrologically connected to previously flagged wetlands/waterways.

Waterway 197 is located off of Century Boulevard approximately 1,200 feet south of Cloverleaf Center Drive (**Appendix A, Plan Sheet Tran 5**). The flagged system is a Waters of the US. It is an unnamed stream that drains to Cabin Branch. The channel is two feet wide and three inches deep, with three inches of flowing water at the time of delineation. It enters the study area through a culvert beneath Century Boulevard. Few trees occur within the floodplain. The stream is classified as riverine upper perennial with an unconsolidated bottom substrate of cobble/gravel (R3UB1).

Waterway 198 is located west of Metropolitan Grove Road on the north side of the CSX railroad tracks (**Appendix A, Plan Sheet Tran 4**). The ephemeral channel drains a SWM pond on the south side of the tracks. It enters the study area through an outfall pipe beneath the railroad tracks. The stream has an average bankfull width of 2.5 feet and a depth of one foot. The embankment above this channel has collapsed and is blocking the outfall pipe.

Waterway 199 is located along the CSX railroad tracks at the Metropolitan Grove Road crossing (**Appendix A, Plan Sheet Tran 4**). The ephemeral channel conveys stormwater to a SWM pond just south of Waterway 198. At time of delineation the channel was two feet wide and three inches deep.

Waterway 200 is located along the CSX railroad tracks at the Metropolitan Grove Road crossing (**Appendix A, Plan Sheet Tran 4**). The ephemeral channel conveys stormwater from approximately Quince Orchard Road to Metropolitan Grove Road along the railroad tracks.

Waterway 200 is an extension of Waterway 199 by way of a culvert underneath Metropolitan Grove Road. At time of delineation the channel was two feet wide and four inches deep.

Waterway 201 is located along Quince Orchard Road beginning at a culvert under Firstfield Road (**Appendix A, Plan Sheet Tran 4**). The ephemeral channel conveys stormwater to Draught Branch. The channel is one foot wide and three inches deep.

Waterway 202 is an intermittent stream that is classified as riverine intermittent with a streambed composed of sand (R4SB2). The stream is a tributary to Draught Branch and is located on National Institute of Standards and Technology (NIST) property (**Appendix A, Plan Sheet Tran 4**). It is located along Quince Orchard Road at the intersection of Quince Orchard Boulevard. The tributary enters the study area through a culvert, where it daylights briefly before entering another culvert approximately 100 feet downstream, and continues underneath Quince Orchard Road. The channel is approximately seven feet wide and one foot deep. At time of delineation, the channel had one inch of water present.

Wetland 203 is located along the banks of Waterway 202 on NIST property (**Appendix A, Plan Sheet Tran 4**). This area is classified as a palustrine emergent wetland with a seasonally saturated water regime (PEM1E). This wetland is hydrologically supported by a stream channel that appears to have undersized culverts. At high flows the constriction causes a backwater effect that provides enough inundation throughout the year to support wetland conditions. During the site visit, there was no surface water but the soils were saturated in the upper 12 inches of the soil profile. Soils in the area are mapped as Glenville silt loam, which are deep, moderately well drained, and poorly drained soils. Soil samples revealed poorly drained conditions, with matrix colors 10YRY5/1 to 10YR5/1. Few redoximorphic features were present within the soil profile. Those present had a color of 10YR5/6 at a depth of 12 inches. The hydric soil indicators included gleyed or low-chroma colors. Principal functions ranked high for sediment stabilization, moderate for water quality, and low for wildlife.

Waterway 204 is located 100 feet off of the northeast corner of Twin Lakes Drive and Orchard Ridge Drive (**Appendix A, Plan Sheet Tran 3**). It is an ephemeral channel that conveys drainage from a SWM pond at the northeast corner of the Quince Orchard Road and Twin Lakes Drive intersection. The channel is one foot wide and six inches deep. The channel flows through a lowland area that looks to be functioning as a SWM facility within a chain of SWM facilities. This lowland area also encompasses Waterways 205 and 206.

Waterway 205 is located 100 feet from the east side of Twin Lakes Drive, approximately 400 feet south of the intersection with Quince Orchard Road (**Appendix A, Plan Sheet Tran 3**). The ephemeral channel conveys stormwater from an outfall pipe until it intersects with Waterway 204. The system is two feet wide and five inches deep.

Waterway 206 is an ephemeral channel that conveys stormwater from an outfall pipe approximately 100 feet south of Quince Orchard Road and 1,000 feet east of Twin Lakes Drive (**Appendix A, Plan Sheet Tran 3**). The channel is two feet wide and one foot deep. This system continues outside of the Transitway ROW.

Waterway 207 is an ephemeral channel that conveys stormwater runoff to a culvert that runs beneath Great Seneca Highway and continues to a SWM pond. The channel is located along Great Seneca Highway directly behind a right of way fence across from Lakelands Drive (**Appendix A, Plan Sheet Tran 3**). The channel is 1.5 feet wide and one inch deep.

Waterway 208 is an ephemeral channel that conveys stormwater from the parking lots of a portion of the townhouse community adjacent to High Gables Drive (**Appendix A, Plan Sheet Tran 3**). The channel runs along the outside of a dog park for the community. Waterways 209 and 210 also drain to this channel where it then enters a culvert that runs beneath Great Seneca Highway. The channel is seven feet wide and 2.5 feet deep. At the time of delineation there was an inch of flowing water present.

Waterway 209 is an ephemeral channel that conveys stormwater down a steep slope from the northbound lanes of Great Seneca Highway at station 212 (**Appendix A, Plan Sheet Tran 3**). This continues to the confluence of Waterway 208 where it then enters a culvert beneath Great Seneca Highway. The channel is two feet wide and ten inches deep.

Waterway 210 is an ephemeral channel that conveys stormwater from a townhouse community on Leafcup Road (**Appendix A, Plan Sheet Tran 3**). The channel runs to the confluence of Waterway 208 where it then enters a culvert that runs beneath Great Seneca Highway. The channel is seven feet wide and five feet deep.

Waterway 211 is located off of the southbound side of Great Seneca Highway at station 188 (**Appendix A, Plan Sheet Tran 3**). The ephemeral channel parallels the road and drains stormwater runoff from the southbound side of Great Seneca Highway to a tributary of Muddy Branch. This channel is three feet wide and five inches deep.

Wetland 215 is situated around W-101 at the northwest corner of the Father Hurley Boulevard and I-270 intersection (**Appendix A, Plan Sheet Tran 6**). Sediment has accumulated around a double culvert under I-270 filling in a large area of riprap along the stream. This palustrine emergent wetland (PEM1E) is dominated by broad leaved cattail. At the time of the visit, there was up to one inch of inundation in the wetland and the soils were saturated in the upper 12 inches of the soil profile. Soils in this wetland are mapped as Hatboro silt loam, which are deep and poorly drained soils. Soil samples exhibited low-chroma colors of 10YR3/1 and 10YR4/1. Hydric soil indicators include sediment deposits and water-stained leaves. Principal functions ranked high for sediment stabilization, moderate for water quality, and low for wildlife.

Wetland 216 is situated in the floodplain along a tributary to Little Seneca Creek at the northwest corner of the Father Hurley Boulevard and I-270 intersection (**Appendix A, Plan Sheet Tran 6**). The system is classified as a palustrine emergent wetland with a temporarily flooded water regime (PEM2A). At the time of the visit, there was one inch of inundation and observable drainage patterns. Dominant vegetation observed included false nettle and soft rush. Soils in this area are mapped as Hatboro silt loam, which are deep and poorly drained soils. However, soil samples were saturated in the upper 12 inches of the profile and had matrix colors of 10YR5/1 and 6/1. Mottles were present and increased in abundance with depth. Mottle colors consisted of 10YR4/6. There were also manganese concretions throughout the soil profile. Principal functions ranked high for sediment stabilization and water quality and low for wildlife.

Wetland 217 is situated in the floodplain along a tributary to Little Seneca Creek at the northwest corner of the Father Hurley Boulevard and I-270 intersection (**Appendix A, Plan Sheet Tran 6**). The system is classified as a palustrine forested, broad-leaved deciduous wetland with a temporarily flooded water regime (PFO1A). The canopy was dominated by sycamore and red maple, while the shrub layer consists of spicebush and southern arrowood. Soils in this area are mapped as Hatboro silt loam, which are deep and poorly drained soils. Soils were gleyed and had low-chroma colors of 10YR3/1 and G25/10B. There were drainage patterns throughout the wetland, which is a good indication that water flows through this site. Principal functions ranked high for sediment stabilization and water quality and low for wildlife.

Waterway 222 is an ephemeral channel that conveys stormwater from Ridge Road through W215 into W-101 (**Appendix A, Plan Sheet Tran 6**). This channel is three feet wide and five inches deep.

Waterway 223 is an upper perennial stream with a cobble/gravel substrate (R3UB1). The stream crosses Quince Orchard Road (MD 124) just east of Clopper Road (MD 117), and drains west to Clopper Lake (**Appendix A, Plan Sheet Tran 4**). The channel width is 23 feet and the depth is three feet. An average of six inches of water was flowing during the site visit. The stream has moderate habitat complexity with deep pools, riffles, and woody debris. The stream appears to be down cutting and widening. The banks of the channel are moderately to severely eroded with undercut banks and bank slumping. The stream is sandwiched between an apartment complex and a grassy park. There is a thin strip of trees along the banks comprised primarily of *Acer negundo* (box elder). Shading of the stream within the study area was only about 15 percent.

Transitway Operations and Maintenance Facilities

Metropolitan Grove Road Study Area

Waterway MG1 is an intermittent stream with a cobble/clay substrate (R4SB1/3) that flows from south to north along the western border of the study area and empties into an unnamed tributary to Great Seneca Creek (**Appendix A, Plan Sheet Tran 4**). The average channel width of the stream is four feet with a depth of five feet. In-stream bank erosion is severe as evidenced by the steep clay banks.

Waterway MG2 is an intermittent stream with a clay substrate (R4SB3) that flows westward along the northern border of the study area and empties into the stream described above (**Appendix A, Plan Sheet Tran 4**). The channel width of the stream is four feet with a depth of one foot.

Waterway MG3 is an intermittent stream with a sand substrate (R4SB2) that flows west through the center of the study area and empties into the stream described above (**Appendix A, Plan Sheet Tran 4**). The average channel width of the stream is two feet with a depth of six inches.

Waterway MG4 is an intermittent stream with a cobble/sand substrate (R4SB1/2) that flows south through the center of the study area (**Appendix A, Plan Sheet Tran 4**). The average channel width of the stream is two feet with a depth of two feet.

Observation Drive Also Known as Old Baltimore Road Study Area

Wetland OD2 is located within the floodplain of Little Seneca Creek, and extends south through the Old Baltimore Road site (**Appendix A, Plan Sheet Tran 6**). This area is classified as a palustrine emergent/forested wetland with a temporary water regime (PEM1A/PFO1A). Flood water from Little Seneca Creek is the main source of hydrology for this wetland. During the site visit, soils in the wetland were saturated to the surface. Other hydrologic indicators included water marks, drift lines, sediment deposits, drainage patterns, oxidized root channels, and water-stained leaves. Water was present at the surface in an unlined bore hole. Dominant vegetation in the herbaceous component of the wetland included reed canary grass, *Urtica dioica* (stinging nettle), *Impatiens pallida* (pale touch-me-not), *Polygonum* sp.(smartweed species), skunk cabbage, sedge species, lady's thumb, soft rush, and rice cut-grass. The dominant vegetation in the forested portion of the wetland included spicebush, *Carpinus caroliniana* (ironwood), red maple, tulip poplar, sycamore and *Quercus bicolor* (swamp white oak). Soils in the wetland are mapped as Hatboro silt loam and Brinklow-Blocktown channery silt loam. Hatboro silt loam is classified as a hydric soil by NRCS. Soil samples exhibited a matrix color of 10YR3/3 within one inch of the ground surface. Between one and four inches of the soil profile, the soils exhibited a matrix color of 10YR7/4 with few, faint mottles of 10YR5/2. The soil samples exhibited more of a hydric nature between four and ten inches of the soil profile with a matrix color of 10YR6/2 and many, distinct mottles of 7.5YR5/6. Below ten inches, the soil samples exhibited a low-chroma matrix color of 10YR5/2 with many, faint mottles of 10YR7/4. Principal functions associated with this wetland ranked intermediate for water quality and high for wildlife. Sediment stabilization functions ranked low.

Wetland OD3 is located within the floodplain of Little Seneca Creek in the Old Baltimore Road site (**Appendix A, Plan Sheet Tran 6**). This area is classified as a palustrine emergent wetland with a temporarily flooded water regime (PEM1A). Flood water from Little Seneca Creek is the main source of hydrology for this wetland. Other hydrologic indicators included saturated soils to the surface, water marks, drift lines, sediment deposits, oxidized root channels, and water-stained leaves. Water was present at zero inches in an unlined bore hole. Dominant vegetation in the wetland included *Polygonum arifolium* (halberdleaf tearthumb), fox sedge, *Phleum anadens* (timothy grass), *Rumex crispus* (curly dock), reed canary grass, pale touch-me-not, sedge species, soft rush, and rice cut grass. Soils in the wetland are mapped as Glenville silt loam, Brinklow-Blocktown channery silt loam, Codorus silt loam, and Hatboro silt loam. Hatboro silt loam is listed as a hydric soil by NRCS. Soil samples exhibited non-hydric characteristics until five inches below the ground surface. Between five and 12 inches, soil samples exhibited a low-chroma matrix color of 10YR5/2 with few, faint mottles of 10YR6/4. Principal functions associated with this wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked low.

Wetland OD4 is located in the floodplain of Little Seneca Creek within the Old Baltimore Road site (**Appendix A, Plan Sheet Tran 6**). This area is classified as a palustrine emergent wetland with a temporarily flooded water regime (PEM1A). Flood water from Little Seneca Creek is the main source of hydrology for this wetland. During the site visit, soils in the wetland were saturated to the surface. Other indicators of hydrology included water marks, drift lines, sediment deposits, oxidized root channels, and water-stained leaves. Water was observed in the unlined bore hole at the ground surface. Dominant vegetation in the wetland included *Mentha arvensis* (wild mint), broadleaf cattail, halberdleaf tearthumb, fox sedge, timothy grass, curly dock, reed canary grass, pale touch-me-not, sedge species, soft rush, and rice cut-grass. Soils in the wetland are mapped as Glenville silt loam and Hatboro silt loam. The characteristics of the soil samples for this wetland are the same as those described for Wetland 3. Principal functions associated with this wetland ranked high for sediment stabilization and water quality, while wildlife functions ranked low.

Waterway OD9/W-100 is the mainstem of Little Seneca Creek (**Appendix A, Plan Sheet Tran 6**), which is classified as a perennial stream with a cobble/gravel substrate (R2UB1). The average channel width of the stream is 15 feet with a depth of 12 inches.

Game Preserve Road Study Area

Waterway GP5 is an intermittent stream with a sand substrate (R4SB2) that flows north to south through the center of the study area. This stream eventually drains into an unnamed tributary to Great Seneca Creek along the western boundary of the study area (**Appendix A, Plan Sheet Tran 4**). The average channel width of the stream is two feet with a depth of two inches.

Waterway GP6 is a perennial stream with a cobble/gravel substrate (R2UB1) that flows north along the western border of the study area and empties into Great Seneca Creek (**Appendix A, Plan Sheet Tran 4**). The average channel width of the stream is six feet with a depth of eight inches.

Waterway GP7 is an ephemeral stream with a sand substrate (R4SB3) that flows east along the eastern border of the study area and empties into Great Seneca Creek (**Appendix A, Plan Sheet Tran 4**). The average channel width of the stream is six feet with a stream depth of 3.5 inches. (*Note*: impacts to this system have not been calculated as part of this study, pending review of this resource by ACOE and MDE).

Waterway GP8 is an ephemeral stream that flows north along the eastern border of the study area and empties into Waterway GP7 (**Appendix A, Plan Sheet Tran 4**). The steam is classified as ephemeral with a cobble/gravel substrate (R4SB3). The average channel width of the stream is two feet with a depth of 3.5 inches. (*Note*: impacts to this system have not been calculated as part of this study, pending review of this resource by ACOE and MDE).

Shady Grove Study Area

No wetlands/waterways were identified within the Shady Grove site.

Crabb's Branch Way

Due to the overlap in project areas between the proposed Crabb's Branch Way facility and the Intercounty Connector (ICC) corridor, the wetland/waterway descriptions presented for this site are based on the information collected during the wetland delineation conducted for the ICC in November 2003 and August 2004, as reported in the 2004 ICC NETR (SHA 2004).

Wetland/Waterway RP7 is a wetland system that includes an intermittent stream, forested wetland, and emergent/scrub-shrub wetlands located north and south of I-370 adjacent to Crabb's Branch Way. This palustrine scrub-shrub wetland system with a temporary water regime (PSS1A) extends north through the study area into an intermittent stream. An ephemeral channel flows northeast to join the intermittent stream along the south side of I-370. The stream is classified as intermittent with a cobble and gravel substrate (R4SB3). The stream is approximately 2.5 feet wide with a depth of four inches. There were two inches of water flowing in the channel during the site visit. Habitat complexity is low as the stream is intermittent and is comprised of shallow gravel and cobble runs interspersed with dry segments of streambed. Bank erosion is moderate with slumping banks being armored with riprap in most places. The banks of the stream are forested with red maple, willow, multiflora rose, and Japanese honeysuckle.

Dominant vegetation in the wetland included red maple, bush honeysuckle, sycamore, black willow, *Quercus palustris* (pin oak), *Solidago anadensis* (Canada goldenrod), multiflora rose, *Allium vineale* (field garlic), Japanese honeysuckle. During the site visit, soils in the wetland were saturated. Soils in the wetland are mapped as Baile silt loam, which is listed as a hydric soil by NRCS. Soil samples exhibited a low-chroma matrix color of 10YR3/2 with mottles.

A palustrine forested wetland with a saturated water regime (PFO1B) begins at the end of Crabb's Branch Way and extends outside of the study area. During the site visit, soils in the wetland were saturated and water-stained leaves were present. Dominant vegetation in the wetland included pale touch-me-knot, rice cutgrass, *Parthenocissus quinquefolia* (Virginia creeper), jewelweed, red maple, *Alnus serrulata* (smooth alder), and *Onoclea sensibilis* (sensitive fern). Soils in the wetland are mapped as Baile silt loam, which is listed as a hydric soil by NRCS. Soil samples exhibited a low chroma matrix color of 10YR3/1 with mottles of 7.5YR4/6. Principal functions provided by the wetland system include sediment/toxicant retention, groundwater discharge, nutrient removal, and wildlife habitat.

c. *Impacts*

Waters of the U.S., including wetlands, are regulated under Section 401 and 404 of the Clean Water Act and under the State of Maryland Nontidal Wetlands Protection Act. Impacts to these resources require a Section 401 Water Quality Certification from MDE and a Joint Federal/State permit for discharge of dredged or fill material into Waters of the US including wetlands.

The No-Build Alternative will have no effect on the Waters of the U.S., including wetlands, within the I-270/US 15 Corridor.

Wetland and waterway impacts associated with build alternatives 6A/B and 7A/B are the same, as the two alternatives would have the same physical footprint (See Section II). A summary of wetland and waterway impacts by highway and transitway alignments and transit stations is shown in **Table 12**. **Table 13** provides a breakdown of wetland and waterway impacts associated with the various transit operations and maintenance facilities. These impacts are not additive, as only a single site will be selected. **Table 14** and **Table 15** depict impacts to each individual wetland and waterway for the highway and transitway components, respectively.

Table 12:
Summary of Highway and Transitway Wetland (Acres) and Waterway (Linear Feet) Impacts

Alternatives 6A/B & 7A/B	Wetland[1] and Waterway Classification				
	PEM	PSS	PFO	Riverine[2]	Ephemeral
Highway	6.9	2.0	4.1	20,198	10,812
Transitway[3]	1.2	0.3	1.1	4,006	1,646

[1] Wetland classes are as follows PEM = Palustrine emergent, PSS = Palustrine scrub-shrub, PFO = Palustrine forested,
[2] Includes perennial and intermittent streams
[3] Includes transit stations

Table 13:
Summary of Operations & Maintenance Facility Wetland (Acres) and Waterway (Linear Feet) Impacts

O&M Facility	Wetland[1] and Waterway Classification				
	PEM	PSS	PFO	Riverine[2]	Ephemeral
Shady Grove Study Area	0	0	0	0	0

Crabb's Branch Way	0	0	0	0	0
Metropolitan Grove Road Study Area	0	0	0	486	0
Observation Drive also know as Old Baltimore Road Study Area	0	0	0	0	0
Game Preserve Road Study Area	0	0	0	660	0

[1] Wetland classes are as follows PEM = Palustrine emergent, PSS = Palustrine scrub-shrub, PFO = Palustrine forested, POW = Palustrine open water

[2] Includes perennial and intermittent streams

Specific wetland and waterway resources impacted by the highway portion of the project are similar to those discussed in the 2002 NETR with the exception of the addition of ephemeral channel impacts not regulated at the time of the 1998 delineation. While the impacted wetland and waterway resources are similar, the area of impact to these resources is larger for the ETL alternatives because of the larger ROW necessary to accommodate the ETL alternatives. In addition, the linear feet of waterway impact is considerably larger because of the addition of ephemeral channels. Ephemeral channel impacts add an additional 10,812 linear feet of waterway impacts to the project.

Emergent wetlands are the wetland class that would be most affected by the ETL highway build alternatives. As discussed in the 2002 NETR, many of these emergent areas are connected to larger wetland systems that provide a diverse and interdependent collection of ecological functions. These systems include Great Seneca Creek, Little Seneca Creek, Monocacy River, Rock Creek, Carroll Creek, and Tuscarora Creek. Forested wetlands would have the next highest impacts, and would include wetlands associated with the Monocacy River and Little Seneca Creek. These wetlands ranked high for the uniqueness/heritage values due to their affiliation with national (Monocacy National Battlefield) and state (Black Hills Regional Park) parks that have significant aesthetic and historical value.

Table 14:
Summary Of Individual Wetland and Waterway
Size[1] & Impacts Along the I-270/US 15 Highway Alignment

Wetland Number		Alternatives 6A/B & 7A/B[2]				
		Ephemeral (ln.ft.)	Riverine[3] (ln.ft.)	PEM[5] (sq.ft.)	PSS[6] (sq.ft.)	PFO[7] (sq.ft.)
W-2	Size in Study Area		624	565		
	Impact		184			
W-3	Size in Study Area		265	928		
	Impact		50			
W-4E	Size in Study Area		187			
	Impact					
W-4W	Size in Study Area		343	15,134		
	Impact					
W-5	Size in Study Area		225			
	Impact		117			
W-6E	Size in Study Area	78	620	2,215		
	Impact	78	620	2,215		

Table 14:
Summary Of Individual Wetland and Waterway Size[1] & Impacts Along the I-270/US 15 Highway Alignment

Wetland Number		Alternatives 6A/B & 7A/B[2]				
		Ephemeral (ln.ft.)	Riverine[3] (ln.ft.)	PEM[5] (sq.ft.)	PSS[6] (sq.ft.)	PFO[7] (sq.ft.)
W-6W	Size in Study Area		177			
	Impact		89			
W-7E	Size in Study Area		178			
	Impact		63			
W-7W	Size in Study Area		664	31,405		
	Impact					
W-8	Size in Study Area		511			
	Impact					
W-9E	Size in Study Area		416			
	Impact		106			
W-9W	Size in Study Area		468		8,515	61,870
	Impact		105		8,515	27,750
W-11	Size in Study Area		403			
	Impact		224			
W-12E	Size in Study Area					870
	Impact					
W-12W	Size in Study Area		795			
	Impact		405			
W-13	Size in Study Area		78	2,001		
	Impact		47	2,001		
W-14E	Size in Study Area	196	264			
	Impact	23	176			
W-14W	Size in Study Area		166		5,225	
	Impact		76		2,672	
W-15W	Size in Study Area		190			8,480
	Impact		120			2,117
W-15E	Size in Study Area	40	175	28,749		
	Impact	40	26	9,239		
W-16	Size in Study Area			3,180		
	Impact			1,713		
W-17	Size in Study Area			5,895		
	Impact					
W-18E	Size in Study Area		415	2,405		
	Impact		109	1,843		
W-18W	Size in Study Area		758	345	415	9,341
	Impact		612	345	415	3,452
W-19N	Size in Study Area		346		1,552	
	Impact		205		1,552	
W-19S	Size in Study Area		123		13,230	
	Impact					
W-20E	Size in Study Area			20,590		6,130
	Impact			3,028		531
W-20W	Size in Study Area		478		44,970	
	Impact		188		11,617	

Table 14:
Summary Of Individual Wetland and Waterway Size[1] & Impacts Along the I-270/US 15 Highway Alignment

Wetland Number		Alternatives 6A/B & 7A/B[2]				
		Ephemeral (ln.ft.)	Riverine[3] (ln.ft.)	PEM[5] (sq.ft.)	PSS[6] (sq.ft.)	PFO[7] (sq.ft.)
W-21	Size in Study Area		301			
	Impact		207			
W-22	Size in Study Area				6,795	1,960
	Impact				1,341	1,625
W-22E	Size in Study Area	265	124			
	Impact	257	124			
W-22W	Size in Study Area	54	1,939		13,450	
	Impact	54	1,377		13,450	
W-23W	Size in Study Area			54,487		
	Impact			9,870		
W-23E	Size in Study Area			31,760		
	Impact			22,677		
W-24	Size in Study Area	16	580			
	Impact	16	126			
W-24N	Size in Study Area			1,639		
	Impact			44		
W-25W	Size in Study Area		421	2,510		
	Impact		421	1,434		
W-25E	Size in Study Area		1,130	7,775		
	Impact		573	7,692		
W-26E	Size in Study Area		225	1,500		
	Impact		225	1,149		
W-26W	Size in Study Area		210			
	Impact		164			
W-27E	Size in Study Area	538	380			
	Impact	538	380			
W-27W	Size in Study Area		345		16,185	
	Impact		255		12,432	
W-28	Size in Study Area		538	12,763	423	
	Impact		538	6,850	96	
W-29	Size in Study Area		211	805		
	Impact		161	445		
W-30	Size in Study Area	370	301			12,104
	Impact	370	242			5,971
W-31	Size in Study Area		180		3,055	
	Impact		177		864	
W-32	Size in Study Area			406		
	Impact			406		
W-34	Size in Study Area		926			
	Impact		156			
W-A35	Size in Study Area		334			
	Impact		159			
W-B35	Size in Study Area	130				
	Impact	103				

Table 14:
Summary Of Individual Wetland and Waterway Size[1] & Impacts Along the I-270/US 15 Highway Alignment

Wetland Number		Alternatives 6A/B & 7A/B[2]				
		Ephemeral (ln.ft.)	Riverine[3] (ln.ft.)	PEM[5] (sq.ft.)	PSS[6] (sq.ft.)	PFO[7] (sq.ft.)
W-C35	Size in Study Area		114			
	Impact		62			
W-D35	Size in Study Area	252	349			
	Impact	252	255			
W-E35	Size in Study Area		8,344	95	7,155	
	Impact					
W-F35	Size in Study Area	169	1,074	8,370		
	Impact	139	956	7,887		
W-G35	Size in Study Area		633			
	Impact		182			
W-H35	Size in Study Area			600		
	Impact			600		
W-36	Size in Study Area		86		230	
	Impact		85		230	
W-38	Size in Study Area	202	132			
	Impact	202	73			
W-39W	Size in Study Area			32,005		
	Impact			11,283		
W-41	Size in Study Area		167			
	Impact		30			
W-42	Size in Study Area		16			
	Impact		8			
W-43	Size in Study Area		221			
	Impact		95			
W-44	Size in Study Area		191			
	Impact		87			
W-45E	Size in Study Area	605	113	3,597		
	Impact	605	61	2,958		
W-45W	Size in Study Area		85			
	Impact		66			
W-46E	Size in Study Area	291	766	1,680	562	
	Impact	62	286	1,380	315	
W-A46E	Size in Study Area			1,015		
	Impact			1,015		
W-46W	Size in Study Area	254	88			
	Impact	208	59			
W-47E	Size in Study Area	54	204	4,890		8,016
	Impact	54	104	2,490		6,066
W-47W	Size in Study Area	549	118			
	Impact	549	98			
W-48E	Size in Study Area			21,800		
	Impact			19,704		
W-48W	Size in Study Area	2,025	979	947		

Table 14:
Summary Of Individual Wetland and Waterway Size[1] & Impacts Along the I-270/US 15 Highway Alignment

Wetland Number		Alternatives 6A/B & 7A/B[2]				
		Ephemeral (ln.ft.)	Riverine[3] (ln.ft.)	PEM[5] (sq.ft.)	PSS[6] (sq.ft.)	PFO[7] (sq.ft.)
	Impact	2,025	500	30		
W-49W	Size in Study Area		3,550	88,235	18,850	138,435
	Impact		2,446	49,351	15,694	76,107
W-50	Size in Study Area	107	621		4,754	
	Impact	107	451		3,770	
W-51	Size in Study Area		591			20,290
	Impact		542			1,573
W-52E	Size in Study Area		106	3,150		
	Impact		103	3,150		
W-52W	Size in Study Area		80			
	Impact		77			
W-53	Size in Study Area	286				25,900
	Impact	286				12,103
W-54	Size in Study Area	19	804			6,405
	Impact	19	462			688
W-55	Size in Study Area			6,310		
	Impact			6,310		
W-56	Size in Study Area	206	237	21,560		2,210
	Impact	206	237	21,510		
W-57E	Size in Study Area				9,805	
	Impact				9,750	
W-57W	Size in Study Area		221			110
	Impact		184			110
W-58E	Size in Study Area			121,705		30,930
	Impact			61,620		8,390
W-58W	Size in Study Area			1,325		
	Impact			1,325		
W-59	Size in Study Area	212	136			
	Impact	165	136			
W-60E	Size in Study Area		645	3,155		8,905
	Impact		32			
W-60W	Size in Study Area	140	1,311			9,783
	Impact	140	1,251			9,129
W-61E	Size in Study Area		125		1,295	
	Impact		86		1,294	
W-A61W	Size in Study Area		600			
	Impact		600			
W-B61W	Size in Study Area		140			
	Impact		79			
W-62A	Size in Study Area			28,603		59,188
	Impact			5,797		14,688
W-62C	Size in Study Area			15,400		10,060
	Impact			9,630		6,960
W-62 (East	Size in Study Area		204			

Table 14:
Summary Of Individual Wetland and Waterway Size[1] & Impacts Along the I-270/US 15 Highway Alignment

Wetland Number		Alternatives 6A/B & 7A/B[2]				
		Ephemeral (ln.ft.)	Riverine[3] (ln.ft.)	PEM[5] (sq.ft.)	PSS[6] (sq.ft.)	PFO[7] (sq.ft.)
Side)	Impact		155			
W-62	Size in Study Area		358			
	Impact		200			
W-A63E/ W-B63E	Size in Study Area	101	911			
	Impact	101	275			
W-A63W	Size in Study Area		1,071			
	Impact		252			
W-B63W/ W-D63W	Size in Study Area		5,943	3,820		105,730
	Impact		156			
W-C63E	Size in Study Area		68			
	Impact					
W-64	Size in Study Area			7,300		
	Impact			4,200		
W-65	Size in Study Area		522		2,324	
	Impact		522		2,324	
W-66	Size in Study Area		46			
	Impact		27			
W-157E	Size in Study Area		135			
	Impact		40			
W-157W	Size in Study Area		88			
	Impact		32			
W-158W	Size in Study Area		13			
	Impact		2			
W-159W	Size in Study Area	126				
	Impact	24				
W-160W	Size in Study Area	112				
	Impact	62				
W-161W	Size in Study Area	640		132		
	Impact	533		132		
W-162E	Size in Study Area			18,582		
	Impact			11,928		
W-163W	Size in Study Area	74				
	Impact	74				
W-163E	Size in Study Area	28				
	Impact	21				
W-166E	Size in Study Area	38				
	Impact	38				
W-166W	Size in Study Area	231				
	Impact	228				
W-168E	Size in Study Area		58			
	Impact		36			
W-171W	Size in Study Area				1,123	
	Impact				196	
W-175E	Size in Study Area	79				

Table 14:
Summary Of Individual Wetland and Waterway Size[1] & Impacts Along the I-270/US 15 Highway Alignment

Wetland Number		Alternatives 6A/B & 7A/B[2]				
		Ephemeral (ln.ft.)	Riverine[3] (ln.ft.)	PEM[5] (sq.ft.)	PSS[6] (sq.ft.)	PFO[7] (sq.ft.)
	Impact	31				
W-176E	Size in Study Area	81				
	Impact	81				
W-177W	Size in Study Area	58				
	Impact	58				
W-178	Size in Study Area	274				
	Impact	145				
W-179	Size in Study Area	131				
	Impact	131				
W-180	Size in Study Area			5,910		
	Impact			5,910		
W-182	Size in Study Area	258				
	Impact	258				
W-183	Size in Study Area	191				
	Impact	191				
W-184W	Size in Study Area	1,135				
	Impact	1,114				
W-186W	Size in Study Area	181				
	Impact	177				
W-187W	Size in Study Area	138				
	Impact	138				
W-188W	Size in Study Area	214				
	Impact	214				
W-189W	Size in Study Area	76				
	Impact	76				
W-190W	Size in Study Area	73				
	Impact	73				
W-191W	Size in Study Area	71				
	Impact	65				
W-192W	Size in Study Area	268				
	Impact	4				
W-193E	Size in Study Area	147				
	Impact	147				
W-194E	Size in Study Area	72				
	Impact	27				
W-196W	Size in Study Area	303				
	Impact	303				
	TOTAL IMPACT LF=	10,812	20,198			
	TOTAL IMPACT AC=			6.9	2.0	4.1

[1] Size of system relates to that portion flagged within the study area only; in many cases the system continues outside the limits of the study and is therefore much larger.

[2] Impacts for each alignment alternative are the same, as both alternatives have the same limit of disturbance.

[3] Riverine includes perennial and intermittent streams combined

[4] POW = Palustrine Open Water

[5] PEM = Palustrine Emergent Wetland
[6] PSS = Palustrine Scrub-shrub Wetland
[7] PFO = Palustrine Forested Wetland

Table 15:
Summary of Individual Wetland and Waterway Size[1] & Impacts Along the I-270/US 15 Transitway Alignment

Wetland Number		Alternatives 6A/B & 7A/B[2]				
		Ephemeral (ln.ft.)	Riverine[3] (ln.ft.)	PEM[4] (sq.ft.)	PSS[5] (sq.ft.)	PFO[6] (sq.ft.)
W-100	Size in Study Area		194			
	Impact		60			
W-101	Size in Study Area		409	438		
	Impact		249			
W-102/ 105	Size in Study Area		3,980		5,065	28,820
	Impact		138			
W-103	Size in Study Area				21,300	
	Impact				12,865	
W-104	Size in Study Area		77		612	
	Impact		60		345	
W-A61W	Size in Study Area		1,000			
	Impact		341			
W-B61W	Size in Study Area		140			
	Impact		61			
W-62A	Size in Study Area			28,603		59,188
	Impact			22,806		44,500
W-62	Size in Study Area		358			
	Impact					
W-63W	Size in Study Area		768			
	Impact		275			
W-106/ 107	Size in Study Area		1,807			
	Impact		1,737			
W-108	Size in Study Area				7,665	
	Impact				1,126	
W-109	Size in Study Area		245			
	Impact		87			
W-150	Size in Study Area		753			4,250
	Impact		334			
W-151	Size in Study Area		566	3,395		
	Impact		88	530		
W-152	Size in Study Area					11,225
	Impact					1,602
W-153	Size in Study Area		400	18,290		35,050
	Impact		157	13,476		1,376
W-154	Size in Study Area	160	640		540	128
	Impact	80				128
W-155	Size in Study Area		1,400	44,400		
	Impact		197	14,337		
W-156	Size in Study Area		730	19,001		
	Impact					
W-186	Size in Study Area	181		914		
	Impact	4		914		
W-197	Size in Study Area		126			
	Impact		76			

Table 15:
Summary of Individual Wetland and Waterway Size[1] & Impacts Along the I-270/US 15 Transitway Alignment

Wetland Number		Alternatives 6A/B & 7A/B[2]				
		Ephemeral (ln.ft.)	Riverine[3] (ln.ft.)	PEM[4] (sq.ft.)	PSS[5] (sq.ft.)	PFO[6] (sq.ft.)
W-198	Size in Study Area	37				
	Impact	37				
W-201	Size in Study Area	380				
	Impact	380				
W-202	Size in Study Area		116			
	Impact		116			
W-203	Size in Study Area			324		
	Impact			324		
W-204	Size in Study Area	203				
	Impact	203				
W-205	Size in Study Area	96				
	Impact	96				
W-206	Size in Study Area	361				
	Impact	361				
W-207	Size in Study Area	62				
	Impact	62				
W-208	Size in Study Area	13				
	Impact	13				
W-209	Size in Study Area	161				
	Impact	161				
W-210	Size in Study Area	64				
	Impact	64				
W-211	Size in Study Area	365				
	Impact					
W-215	Size in Study Area			2,224		
	Impact			0		
W-216	Size in Study Area			536		
	Impact			536		
W-217	Size in Study Area					4,907
	Impact					0
W-222	Size in Study Area	250				
	Impact	185				
W-223	Size in Study Area		320			
	Impact		30			
	TOTAL IMPACT LF=	1,646	4,006			
	TOTAL IMPACT AC=			1.2	0.3	1.1

[1] Size of system relates to that portion flagged within the study area only; in many cases the system continues outside the limits of the study and is therefore much larger.

[2] Impacts for each alignment alternative are the same, as both alternatives have the same limit of disturbance.

[3] Riverine includes perennial and intermittent streams combined

[4] PEM = Palustrine Emergent Wetland

[5] PSS = Palustrine Scrub-shrub Wetland

[6] PFO = Palustrine Forested Wetland

Consistent with the 2002 NETR, SWM facilities were not specifically addressed in this document. Design of SWM facilities is ongoing, and a thorough investigation will be conducted during the final design process. The design of additional SWM facilities may result in additional wetland and waterway impacts that will be addressed during the FEIS stage of the project.

Transitway alignment impacts under the current ETL alternatives would be somewhat less than those described in the 2002 NETR/DEIS, because of shifts in the alignment that have occurred since those documents were produced. The greatest decrease in wetland and waterway impacts has occurred just to the north of the proposed Metropolitan Grove Station. Additional transitway impacts could also occur from a proposed operations and maintenance facility. Five potential sites are currently being investigated, but only a single site would be needed. Of the five potential sites, none would have wetland impacts and only the Metropolitan Grove Road Study Area and Game Preserve Road Study Area sites would have waterway impacts (Table 13).

d. Avoidance and Minimization

Complete avoidance of impacts to surface waters and wetlands is not possible due to the quantity of these systems in the project area and their orientation perpendicular to the proposed ETL alternatives and transitway alignment. However, impacts have been avoided or minimized wherever possible through the initial placement of alignments to avoid unnecessary crossings. Investigations of further avoidance and minimization measures are on-going and will continue throughout all phases of engineering design for the project. Avoidance and minimization measures implemented from the outset of project design include:

- 2:1 side slopes throughout the project corridor for the proposed ETL highway alignment.
- Widening of major stream crossings (e.g., Monocacy River, Great Seneca Creek) on the same bridge structures to avoid the need for additional piers.
- The southbound ramps at the proposed interchange at I-270/Newcut Road have been reconfigured to the southwest quadrant to minimize impacts to more valuable wetland resources in the northwest quadrant.

Additional measures currently being assessed include alignment shifts, the use of retaining walls and extended wing walls.

During final design, bridges and culverts will be designed to maintain the geomorphic stability of the stream channels as bankfull and flood-prone elevations are evaluated. Consideration will be given to the full range of crossing options including bridging and culvert designs such as depressed culverts that allow for the maintenance of a natural stream bottom and reduce the risk of creating barriers to fish movement.

Short-term construction impacts will be minimized through strict adherence to SHA erosion and sediment control procedures and MDE SWM management regulations. These procedures include the use of BMPs and structural controls such as the minimization of exposed soils through vegetative cover, use of contouring and diversion to reduce water velocities, routing of runoff to retention basins, and installation of control structures such as sediment fences. For Class I surface waters, in-stream work may not be conducted during the period March 1 through June 15, inclusive, during any year, while Class III waters have a restriction for in-stream construction from October 1 through April 30. Surface waters designated as Class IV have an in-stream restriction during the period March 1 through May 31. Long-term impacts to water quality will be minimized to the extent possible through the use of an SHA and MTA approved SWM management plan. SWM plans will be in compliance with MDE requirements and will be designed to treat both quantity and quality of stormwater runoff prior to discharge into receiving waters.

e. Mitigation

The mitigation section of the 2002 NETR will not be updated until the FEIS stage of the project. At that time, the proposed mitigation sites will be reviewed by the resource team to note any changes in the existing conditions of each site since the initial field review. The sites will be prioritized and field reviewed by USACE and MDE to determine which mitigation sites meet the project needs.

6. Wetlands of Special State Concern

As stated in the 2002 NETR, one Wetland of Special State Concern (WSSC), the Germantown Bog, is located approximately 400 feet upstream of the project area. The information presented in this section about the bog has not changed since the 2002 NETR. Because the limits of the two ETL alternatives do not exceed those of the alternatives discussed in the 2002 NETR, there are still no anticipated impacts to the WSSC.

D. TERRESTRIAL VEGETATION AND WILDLIFE

1. Methods

The methods used to assess existing terrestrial habitats and wildlife within the ETL highway and transitway alignments are the same as those described in the 2002 NETR.

2. Results

Due to the overlap in the design between the ETL alternatives and the I-270 DEIS alternatives, the terrestrial plant communities and wildlife described in the 2002 NETR are generally the same for the ETL alternatives as that described for the DEIS alternatives. One exception is the addition to the transitway component of the project of the Crabbs Branch operations and maintenance site. This site occurs within an area comprised of managed fields and a narrow treeline along a stream. The field is infrequently mowed and comprised of herbaceous and woody shrubs typical of old field habitat including *Solidago* spp. (goldenrod), *Symphiotrichum* spp. (aster), Japanese honeysuckle, tatarian honeysuckle, multiflora rose and seedlings of woody forest species. The treeline represents a finger of the broader forest association within the area dominated by tulip poplar. Species typically associated with the tulip tree association were described in detail in the 2002 NETR.

3. Impacts

Impacts to plant communities and wildlife associated with the ETL build alternatives will be the same, as the two alternatives will have the same physical footprint (See Section II). In general, impacts to plant communities by project build alternatives include direct losses from clearing within rights-of way and changes in plant community structure and composition. Effects to terrestrial resources will involve the conversion of habitat to impervious road, rail, or other associated facility. Effects could also result from the human-induced introduction of invasive non-native plant species into undisturbed habitat adjacent to newly impacted sites. However, because the highway alignment alternatives generally involve the addition of travel lanes immediately to the outside or within the median of the existing highway, and the transitway alignment generally follows exiting roadways, the majority of these effects will be to maintained grassy strips or narrow rows of trees. As described in the 2002 NETR, the largest areas of potential impact to terrestrial habitats will occur within the proposed COMSAT transitway station, transitway operations and maintenance facilities, and portions of the transitway alignment. The transitway operations and maintenance facilities are mostly planned for undeveloped land adjacent to the transitway alignment, as are portions of the proposed transitway alignment between Metropolitan Grove Station and the proposed COMSAT station.

Potential forest impacts associated with the ETL alternatives include 268.6 acres for the highway component and 27.2 acres for the transitway component. Of the five operations and maintenance facilities, three would have forest impacts. These include 0.8 acre at the Observation Drive Also Known as Old Baltimore Road Study Area, 10.2 acres at the Metropolitan Grove Road Study Area, and 18.7 acres at the Game Preserve Road Study Area. The specific forest stands potentially impacted by the ETL highway and transitway alternatives are similar to those described in the 2002 NETR.

4. Avoidance and Minimization and Mitigation

Discussion of general and specific avoidance and minimization efforts for the project was included in Section C.5. These efforts would apply to forest resources as well. The discussion of mitigation options for unavoidable forest impacts would be the same as was described in the 2002 NETR.

E. AQUATIC HABITAT/SPECIES

1. Aquatic Habitat

Aquatic habitat assessment is generally completed by state and local agencies concurrently with benthic macroinvertebrate and fish community field assessments. New aquatic community assessment locations were sampled by the MDNR, MBSS, the MCDEP, and the FCDPW since the 2002 NETR was published. In addition, new aquatic habitat assessments were conducted by SHA during the fish community sampling completed for the I-270 project during the summer of 2006. Additional habitat assessments for the I-270 project will be conducted by SHA during benthic macroinvertebrate sampling in spring of 2007. These data will be included in the FEIS.

a. Methods

A new Maryland Physical Habitat Index (PHI) was finalized by MBSS in 2003. This habitat assessment was based on February 2001 MBSS guidelines, and was conducted within each of the 75-meter segments sampled for fish during 2006. Each of the 75-meter segments was evaluated for instream habitat, epifaunal substrate, velocity/depth diversity, pool/glide/eddy quality, riffle/run quality, embeddedness, shading, remoteness, bank stability, the amount of instream woody debris/rootwads, and the abundance of trash and human refuse.

Habitat scores and Index of Biotic Integrity (IBI) scores are positively correlated, with high habitat scores usually predicting high IBI scores. The physical habitat assessment methods were developed using parameters selected from the 1994-2000 MBSS data. Although a number of parameters are evaluated, for Piedmont sites, eight individual physical habitat metrics were determined to be most important in discriminating reference sites from degraded sites remoteness, shading, epifaunal substrate, instream habitat, total number of instream woody debris and rootwads, embeddedness, riffle/run quality, and bank stability. Four categories of habitat health were established for the physical habitat index (PHI) as follows:

- Scores of 81 to 100 are rated “Minimally Degraded”
- Scores of 66 to 80.9 are rated “Partially Degraded”
- Scores of 51 to 65.9 are rated “Degraded”
- Scores of 0 to 50.9 are rated “Severely Degraded”

Habitat assessments conducted by SHA for this study during the summer of 2006 were analyzed using this Final PHI.

b. <u>Results</u>

Physical habitat assessment results from SHA sampling during 2006 and from county and state agency sampling are presented in **Table 16**. PHI scores for sites newly sampled by SHA ranged from 34.67, severely degraded, to 80.48, partially degraded. The highest PHI scores were found in Carroll Creek, just downstream of I-270. Though the left bank riparian buffer within this segment was heavily mowed, a high number of instream woody debris and rootwads were present. In addition, no bank erosion was present within this section of stream. Aquatic habitat scores for Tuscarora Creek all fell within the Severely Degraded range. Downstream of I-270, extremely high embeddedness resulted in very low epifaunal substrate and riffle/run quality. Active agriculture land uses adjacent to this stream segment are most likely the cause of the very high embeddedness. Upstream of I-270, the PHI score was slightly better, with lower embeddedness but a very low amount of instream woody debris. PHI scores within Muddy Run all fell within the Severely Degraded range. Both the upstream and downstream sites were negatively affected by high embeddedness, poor epifaunal substrate, and a lack of instream woody debris and rootwads. Habitat scores in Bennett Creek ranged from Degraded, upstream of I-270 to Partially Degraded, downstream of I-270. Aquatic habitat within the upstream segment of Bennett Creek was negatively impacted by a lack of shading, low epifaunal substrate quality, and minor but extensive bank erosion. Downstream of I-270, the aquatic habitat improves as epifaunal substrate quality, shading, and riffle/run quality improve.

Table 16:
Summary of Habitat Assessment Results for
Major Watersheds within the I-270/US 15 Corridor

Watershed	Agency	Year	Habitat Score Range	Habitat Ranking Range
Carroll Creek	SHA	2006	80.84	Partially Degraded
Tuscarora Creek	SHA	2006	37.05 – 50.47	Severely Degraded
Muddy Run	SHA	2006	34.67 – 47.51	Severely Degraded
Bennett Creek	SHA	2006	57.38 - 68.51	Degraded to Partially Degraded
Little Bennett	MCDEP	2003	138 - 149	Good
Little Seneca	MCDEP	2004 - 2006	117 – 158	Good to Excellent/Good
Great Seneca	MCDEP	2001 – 2004	102 – 138	Good/Fair to Good
Muddy Branch	MCDEP	2002	121 - 139	Good
Mill Creek	MCDEP	2002	144 – 172	Good
	SHA	2003	23.2 - 31.0	Poor

Existing habitat data were available from MCDEP aquatic assessments within the project study area. Within Little Bennett Creek, aquatic habitat was rated as Good by the MCDEP habitat assessment. Generally, sites located within Little Bennett Creek had optimal instream habitat and epifaunal substrate quality with slightly lower ratings for embeddedness and sediment deposition. The large number of sites sampled within Little Seneca Creek resulted in highly variable individual habitat assessment scores. Generally, the channel alteration and riffle/run frequency scores were optimal with bank stability and bank vegetative protection scoring slightly lower. Aquatic habitat within Great Seneca Creek ranged from Good/Fair to Good and is characterized by moderate instream habitat and poor bank stability and bank vegetative protection. Habitat scores within Muddy Branch were rated as Good by MCDEP. These sites were characterized by optimal instream habitat with moderate sediment deposition, bank stability, and bank vegetative protection. Aquatic habitat within Mill Creek was rated as Good by MCDEP and Poor by SHA. These sites lacked high quality riffle/run habitats and suffered from moderate to high embeddedness.

c. *Impacts*

The No-Build Alternative would have no direct effect on aquatic habitat. All of the build alternatives would have direct impacts upon aquatic habitat. Additional analysis during the summer of 2007 will provide further detail on the impacts that could occur as a result of the project's build alternatives.

During construction, large areas of exposed soil could be eroded by wind and rain when the vegetation and naturally occurring soil stabilizer are removed. Erosion of exposed soils could significantly increase the sediment load to receiving waters. Increased sediment loads could destroy or damage habitat areas. In the majority of the impacted streams, the area of channel disturbance is relatively small in comparison to the remaining habitat available, making the overall habitat and mortality impact a small one. The smaller the stream, however, the greater the relative impact to aquatic habitat.

In general, most of the impacts to stream habitat within the project area corridor will occur at locations already degraded by existing roadway culverts or bridges. The greatest potential negative effect on aquatic biota is related to the change in land-cover associated with the build alternatives. All of the build alternatives would require clearing of some forested land in stream valleys that currently provide vital shading of streams; important food and habitat sources for organic detritus and coarse woody debris; and anchoring of stream banks and floodplains. The most substantial and long-term change, however, from the build alternatives would be an increase in impervious surfaces in the study area. The conversion of open-space and forested areas to impervious surfaces has the potential to have a wide range of impacts on study area streams and their inhabitants.

d. *Avoidance and Minimization*

Complete avoidance of impact from the build alternatives to study area streams would be impossible because of the number of perpendicular crossings to the proposed altenatives. In some cases, culvert bottoms or inverts may be installed below the base invert of the stream channel to allow for replacement of a natural stream bottom within the culvert, minimizing long-term impacts to aquatic habitat. Some temporary degradation to local water quality during construction and consequently aquatic habitat may occur during rain events; however, these impacts will be minimized through erosion and sediment control measures. Stormwater management facilities, including methods such as installation of vegetated ditches, drainage swales and infiltration basins, for example, would minimize the impacts from runoff by absorbing and filtering pollutants.

2. Macroinvertebrates

New sites within and adjacent to the project area were sampled by the MDNR, MBSS, the MCDEP, and the FCDPW since the 2002 NETR was published. No new macroinvertebrate data were collected by SHA during 2006, but benthic sampling will be conducted in the spring of 2007. These data will be included in the FEIS.

a. *Methods*

Benthic macroinvertebrate community assessments were conducted using similar methodologies developed by individual state and county agencies. Methods developed by MCDEP were discussed in detail in the 2002 NETR and are applicable to the MCDEP data presented below. Benthic Index of Biotic Integrity (BIBI) scores for Ballenger Creek were calculated by FCDPW using the original MBSS methods discussed in the 2002 NETR. BIBI data for other streams, collected by MBSS, were calculated using the newly developed 2005 BIBI.

The MBSS BIBI compares the macroinvertebrate community within a given stream to reference macroinvertebrate communities in least-impaired streams. The BIBI is based on state-wide reference streams in each physiographic province. The BIBI for the Piedmont uses six community metrics found to characterize macroinvertebrate community health in Maryland’s Piedmont streams. The metrics calculated for Piedmont streams are as follows:

Total Number of Taxa - This metric reflects the health of the community through a measurement of the total number of unique taxa in a sample. An increase in taxa is directly related to the increase in water quality, habitat diversity, and/or habitat suitability.

Number of EPT Taxa - The richness of the generally intolerant insect orders of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). This value summarizes taxa richness with macroinvertebrates that are generally considered to be intolerant of pollution. Therefore, a higher number of EPT taxa within the sample suggests better water quality conditions.

Number of Ephemeroptera Taxa - The richness of mayfly taxa indicates the ability of a stream to support this generally intolerant insect order.

Percent Intolerant to Urban - The percentage of insects, that have a tolerance value less than or equal to three, that make up the total sample. This metric generally increases without urban stressors.

Percent Chironomidae - The percentage of taxa belonging to the family Chironomidae (midges). This metric generally increases with increasing stressors.

Percent Clingers - The percentage of taxa that cling to surfaces in fast moving water by means of morphological adaptations or construction of fixed retreats. This metric generally increases without stressors.

Each metric is scored a five, three, or one depending on the value as compared to other Maryland Piedmont streams. **Table 17** shows the thresholds for the determination of the metric scoring.

Table 17:
MBSS BIBI Metrics

Metric	Threshold		
	1	3	5
Total number of Taxa	< 15		>= 25
Number of EPT Taxa	< 5		>= 11
Number of Ephemeroptera	< 2		>= 4
Percent Intolerant to Urban	<12		>= 51
Percent Chironomidae	> 63		<= 24
Percent Clingers	< 31		>= 74

Source MBSS 2005

Each of the metric scores is added together, and the resulting average is the BIBI score. **Table 18** shows the scores and narrative rankings of the MBSS BIBI.

Table 18:
Narrative Description of Stream Biological Integrity Associated With Each of the MBSS BIBI Scores

IBI Score	Narrative Integrity Class	Characteristics
4.0-5.0	Good	Comparable to reference streams considered to be minimally impacted. Falls within upper 50% of reference site conditions.
3.0-3.9	Fair	Comparable to reference conditions, but some aspects of biological integrity may not resemble the qualities of minimally impacted streams. Falls within the lower portion of the range of reference sites (10th to 50th percentile).
2.0-2.9	Poor	Significant deviation from reference conditions, with many aspects of biological integrity not resembling the qualities of these minimally impacted streams, indicating some degradation.
1.0-1.9	Very Poor	Strong deviation from reference conditions, with most aspects of biological integrity not resembling the qualities of these minimally impacted streams, indicating severe degradation.

Source *MBSS (1999)*

b. *Results*

Benthic macroinvertebrate community quality varied throughout the project study area. Little Seneca Creek and Little Bennett Creek contained the least impaired communities, while Carroll Creek and Rock Creek (Monocacy River tributary) were the most impaired. BIBI scores from these watersheds are summarized in **Table 19**.

**Table 19:
Summary of BIBI Results for
Major Watersheds within the I-270/US 15 Corridor**

Watershed	Agency	Year	BIBI Score Range	BIBI Ranking Range
Carroll Creek	MBSS	2000	1.75	Very Poor
Tuscarora Creek	MBSS	2004	1.25 – 2.50	Very Poor to Poor
Muddy Run	MBSS	2000	3.25	Fair
Bennett Creek	MBSS	2000	2.75	Poor
Little Bennett	MBSS	2000 – 2003	2.75 – 3.50	Poor to Fair
	MCDEP	2001 – 2003	22 – 36	Fair to Excellent
Little Seneca	MBSS	2001	1.67 – 4.00	Very Poor to Good
	MCDEP	2000 – 2005	12 - 40	Poor to Excellent
Great Seneca	MBSS	2001	1.67 – 2.67	Very Poor to Poor
	MCDEP	2001 – 2004	14 – 24	Poor to Fair
Muddy Branch	MBSS	2003 – 2004	2.00 – 2.75	Poor
	MCDEP	2002	8	Poor
Monocacy River	MBSS	2003 – 2004	1.00 – 2.00	Very Poor to Poor
Rock Creek	MBSS	2000 – 2003	1.25 – 1.50	Very Poor
Ballenger Creek	FCDPW	2003	2.50	Poor
Mill Creek	MCDEP	2002	12 – 14	Poor
	SHA	2003	1.9 – 2.8	Very Poor to Poor

The benthic macroinvertebrate community within Carroll Creek was rated as Very Poor by the MBSS BIBI. The community was heavily dominated by tolerant Amphipoda (scud) and Chironomidae (midge) taxa. MBSS BIBI scores for Tuscarora Creek ranged from Very Poor to Poor. Generally, the community at these sites was comprised of midges, scuds, and larvae Simulidae (blackfly). Sites scoring slightly higher contained several additional less tolerant EPT (Ephemeroptera, Plecoptera, and Trichoptera) taxa. The benthic macroinvertebrate community in Muddy Run was rated as Fair by the MBSS BIBI. This site was dominated by sensitive *Amphinemura* sp. (stonefly), sensitive *Ephemerella* sp. (mayfly) and blackfly larvae. The MBSS BIBI rated Bennett Creek as Poor (2.75). This site was heavily dominated by various midge taxa and one sensitive mayfly taxa. The Little Bennett Creek watershed was sampled at various locations within the project study area and was rated as Poor to Fair by the MBSS BIBI and Fair to Excellent by MCDEP. All of these sites were generally dominated by sensitive stonefly and mayfly taxa.

The highest quality macroinvertebrate communities were found within the Little Seneca Creek watershed. Sites sampled within the Little Seneca Creek watershed contained a high number of macroinvertebrate taxa as well as a diverse grouping of both sensitive mayfly and stonefly taxa. The BIBI scores for Great Seneca Creek ranged from Very Poor to Poor, for the MBSS BIBI, and from Poor to Fair, for the MCDEP BIBI. Samples collected in this watershed were heavily dominated by several midge genera along with common net-spinning Hydropsychidae (caddisflies). Benthic macroinvertebrate community conditions within Muddy Branch were rated as Poor by both the MBSS BIBI and MCDEP BIBI. These sites were heavily dominated by pollution tolerant midges, scuds, and aquatic worms. Sites sampled by MBSS within the Monocacy River watershed were all located on unnamed tributaries. No sites were sampled on the Monocacy River mainstem. The BIBI scores for the Monocacy River watershed ranged from 1.00 to 2.00 or Very Poor to Poor. These benthic macroinvertebrate communities were heavily dominated by midge and scud taxa with few stoneflies included in the higher scoring sites in the watershed. Sites sampled within the Rock Creek watershed were the most impacted within the project study area. BIBI scores within this watershed were all Very Poor. These sites were almost entirely comprised of very tolerant midges, scuds, and aquatic worms. Benthic macroinvertebrate community conditions were rated as Poor within Ballenger Creek. Detailed benthic community data were not available for this watershed. MCDEP rated the benthic macroinvertebrate community of Mill Creek as Poor while SHA rated sites within this watershed as Very Poor and Poor. The site sampled within this watershed was dominated by midges and common net-spinning caddisflies.

c. *Impacts*

The build alternatives would not have any direct effect on macroinvertebrate species. During construction of the build alternatives, the stream channel in many locations will be excavated and any macroinvertebrate organisms living within the stream channel would be displaced or destroyed by construction equipment. Following construction activities, it is unlikely that the new culvert would support the same macroinvertebrate community present before construction. Culverts are relatively straight and typically do not allow for the development of the varied macroinvertebrate habitat of an unrestrained channel.

Perennial streams would be temporarily affected by siltation from runoff, especially near areas proposed for stream crossings and channel relocations. Time of year restrictions and other limitations would be implemented, in order to minimize impacts to macroinvertebrates during construction. The increased amount of impervious road surface and resulting traffic would likely produce more runoff of pollutants typically associated with this type of highway project, including gasoline, oil, de-icing chemicals and other compounds. These would run off into drainage ditches, roadside slopes and overpasses, and ultimately could adversely affect macroinvertebrate populations.

d. *Avoidance and Minimization*

Complete avoidance of impact from the build alternatives to study area streams would be impossible because of the number of perpendicular crossings to the proposed alignments. As described in the aquatic habitat section, “bottomless” culverts may be installed below the base invert of the stream channel to allow for replacement of a natural stream bottom within the culvert, minimizing long-term impacts to macroinvertebrate populations. Stormwater management facilities would minimize the negative impacts to water quality from runoff by absorbing and filtering pollutants, thereby reducing harm to macroinvertebrate populations.

3. Fisheries

a. *Methods*

Fish were sampled at select locations within the project area during the 2006 summer sampling period (June 1 – September 30) using double-pass electrofishing of 75-m stream segments. Sampling segments were located up and downstream of I-270 in Carroll Creek. Block nets were placed at each end of the segment and backpack electrofishing units were used to sample the segment, starting at the downstream end. One to three backpack electrofishing units were used at each segment, depending on the width of the stream. An attempt was made to thoroughly fish each segment, sampling all available cover and habitat structures throughout the segment. A consistent effort was applied over the two passes in an attempt to capture all fish.

Captured fish were identified to species, if possible, counted, and examined for visible external pathologies or other abnormalities. Any individuals that could not be identified to species were retained for identification in the office. For each pass, all fish were weighed together for an aggregate biomass measurement in grams. The total lengths of gamefish were measured to the nearest millimeter. After processing of the fish collected was completed in the field, the fish were released.

The fish data were analyzed using tolerance value, native or introduced origin, trophic status, lithophilic spawning status, and abundance to calculate metrics. Also included in the calculation of the fish metrics is the watershed area (in acres) and the total area of the study segment (in square meters) sampled. Watershed area was used to modify several of the metrics to account for community changes due to stream size. For Piedmont streams the following metrics were used to calculate the IBI:

Number of Benthic Fish Species (Adjusted for watershed area) - Total number of fish species that reside primarily on the stream bottom. Darter (*Etheostoma sp.*, *Percina sp.*), sculpin (*Cottus sp.*), madtom (*Notorus sp.*), and lamprey (*Lampetra sp.*) species were included as benthic specialists in this metric.

Percent Tolerant Fish - The percentage of individuals rated as tolerant to anthropogenic stress.

Percent Generalists, Omnivores, and Invertivores - The percentage of individuals classified into the trophic groups of generalist, omnivore, or invertivore; these are the most general of all feeding groups.

Number of Individuals per square meter - The number of individuals captured at a site, divided by the surface area fished. Surface area is computed as the length of stream fished (usually 75-m) multiplied by the average stream width.

Biomass (g) per square meter – The total mass in grams of fish captured at a site, divided by the surface area fished.

Percent lithophilic spawners - The percentage of individuals that use rock substrates for spawning.

Each individual metric is scored 1, 3, or 5 based on the comparison with the distribution of metric values at MBSS reference sites. Final MBSS FIBI scores were calculated as the mean of the individual metric scores and ranged from 1 to 5. **Table 20** describes the characteristics associated with each MBSS FIBI score.

Table 20:
Narrative Descriptions of Stream Biological Integrity Associated with the FIBI Scores for MBSS Protocols

IBI Score	Narrative Integrity Class	Characteristics
4.0-5.0	Good	Comparable to reference streams considered to be minimally impacted. Falls within upper 50% of reference site conditions.
3.0-3.9	Fair	Comparable to reference conditions, but some aspects of biological integrity may not resemble the qualities of these minimally impacted streams. Falls within the lower portion of the range of reference sites (10th to 50th percentile).
2.0-2.9	Poor	Significant deviation from reference conditions, with many aspects of biological integrity not resembling the qualities of these minimally impacted streams, indicating some degradation.
1.0-1.9	Very Poor	Strong deviation from reference conditions, with most aspects of biological integrity not resembling the qualities of these minimally impacted streams, indicating severe degradation.

Source *MBSS (1999)*

b. Results

The MCDEP and MBSS FIBIs rated the fish community highest within the Carroll Creek, Bennett Creek, and Ballenger Creek watersheds, while Muddy Run, Rock Creek, and the Monocacy River tributaries generally scored lowest. FIBI scores at sites sampled by SHA in 2006 ranged from Poor to Good. **Table 21** summarizes the results of the fish sampling within the project study area.

Table 21:
Summary of FIBI Results

Watershed	Agency	Year	FIBI Score Range	FIBI Ranking Range
Tuscarora Creek	SHA	2006	4.00 – 4.67	Good
	MBSS	2004	1.00 – 3.67	Very Poor to Fair
Carroll Creek	SHA	2006	4.67	Good
Muddy Run	SHA	2006	2.67 – 3.33	Poor to Fair
Bennett Creek	SHA	2006	3.00 – 4.67	Fair to Good
	MBSS	2000	3.00	Fair
Little Bennett	MBSS	2000 – 2003	2.75 – 3.50	Poor to Fair
	MCDEP	2001 - 2003	3.20 – 4.10	Fair to Good
Little Seneca	MBSS	2001	2.00 – 4.00	Poor to Good
	MCDEP	2000 – 2005	1.40 – 4.70	Poor to Excellent
Great Seneca	MBSS	2001	1.00 – 4.33	Very Poor to Good
Muddy Branch	MBSS	2003 – 2004	3.33 – 5.00	Fair to Good
	MCDEP	2001 – 2004	1.90 – 3.70	Poor to Good
Monocacy River	MBSS	2003 – 2004	1.00 – 3.67	Very Poor to Fair
Rock Creek	MBSS	2000 – 2003	2.00 – 3.67	Poor to Fair
Ballenger Creek	FCDPW	2000 – 2002	4.33	Good
Mill Creek	MCDEP	2002	2.30 – 2.80	Fair
	SHA	2003	1.44 – 2.11	Very Poor to Poor

In 2006, the mainstem of Tuscarora Creek, upstream and downstream of I-270, were sampled by SHA. These sites both scored in the Good range for the MBSS FIBI. A total of 31 fish species were collected in Tuscarora Creek. One species, *Etheostoma caeruleum* (rainbow darter), was not collected in any other project study areas. Two gamefish species, *Micropterus salmoides* (largemouth bass) and *Micropterus dolomieu* (smallmouth bass), were collected in Tuscarora Creek. The average length of these gamefish was 146.6 mm and 148 mm, respectively. Fish sampling conducted by SHA and MBSS showed FIBI scores that ranged from Very Poor to Good. Very Poor sites were located on smaller tributary streams while the mainstem of Tuscarora Creek was rated from Fair to Good. Fish sampling conducted by SHA showed that the percent of lithophilic spawners scored lower than any other metric. This is likely related to the embedded riffle habitat which also resulted in lower than expected BIBI results. A complete list of fish species collected in Tuscarora Creek, and the other project study area watersheds, is provided in **Table 22**.

Table 22:
Fish Species Collected within the I-270/US 15 Project Study Area

Species	TC	CC	MR	BC	LB	LS	GS	MB	MRi	RC	MC
American eel (*Anguilla rostrata*)				X	X	X	X	X			
Blacknose dace (*Rhinichthys atratulus*)	X	X	X	X	X	X	X	X	X	X	X
Bluntnose minnow (*Pimephales notatus*)	X		X	X	X	X	X	X	X	X	
Central stoneroller (*Campostoma anomalum*)	X		X	X	X	X	X	X	X		
Comely shiner (*Notropis amoenus*)				**X**							
Common carp (*Cyprinus carpius*)			X								
Common shiner (*Luxilus cornutus*)	X		X	X	X	X	X				
Creek chub (*Semotilus atromaculatus*)	X		X	X	X	X	X	X	X	X	X
Cutlips minnow (*Exoglossum maxillingua*)							X				
Eastern silvery minnow (*Hybognathus reguis*)	X			X							
Fallfish (*Semotilus corporalis*)	X		X	X		X	X				X
Golden shiner (*Notemigonus crysoleucas*)			X			X	X				
Goldfish (*Carassius auratus*)											
Longnose dace (*Rhinichthys cataractae*)	X	X	X	X	X	X	X	X	X	X	X
Pearl dace (*Margariscus margarita*)		**X**							**X**	**X**	
River chub (*Nocomis micropogon*)							X				
Rosyface shiner (*Notropis rubellus*)				X			X				
Rosyside dace (*Clinostomus funduloides*)	X		X	X	X	X	X	X			X
Satinfin shiner (*Cyprinella anolastana*)	X		X								
Silverjaw minnow (*Notropis buccatus*)	X			X	X	X	X	X			
Spotfin shiner (*Cyprinella spiloterus*)	X		X	X		X		X	X		X
Spottail shiner (*Notropis hudsonius*)	X			X			X	X			
Swallowtail shiner (*Notropis procne*)	X						X	X			
Creek chubsucker (*Erimyzon oblongus*)						X	X				
Northern hogsucker (*Hypentelium nigricans*)	X			X	X	X		X			
White sucker (*Catostomus commersoni*)	X	X	X	X	X	X	X	X	X	X	X
Golden redhorse (*Moxostoma erytrurm*)				X				X			
Brown bullhead (*Amerius nebulosus*)											
Yellow bullhead (*Amerius natalis*)	X		X	X	X	X	X	X	X		X
Channel catfish (*Ictalurus punctatus*)								X			
Margined madtom (*Noturus insignis*)								X			
Brown trout (*Salma trutta*)					X						
Rainbow trout (*Onchorynchus mykiss*)		X									
Banded killifish (*Fundulus diaphanus*)	X		X				X				
Mosquitofish (*Gambusia holbrooki*)			X	X		X		X			
Blue ridge sculpin (*Cottus caeruleomentum*)				X	X	X	X	X	X		
Potomac sculpin (*Cottus girardi*)	X	X	X	X	X	X	X	X	X	X	X
Black crappie (*Pomoxis nigromaculatus*)						X					
Bluegill (*Lepomis macrochirus*)	X	X	X	X	X	X	X	X	X		X
Green sunfish (*Lepomis cyanellus*)	X	X	X	X	X	X	X	X	X		X
Largemouth bass (*Micropterus salmoides*)	X		X	X	X	X	X	X	X		
Longear sunfish (*Lepomis megalotis*)	X			X				X			
Pumpkinseed (*Lepomis gibbosus*)	X		X	X		X	X				X
Redbreast sunfish (*Lepomis auritus*)	X		X	X	X	X	X	X	X		
Rock bass (*Ambloplites rupestris*)				X	X		X	X			
Smallmouth bass (*Micropterus dolomieu*)	X		X	X		X	X	X			
Lepomis hybrid	X			X			X		X		
Fantail darter (*Etheostoma flabellare*)	X	X		X	X	X	X	X	X	X	
Greenside darter (*Etheostoma blennoides*)	X		X	X	X	X	X	X	X		
Rainbow darter (*Etheostoma caeruleum*)	X										
Tessellated dater (*Etheostoma olmstedi*)	X			X	X	X	X	X			X
Total number of Species	**31**	**9**	**24**	**34**	**23**	**29**	**33**	**30**	**18**	**8**	**13**

* TC- Tuscarora Creek, CC – Carroll Creek, MR – Muddy Run, BC – Bennett Creek, LB – Little Bennett Creek, LS – Little Seneca Creek, GS – Great Seneca Creek, MB – Muddy Branch, MRi – Monocacy River, RC – Rock Creek, MC – Mill Creek

Species in **BOLD** are Maryland State Threatened Species

In 2006, one site was sampled by SHA on the mainstem of Carroll Creek, just downstream of I-270. This site was rated as Good by the MBSS FIBI. Nine species of fish were collected at this location, one of which was a gamefish (*Onchorynchus mykiss* (rainbow trout)). Rainbow trout are routinely stocked by MDNR within the Carroll Creek watershed. The average length of the rainbow trout was 264.1 mm. One species collected, *Margariscus margarita* (pearl dace), is considered state threatened by Maryland. The pearl dace has been collected by other agencies within the Carroll Creek watershed in the past. This collection is discussed further in Section III.F. Rare, Threatened, and Endangered Species. No migratory fish were collected in Carroll Creek.

Within the Muddy Run watershed, SHA sampled two sites in 2006, one upstream and one downstream of I-270. The FIBI scores at these sites ranged from Poor to Fair, with the downstream site scoring in the higher range. The number of benthic species and percent lithophilic spawners were relatively low at both sites. This is reflective of the high sedimentation and high embeddedness as a result of active agriculture adjacent to the sites. A total of 24 species were collected at these two sites, one of which (common carp) was not collected at any other project area watershed. Two gamefish species, largemouth and smallmouth bass, were collected in Muddy Run. The average size of these gamefish was 58.4 mm and 37.5 mm, respectively. No migratory fish were collected in Muddy Run.

In 2006, two sites were sampled by SHA on the mainstem of Bennett Creek. These sites ranged from Fair to Good for the MBSS FIBI. The biomass of fish per square meter within the stream was the lowest ranked individual metric at both sites. MBSS sampling rated Bennett Creek as Fair (3.00) for the FIBI. Thirty-four species of fish were collected within the Bennett Creek watershed, the highest of any project area watershed. One species, *Notropis amoenus* (comely shiner), that was collected in Bennett Creek was not found in any other project area watersheds. The comely shiner is listed as state threatened by MDNR. This is a new record of the comely shiner in this watershed. This collection is discussed further in Section E. Rare, Threatened, and Endangered Species. Bennett Creek also contained two other uncommon fish species, *Notropis rubellus* (rosyface shiner) and *Moxostoma erytrurm* (golden redhorse), that occurred in only one other project area watershed. Two gamefish species, largemouth bass and smallmouth bass, were collected in Bennett Creek. One migratory species, *Anguilla rostrata* (American eel), was collected.

Fish sampling was conducted by MBSS and MCDEP within Little Bennett Creek. The FIBI scores ranged from Poor to Good. A total of 23 species of fish were collected, one of which (*Salma trutta* (brown trout)) was not found in any other project area watersheds. Gamefish collected within Little Bennett included largemouth bass and brown trout. One migratory fish species, American eel, was collected.

Fish sampling was conducted by MBSS and MCDEP within Little Seneca Creek. The FIBI scores ranged from Poor to Excellent. Lower scoring sites were generally located on tributary streams while higher quality sites were located on the mainstem of Little Seneca Creek. A total of 29 species of fish were collected within this watershed. One species, *Pomoxis nigromaculatus* (black crappie) was not collected in any other project area watersheds. One species, *Erimyzon oblongus* (creek chubsucker), was collected in only one other project area watershed. Two gamefish species, largemouth bass and smallmouth bass, were collected in Little Seneca Creek. One migratory species, American eel, was collected.

In 2001, four sites were sampled by MBSS within Great Seneca Creek. FIBI scores at these sites ranged from Very Poor to Good. Sites scoring in the Very Poor range were located on small tributaries, while sites sampled along the mainstem of Great Seneca scored in the Good range. Thirty-three species of fish were collected within the Great Seneca Creek watershed, the second highest of any project area watershed. Two species, *Exoglossum maxillingua* (cutlips minnow) and *Nocomis micropogon* (river chub), which were collected in Great Seneca Creek were not found in other project area watersheds. Other uncommon fish, found in only one other watershed included rosyface shiner and creek chubsucker. Two gamefish species, largemouth bass and smallmouth bass, were collected in Great Seneca Creek. One migratory species, American eel, was collected.

Sampling conducted within the Muddy Branch watershed by MBSS and MCDEP rated the fish community from Poor to Good. A total of 30 species of fish were collected within Muddy Branch. Two of these species, *Ictalurus punctatus* (channel catfish) and *Noturus insignis* (margined madtom), were not collected in any other project area watersheds. One relatively uncommon fish collected in Muddy Branch, golden redhorse, was found in only one other project area watershed. Two gamefish species, largemouth bass and smallmouth bass, were collected in Muddy Branch. One migratory species, American eel, was collected.

Fish IBI scores for the Monocacy River watershed ranged from Very Poor to Fair. All of these sites, sampled by MBSS, were located within tributaries to the Monocacy River. The large size and depth of the Monocacy River mainstem makes it unsampleable for the application of MBSS and county agency protocols. Eighteen species of fish were collected within the Monocacy River tributaries. One species collected, pearl dace, is considered state threatened by Maryland. The pearl dace has been collected by other agencies within the Monocacy River watershed in the past. This collection is discussed further in Section E. Rare, Threatened, and Endangered Species. One gamefish species, largemouth bass, was collected within these tributaries. No migratory fish species were collected.

FIBI scores from MBSS sampling within Rock Creek, a tributary to the Monocacy River, rated the fish community from Poor to Fair. Only eight species of fish were collected within this watershed, none of which were found exclusively within the watershed. One species collected, pearl dace, is considered state threatened by Maryland. The pearl dace has been collected by other agencies within the Rock Creek watershed in the past. This collection is discussed further in Section E. Rare, Threatened, and Endangered Species. No gamefish or migratory species were collected within Rock Creek.

Detailed species data were not available for Ballenger Creek. Sampling by FCDPW rated the fish community as Good (4.33).

One site was sampled within Mill Creek, a tributary to Rock Creek and the Potomac River. This site, sampled by MCDEP, was rated as Fair (2.30 – 2.80), by the FIBI. Sampling by SHA yielded FIBI scores ranging from 1.9 (Very Poor) to 2.8 (Poor). Thirteen fish species were collected within Mill Creek. No gamefish or migratory species were collected within Mill Creek.

c. *Impacts*

Alternative 1 will not have an effect on the aquatic biota of the study area watersheds, but all build alternatives have the potential to affect aquatic biota in the project area. Impacts to aquatic biota can occur directly or indirectly in the project area if any of the build alternatives are selected. Direct impacts include changes from implementation of an alternative that causes an immediate and obvious alteration to the resources. The primary direct impacts to aquatic biota from the I-270 ETL would be mortality of aquatic organisms during construction of stream crossings from heavy equipment, and loss of natural habitat from placement of culvert pipes and other in-stream structures. Indirect impacts are changes in the resource that can occur now, or in the future, that are related to the direct impacts of the roadway on both the land and stream environment. For instance, the replacement of a portion of a natural stream channel with a culvert structure can have the direct impacts mentioned above, but can also change the hydrology of the stream if not properly installed or designed. In turn, indirect impacts such as degradation of in-stream habitat can result in the loss of sensitive aquatic species that are not equipped to adapt to changes in habitat characteristics. Indirect impacts can be both numerous and varied and are often difficult to quantify.

Direct Impacts

Direct impacts to stream channels require a Section 404 permit from the USACE, as well as a Section 401 water quality certification from MDE. A waterway construction permit from MDE would also be required for work in streams and floodplains. As discussed in the Waters of the U.S., including wetlands, section of the document, the implementation of both Alternative 6A/B and Alternative 7A/B would result in the direct impact of 20,198 linear feet of stream channels for the highway component and 4,006 linear feet for the transitway component.

The highway component of the build alternatives will require extending existing bridges, culverts, and pipes to accommodate the addition of general purpose lanes. Short term construction impacts from bridge extensions could temporarily displace macroinvertebrates and fish populations as increased sediment loads enter the stream. Long term impacts for culvert and pipe installation are anticipated as the stream channel would be displaced or crushed by construction equipment during in-stream construction. In recent years, culvert bottoms or inverts are most often installed below the base invert of the stream channel, in compliance with MDE regulations to allow for replacement of a natural stream bottom within the culvert, minimizing long-term impacts to aquatic habitat. The primary impact from in-stream construction would be to benthic organisms, such as macroinvertebrates, that are relatively stationary. However, fish mortality is also a possibility as they can be trapped in pools during dewatering of the channel. Although a natural stream bottoms would be reestablished within the culvert, the habitat is unlikely to support the same fish or macroinvertebrate community present before construction. Most of the construction of the bridge extensions is occurring in portions of the stream that are currently disturbed by the existing crossing. In the majority of the impacted streams, the area of channel disturbance is relatively small in comparison to the remaining habitat available, making the overall habitat and mortality impact a small one. However, the smaller the stream, the greater the relative impact to aquatic biota.

Indirect Impacts

Although the direct and indirect impacts from stream crossings have the potential to cause negative impacts to aquatic biota, perhaps the greatest negative effects are related to the change in land-cover associated with either of the build alternatives. **Table 23** summarizes some of the numerous potential changes to streams linked to impervious surfaces and how they can affect the aquatic community. The highway component of the build alternatives will require less clearing of forested land in stream valleys as these areas were already cleared or disturbed for the I-270/US 15 roadway and ROW. Some areas may require new clearing that would be a temporary impact related to construction of the road. In these cases, disturbed areas would be revegetated and eventually would again provide shade to the stream. Other temporary impacts to aquatic biota related to construction include the potential for unintentional sediment discharges that degrade aquatic habitat and impair aquatic communities.

Table 23:
Summary of Potential Impacts
to Aquatic Biota From Increased Impervious Cover

Stream Change	Effects on Aquatic Biota
Flow Related/Physical Impacts	
Increased flow volumes/Channel forming storms	Alterations in habitat complexity Changes in availability of food organisms Reduced prey diversity Scour related mortality Long-term depletion of large woody debris Accelerated streambank erosion
Decreased base flows	Crowding and increased competition for foraging sites Increased vulnerability to predation Increased fine sediment deposition
Increased sediment transport	Reduced survival of eggs and fry, loss of spawning habitat due to deposition Reduced macroinvertebrate reproduction from siltation of pools
Loss of pools and riffles	Shift in balance of species due to habitat change Loss of deep water cover and feeding areas
Changes in substrate composition	Reduced survival of eggs Loss of inter-gravel fry refugia Reduced aquatic insect production
Loss of large woody debris	Loss of cover from predators and high flows Reduced sediment and organic matter storage Reduced pool formation and organic substrate for macroinvertebrates
Creation of fish blockages	Loss of spawning habitat for adults Inability to reach over-wintering sites Loss of Summer rearing habitat Increased vulnerability to predation
Chemical Impacts	
Increase in temperature	Changes in migration patterns Increased metabolic activity, increased disease and parasite susceptibility Increased mortality of sensitive fish
Reduction in water quality	Reduced survival of eggs and fry Acute and chronic toxicity to juveniles and adult fish Loss of sensitive species Increased physiological stress
Increased turbidity	Reduced survival of eggs Reduced plant productivity Physiological stress on aquatic organisms
Algae blooms	Oxygen depletion due to algal blooms Increased eutrophication rate of standing waters

Source Center for Watershed Protection (CWP) 2003

The greatest conversion of forested land to impervious surface will occur within portions of the transitway alignment, especially in the operations and maintenance facility footprints. This increase in impervious surface is the most substantial and long-term change within the project area. Studies have shown a direct correlation between an increase in impervious cover and the decline in diversity of aquatic insects and freshwater fish (CWP 2003). These impacts are most apparent in the macroinvertebrate community. Macroinvertebrates are relatively immobile and are quickly affected by habitat impacts such as bank erosion, sedimentation, and channel instability. They are unable to move from unstable stream sections and seek refuge in more stable habitat during high flows. For this reason and also because they represent a large portion of the base of the stream food chain, declines or changes in macroinvertebrate abundance and diversity are often an early signal of watershed impacts.

The fish communities are more mobile than macroinvertebrates and can respond to short-term water quality or flow impacts through avoiding those sections of the stream and relocating. However, long-term changes in flow regimes and habitat from imperviousness could eventually alter the diversity of resident fish communities as clean and stable stream substrates for feeding and spawning are typically lost. Sensitive fish species within the study area such as brown trout and rainbow trout and state threatened species such as the comely shiner and pearl dace could be negatively affected by an increase in impervious cover.

d. Avoidance and Minimization and Mitigation

Total avoidance of impacts to fisheries cannot be avoided because of the large area of watershed affected by the project and the numerous stream systems that are perpendicular to the project corridor. However, long term adverse effects to fish populations can be minimized through the strict adherence to SHA erosion and sediment control procedures and MDE stormwater management regulations. Furthermore, installation of culvert bottoms or inverts below the base invert of the stream channel will help maintain a natural stream bottom, thereby reducing degradation of habitat and preventing barriers to fish passage.

Long-term impacts to water quality will be minimized to the extent possible through the use of an SHA and MTA approved stormwater management plan. Stormwater management will be in compliance with MDE requirements and will be designed to treat both quantity and quality of stormwater runoff prior to discharge into receiving waters. Mitigation, such as construction of fish passage structures or vegetating riparian buffers, will be explored during the design stage should one of the build alternatives be chosen.

F. RARE, THREATENED, AND ENDANGERED SPECIES

1. Methods

The U.S. Fish and Wildlife Service (USFWS) and the MDNR Wildlife and Heritage Division (WHD) were contacted in February 2006 to update the information presented in the 2002 NETR regarding the presence of rare, threatened, or endangered (RTE) species immediately adjacent to the project area or within one mile of the ETL corridor and transitway alignment. Response letters were received from MDNR in February and May of 2006 and the USFWS letter was received in September 2006 (**Appendix E**).

A species’ rank and status as an RTE within the state is based upon standard criteria that include the number of known distinct occurrences with consideration given to the total number of individuals at each locality, current level of protection, the types and degree of threats, ecological vulnerability, and population trends. The ranks can be used to assess the range-wide status of a species, as well as the status within portions of the species’ range. A species may be given state status if it is determined, based on the tracking efforts, that sufficient information exists to suggest that the species is in further decline. State ranked species without a status of endangered, threatened, or in need of conservation are not provided protection by MDNR-WHD.

Species with a status of endangered, threatened, or in need of conservation are afforded protection under the Nongame and Endangered Species Conservation Act. The status of species of concern within the project area as determined by MDNR and taken from COMAR 08.03.08 are discussed below:

- E - Endangered. A species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy.
- T - Threatened. A species of flora or fauna, which appears likely, within the foreseeable future, to become endangered in the State.
- I - In Need of Conservation. An animal species whose population is limited or declining in the State such that it may become threatened in the foreseeable future if current trends or conditions persist.

2. Results

There are no federally proposed or listed endangered or threatened species known to exist within the project impact areas. Therefore, no biological assessment or further Section 7 consultation is required with the USFWS.

The RTE species information relating to state listed species as discussed in the 2002 NETR was updated to include two newly listed state threatened species pearl dace and comely shiner. Both species were not mentioned in the MDNR response letter, but both specimens were caught during the fish sampling of Carroll Creek and Bennett Creek conducted in summer of 2006 by SHA. The MDNR-WHD list of RTE animals states that both species are state ranked as rare with a threatened status in MD (MDNR 2003). The fish sampling techniques used in each of these streams is described in detail in the Water Quality section of the document. These two records have since been reported to MDNR-WHD for comment and cataloging.

The comely shiner was caught in Bennett Creek approximately 5,000 feet downstream of the I-270/US 15 Highway, just north of Dixon Road. The habitat for the comely shiner is characterized as warm water, medium to large streams and rivers with a low to moderate gradient. The comely shiner is found in mostly slow runs and pools adjacent to moderately moving currents. This species has undergone a severe decline in its population, with almost 70% of its occurrences being considered historical and extirpated. The range of the comely shiner has been reduced due to degraded water quality conditions in the Piedmont drainages (Larney 2005).

The pearl dace was caught in Carroll Creek just downstream of US 15. The habitat for the pearl dace is characterized by cooler, spring-fed streams with clean riffles and pools. MBSS records indicate that the pearl dace is present in Rock Creek upstream of US 15 and in an unnamed tributary to the Monocacy River located south of the Monocacy River crossing of I-270. According to MBSS, there are approximately 500,000 pearl dace in Maryland streams draining to Antietam Creek, Marsh Run, and the Monocacy River in the upper Potomac River basin. Due to the limited range of this species and its vulnerability to stream degradation, this species is state ranked as rare (MDNR 2003).

The *Arabis shortii* (short's rockcress) status has been downgraded since the 2002 NETR was issued. The short's rockcress no longer has a state threatened status, but is ranked as an S3, which means that this species is on the watch list. Species that are on the watch list are rare to uncommon with the number of occurrences typically in the range of 21 to 100 in Maryland. It may have fewer occurrences but with a large number of individuals in some populations, and it may be susceptible to large-scale disturbances. Species with an S3 rank are not actively tracked by the MDNR-WHD.

The Germantown Bog is a Wetland of Special State Concern that lies over 1,000 feet east of the I-270/US 15 Corridor within an unnamed tributary to Little Seneca Creek. The listed species within the Germantown Bog include *Sanguisorba canadensis* (Canadian burnet), *Sphenopholis pensylvanica* (swamp-oats), and *Carex buxbaumii* (Buxbaum's sedge). A new RTE survey for the state listed threatened species known to occur within the Germantown Bog will be conducted in 2007, during the corresponding flowering periods for these species (May to October). Results of the survey will be included in the FEIS.

3. Impacts

The No-Build Alternative will have no effect on the RTE species within the I-270/US 15 Corridor.

Selection of a build alternative for the I-270/US 15 Corridor project has the potential to negatively affect the RTE fish species located within the study area. Impacts to the comely shiner and pearl dace would likely be similar to the impacts to other aquatic biota. As described above, these impacts can be characterized as direct and indirect. The primary direct impacts to the comely shiner and the pearl dace from the I-270 ETL would be mortality of fish during construction of stream crossings from heavy equipment, and loss of natural habitat from placement of culvert pipes and other in-stream structures. The comely shiner inhabits areas of flow separation between pools and riffles. Habitat changes resulting from manipulation of the channel through the placement of a new culvert or culvert extensions have the potential to modify habitat features within the stream. The collection site of the comely shiner within Bennett Creek, approximately 5,000 feet downstream of I-270, may lessen the likelihood of potential habitat shifts that may be detrimental to the comely shiner.

Indirect impacts important to these species are habitat modifications or temperature fluctuations that can occur now, or in the future, that are related to the direct impacts of the roadway on both the land and stream environment. The pearl dace inhabits streams with a spring-fed, cooler temperature regime making impacts associated with a change in temperature important. Increasing watershed imperviousness, unless mitigated, may adversely affect the pearl dace's thermal regime, primarily by decreasing groundwater recharge, decreasing baseflow, and increasing warm season temperatures of the stream with heated stormwater runoff. The impacts to the temperature regime of Carroll Creek will likely be very small due to the relatively large watershed size in relation to the culvert extension planned for the crossing.

4. Avoidance and Minimization and Mitigation

Avoidance, minimization, and mitigation of these impacts to the comely shiner and pearl dace can be accomplished using different methods. To help avoid impacts, all in-stream work for culverts and bridges will be carried out in compliance with MDE requirements related to state-mandated stream closure periods for the designated use class of the stream, which is administered by MDE. In-stream work is prohibited, for the protection of aquatic species, in Use I streams from March 1 through June 15, Use III streams from October 1 through April 30, and Use IV streams from March 1 through May 31. In response to potential impacts to RTE fish species on other projects, stream closure periods during construction activities have been extended. In Use III streams, such as Carroll Creek, the mandatory stream closure period may be extended to October 1 through April 30 or July 31. Other measures recommended by resource agencies to minimize impacts to these species include the use of BMPs for erosion control, on-site environmental inspectors to ensure erosion and sediment control compliance, and improvements to existing water quality and stream channel degradation in these watersheds through mitigation and environmental stewardship. Unavoidable direct impacts to stream channels would be mitigated in accordance with state and federal regulations through projects aimed at improving water quality.

Multi-Modal Corridor Study

Frederick and Montgomery Counties, Maryland

Appendix A

I-270 / US 15 Highway Corridor and Corridor Cities Transitway Plan Sheets

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- R/W 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- Hiker / Biker Path
- ▨ Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/di01row.dgn

SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET

0 0.1MILES

Shady Grove 1 2 3 4 5 6 7 Montgomery County Frederick County MD 75 MATCH LINE 8 9 10 11 12 Urbana Frederick 13 14 15 Biggs Ford Road MATCH LINE

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration
MTA Maryland

Date: 4 / 2007

Sheet No. 1 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration
MTA Maryland

Date: 4 / 2007

Sheet No. 2 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- - R/W - 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- Hiker / Biker Path
- Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/di03ETL.dgn

SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET

0 0.1MILES

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration

MTA Maryland

Date:	Sheet No.
4 / 2007	3 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

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LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- - R/W - 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- 🟧 Hiker / Biker Path
- ▨ Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/di04ETL.dgn

SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET

0 0.1MILES

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

PLAN SHEET KEYMAP

SHA State Highway Administration

MTA Maryland

Date:	Sheet No.
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I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

Date:	Sheet No.
4 / 2007	5 OF 15

SCALE
1"=200'

PARK AND RIDE FACILITY SUBJECT TO CHANGE; TO BE INTEGRATED WITH FUTURE LAND USE: AREA PROGRAMMED TO ACCOMMODATE 4 BUS BAYS AND 1,000 PARKING SPACES

COMSAT/LOCKHEED MARTIN
- INDUSTRIAL PARK; RESIDENTIAL MIXED USE
- 154.3 ACRES
- POTENTIAL FOR 4 MILLION SQ. FT. OFFICE

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- - R/W - 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- Hiker / Biker Path
- Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/di05ETL.dgn

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

LEGEND

	Historic District Boundary
	Park & Historic District
	Park Boundary
	100 Year Floodplain Boundary
	Sole Source Aquifer
W-#	Wetland Area (Surveyed)
	Streams (Surveyed)
	Streams (Non-Surveyed)
	Ephemeral Streams
	Forested Area Boundary
	Existing Right-of-Way
- R/W -	2006 ETL Proposed Right-of-Way
	Proposed Retaining Wall
🟨	Proposed General-Purpose Lanes (GPL)
🟩	Proposed Express Toll Lanes (ETL)
🟪	Separate Planning Study
	I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
	Hiker / Biker Path
	Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET

0 0.1MILES

Shady Grove
Montgomery County | Frederick County
Urbana
Frederick
Biggs Ford Road
MD 75
MATCH LINE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration
MTA Maryland

Date: 4 / 2007

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k:/projects/197-17/ETLv8/dgn/di06ETL.dgn

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

Date: 4 / 2007

Sheet No. 7 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

PROPOSED NORTHBOUND I-270 TO EASTBOUND MD 80 RAMP: SEPARATE DESIGN EFFORT

MASTER PLANNED TRANSITWAY - ALIGNMENT FOR REFERENCE ONLY.

LEGEND

Historic District Boundary	- R/W - 2006 ETL Proposed Right-of-Way
Park & Historic District	Proposed Retaining Wall
Park Boundary	🟨 Proposed General-Purpose Lanes (GPL)
100 Year Floodplain Boundary	🟩 Proposed Express Toll Lanes (ETL)
Sole Source Aquifer	🟪 Separate Planning Study
Wetland Area (Surveyed) W-#	I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
Streams (Surveyed)	Hiker / Biker Path
Streams (Non-Surveyed)	Master Plan Transitway
Ephemeral Streams	Potential Displacement:
Forested Area Boundary	B-# R-# Business and Residential
Existing Right-of-Way	

k:/projects/197-17/ETLv8/dgn/di08ETL.dgn

SCALE 1"=200'
0 100' 200' 300' 400' 500' FEET
0 0.1MILES

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

Date: 4 / 2007

Sheet No. 8 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
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LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- - R/W - 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- Hiker / Biker Path
- Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/di09ETL.dgn

SCALE 1"=200'
0 100' 200' 300' 400' 500' FEET
0 0.1MILES

Shady Grove 1 2 3 4 5 6 7 Montgomery County | Frederick County MD 75 MATCH LINE
8 9 10 Urbana 11 Frederick 12 13 14 Biggs Ford Road 15 MATCH LINE

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration
MTA Maryland

Date: 4 / 2007

Sheet No. 9 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- -R/W- 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- Hiker / Biker Path
- Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/di10ETL.dgn

SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET
0 0.1MILES

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration
MTA Maryland

Date: 4 / 2007

Sheet No. 10 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- - R/W - 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- Hiker / Biker Path
- Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/di11ETL.dgn

SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET

0 0.1MILES

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

Date: 4 / 2007

Sheet No. 11 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

PLAN SHEET KEYMAP

LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- - R/W - 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- Hiker / Biker Path
- Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET
0 0.1 MILES

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration
MTA Maryland

Date: 4 / 2007

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k:/projects/197-17/ETLv8/dgn/di12ETL.dgn

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- - R/W - 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- Hiker / Biker Path
- Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/di13ETL.dgn

SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET
0 0.1MILES

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

Date: 4 / 2007

Sheet No. 13 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

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I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration
MTA Maryland

Date:	Sheet No.
4 / 2007	14 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
- The Montgomery County & Frederick County digital aerial photography was flown in 2004. Mapping provided by SHA.

LEGEND

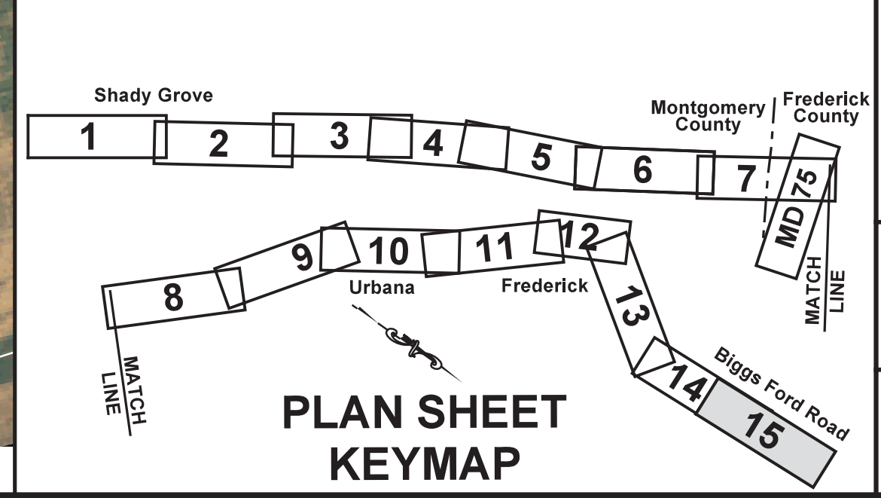
▨	Historic District Boundary
	Park & Historic District
	Park Boundary
	100 Year Floodplain Boundary
▨	Sole Source Aquifer
W-#	Wetland Area (Surveyed)
	Streams (Surveyed)
	Streams (Non-Surveyed)
	Ephemeral Streams
	Forested Area Boundary
	Existing Right-of-Way
-R/W-	2006 ETL Proposed Right-of-Way
	Proposed Retaining Wall
🟨	Proposed General-Purpose Lanes (GPL)
🟩	Proposed Express Toll Lanes (ETL)
🟪	Separate Planning Study
	I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
	Hiker / Biker Path
▨	Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/di15ETL.dgn

PLAN SHEET KEYMAP



SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET
0 0.1 MILES

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration
MTA Maryland

Date: 4 / 2007

Sheet No. 15 OF 15

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS. THEY ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

The aerial photography source:
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LEGEND

- Historic District Boundary
- Park & Historic District
- Park Boundary
- 100 Year Floodplain Boundary
- Sole Source Aquifer
- Wetland Area (Surveyed) W-#
- Streams (Surveyed)
- Streams (Non-Surveyed)
- Ephemeral Streams
- Forested Area Boundary
- Existing Right-of-Way
- -R/W- 2006 ETL Proposed Right-of-Way
- Proposed Retaining Wall
- 🟨 Proposed General-Purpose Lanes (GPL)
- 🟩 Proposed Express Toll Lanes (ETL)
- 🟪 Separate Planning Study
- I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
- Hiker / Biker Path
- ▨ Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

k:/projects/197-17/ETLv8/dgn/diMD75ETL.dgn

SCALE 1"=200'

0 100' 200' 300' 400' 500' FEET

0 0.1MILES

PLAN SHEET KEYMAP

Shady Grove 1 2 3 4 5 6 7 Montgomery County | Frederick County MD 75 MATCH LINE

8 9 10 11 12 13 14 15 Urbana Frederick Biggs Ford Road MATCH LINE

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

EXPRESS TOLL LANES ALTERNATIVES 6 A/B, 7 A/B

SHA State Highway Administration

MTA Maryland

Date: 4 / 2007

Sheet No. MD 75 1 of 1

LEGEND

▨	Historic District Boundary
	Park & Historic District
	Park Boundary
◆	100 Year Floodplain Boundary
▨	Sole Source Aquifer
W-#	Wetland Area (Surveyed)
•••	Streams (Surveyed)
	Streams (Non-Surveyed)
	Ephemeral Streams
	Forested Area Boundary
	Existing Right-of-Way
-R/W-	2006 ETL Proposed Right-of-Way
	Proposed Retaining Wall
🟨	Proposed General-Purpose Lanes (GPL)
🟩	Proposed Express Toll Lanes (ETL)
🟪	Separate Planning Study
	I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
🟥	Hiker / Biker Path
▨	Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

SCALE
0 100' 200' 300' 400' 500' FEET
0 0.1 MILES

TRAN 1
TRAN 2
TRAN 3
TRAN 4
TRAN 5
TRAN 6

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

ALTERNATIVES 6A/B AND 7A/B
CCT ALIGNMENT

SHA State Highway Administration
MTA Maryland

Date:	Sheet No.
May 2007	TRAN 1 OF 6

LEGEND

Historic District Boundary
Park & Historic District
Park Boundary
100 Year Floodplain Boundary
Sole Source Aquifer
Wetland Area (Surveyed) W-#
Streams (Surveyed)
Streams (Non-Surveyed)
Ephemeral Streams
Forested Area Boundary
Existing Right-of-Way
-R/W- 2006 ETL Proposed Right-of-Way
Proposed Retaining Wall
🟨 Proposed General-Purpose Lanes (GPL)
🟩 Proposed Express Toll Lanes (ETL)
🟪 Separate Planning Study
I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
🟥 Hiker / Biker Path
▨ Master Plan Transitway

Potential Displacement:

B-# R-# Business and Residential

PLAN SHEET KEYMAP

SCALE 0 100' 200' 300' 400' 500' FEET
0 0.1 MILES

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

ALTERNATIVES 6A/B AND 7A/B
CCT ALIGNMENT

Date:	Sheet No.
May 2007	TRAN 2 OF 6

LEGEND

Historic District Boundary	-R/W- 2006 ETL Proposed Right-of-Way
Park & Historic District	Proposed Retaining Wall
Park Boundary	🟨 Proposed General-Purpose Lanes (GPL)
100 Year Floodplain Boundary	🟩 Proposed Express Toll Lanes (ETL)
Sole Source Aquifer	🟪 Separate Planning Study
Wetland Area (Surveyed) W-#	I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
Streams (Surveyed)	🟥 Hiker / Biker Path
Streams (Non-Surveyed)	▨ Master Plan Transitway
Ephemeral Streams	Potential Displacement:
Forested Area Boundary	B-# R-# Business and Residential
Existing Right-of-Way	

SCALE 0 100' 200' 300' 400' 500' FEET
0 0.1 MILES

TRAN 1
TRAN 2
TRAN 3
TRAN 4
TRAN 5
TRAN 6

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

ALTERNATIVES 6A/B AND 7A/B
CCT ALIGNMENT

SHA State Highway Administration
MTA Maryland

Date:	Sheet No.
May 2007	TRAN 3 OF 6

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

ALTERNATIVES 6A/B AND 7A/B
CCT ALIGNMENT

SHA State Highway Administration
MTA Maryland

Date: May 2007

Sheet No. TRAN 4 OF 6

LEGEND

	Historic District Boundary	-R/W-	2006 ETL Proposed Right-of-Way
	Park & Historic District		Proposed Retaining Wall
	Park Boundary	🟨	Proposed General-Purpose Lanes (GPL)
	100 Year Floodplain Boundary	🟩	Proposed Express Toll Lanes (ETL)
	Sole Source Aquifer	🟪	Separate Planning Study
W-#	Wetland Area (Surveyed)		I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
	Streams (Surveyed)	🟥	Hiker / Biker Path
	Streams (Non-Surveyed)	▨	Master Plan Transitway
	Ephemeral Streams		Potential Displacement:
	Forested Area Boundary	B-# R-#	Business and Residential
	Existing Right-of-Way		

PLAN SHEET KEYMAP

TRAN 1
TRAN 2
TRAN 3
TRAN 4
TRAN 5
TRAN 6

SCALE 0 100' 200' 300' 400' 500' FEET
0 0.1 MILES

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

ALTERNATIVES 6A/B AND 7A/B
CCT ALIGNMENT

SHA State Highway Administration
MTA Maryland

Date: May 2007

Sheet No. TRAN 5 OF 6

LEGEND

Historic District Boundary
Park & Historic District
Park Boundary
100 Year Floodplain Boundary
Sole Source Aquifer
Wetland Area (Surveyed) W-#
Streams (Surveyed)
Streams (Non-Surveyed)
Ephemeral Streams
Forested Area Boundary
Existing Right-of-Way

-R/W- 2006 ETL Proposed Right-of-Way
Proposed Retaining Wall
🟨 Proposed General-Purpose Lanes (GPL)
🟩 Proposed Express Toll Lanes (ETL)
🟪 Separate Planning Study
I-270 Corridor Cities Transitway (Shady Grove to COMSAT)
🟥 Hiker / Biker Path
▨ Master Plan Transitway

Potential Displacement:
B-# R-# Business and Residential

SCALE
0 100' 200' 300' 400' 500' FEET
0 0.1 MILES

TRAN 1
TRAN 2
TRAN 3
TRAN 4
TRAN 5
TRAN 6

PLAN SHEET KEYMAP

I-270/ US 15 MULTI-MODAL CORRIDOR STUDY

ALTERNATIVES 6A/B AND 7A/B
CCT ALIGNMENT

Date: May 2007
Sheet No. TRAN 6 OF 6

Multi-Modal Corridor Study

Frederick and Montgomery Counties, Maryland

Appendix B

Wetland Summary Tables

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-1**	R2UB1	Perennial stream	N/A		N/A	N/A
W-2**	PEM1C/E	Saturated Inundated – 1” Drainage pattern Oxidized root channels	Soft Rush Meadow Fescue Smartweed sp. Red Maple Green Ash	*Juncus effusus* *Lolium pratense* *Polygonum sp.* *Acer rubrum* *Fraxinus pennsylvanica*	Melvin-Lindside silt loam	SS- 0.5 WQ- 0.8 WL- 0.2
	R4SB1	Intermittent stream	N/A		N/A	N/A
	R2UB1	Perennial stream	N/A		N/A	N/A
W-3**	R4SB2	Intermittent stream	N/A		N/A	N/A
	PEM1C	Inundated - <1” Saturated Drift lines Oxidized root channels	Broad-leaf Cattail Jewelweed	*Typha latifolia* *Impatiens capensis*	Adamstown silt loam	SS- 0.8 WQ- 0.7 WL- 0.3
W-4E**	R2UB1	Perennial stream	N/A		N/A	N/A
W-5**	R4SB1	Intermittent stream	N/A		N/A	N/A
W-6E	R3UB2	Perennial stream	N/A		N/A	N/A
	PEM1C	Saturated Inundated – 1-5” Drainage patterns	Broad-leaf Cattail Deertongue Witchgrass Nightshade	*Typha latifolia* *Dichanthelium clandestinum* *Solanum dulcamara*	Rohrersville-Lantz silt loam	SS- 0.9 WQ- 0.9 WL- 0.4
	Ephemeral channels		N/A		N/A	N/A
W-6W	R3UB1	Perennial stream	N/A		N/A	N/A
W-7E**	R2UB1	Perennial stream	N/A		N/A	N/A
W-7W**	R4SB3	Intermittent stream	N/A		N/A	N/A
	PEM1A/C	Saturated	Spike Rush Soft Rush	*Eleocharis* sp. *Juncus effusus*	Lindside silt loam	SS- 0.8 WQ- 0.9 WL- 0.1
	PEM1E	Drift lines Drainage patterns	Wool Grass Grass sp.	*Scirpus cyperinus* *Gramineae* sp.	Lindside silt loam	

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-9**	R2UB1	Perennial stream	N/A		N/A	N/A
	PFO1A/C	Drift lines Sediment deposits Drainage patterns	Red Maple Silver Maple Box Elder Spring Beauty Reed Canary Grass Virginia Bluebells	*Acer rubrum* *Acer saccharinum* *Acer negundo* *Claytonia virginica* *Phalaris arundinacea* *Mertensia virginica*	Lindside silt loam	SS- 0.9 WQ- 0.8 WL- 0.6 FS- 0.7 UH- 1.0
	PSS1A/C	Inundated – 8” Water marks Drainage patterns Saturated Water-stained leaves	Box Elder Moneywort	*Acer negundo* *Lysimachia nummularia*	Lindside silt loam	SS- 0.9 WQ- 0.8 WL- 0.6 FS- 0.7 UH- 1.0
W-11**	R4SB1	Intermittent stream	N/A		N/A	N/A
W-22**	PFO1C	Inundated –4” Saturated Water marks Drainage patterns	Silver Maple Poison Ivy Slippery Elm	*Acer saccharinum* *Toxicodendron radicans* *Ulmus rubra*	Glenville-Baile silt loams	SS- 0.6 WQ- 0.7 WL- 0.5 U/H- 1.0
W-12W**	R4SB1	Intermittent stream	N/A		N/A	N/A
W-13**	R3UB1	Perennial stream	N/A		N/A	N/A
	PEM1E	Saturated Inundated - 2” Drainage patterns	No vegetation present. Wetland designation assumes vegetation will		Mt. Airy channery loam	SS- 0.8 WQ- N/A WL- 0.1
W-14E	R4SB1	Intermittent stream	N/A		N/A	N/A
	Ephemeral channels		N/A		N/A	N/A
W-14W**	R4SB1	Intermittent stream	N/A		N/A	N/A
	PSS1E	Saturated Inundated - 1” Drainage patterns Oxidized root channels	Spicebush Multiflora Rose Jewelweed Manna Grass Sedge	*Lindera benzoin* *Rosa multiflora* *Impatiens capensis* *Glyceria striata* *Carex* sp.	Glenville-Baile silt loams	SS-0.7 WQ- 0.5 WL- 0.5

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-15E	R4SB1	Intermittent stream	N/A		N/A	N/A
	PEM1C/E	Inundated - 1” Saturated Oxidized root channels	Blue-joint Grass Sedge Soft Rush Jewelweed	*Calamagrostis canadensis* *Carex sp.* *Juncus effusus* *Impatiens capensis*	Glenville-Baile silt loam	SS- 0.8 WQ- 0.9 WL- 0.2
	Ephemeral channel		N/A		N/A	N/A
W-15W**	R4SB1	Intermittent stream	N/A		N/A	N/A
	PFO1C/E	Inundated - 0.5” Saturated Drainage patterns Oxidized root channels	Silver Maple Spicebush Panic Grass Sedge	*Acer saccharinum* *Lindera benzoin* *Dichanthelium clandestinum* *Carex sp.*	Glenville-Baile silt loam	SS- 0.8 WQ- 0.8 WL- 0.4
W-16**	PEM2B/E	Inundated - 1” Saturated Drainage patterns	Sedge Blue-joint Grass Spike Rush Soft Rush	*Carex* sp. *Calamagrostis canadensis* *Eleocharis obtusa* *Juncus effusus*	Mt. Airy channery loam	SS- 1.0 WQ- 0.7 WL- 0.3
W-17**	PEM1C/E	Inundated - 1” Saturated Drainage patterns	Soft Rush Broad-leaf Cattail Wool Grass Sensitive Fern	*Juncus effusus* *Typha latifolia* *Scirpus cyperinus* *Onoclea sensibilis*	Rohrersville-Lantz silt loams	SS- 0.5 WQ- N/A WL- 0.2
W-18E**	PSS2B/E	Drainage patterns Oxidized root channels	Red Maple Spicebush	*Acer rubrum* *Lindera benzoin*	Rohrersville-Lantz silt loam	SS- 0.8 WQ- 1.0 WL- 0.3
	R4SB3	Intermittent stream	N/A		N/A	N/A
W-18W	R3UB1	Intermittent stream	N/A		N/A	N/A
	R4SB3	Intermittent stream	N/A		N/A	N/A
	PEM2B/E	Inundated - 1” Saturated Water marks	Jewelweed Blue-joint Grass	*Impatiens capensis* *Calamagrostis canadensis*	Rohrersville-Lantz silt loam	SS- 0.7 WQ- 0.9 WL- 0.4
	PFO1E	Saturated	Silky Dogwood Sedge Grass Jewelweed	*Cornus amomum* *Carex* sp. *Gramineae* sp. *Impatiens capensis*	Rohrersville-Lantz silt loam	SS- 0.9 WQ- 1.0 WL- 0.6

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-19N	R2UB2	Perennial stream	N/A		N/A	N/A
	PSS1E	Inundated - 1” Saturated Drainage patterns	Spicebush Black Willow Blue-joint Grass	*Lindera benzoin* *Salix nigra* *Calamagrostis canadensis*	Rohrersville-Lantz silt loams	SS- 0.8 WQ- 0.8 WL- 0.5
W-20E**	PEM2B/E	Inundated - 1-4” Saturated Drainage patterns Water marks Drift lines	Jewelweed Blue-joint Grass	*Impatiens capensis* *Calamagrostis canadensis*	Rohrersville-Lantz silt loams	SS-0.7 WQ- 0.9 WL- 0.4
	PEM1C/E	Sediment deposits	Broad-leaf Cattail Sedge	*Typha latifolia* *Carex sp.*	Rohrersville-Lantz silt loams	SS-1.0 WQ- 1.0 WL- 1.0
	PFO1C/E	Inundated - 1-4” Saturated Water marks	Silver Maple Poison Ivy Stout Woodreed	*Acer saccharinum* *Toxicodendron radicans* *Cinna arundinacea*	Worsham silt loam	SS- 0.7 WQ- 0.7 WL- 0.5
W-20W**	R2UB1	Perennial stream	N/A		N/A	N/A
	R4SB2	Intermittent stream	N/A		N/A	N/A
	PSS1E	Inundated - 1-4” Saturated Drainage patterns Water marks Drift lines	Spicebush Sedge Jewelweed Blue-joint Grass	*Lindera benzoin* *Carex sp.* *Impatiens capensis* *Calamagrostis canadensis*	Rohrersville-Lantz silt loams	SS- 0.7 WQ- 0.9 WL- 0.5
W-21**	R4SB1	Intermittent stream	N/A		N/A	N/A
W-22E	R4SB1	Intermittent stream	N/A		N/A	N/A
	Ephemeral channels		N/A		N/A	N/A
W-22W	R3UB1	Perennial stream	N/A		N/A	N/A
	PSS1E	Inundated - 0.5” Saturated Drainage patterns	Spicebush False Nettle Fowl Manna Grass Jewelweed	*Lindera benzoin* *Boehmeria cylindrica* *Glyceria striata* *Impatiens capensis*	Rohrersville-Lantz silt loams	SS- 0.8 WQ- 0.9 WL- 0.7
	Ephemeral channel		N/A		N/A	N/A

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-23E	PEM1/2C	Water marks Drift lines Sediment deposits Oxidized root channels	Nepalese Browntop New England Aster Broad-leaf Cattail Jewelweed Soft Rush Deertongue Witchgrass	*Microstegium vimineum* *Aster novae-angliae* *Typha latifolia* *Impatiens capensis* *Juncus effusus* *Dichanthelium clandestinum*	Hatboro-Codorus silt loams	SS- O.8 WQ- 0.9 WL- 0.3
W-23W	PEM1B	Inundated – 1” Saturated Drainage patterns	Broad-leaf Cattail Jewelweed Fowl Manna Grass	*Typha latifolia* *Impatiens capensis* *Glyceria striata*	Hatboro-Codorus silt loam	SS- 0.8 WQ- 0.9 WL- 0.4
W-24	R2UB2/3	Perennial stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-24N	PEM2A	Drift lines Sediment deposits	Common Hop Asiatic Tearthumb Lady’s thumb Reed Canary Grass Jewelweed	*Humulus lupulus* *Polygonum perfoliatum* *Polygonum persicaria* *Phalaris arundinacea* *Impatiens capensis*	Hatboro silt loam	SS- 0.7 WQ- 0.9 WL- 0.1
W-25E**	R3UB1	Perennial stream	N/A	N/A	N/A	N/A
	PEM2C	Saturated Drainage patterns	Smartweed Jewelweed Arrow-leaf Tearthumb Deertongue Witchgrass	*Polygonum sp.* *Impatiens capensis* *Polygonum sagittatum* *Dichanthelium clandestinum*	Hatboro-Codorus silt loam	SS- 0.8 WQ- 0.9 WL- 0.2
W-25W**	R3UB1	Perennial stream	N/A		N/A	N/A
	PEM2E	Inundated – 1” Saturated	Rice Cutgrass Jewelweed Fowl Manna Grass Asiatic Tearthumb	*Leersia oryzoides* *Impatiens capensis* *Glyceria striata* *Polygonum perfoliatum*	Hatboro-Codorus silt loam	SS- 0.9 WQ- 0.9 WL- 0.4
W-26E**	R3UB1	Perennial stream	N/A		N/A	N/A
	PEM2B	Inundated- 2” Water marks Sediment deposits	Jewelweed Arrow-leaf Tearthumb Marsh Pepper	*Impatiens capensis* *Polygonum sagittatum* *Polygonum hydropiper*	Glenville-Baile silt loam	SS- 0.8 WQ- 0.9 WL- 0.4

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-26W**	R3UB1		N/A			
W-27E	R3UB1	Perennial stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-27W**	R3UB1	Perennial stream	N/A		N/A	N/A
	PEM2E	Inundated – 1-5”	Sensitive Fern	*Onoclea sensibilis*	Linganore-Hyattstown	SS- 0.7
		Saturated	Jewelweed	*Impatiens capensis*	channery silt loam	WQ- 0.8
		Drainage patterns	Goldenrod	*Solidago sp.*		WL- 0.4
	PSS1E	Inundated – 1-5”	Box Elder	*Acer negundo*		SS- 0.9
		Saturated	Spicebush	*Lindera benzoin*		WQ- 0.9
		Drainage patterns	Jewelweed	*Impatiens capensis*		WL- 0.1
			Fowl Manna Grass	*Glyceria striata*		
W-28	POW	Inundated - >1’				
	PEM2C/E	Saturated	Blunt Spikerush	*Eleocharis obtusa*	Mt. Airy channery loam	SS- 0.9
		Shallow Inundation	Water Purslane	*Ludwigia palustris*		WQ- N/A
			Soft Rush	*Juncus effusus*		WL- 0.2
			Canada Rush	*Juncus canadensis*		
			Green Bulrush	*Scirpus atrovirens*		
			Woolgrass	*Scirpus cyperinus*		
			Jewelweed	*Impatiens capensis*		
			Fowl Manna Grass	*Glyceria striata*		
	PSS1A	Saturated	Weeping Willow	*Salix babylonica*	Glenville-Baile silt loam	SS- 0.6
		Oxidized root channels	Meadow Fescue	*Lolium pratense*		WQ- 0.9
			False Nettle	*Boehmeria cylindrica*		WL- 0.2
W-29	PEM2B	Inundated -<1”	Rice Cutgrass	*Leersia oryzoides*	Mt. Airy channery loam	SS- 0.7
		Saturated	Jewelweed	*Impatiens capensis*		WQ- 0.8
		Drainage patterns	Shallow Sedge	*Carex lurida*		WL- 0.2
	R3UB1	Perennial stream	N/A		N/A	N/A

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-30	R3UB1	Perennial stream	N/A		N/A	N/A
	PFO1E	Inundated – <0.5” Saturated Drainage patterns Water marks	Red Maple Sycamore Spicebush Jewelweed Fowl Manna Grass	*Acer rubrum* *Platanus occidentalis* *Lindera benzoin* *Impatiens capensis* *Glyceria striata*	Glenville-Baile silt loams	SS- 0.8 WQ- 0.9 WL- 0.2
	Ephemeral channel		N/A		N/A	N/A
W-31**	R4SB1	Intermittent stream	N/A		N/A	N/A
	PSS1E	Inundated – 1” Saturated Water in pit – 16” Drainage patterns	Spicebush Redtop Grass Nepalese Browntop	*Lindera benzoin* *Agrostis alba* *Microstegium vimineum*	Blocktown channery silt loam	SS- 0.9 WQ- 0.9 WL- 0.3
W-32**	PEM2E	Saturated Oxidized root channels	Jewelweed Arrow-leaf Tearthumb Nepalese Browntop Tall Goldenrod Pointed broom sedge	*Impatiens capensis* *Polygonum sagittatum* *Microstegium vimineum* *Solidago gigantea* *Carex scoparia*	Blocktown channery silt loam	SS- 0.8 WQ- 0.9 WL- 0.2
W-34**	R3UB1	Perennial stream	N/A		N/A	N/A
W-A35	R3UB1	Perennial stream	N/A		N/A	N/A
W-B35	Ephemeral channel		N/A		N/A	N/A
W-C35	R3UB2	Perennial stream	N/A		N/A	N/A
W-D35	R3UB2	Perennial stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-E35**	R3UB2	Perennial stream	N/A		N/A	N/A
	PSS1E	Saturated Drainage patterns Oxidized root channels	Spicebush Sweet Pepperbush Elderberry Arrow-wood	*Lindera benzoin* *Clethra alnifolia* *Sambucus canadensis* *Viburnum dentatum*	Hatboro silt loam, Brinklow-Blocktown channery silt loam, Hyattstown channery silt loam, Baile silt loam	SS- 0.9 WQ- 0.8 WL- 0.2
	PEM1/2/C/E	Saturated Drainage patterns Oxidized root channels	Skunk Cabbage Jewelweed Fowl Manna Grass Sensitive Fern Poison Ivy	*Symplocarpus foetidus* *Impatiens capensis* *Glyceria striata* *Onoclea sensibilis* *Toxicodendron radicans*		SS- 0.8 WQ- 0.9 WL- 0.1

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-F35	PEM2C/E	Drift Lines	Jewelweed Soft rush Marsh pepper Rice cutgrass Frank's sedge	*Impatiens capensis* *Juncus effusus* *Polygonum hydropiper* *Leersia oryzoides* *Carex frankii*	Hyattstown channery silt loam	SS- 0.8 WQ- 0.9 WL- 0.1
	Ephemeral channel		N/A		N/A	N/A
W-G35	R3UB1	Perennial stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-H35**	PEM1/2C/E	Drainage patterns	Deer-tongue witchgrass Fowl manna grass Frank's sedge Soft rush Meadow fescue Cockle-bur	*Dichanthelium clandestinum* *Glyceria striata* *Carex frankii* *Juncus effusus* *Lolium pratense* *Xanthium sp.*	Brinklow-Blocktown channery silt loam	SS- 0.8 WQ- 0.9 WL- 0.1
W-36**	R3UB1	Perennial stream	N/A		N/A	N/A
	PSS1E	Inundated – 0.5" Saturated	Jewelweed Spicebush Fowl Manna Grass	*Impatiens capensis* *Lindera benzoin* *Glyceria striata*	Brinklow-Blocktown channery silt loam	SS- 0.8 WQ- 0.9 WL- 0.4
W-38	Ephemeral channel		N/A		N/A	N/A
	R4SB1/3	Inundated – 0.5"	N/A		N/A	N/A
W-39	PEM2E	Inundated – 0.5" Saturated	Soft Rush Blunt Spikerush Arrow-leaf Tearthumb Water Plantain Redtop Grass	*Juncus effusus* *Eleocharis obtusa* *Polygonum sagittatum* *Alisma subcordatum* *Agrostis alba*	Glenville silt loam	SS- 0.5 WQ- 1.0 WL- 0.2
W-41**	R4SB1	Intermittent stream	N/A		N/A	N/A
W-42**	R4SB1	Intermittent stream	N/A		N/A	N/A
W-43	R3UB1	Perennial stream	N/A		N/A	N/A
W-44	R3UB1	Perennial stream	N/A		N/A	N/A

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-45E	R4SB1	Intermittent stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
	PEM2E	Drainage patterns Oxidized root channels	Rice Cutgrass Smartweed	*Leersia oryzoides* *Polygonum sp.*	Hatboro silt loam	SS- 0.9 WQ- 0.9 WL- 0.1
W-45W**	R4SB1	Intermittent stream	N/A		N/A	N/A
	PFO1E	Drift lines Drainage patterns in wetland	Green Ash Spicebush Japanese Honeysuckle Garlic Mustard Poison Ivy	*Fraxinus pennsylvanica* *Lindera benzoin* *Lonicera japonica* *Alliaria officinalis* *Toxicodendron radicans*	Hatboro silt loam	SS- 0.8 WQ- 1.0 WL- 0.3
W-46E	R2UB1	Perennial stream	N/A		N/A	N/A
	PEM1/2E	Saturated Drainage patterns	Flattop Goldennrod Deertongue Witchgrass Soft Rush Redtop Grass	*Euthamia graminifolia* *Dichanthelium clandestinum* *Juncus effusus* *Agrostis alba*	Hatboro silt loam	SS- 0.9 WQ- 0.9 WL- 0.2
	R4SB1	Intermittent stream	N/A		N/A	N/A
	Ephemeral channels		N/A		N/A	N/A
	PSS1E	Saturated Drift lines Drainage patterns Depth to water in pit- 4"	Jewelweed Fowl Manna Grass Spicebush Green Ash Red Maple	*Impatiens capensis* *Glyceria striata* *Lindera benzoin* *Fraxinus pennsylvanica* *Acer rubrum*	Hatboro silt loam	SS- 0.9 WQ- 0.9 WL- 0.3
	PEM1/2B	Inundated- 0.5" Saturated Depth to water in pit- 0"	Broad-leaf Cattail Jewelweed Arrow-leaf Tearthumb Shallow Sedge Rice Cutgrass	*Typha latifolia* *Impatiens capensis* *Polygonum sagittatum* *Carex lurida* *Leersia oryzoides*	Habtboro silt loam	SS- 0.8 WQ- 0.7 WL- 0.6

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-A46E**	PEM1A	Inundated - <0.5”	Green Bulrush	*Scirpus atrovirens*	Hatboro silt loam	SS- 0.9
		Saturated	Soft Rush	*Juncus effusus*		WQ- N/A
						WL- 0.1
W-46W	R3UB1	Perennial stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-47E	PFO1E	Inundated -1”	Red Maple	*Acer rubrum*	Hatboro silt loam	SS-0.9
						WQ- 0.9
	PEM1/2E	Saturated	Soft Rush	*Juncus effusus*		WL- 0.2
			Deertongue Witchgrass	*Dichanthelium clandestinum*		
			Reed Canary Grass	*Phalaris arundinacea*		
	R3UB1	Perennial stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-47W	R3UB1	Perennial stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-48E	PEM1E	Inundated – 1-2”	Broad-Leaf Cattail	*Typha latifolia*	Baile silt loam	SS- 0.9
		Saturated	Sensitive Fern	*Onoclea sensibilis*		WQ- 1.0
		Sediment deposits	Soft Rush	*Juncus effusus*		WL- 0.2
			Arrow-leaf Tearthumb	*Polygonum sagittatum*		
W-48W	Ephemeral channel		N/A		N/A	N/A
	PEM2C/E	Saturated	Jewelweed	*Impatiens capensis*	Baile silt loam	SS- 0.7
		Drainage patterns	Arrow-leaf Tearthumb	*Polygonum sagittatum*		WQ- 0.8
		Depth to water in pit- 6"	Halberd-leaved Tearthumb	*Polygonum perfoliatum*		WL- 0.1
			Nepalese Browntop	*Microstegium vimineum*		
			Japanese Honeysuckle	*Lonicera japonica*		
			Lady's Thumb	*Polygonum persicaria*		
	R4SB1	Intermittent stream	N/A		N/A	N/A
	R3UB1	Perennial stream	N/A		N/A	N/A

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Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-49**	R3UB1	Perennial stream	N/A		N/A	N/A
	PFO1C/E	Inundated – 1-2” Saturated Drainage patterns	Red Maple Spicebush Duck Potato Jewelweed Sensitive Fern Fowl Manna Grass	*Acer rubrum* *Lindera benzoin* *Sagittaria latifolia* *Impatiens capensis* *Onoclea sensibilis* *Glyceria striata*	Hatboro silt loam	SS- 0.8 WQ- 1.0 WL- 0.6
	PSS1E	Inundated – 1-2” Saturated Drainage Patterns	Skunk Cabbage Elderberry Silky Dogwood Smooth Alder Water Plantain Arrow-leaf Tearthumb Water Pepper Soft Rush Rice Cutgrass Flattop Goldenrod Frank’s Sedge	*Symplocarpus foetidus* *Sambucus canadensis* *Cornus amomum* *Alnus serrulata* *Alisma subcordatum* *Polygonum sagittatum* *Polygonum hydropiper* *Juncus effusus* *Leersia oryzoides* *Euthamia graminifolia* *Carex frankii*	Hatboro silt loam	SS- 0.7 WQ- 0.8 WL- 0.6
W-50	R3UB1	Perennial stream	N/A		N/A	N/A
	PSS1B	Depth to water in pit – 7” Saturated Drainage patterns Water-stained leaves	Whitegrass Halberdleaved tearthumb Moneywort Spicebush Winterberry	*Leersia virginica* *Polygonum arifolium* *Lysimachia nummularia* *Lindera benzoin* *Ilex verticillata*	Hatboro silt loam	SS- 0.8 WQ- 0.9 WL- 0.5 U/H- 1.0
	Ephemeral channel		N/A		N/A	N/A
W-51**	R3UB1	Perennial stream	N/A		N/A	N/A
W-52E**	R2UB1	Perennial stream	N/A		N/A	N/A
	PEM1/2C/E	Saturated Sediment deposits Drainage patterns	Rice Cutgrass Arrow-leaf Tearthumb Soft Rush Shallow Sedge Jewelweed	*Leersia oryzoides* *Polygonum sagittatum* *Juncus effusus* *Carex lurida* *Impatiens capensis*	Hatboro silt loam	SS- 1.0 WQ- 1.0 WL- 0.7 U/H- 1.0
W-52W**	R2UB1	Perennial stream	N/A		N/A	N/A

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-53	PFO1C	Saturated	Yellow Poplar	*Liriodendron tulipifera*	Hatboro silt loam	SS- 0.7
		Sediment deposits	Red Maple	*Acer rubrum*		WQ- 0.8
			Spicebush	*Lindera benzoin*		WL- 0.5
			False Nettle	*Boehmeria cylindrica*		
			Lady's Thumb	*Polygonum persicaria*		
			Nepal Browntop	*Microstegium vimineum*		
			Skunk Cabbage	*Symplocarpus foetidus*		
	Ephemeral channel		N/A		N/A	N/A
W-54	Ephemeral channels		N/A		N/A	N/A
	R4SB1	Intermittent stream	N/A		N/A	N/A
W-55	PEM1/2C/E	Sediment deposits	Rice Cutgrass	*Leersia oryzoides*	Glenville silt loam	SS- 0.9
		Drainage patterns	Water Pepper	*Polygonum hydropiper*		WQ- 0.9
			Water Purslane	*Ludwigia palustris*		WL- 0.2
			Blunt Spikerush	*Eleocharis obtusa*		
			Straw-colored Sedge	*Cyperus strigosus*		
			Deertongue Witchgrass	*Dichanthelium clandestinum*		
W-56	PEM1E	Inundated – <1"	Fowl Manna Grass	*Glyceria striata*	Baile silt loam	SS- 0.9
		Saturated	Arrow-leaf Tearthumb	*Polygonum sagittatum*		WQ- 0.9
		Sediment deposits	Rice Cutgrass	*Leersia oryzoides*		WL- 0.2
		Drainage patterns	Broad-leaf Cattail	*Typha latifolia*		
		Oxidized root channels				
	R4SB1	Intermittent stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-57E**	PSS1E/F	Inundated - <1"	Arrow-wood	*Viburnum dentatum*	Hatboro silt loam	SS- 0.8
		Saturated	Elderberry	*Sambucus canadensis*		WQ- 0.9
			Fowl Manna Grass	*Glyceria striata*		WL- 0.5
			Rice Cutgrass	*Leersia oryzoides*		U/H- 1.0
			Marsh Pepper	*Polygonum hydropiper*		
			Jewelweed	*Impatiens capensis*		
			Sensitive Fern	*Onoclea sensibilis*		

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-57W**	R3UB1	Perennial stream	N/A		N/A	N/A
	PFO1A	Inundated – 6”	Red Maple	*Acer rubrum*	Hatboro silt loam	SS-0.8
		Drainage patterns	Sycamore	*Platanus occidentalis*		WQ- 0.9
		Sediment deposit	Black Willow	*Salix nigra*		WL- 0.5
			Ironwood	*Carpinus caroliniana*		
			Whitegrass	*Leersia virginica*		
			Jewelweed	*Impatiens capensis*		
			Water Purslane	*Ludwigia palustris*		
			False Nettle	*Boehmeria cylindrica*		
			Aster	*Aster* sp.		
			Goldenrod	*Solidago* sp.		
			Bugleweed	*Lycopus americanus*		
W-58E**	PFO1A	Dry during visit	Pin Oak	*Quercus palustris*	Baile silt loam	SS- 0.8
		Seasonal high water	Persimmon	*Diospyros virginiana*		WQ- 0.9
		table	Black Willow	*Salix nigra*		WL- 0.5
			Spicebush	*Lindera benzoin*		
			Elderberry	*Sambucus canadensis*		
			Multiflora Rose	*Rosa multiflora*		
			Blackberry	*Rubus allegheniensis*		
			Sensitive Fern	*Onoclea sensibilis*		
			Arrow-leaf Tearthumb	*Polygonum sagittatum*		
			White Avens	*Geum canadense*		
			False Nettle	*Boehmeria cylindrica*		
	PEM1/2E	Water marks	Broad-leaf Cattail	*Typha latifolia*	Glenville silt loam	SS- 0.8
		Drift lines	Water Purslane	*Ludwigia palustris*		WQ- 0.9
		Sediment deposits	Soft Rush	*Juncus effusus*		WL- 0.3
			Blunt Spikerush	*Eleocharis obtusa*		
			Blue Vervain	*Verbena hastada*		

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-58W**	PEM1B	Inundated – 3” Saturated Drainage patterns	Rice Cutgrass Broad-leaf Cattail Goldenrod Aster Tickseed Sunflower Water Purslane Arrow-leaf Tearthumb Jewelweed Black Willow Soft Rush	*Leersia oryzoides* *Typha latifolia* *Solidago* sp. *Aster* sp. *Bidens aristosa* *Ludwigia palustris* *Polygonum sagittatum* *Impatiens capensis* *Salix nigra* *Juncus effusus*	Baile silt loam	SS- 0.9 WQ- 0.8 WL- 0.2
W-59**	R4SB1	Intermittent stream	N/A		N/A	N/A
W-59E	Ephemeral channel		N/A		N/A	N/A
W-60E**	PFO1C/E	Inundated- 1-6" Saturated Drift lines Sediment deposits Drainage patterns	Tulip Poplar Green Ash Spicebush Arrow-wood Japanese honeysuckle Stout Woodreed	*Liriodendron tulipifera* *Fraxinus pennsylvanica* *Lindera benzoin* *Viburnum dentatum* *Lonicera japonica* *Cinna arundinacea*	Hatboro silt loam	SS- 0.8 WQ- 1.0 WL- 0.3
W-60W	R3UB1	Perennial stream	N/A		N/A	N/A
W-61E**	PSS1E	Saturated	Skunk Cabbage	*Symplocarpus foetidus*	Blocktown silt loam	SS- 0.8
		Drainage patterns Water-stained leaves	Spicebush	*Lindera benzoin*		WQ- 0.8 WL- 0.3
W-A61W**	R4SB1	Intermittent stream	N/A		N/A	N/A
W-B61W**	R2UB1	Perennial stream	N/A		N/A	N/A
W-62E**	R2UB1	Perennial stream	N/A		N/A	N/A
W-62W**	R2UB1	Perennial stream	N/A		N/A	N/A
W-62A**	PEM1A	Saturated Depth to water in pit – 12” Water-stained leaves	Arrow-leaf Tearthumb Barnyard Grass Rice Cutgrass Soft Rush	*Polygonum sagittatum* *Echinocloa crus-galli* *Leersia oryzoides* *Juncus effusus*	Hatboro silt loam	SS- 0.9 WQ- 0.9 WL- 0.2
	PFO1A	Drainage patterns	Green Ash Red Maple Winterberry Arrow-wood Stout Woodreed	*Fraxinus pennsylvanica* *Acer rubrum* *Ilex verticillata* *Viburnum dentatum* *Cinna arundinacea*	Hatboro silt loam	SS- 0.9 WQ- 1.0 WL- 0.5

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-62C**	PEM1A	Dried cracked mud	Skunk Cabbage	*Symplocarpus foetidus*	Hatboro silt loam	SS- 0.6
			Soft Rush	*Juncus effusus*		WQ- 0.8
			Whitegrass	*Leersia virginica*		WL- 0.3
	PFO1A	Drainage patterns	Green Ash	*Fraxinus pennslvanica*	Hatboro silt loam	SS- 0.8
		Dried cracked mud	Red Maple	*Acer rubrum*		WQ- 1.0
			Pin Oak	*Quercus palustris*		WL- 0.3
			Sycamore	*Platanus occidentalis*		
			Box Elder	*Acer negundo*		
			Garlic Mustard	*Alliaria petiolata*		
			False Nettle	*Boehmeria cylindrica*		
			Swamp Smartweed	*Polygonum hydropiperoides*		
W-A63W	R3UB1/2	Perennial stream	N/A		N/A	N/A
W-B63E	R3UB1	Perennial stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-B63W**	PFO1A/B/C/F	Inundated – 0-1”	Pin Oak	*Quercus palustris*	Hatboro silt loam	SS- 0.8
		Saturated	Black Willow	*Salix nigra*		WQ- 0.9
		Drift lines	Sycamore	*Platanus occidentalis*		WL- 0.5
		Sediment deposits	Black Gum	*Nyssa sylvatica*		
		Drainage patterns	Red Maple	*Acer rubrum*		
			Black Haw	*Viburnum prunifolium*		
			Spicebush	*Lindera benzoin*		
			Multiflora Rose	*Rosa multiflora*		
			False Nettle	*Boehmeria cylindrica*		
			Nepalese browntop	*Microstegium vimineum*		
			Stout Woodreed	*Cinna arundinacea*		
			Garlic Mustard	*Allaria officinales*		
			Skunk Cabbage	*Symplocarpus foetidus*		
			Tussock Sedge	*Carex crinita*		
	R3UB1/2	Perennial stream	N/A		N/A	N/A

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-C63E**	PEM1A	Inundated – 1-2” Saturated	Arrow-leaf Tearthumb Blue Vervain Straw-colored Sedge Soft Rush Jewelweed Black Willow Water Pepper	*Polygonum sagittatum* *Verbena hastata* *Cyperus strigosus* *Juncus effusus* *Impatiens capensis* *Salix nigra* *Polygonum hydropiper*	Baile silt loam	SS- 0.9 WQ- 0.9 WL- 0.4
W-64W**	PEM1/2F	Inundated – 4” Saturated Water marks Drainage patterns	Broad-leaf Cattail Black Willow Soft Rush Rice Cutgrass Redtop Grass Marsh Pepper	*Typha latifolia* *Salix nigra* *Juncus effusus* *Leersia oryzoides* *Agrostis alba* *Polygonum hydropiper*	Baile silt loam	SS- 0.9 WQ- N/A WL- 0.3
W-65**	R3UB1	Perennial stream	N/A		N/A	N/A
	R4SB2	Intermittent stream	N/A		N/A	N/A
	PSS1A	Inundated- 1"	Broad-leaf Cattail Black Willow Jewelweed Red Maple	*Typha latifolia* *Salix nigra* *Impatiens capensis* *Acer rubrum*	Baile slit loam	SS- 0.9 WQ- 0.9 WL- 0.6
W-66	R3UB1	Perennial stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-102**	R4SB1/2	Mixed alluvial	N/A		N/A	N/A
	R2UB1/2	Mixed alluvial	N/A		N/A	N/A
	PSS1C/E	Inundated – 1” Saturated Drainage patterns	Spicebush Winterberry Skunk Cabbage Whitegrass False Nettle Cinnamon Fern	*Lindera benzoin* *Ilex verticillata* *Symplocarpus foetidus* *Leersia virginica* *Boehmeria cylindrica* *Osmunda cinnamomea*	Blocktown channery w/ Baile inclusion	SS- 0.8 WQ- 0.8 WL- 0.5
	PEM1C/E	Water-stained leaves	Skunk Cabbage Christmas Fern Stout Woodreed	*Symplocarpus foetidus* *Polystichum acrostichoides* *Cinna arundinacea*	Blocktown channery w/ Baile inclusion	SS- 0.8 WQ- 0.9 WL- 0.3
	PSS1E	Drainage pattern Water-stained leaves	Winterberry Black Gum Skunk Cabbage Highbush Blueberry	*Ilex verticillata* *Nyssa sylvatica* *Symplocarpus foetidus* *Vaccinium corymbosum*	Blocktown channery w/ Baile inclusion	SS- 0.8 WQ- 0.9 WL- 0.3
	PFO1C/E	Inundated – 1” Saturated Drainage patterns Water-stained leaves	Sycamore Red maple Winterberry Spicebush Stout Woodreed	*Platanus occidentalis* *Acer rubrum* *Ilex verticillata* *Lindera benzoin* *Cinna arundinacea*	Gaila silt loam w/ Baile inclusion	SS- 0.8 WQ- 0.8 WL- 0.6
W-105**	R2UB1	Inundated – 1”-2’	N/A		N/A	N/A
W-157E	R2UB2	Perennial stream	N/A		N/A	N/A
W-157W	R2UB2	Perennial stream	N/A		N/A	N/A
W-158W	R4SBx	Intermittent stream	N/A		N/A	N/A
W-159W	Ephemeral channel		N/A		N/A	N/A
W-160W	Ephemeral channel		N/A		N/A	N/A
W-161W	Ephemeral channel		N/A		N/A	N/A
	PEM1A	Saturated Drainage patterns Sediment deposits	Marsh Pepper Lady's Thumb	*Polygonum hydropiper* *Polygonum persicaria*	Adamstown-Funkstown complex	SS- 0.3 WQ- 0.6 WL- 0.1

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-162E	PEM1/2C	Inundated- 2" Saturated	Blunt Spikerush Lady's Thumb Marsh Pepper Soft-Stem Bulrush Fox Sedge Marsh Seedbox	*Eleocharis obtusa* *Polygonum persicaria* *Polygonum hydropiper* *Scirpus validus* *Carex vulpinoidea* *Ludwigia palustris*	Udorthents	SS- 0.7 WQ- 0.7 WL- 0.4
W-163E	Ephemeral channel		N/A		N/A	N/A
W-163W	Ephemeral channel		N/A		N/A	N/A
W-164W	R4SB1/2	Intermittent stream	N/A		N/A	N/A
W-165W	PEM1E	Saturated	Shallow Sedge Soft Rush Rice Cutgrass True Water Cress Fox Sedge Redtop	*Carex lurida* *Juncus effusus* *Leersia oryzoides* *Nasturtium officinale* *Carex vulpinoidea* *Agrostis gigantea*	Codorus and Hatboro silt loam	SS- 0.9 WQ- 1.0 WL- 0.1
	R4SB1/2	Intermittent stream	N/A		N/A	N/A
	Ephemeral channel		N/A		N/A	N/A
W-166E	Ephemeral channel		N/A		N/A	N/A
W-166W	Ephemeral channel		N/A		N/A	N/A
W-167E	R2UB2 Tributary to Little Bennett Creek	Perennial stream	N/A		N/A	N/A
W-168E	R4SB2	Intermittent stream	N/A		N/A	N/A
W-169E	R4SB2	Intermittent stream	N/A		N/A	N/A
W-170W	R2UB1	Perennial stream	N/A		N/A	N/A
W-171W	PSS1C	Inundated- 0.2" Saturated Depth to water in pit- 12"	Rice Cutgrass Jewelweed Nepalese Browntop Arrow-leaf Tearthumb Shallow Sedge Spicebush	*Leersia oryzoides* *Impatiens capensis* *Microstegium vimineum* *Polygonum sagittatum* *Carex lurida* *Lindera benzoin*	Rohrersville-Lantz silt loam	SS- 0.9 WQ- 0.9 WL- 0.4
W-172E	POWx w/PEM fringe	Inundated to unknown depth Saturated	Broad-leaf Cattail Water Lily Species Sweet Flag	*Typha latifolia* *Nymphae* sp. *Acorus calamus*	Glenville-Baile silt loam	SS- 0.7 WQ- 0.5 WL- 0.3 FS- 0.6

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-173E	PEM1E	Saturated	Soft Rush Redtop Shallow Sedge	*Juncus effusus* *Agrostis gigantea* *Carex lurida*	Linganore-Hyattstown channery silt loam	SS- 0.8 WQ- 0.9 WL- 0.1
W-174E	PEM1E	Saturated Oxidized root channels	Sweet Flag Shallow Sedge Mint species	*Acorus calamus* *Carex lurida* *Mentha* sp.	Linganore-Hyattstown channery silt loam	SS- 0.6 WQ- 0.9 WL- 0.2
W-175E	Ephemeral channel		N/A		N/A	N/A
W-176E	Ephemeral channel		N/A		N/A	N/A
W-177W	Ephemeral channel		N/A		N/A	N/A
W-178E	Ephemeral channel		N/A		N/A	N/A
W-179W	Ephemeral channel		N/A		N/A	N/A
W-180W	PEM1C	Inundated - 1" Saturated Drainage patterns	Jewelweed Shallow Sedge Broad-leaf Cattail Arrow-leaf Tearthumb Marsh Seedbox	*Impatiens capensis* *Carex lurida* *Typha latifolia* *Polygonum sagittatum* *Ludwigia palustris*	Brinklow-Blocktown channery silt loam	SS- 0.8 WQ- 0.9 WL- 0.1
W-182E	Ephemeral channel		N/A		N/A	N/A
W-183E	Ephemeral channel		N/A		N/A	N/A
W-184W	Ephemeral channel		N/A		N/A	N/A
W-185W	PEM1E	Saturated	Reed Canary Grass Marsh Pepper Blunt Spikerush Soft Rush Wool-grass Shallow Sedge	*Phalaris arundinacea* *Polygonum hydropiper* *Eleocharis obtusa* *Juncus effusus* *Scirpus cyperinus* *Carex lurida*	Baile silt loam	SS- 0-.8 WQ- 0.9 WL- 0.5
W-186W	PEM1E	Saturated Depth to water in pit- 0"	Rice Cutgrass Soft Rush Shallow Sedge Hairy Jointgrass Deer-tongue witchgrass	*Leersia oryzoides* *Juncus effusus* *Carex lurida* *Arthraxon hispidus* *Dicanthelium clandestinum*	Baile silt loam	SS- 0-.8 WQ- 0.9 WL- 0.5
W-187W	Ephemeral channel		N/A		N/A	N/A
W-188W	Ephemeral channel		N/A		N/A	N/A
W-189W	Ephemeral channel		N/A		N/A	N/A
W-190W	Ephemeral channel		N/A		N/A	N/A
W-191W	Ephemeral channel		N/A		N/A	N/A

WETLANDS AND WATERS OF THE US WITHIN THE HIGHWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Vegetation		Soils	Wetland Function*
W-192W	PSS1C/E	Inundated- 1"	Spicebush	*Lindera benzoin*	Occoquan loam	SS- 0.8
		Saturated	Southern Arrow-wood	*Viburnum dentatum*		WQ- 0.9
			Poison Ivy	*Toxicodendron radicans*		WL- 0.4
			Fowl Manna Grass	*Glyceria striata*		
			Carex sp.	*Sedge sp.*		
	R3UB1	Perennial stream	N/A		N/A	N/A
	Ephmeral channel		N/A		N/A	N/A
W-193E	Ephemeral channel		N/A		N/A	N/A
W-194E	Ephemeral channel		N/A		N/A	N/A
W-195E	PEM1C/E	Drainage patterns	Jewelweed	*Impatiens capensis*	Glenville-Baile silt loam	SS- 0.8
				Glyceria striata		WQ- 1.0
			Carex sp.	*Sedge sp.*		WL- 0.2
			Lesser Clearweed	*Pilea fontana*		
W-196W	Ephemeral channel		N/A		N/A	N/A

* *The functional assessment score is a number from 0.0-1.0 which describes a wetland's relative capacity to perform a function, where 0.0 represents no functional capacity and 1.0 represents optimal functional capacity.*

SBEC -- Shoreline Bank Erosion Control
SS -- Sediment Stabilization
WQ -- Water Quality
UH -- Uniqueness/Heritage
FS -- Fish (Non-tidal Stream)

** *Wetlands/waterways previously flagged during the 1997 field reconnaissance whose limits were not extended nor has their classification changed as part of the ETL study.*

WETLANDS AND WATERS OF THE US WITHIN THE TRANSITWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Dominant Vegetation		Soils	Wetland Function*
W-101**	PEM1C/E	Inundated – 12”	Soft Rush	*Juncus effusus*	Hatboro silt loam	SS- 0.8
		Drainage Pattern	Meadow Fescue	*Lolium pratense*		WQ- 0.78
	R2UB1		N/A			WL- 0.1
W-102**	R4SB1/2	Mixed alluvial	N/A			
	R2UB1/2	Mixed alluvial	N/A			
	PSS1C/E	Inundated – 1”	Spicebush	*Lindera benzoin*	Blocktown channery	SS- 0.8
		Saturated	Winterberry	*Ilex verticillata*	w/ Baile inclusion	WQ- 0.8
		Drainage patterns	Skunk Cabbage	*Symplocarpus foetidus*		WL- 0.5
			Whitegrass	*Leersia virginica*		
			False Nettle	*Boehmeria cylindrica*		
			Cinnamon Fern	*Osmunda cinnamomea*		
	PEM1C/E	Water-stained leaves	Skunk Cabbage	*Symplocarpus foetidus*	Blocktown channery	SS- 0.8
			Christmas Fern	*Polystichum acrostichoides*	w/ Baile inclusion	WQ- 0.9
			Stout Woodreed	*Cinna arundinacea*		WL- 0.3
	PSS1E	Drainage pattern	Winterberry	*Ilex verticillata*	Blocktown channery	SS- 0.8
		Water-stained leaves	Black Gum	*Nyssa sylvatica*	w/ Baile inclusion	WQ- 0.9
			Skunk Cabbage	*Symplocarpus foetidus*		WL- 0.3
			Highbush Blueberry	*Vaccinium corymbosum*		
	PFO1C/E	Inundated – 1”	Sycamore	*Platanus occidentalis*	Gaila silt loam	SS- 0.8
		Saturated	Red maple	*Acer rubrum*	w/ Baile inclusion	WQ- 0.8
		Drainage patterns	Winterberry	*Ilex verticillata*		WL- 0.6
		Water-stained leaves	Spicebush	*Lindera benzoin*		
			Stout Woodreed	*Cinna arundinacea*		
W-103**	PSS1C	Inundated – <1”	Broadleaf Cattail	*Typha latifolia*	Wheaton-Urban	SS- 0.82
		Saturated	Soft rush	*Juncus effusus*	Land Complex	WQ- 0.92
		Drainage patterns	Rice cutgrass	*Leersia oryzoides*		WL- 0.56
		Oxidized root channels	Arrowleaved tearthumb	*Polygonum sagittatum*		
			False nettle	*Boehmeria cylindrica*		
			Shallow sedge	*Carex lurida*		
			Elderberry	*Sambucus canadensis*		
			Black willow	*Salix nigra*		
W-104**	R2UB1	Inundated – 1-6”	N/A	*Salix nigra*		
	PSS1A/C	Saturated	Black Willow	*Acer rubrum*	Hatboro	SS- 0.7
		Drainage patterns	Red Maple	*Leersia virginica*		WQ- 0.7
			White Grass			WL- 0.3
W-105**	R2UB1	Inundated – 1”-2’	N/A			
W-106**	R2UB1	Inundated –2- 4”	N/A			
W-107**	R2UB1	Inundated – 1-12”	N/A			

WETLANDS AND WATERS OF THE US WITHIN THE TRANSITWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Dominant Vegetation		Soils	Wetland Function*
W-108	PSS1C	Inundated – 1-4”	Black Willow	*Salix nigra*	Hatboro silt loam	SS- 0.8
		Saturated	Soft Rush	*Juncus effusus*		WQ- 0.8
		Drainage patterns	Wool Grass	*Scirpus cyperinus*		WL- 0.4
		Oxidized root channels	Fall Panic Grass	*Panicum dichotomiflorum*		
			Monkey Flower	*Mimulus ringens*		
			Seed Box	*Ludwigia alternifolia*		
			Deertongue Witchgrass	*Dichanthelium clandestinum*		
			Rice Cutgrass	*Leersia oryzoides*		
W-109**	R2UB1	Inundated –1-4”	N/A			
W-150**	R2UB2		N/A			
	PFO1A	Inundated- 1-3”	Black willow	*Salix nigra*	Urban land	SS- 0.8
		Sediment deposits	Red maple	*Acer rubrum*		WQ- 0.8
		Drainage patterns	Pin oak	*Quercus palustris*		WL- 0.4
		Oxidized root channels	Silky dogwood	*Cornus amomum*		
		Water-stained leaves	Southern arrowwood	*Viburnum dentatum*		
			Sedge	*Carex sp.*		
			Ground ivy	*Glecoma hederacea*		
			Jewelweed	*Impatiens capensis*		
W-151**	R2UB1		N/A			
	PEM1C/E	Drift lines	Goldenrod sp.	*Solidago sp.*	Baile silt loam	SS- 0.9
		Sediment deposits	Red Maple	*Acer rubrum*		WQ- 0.8
		Drainage patterns	Rice Cutgrass	*Leersia oryzoides*		WL- 0.3
		Oxidized root channels	Smartweed	*Polygonum sp.*		
		Stream 1-3” flow				
W-152**	R2UB1	Inundated – 0-4”	N/A			
	PFO1C/E	Saturated	Red Maple	*Acer rubrum*	Baile silt loam	SS- 0.7
		Sediment deposits	Pin Oak	*Quercus palustris*		WQ- 0.6
		Water-stained leaves	False Nettle	*Boehmeria cylindrica*		WL- 0.2
W-153	R2UB3		N/A			
	PFO1C/E	Saturated	Red Maple	*Acer rubrum*	Baile silt loam	SS- 0.6
		Drainage patterns	Spicebush	*Lindera benzoin*		WQ- 0.6
		Oxidized root channels	Buttonbush	*Cephalanthus occidentalis*		WL- 0.3
		Water marks	Pin Oak	*Quercus palustris*		
			Panic Grass	*Dichanthelium sp.*		
			Sedge	*Carex sp.*		
W-153	PEM1C/E	Drift lines	Panic Grass	*Dichanthelium sp.*	Baile silt loam	SS- 0.7
		Saturated	Rice Cutgrass	*Leersia oryzoides*		WQ- 0.7
		Oxidized root channels	Asiatic Tearthumb	*Polygonum perfoliatum*		WL- 0.3
		Sediment deposits	Sedge	*Carex sp.*		
		Drainage patterns	Soft Rush	*Juncus effusus*		
		Water marks	Jewelweed	*Impatiens capensis*		

WETLANDS AND WATERS OF THE US WITHIN THE TRANSITWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Dominant Vegetation		Soils	Wetland Function*
W-154**	R4SB1		N/A		Mixed alluvial	
	PSS1E	Saturated at 10”	Black willow	*Salix nigra*	Hatboro silt loam	SS- 0.9
		Drainage patterns	Broad leaved cattail	*Typha latifolia*		WQ- 0.8
			Soft rush	*Juncus effusus*		WL- 0.3
			Water purslane	*Ludwigia palustris*		
W-155**	R2UB1		N/A			
	PEM1F	Inundated – 1-3”	Black Willow	*Salix nigra*	Hatboro silt loam	SS- 0.9
		Drainage patterns	Rice Cutgrass	*Leersia oryzoides*		WQ- 0.9
		Drift lines	White Grass	*Leersia virginica*		WL- 0.2
	PSS1A	Saturated	Jewelweed	*Impatiens capensis*	Hatboro silt loam	SS- 0.7
			Soft Rush	*Juncus effusus*		WQ- 0.8
			Cattail	*Typha latifolia*		WL- 0.5
			Smooth Alder	*Alnus serrulata*		
			Black Willow	*Salix nigra*		
			Red Maple	*Acer rubrum*		
			Buttonbush	*Cephalanthus occidentalis*		
W-156**	R3UB1		N/A		Mixed alluvial	
	PEM1C	Inundated – 4”	Black Willow	*Salix nigra*	Hatboro silt loam	SS- 0.9
		Drainage patterns	White Grass	*Leersia virginica*		WQ- 1.0
			Soft Rush	*Juncus effusus*		WL- 0.3
			Rice Cutgrass	*Leersia oryzoides*		
			Sedge sp.	*Carex sp.*		
W-A61W	R4SB1	Inundated – 4”	N/A			
W-B61W	R2UB1		N/A			
W-61E	R2UB1		N/A			
	PSS1E	Saturated	Skunk Cabbage	*Symplocarpus foetidus*	Blocktown silt loam	SS- 0.8
		Drainage patterns	Spicebush	*Lindera benzoin*		WQ- 0.8
		Water-stained leaves				WL- 0.3
W-62A	PEM1A	Saturated	Common Reed	*Phragmites australis*	Hatboro silt loam	SS- 0.9
		Depth to water in pit –12”	Arrowleaved Tearthumb	*Polygonum sagittatum*		WQ- 0.9
		Water-stained leaves	Barnyard Grass	*Echinocloa muricata*		WL- 0.2
			Rice Cutgrass	*Leersia oryzoides*		
			Soft Rush	*Juncus effusus*		
	PFO1A		Green Ash	*Fraxinus pennsylvanica*	Hatboro silt loam	SS- 0.9
			Red Maple	*Acer rubrum*		WQ- 1.0
			Box Elder	*Acer negundo*		WL- 0.5
			Winterberry	*Ilex verticillata*		
			Arrowwood	*Viburnum dentatum*		
			Stout Woodreed	*Cinna arundinacea*		
			Whitegrass	*Leersia virginica*		
			Skunk Cabbage	*Symplocarpus foetidus*		

WETLANDS AND WATERS OF THE US WITHIN THE TRANSITWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Dominant Vegetation		Soils	Wetland Function*
W-62	R2UB1	Inundated – >6"	N/A		Mixed alluvial	
W197	R3UB1	Inundated – 3"	N/A		Baile silt loam	N/A
W198	Ephemeral Channel	N/A	N/A		Glenelg silt loam	N/A
W199	Ephemeral Channel	N/A	N/A		Wheaton-Urban land	N/A
W200	Ephemeral Channel	N/A	N/A		Wheaton-Urban land	N/A
W201	Ephemeral Channel	N/A	N/A		Wheaton-Urban land	N/A
W202	R4SB2	Inundated – 1"	N/A		Glenville silt loam	N/A
W203	PEM1E	Saturated Drainage patterns Sediment Deposits	Broad-leaf Cattail	*Typha latifolia*	Glenville silt loam	SS – 0.65 WQ – 0.32 W – 0.12
W204	Ephemeral Channel	N/A	N/A		Gaila silt loam	N/A
W205	Ephemeral Channel	N/A	N/A		Gaila silt loam	N/A
W206	Ephemeral Channel	N/A	N/A		Glenelg silt loam	N/A
W207	Ephemeral Channel	N/A	N/A		Glenelg silt loam	N/A
W208	Ephemeral Channel	N/A	N/A		Hatboro silt loam	N/A
W209	Ephemeral Channel	N/A	N/A		Hatboro silt loam	N/A
W210	Ephemeral Channel	N/A	N/A		Hatboro silt loam	N/A
W211	Ephemeral Channel	N/A	N/A		Brinklow-Blocktown	N/A
W215	PEM1E	Inundated Saturated Sediment Deposits Drainage Patterns	Broad-leaf Cattail Weeping Willow	*Typha latifolia* *Salix babylonica*	Hatboro silt loam	SS – 0.65 WQ – 0.32 W – 0.12
W216	PEM2A	Saturated Drainage Patterns	Green Ash Small-spike False-nettle Soft Rush	*Fraxinus pennsylvanica* *Boehmeria cylindrica* *Juncus effusus*	Hatboro silt loam	SS – 0.76 WQ – 0.74 W – 0.1
W217	PFO1A	Drainage patterns Water stained leaves	Red Maple Green Ash Northern Spicebush American Sycamore Northern arrow-wood	*Acer rubrum* *Fraxinus pennsylvanica* *Lindera benzoin* *Platanus occidentalis* *Viburnum recognitum*	Occoquan loam	
W222	Ephemeral Channel	N/A	N/A		Baile silt loam	N/A
W1	PUB1	Saturated Sediment Deposits Water Marks Drift Lines	N/A		Glenelg silt loam	N/A
WUS 1	R4SB1/3		N/A		N/A	N/A
WUS 2	R4SB3		N/A		N/A	N/A
WUS 3	R4SB2		N/A		N/A	N/A
WUS 4	R4SB1/2		N/A		N/A	N/A
W2	PEM1A	Saturated Drift Lines	Reed Canary Grass Stinging Nettle	*Phalaris arundinacea* *Urtica dioica*	Hatboro silt loam and Brinklow-	Wildlife Habitat

WETLANDS AND WATERS OF THE US WITHIN THE TRANSITWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Dominant Vegetation		Soils	Wetland Function*
	PFO1A	Sediment Deposits Water Marks Oxidized Root Channels Water-stained Leaves Drainage Patterns	Pale Touch-me-not Smartweed sp. Sedge sp. Skunk Cabbage Lady's Thumb Soft Rush Rice Cutgrass Tulip Poplar Red Maple American Sycamore Swamp White Oak Ironwood Spicebush	*Impatiens pallida* *Polygonum sp.* *Carex sp.* *Symplocarpus foetidus* *Polygonum persicaria* *Juncus effuses* *Leersia oryzoides* *Liriodendron tulipifera* *Acer rubrum* *Platanus occidentalis* *Quercus bicolor* *Carpinus caroliniana* *Lindera benzoin*	Blocktown channery silt loam	
W3	PEM1A	Saturated Drift Lines Sediment Deposits Water Marks Oxidized Root Channels Water-stained Leaves	Halberdleaf Tearthumb Fox Sedge Timothy Grass Curly Dock Reed Canary Grass Pale Touch-me-not Soft Rush Rice Cutgrass	*Polygonum arifolium* *Carex vulpinoidea* *Phleum pretense* *Rumex crispus* *Phalaris arundinacea* *Impatiens pallida* *Juncus effuses* *Leersia oryzoides*	Glenville silt loam, Brinklow-Blocktown channery silt loam, Codorus silt loam, and Hatboro silt loam	Sediment Stabilization, Water Quality
W4	PEM1A	Saturated Drift Lines Sediment Deposits Water Marks Oxidized Root Channels Water-stained Leaves	Wild Mint Broadleaf Cattail Halberdleaf Tearthumb Fox Sedge Timothy Grass Curly Dock Pale Touch-me-not Soft Rush Rice Cutgrass	*Mentha arvensis* *Typha latifolia* *Polygonum arifolium* *Carex vulpinoidea* *Phleum pretense* *Rumex crispus* *Impatiens pallida* *Juncus effuses* *Leersia oryzoides*	Glenville silt loam and Hatboro silt loam	Sediment Stabilization, Water Quality
WUS 9/	R2UB1		N/A		N/A	N/A
WUS 5	R4SB2		N/A		N/A	N/A
WUS 6	R2UB1		N/A		N/A	N/A
WUS 7	R4SB3		N/A		N/A	N/A
WUS 8	R4SB3		N/A		N/A	N/A

WETLANDS AND WATERS OF THE US WITHIN THE TRANSITWAY ALIGNMENT

Wetland Number	Cowardin Class	Hydrologic Indicators	Dominant Vegetation		Soils	Wetland Function*
RP7	R4SB3				Baile silt loam	Groundwater Discharge, Sediment/Toxicant Retention, Nutrient Removal, Wildlife Habitat
	PSS1A	Saturated	Red Maple	*Acer rubrum*		
			Black Willow	*Salix nigra*		
			Pin Oak	*Quercus palustris*		
			Bush Honeysuckle	*Lonicera tatarica*		
			American Sycamore	*Platanus occidentalis*		
			Multiflora Rose	*Rosa multiflora*		
			Japanese Honeysuckle	*Lonicera japonica*		
			Canada Goldenrod	*Solidago Canadensis*		
			Field Garlic	*Allium vineale*		
	PFO1B	Saturated Water-stained Leaves	Red Maple	*Acer rubrum*		
			Smooth Alder	*Alnus serrulata*		
			Virginia Creeper	*Parthenocissus quinquefolia*		
			Pale Touch-me-not	*Impatiens pallida*		
			Jewelweed	*Impatiens capensis*		
			Rice Cutgrass	*Leersia oryzoides*		
			Sensitive Fern	*Onoclea sensibilis*		

Notes:

* *The functional assessment score is a number from 0.0-1.0, which describes a wetland's relative capacity to perform a function, where 0.0 represents no functional capacity and 1.0 represents optimal functional capacity.*

SBEC -- Shoreline Bank Erosion Control
SS -- Sediment Stabilization
WQ -- Water Quality
UH -- Uniqueness/Heritage
FS -- Fish (Non-tidal Stream)

** *Wetlands/waterways previously flagged during the 1998 delineation whose limits were not extended nor has their classification changed as part of the current ETL study.*

Multi-Modal Corridor Study

Frederick and Montgomery Counties, Maryland

Appendix C

Wetland Delineation Data Sheets

Stream Features
Field Sheet

Date: 6/16/06 Project Site: I-270 Wetland # : 6W

Observer(s): BG, MR

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R2UB2

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 4' Depth 3' Avg. Water Depth 2"

Has stream morphometry been altered? yes Describe type and degree:

overwidened at culvert

Habitat and Pollutants:

Substrate (predominant type (s)): sand

Habitat Complexity (Characterize) low due to shallow flows

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: ____

Silt Deposition: moderate

Pollutants (observation / potential sources): road runoff

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: garlic mustard, black oak, white oak, sycamore, cherry

Approximate % shading by woody species: 98%

Steepness of adjacent slopes: 1-5%

Notes: ____

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	6/16/06
Applicant / Owner :	SHA	County :	Fredrick
Investigator :	BG, MR, JB	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PF01E
Is the area a potential Problem Area?	No	Transect ID :	
(If needed, explain below.)		Plot ID :	TP-18A

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Acer rubrum*	T	FAC	9		
2 *Rosa multiflora*	S	FACU	10		
3 *Lindera benzoin*	S	FACW	11		
4 *Carex lurida*	H	OBL	12		
5 *Cinna arundinacea*	H	FACW	13		
6 *Parthenocissus quinquef*	V	FACU	14		
7 *Onoclea sensibilis*	H	FACW	15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 71%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

√ No Recorded Data Available

Field Observations:

Depth of Surface Water 0 (in.)

Depth to Free Water in Pit: none (in.)

Depth to Saturated Soil 10 (in.)

Wetland Hydology Indicators:

Primary Indicators
- ___ Inundated
- √ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- √ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized root channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ Fac-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Drought year

Soils

Map unit name
(Series and Phase): Rohrersville-Lantz silt loams
Taxonomy (Subgroup): Fragiaquic Hapludalfs

Drainage class: Somewhat poorly drained
Field observations confirm map type?

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-2	A1	10YR4/2	10YR5/8	common/faint	Silt Loam
2-5	B1	2.5Y5/3	10YR5/8	many/distinct	Silt Loam
5-9	B2	5Y4/2	10YR4/6	many/prominent	Silt Loam
9-12+	B3	5Y5/1	10YR5/8 10YR6/8	many/prominent	Silty Clay Loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
√ Gleyed or Low-Chroma Soils
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 6/16/06 Project Site: I-270 Wetland # : W19W

Observer(s): BG, MR, JB

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R2VB2

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 4' Depth 4.5' Avg. Water Depth 5"

Has stream morphometry been altered? no Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): sand

Habitat Complexity (Characterize) low, due to low flows and clay facies

Bank Erosion: Severe ____ Moderate √ Minor ____

Describe: exposed bank

Silt Deposition: moderate

Pollutants (observation / potential sources): road runoff

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: willows, maple, tree-of-heaven, rose, VA creeper, jewel weed

Approximate % shading by woody species: 95%

Steepness of adjacent slopes: 1-2%

Notes:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	6/29/06
Applicant / Owner :	SHA	County :	Frederick
Investigator :	BG, BS, BC	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PFO1C
Is the area a potential Problem Area?	No	Transect ID :	W22W
(If needed, explain below.)		Plot ID :	TP-22.1W

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Lindera benzoin*	H	FACW-	9		
2 *Fraxinus pennsylvanica*	T	FACW	10		
3 *Impatiens capensis*	H	OBL	11		
4 *Polygonum perfoliatum*	H	FAC	12		
5 *Elmus sp.*	T		13		
6 *Glyceria striata*	H	OBL	14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-)
100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water 0.25 (in.)
Depth to Free Water in Pit: 0 (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydrology Indicators:
Primary Indicators
√ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
√ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
___ Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): Rohrersville-Lantz silt loam
Taxonomy (Subgroup): Fragiaquic Hapludalfs

Drainage class: Somewhat poorly drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-8		2.5Y3/2			Clay Loam
8-12+		2.5Y3/2	2.5Y3/3	few/faint	Clay Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions (Mg)
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? No
Hydric Soils Present? No

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 6/29/06 Project Site: I-270 ETL Wetland # : 22W

Observer(s): BG, BS

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R2UB2

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 3' Depth 1.5' Avg. Water Depth 3'

Has stream morphometry been altered? no Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): gravel

Habitat Complexity (Characterize) lower than upstream sections

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: ____

Silt Deposition: moderate

Pollutants (observation / potential sources): none

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: walnut, cherry, rose, spicebush

Approximate % shading by woody species: 40%

Steepness of adjacent slopes: 1-25%

Notes: ____

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	7/12/06
Applicant / Owner :	SHA	County :	Montgomery
Investigator :	DS, HL	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PEM2A
Is the area a potential Problem Area?	Yes	Transect ID :	W24N
(If needed, explain below.)		Plot ID :	TP-W24N

Explanation: site is on the alluvial floodplain of Bennett Creek; soils newly deposited and show no hydric indicators

Vegetation

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Humulus lupulus*	H	NI	9			
2	*Polygonum perfoliatum*	H	FAC+	10			
3	*Polygonum persicaria*	H	FACW	11			
4	*Phalaris arundinacea*	H	FACW+	12			
5	*Impatiens capensis*	H	FACW	13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-)

60%

Remarks: Visual estimation of dominance by aerial cover

Hydology

____ Recorded Data (Describe in Remarks)
  ____ Stream, Lake, or Tide Gauge
  ____ Aerial Photographs
  ____ Other
√ No Recorded Data Available

Field Observations:

Depth of Surface Water - (in.)

Depth to Free Water in Pit: - (in.)

Depth to Saturated Soil - (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ____ Inundated
- ____ Saturated in Upper 12 Inches
- ____ Water Marks
- √ Drift Lines
- √ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized root channels in Upper 12 Inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ Fac-Neutral Test
- Other (Explain in Remarks)

Remarks: no rain in prior 72 hours

Soils

Map unit name
(Series and Phase): Hatboro silt loam
Taxonomy (Subgroup): Typic Fluvaquents

Drainage class: Poorly drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-4		10YR3/4			Silt Loam
4-7		10YR4/3	10YR4/6	few/faint	Silt Loam
7+					Sand and Gravel

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
√ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
√ Gleyed or Low-Chroma Soils

___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks: TF10 Alluvial Depleted Matrix-doesn’t technically meet this test criterion on depth of layer, however, area is obviously frequently flooded.

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? No

Is this Sampling Point Within a Wetland? Yes

Remarks: While soils don't technically meet hydric soil criteria, the hydrologic indicators and vegetation suggest frequent flooding. Site is a problem floodplain situation.

Stream Features
Field Sheet

Date: 6/29/06 Project Site: I-270 ETL Wetland # : 24W

Observer(s): BG, BS

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R2UB2

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 50' Depth 6' Avg. Water Depth 1'

Has stream morphometry been altered? yes Describe type and degree:

channelized near culvert

Habitat and Pollutants:

Substrate (predominant type (s)): sand

Habitat Complexity (Characterize) moderate - deep pools, riffle/pool sequence

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: ____

Silt Deposition: heavy

Pollutants (observation / potential sources): sediment, road runoff

Stormwater Outfalls: none

Riparian Zone:

Development: none, powerline ROW on left bank

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: sycamore, box elder, rose, golden rod

Approximate % shading by woody species: 40%

Steepness of adjacent slopes: 1-5%

Notes: historic rain event occurred prior to field visit

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	7/10/06
Applicant / Owner :	SHA	County :	Fredrick
Investigator :	DS, BC, EG	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PSS1A
Is the area a potential Problem Area?	No	Transect ID :	W28
(If needed, explain below.)		Plot ID :	TP-W28

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Salix babylonica*	S	FACW-	9		
2 *Lolium pratense*	H	FACU	10		
3 *Boehmeria cylindrica*	H	FACW+	11		
4			12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 67%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water - (in.)
Depth to Free Water in Pit: - (in.)
Depth to Saturated Soil - (in.)

Wetland Hydology Indicators:
Primary Indicators
___ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
√ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
Other (Explain in Remarks)

Remarks: no rain in 72 hours

Soils

Map unit name
(Series and Phase): Glenville-Baile silt loam
Taxonomy (Subgroup): Aquic Fragiudults

Drainage class: moderately well drained
Field observations confirm map type?
No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-1		10YR3/2			Silt Loam w/coarse frag
1-8		10YR4/2	7.5YR3/4	common/distinct	Silt Loam
8-12+		10YR4/4	10YR5/8	few/faint	Clay Loam w/coarse frag

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks: very small alluvial area (<400ft^2) adjacent to channel at pond

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site : I-270 ETL
Date : 7/13/06
Applicant / Owner : SHA
County : Montgomery
Investigator : DS, BS, CA
State : MD
Do Normal Circumstances exist on the site? Yes
Is the site significantly disturbed? (Atypical Situation)? No
Community ID : PSS1E
Is the area a potential Problem Area? No
Transect ID : W46E
(If needed, explain below.)
Plot ID : TP-W46E2

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Impatiens capensis*	H	FACW	9		
2 *Lindera benzoin*	S	FACW-	10		
3 *Fraxinus pennsylvanica*	S	FACW	11		
4 *Acer rubrum*	T	FAC	12		
5 *Glyceria striata*	H	OBL	13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

____ Recorded Data (Describe in Remarks)
 ____ Stream, Lake, or Tide Gauge
 ____ Aerial Photographs
 ____ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water - (in.)
Depth to Free Water in Pit: 4 (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydrology Indicators:
Primary Indicators
____ Inundated
√ Saturated in Upper 12 Inches
____ Water Marks
√ Drift Lines
____ Sediment Deposits
√ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
____ Oxidized root channels in Upper 12 Inches
____ Water-Stained Leaves
____ Local Soil Survey Data
____ Fac-Neutral Test
Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): Hatboro silt loam
Taxonomy (Subgroup): Typic Fluvaquents

Drainage class: Poorly drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-12		10YR3/1			Sand & Gravel w/organics

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- √ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 7/13/06 Project Site: I-270 Wetland # : W-46E

Observer(s): DS, BS

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R4SB1

Approximate Drainage Basin: <10 acres

Morphology:

Avg. Channel Width 7' Depth 2.5' Avg. Water Depth 0.5"

Has stream morphometry been altered? No Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): gravel

Habitat Complexity (Characterize) shallow pools, riffles, runs, low in-stream woody debris

Bank Erosion: Severe ____ Moderate √ Minor ____

Describe: some undercutting on bank at bends, downcutting

Silt Deposition: minor

Pollutants (observation / potential sources): road runoff from I-270

Stormwater Outfalls: none

Riparian Zone:

Development: some clearing for utility easement

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: maple, poplar, oaks, spicebush, skunk cabbage

Approximate % shading by woody species: 75%

Steepness of adjacent slopes: 15-20%

Notes:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	7/13/06
Applicant / Owner :	SHA	County :	Montgomery
Investigator :	DS, BS, CA	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PEM1/2B
Is the area a potential Problem Area?	No	Transect ID :	W46E
(If needed, explain below.)		Plot ID :	TP-W46E

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Typha latifolia*	H	OBL	9		
2 *Impatiens capensis*	H	FACW	10		
3 *Polygonum sagittatum*	H	OBL	11		
4 *Carex lurida*	H	OBL	12		
5 *Leersia oryzoides*	H	OBL	13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-)
100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)	Wetland Hydology Indicators:
___ Stream, Lake, or Tide Gauge	Primary Indicators
___ Aerial Photographs	√ Inundated
___ Other	√ Saturated in Upper 12 Inches
√ No Recorded Data Available	___ Water Marks
	___ Drift Lines
Field Observations:	___ Sediment Deposits
Depth of Surface Water <0.5 (in.)	___ Drainage Patterns in Wetlands
	Secondary Indicators (2 or more required):
Depth to Free Water in Pit: 0 (in.)	___ Oxidized root channels in Upper 12 Inches
	___ Water-Stained Leaves
	___ Local Soil Survey Data
Depth to Saturated Soil 0 (in.)	___ Fac-Neutral Test
	___ Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): Hatboro silt loam
Taxonomy (Subgroup): Typic Fluvaquents

Drainage class Poorly drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-15		10YR3/1			Silt Loam w/organics
15+					Gravel

Hydric Soil Indicators:

- ____ Histosol
- ____ Histic Epipedon
- √ Sulfidic Odor
- ____ Aquic Moisture Regime
- ____ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ____ Concretions
- ____ High Organic Content in Surface Layer in Sandy Soils
- ____ Organic Streaking in Sandy Soils
- ____ Listed on Local Hydric Soils List
- ____ Listed on National Hydric Soils List
- ____ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 6/20/06 Project Site: I-270 Wetland # : W-46W

Observer(s): DS, HL

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R3UB1

Approximate Drainage Basin: >150 acres

Morphology:

Avg. Channel Width 12' Depth 2' Avg. Water Depth 2"

Has stream morphometry been altered? No Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): gravel

Habitat Complexity (Characterize) A few deeper pools on channel bends, mostly shallow runs/riffles

Bank Erosion: Severe ____ Moderate √ Minor √

Describe: Undercut banks on bends, exposed tree rooots

Silt Deposition: minor

Pollutants (observation / potential sources): Receives runoff from Whelan Lane

Stormwater Outfalls: None

Riparian Zone:

Development: None

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: Poplar, maples, oaks, spicebush

Approximate % shading by woody species: 85%

Steepness of adjacent slopes: 10-15%

Notes:

Stream Features
Field Sheet

Date: 7/13/06 Project Site: I-270 ETL Wetland # : 47W

Observer(s): DS, HL

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: 2% Classification: R3UB1

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 10' Depth 2.5' Avg. Water Depth 2"

Has stream morphometry been altered? no Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): gravel

Habitat Complexity (Characterize) low- shallow pools on bends

Bank Erosion: Severe ____ Moderate √ Minor ____

Describe: entrenched

Silt Deposition: minor

Pollutants (observation / potential sources): road runoff

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: tulip poplar, red maple, green ash

Approximate % shading by woody species: 90%

Steepness of adjacent slopes: 15-25%

Notes:

Stream Features
Field Sheet

Date: 6/20/06 Project Site: I-270 Wetland # : W-48W

Observer(s): BG, BS

Stream Flow:

Perennial: ______ Intermittent √ Ephemeral ______

Gradient: ______ Classification: R4SB1

Approximate Drainage Basin: ______

Morphology:

Avg. Channel Width 3' Depth 1' Avg. Water Depth 0.5"

Has stream morphometry been altered? no Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): gravel

Habitat Complexity (Characterize) shallow runs predominate

Bank Erosion: Severe ______ Moderate √ Minor ______

Describe: some entrenchment occurring

Silt Deposition: minor

Pollutants (observation / potential sources): None observed

Stormwater Outfalls: None observed

Riparian Zone:

Development: None

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: maple, ash, poplar, sycamore, spicebush

Approximate % shading by woody species: 65%

Steepness of adjacent slopes: 10%

Notes:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	7/20/06
Applicant / Owner :	SHA	County :	Montgomery
Investigator :	DS, HL	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PEM2C/E
Is the area a potential Problem Area?	No	Transect ID :	48W
(If needed, explain below.)		Plot ID :	TP-W48W

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Impatiens capensis*	H	FACW	9		
2 *Polygonum sagittatum*	H	OBL	10		
3 *Polygonum perfoliatum*	H	FAC+	11		
4 *Microstegium vimineum*	H	FAC	12		
5 *Polygonum persicaria*	H	FACW	13		
6 *Lonicera japonica*	V	FAC-	14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-)

67%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

√ No Recorded Data Available

Field Observations:

Depth of Surface Water 0 (in.)

Depth to Free Water in Pit: 6 (in.)

Depth to Saturated Soil 5 (in.)

Wetland Hydology Indicators:

Primary Indicators
- ___ Inundated
- √ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- √ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized root channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ Fac-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: small bowl shaped depressional area

Soils

Map unit name
(Series and Phase): Baile Silt Loam
Taxonomy (Subgroup): Typic Ochraquults
Drainage class Poorly drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-4	A1	10YR4/2	7.5YR3/4	common/distinct	Silt Loam
4+		10YR4/3	7.5YR3/4	common/distinct	Silt Loam w/gravel

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions (Mg)
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: water below 4"

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 7/27/06 Project Site: I-270 Wetland # : 56

Observer(s): DS, JB

Stream Flow:

Perennial: ____ Intermittent √ Ephemeral ____

Gradient: 1-2% Classification: R4SB1

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 2' Depth 0.5' Avg. Water Depth <0.5"

Has stream morphometry been altered? yes Describe type and degree:

channel has created from seepage resulting along toe of slope

Habitat and Pollutants:

Substrate (predominant type (s)): gravel

Habitat Complexity (Characterize) none

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: slumping banks in few areas

Silt Deposition: minor

Pollutants (observation / potential sources): road runoff

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: virginia pine, green ash, bush honeysuckle

Approximate % shading by woody species: 90%

Steepness of adjacent slopes: >25%

Notes:

Stream Features
Field Sheet

Date: 1/23/07 Project Site: I-270 Wetland # : A60W

Observer(s): DRS, CAK, HS

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: 3-5% Classification: R3UB1

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 9' Depth 3.5' Avg. Water Depth 3"

Has stream morphometry been altered? no Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): Gravel

Habitat Complexity (Characterize) moderate with riffle/pool complexes and very few runs

No fish observed

Bank Erosion: Severe ____ Moderate √ Minor ____

Describe: channel is downcutting and widening with undercut banks

Silt Deposition: moderate

Pollutants (observation / potential sources): some garbage; recieves runoff from parking lots.

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: tulip poplar, red maple, spicebush, multiflora rose, Japanese honeysuckle, green ash, blackberry, field garlic

Approximate % shading by woody species: 75%

Steepness of adjacent slopes: >25%

Notes: connects to wus60w at middlebrook road

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site : I-270 ETL
Applicant / Owner : SHA
Investigator : DRS, CAK, HS
Date : 1/23/07
County : MO
State : MD

Do Normal Circumstances exist on the site? Yes
Is the site significantly disturbed? (Atypical Situation)? No
Is the area a potential Problem Area? No
(If needed, explain below.)

Community ID : PFO1E
Transect ID : WB60W
Plot ID : TP-B60W

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Lindera benzoin*	H	FACW-	9		
2 *Acer rubrum*	T	FAC	10		
3 *Rosa multiflora*	S	FACU	11		
4 *Boehmeria cylindrica*	H	FACW+	12		
5 *Scirpus sp.*	H		13		
6 *Cinna arundinaceae*	H	FACW	14		
7 *Juncus effusus*	H	FACW+	15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

√ No Recorded Data Available

Field Observations:
- Depth of Surface Water 0.5 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil 0 (in.)

Wetland Hydology Indicators:

Primary Indicators
- √ Inundated
- √ Saturated in Upper 12 Inches
- √ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- √ Oxidized root channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ Fac-Neutral Test
- Other (Explain in Remarks)

Remarks: Runoff from parkinjg lot and outfall from SWM pond

Soils

Map unit name
(Series and Phase): Bail silt loam 0-3% slopes
Drainage class: Poorly drained
Taxonomy (Subgroup): Typic endoaquults
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-3		10YR4/2	7.5YR3/4	few/distinct	Silt Loam w/organics
3-12		2.5Y4/2	7.5YR4/6	few/prominent	Silty Clay Loam w/organics

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
√ Gleyed or Low-Chroma Soils
___ Concretions (Mg)
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks: small floodplain wetland, adjacent to incised stream, no surface connections

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? No
Hydric Soils Present? No
Is this Sampling Point Within a Wetland? Yes

Remarks:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	1/23/07
Applicant / Owner :	SHA	County :	MO
Investigator :	DRS, CAK, HS	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PFO1E
Is the area a potential Problem Area?	No	Transect ID :	
(If needed, explain below.)		Plot ID :	WF60W

Explanation:

Vegetation

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Lindera benzoin*	H	FACW-	9			
2	*Acer rubrum*	T	FAC	10			
3	*Fraxinus pennsylvanica*	S	FACW	11			
4	*microstegium vimineum*	H	FAC	12			
5	*Smilax rotundifolia*	H	FAC	13			
6	*symplocarpus foetidus*	H	OBL	14			
7	*Fraxinus pennsylvanica*	T	FACW	15			
8				16			

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-)
100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water <0.5* (in.)
Depth to Free Water in Pit: 0 (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydrology Indicators:
Primary Indicators
√ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
√ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
Other (Explain in Remarks)

Remarks: *10% of wetland. Seasonal seep on gentle slope adjacent to stream

Soils

Map unit name
(Series and Phase): Hatboro silt loam 0-3% slopes
Taxonomy (Subgroup): Fluvaquentic Endoaquepts
Drainage class: Poorly drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-1	A	2.5Y3/1			Silt Loam w/organics
1-7		2.5Y4/2	7.5YR3/4	common/prominent	Silt Loam w/organics
-	-		7.5YR4/6	common/prominent	
7-12		2.5Y4/3	7.5YR3/4	common/prominent	Silty Clay

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions (Mg)
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 1/23/07 Project Site: I-270 Wetland # : A60W

Observer(s): DRS, CAK, HS

Stream Flow:

Perennial: ____ Intermittent √ Ephemeral ____

Gradient: 2-3% Classification: R4SB1

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 4' Depth 1.5' Avg. Water Depth 1"

Has stream morphometry been altered? no Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): Gravel

Habitat Complexity (Characterize) low shallow runs only

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: some bank slumping

Silt Deposition: minor

Pollutants (observation / potential sources): none

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: tulip poplar, red maple, spicebush, multiflora rose, Japanese honeysuckle

Approximate % shading by woody species: 80%

Steepness of adjacent slopes: >10%

Notes: short side channel

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 CCT	Date :	1/23/07
Applicant / Owner :	SHA	County :	Montgomery
Investigator :	DRS, HS, CK	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PFO1C
Is the area a potential Problem Area?	No	Transect ID :	W154
(If needed, explain below.)		Plot ID :	TP-154

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Salix nigra*	T	FACW+	9		
2 *Cornus amomum*	S	FACW	10		
3 *Impatiens capensis*	H	FACW	11		
4 *Eupatorium perfoliatum*	H	FACW	12		
5 *Lonicera japonica*	H	FAC-	13		
6 Grass *sp.*	H		14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 80%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water 1 (in.)
Depth to Free Water in Pit: 0 (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydology Indicators:
Primary Indicators
√ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
√ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
Other (Explain in Remarks)

Remarks: This wetland is located in a low area that it surrounded by gabion and adjacent to a culvert. An ephemeral channel flows into the wetland.

Soils

Map unit name
(Series and Phase): ____
Taxonomy (Subgroup): ____

Drainage class ____
Field observations confirm map type?

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-8		2.5Y3/2	7.5YR3/4	few/prominent	fine scl w/lots of rootlets
8-12		2.5Y4/2			fine scl w/lots of rootlets

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 6/5/06 Project Site: I-270 Wetland # : 157

Observer(s): BG, BS

Stream Flow:

Perennial: √ Intermittent ______ Ephemeral ______

Gradient: ______ Classification: R2UB2

Approximate Drainage Basin: ______

Morphology:

Avg. Channel Width 3.5' Depth 3' Avg. Water Depth 3"

Has stream morphometry been altered? yes Describe type and degree:

over-widened at culvert

Habitat and Pollutants:

Substrate (predominant type (s)): sand

Habitat Complexity (Characterize) low- no clean riffles

Bank Erosion: Severe ______ Moderate ______ Minor √

Describe: healed over scarring

Silt Deposition: minor

Pollutants (observation / potential sources): parking lot runoff

Stormwater Outfalls: none

Riparian Zone:

Development: Left bank field, right bank forested

Riparian vegetation: Forest √ Shrubs √ Herbs ______

Dominant Species: maple, Ailanthus, poison ivy, Rubus, Tartarian honeysuckle

Approximate % shading by woody species: 98%

Steepness of adjacent slopes: 1-2%

Notes:

Stream Features
Field Sheet

Date: 5/6/06 Project Site: I-270 Wetland # : 157W

Observer(s): BG, BS

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R2UBx

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 12' Depth 1' Avg. Water Depth 2"

Has stream morphometry been altered? yes Describe type and degree:

rip rapped from pond

Habitat and Pollutants:

Substrate (predominant type (s)): rip rap

Habitat Complexity (Characterize) low

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: -

Silt Deposition: -

Pollutants (observation / potential sources): none

Stormwater Outfalls: none

Riparian Zone:

Development: mowed grass

Riparian vegetation: Forest ____ Shrubs ____ Herbs √

Dominant Species: ____

Approximate % shading by woody species: 1%

Steepness of adjacent slopes: 1%

Notes: Phragmites located in channel, no soils

Stream Features
Field Sheet

Date: 5/6/06 Project Site: I-270 Wetland # : 158W

Observer(s): BG, BS

Stream Flow:

Perennial: ______ Intermittent √ Ephemeral ______

Gradient: ______ Classification: R4SB2

Approximate Drainage Basin: ______

Morphology:

Avg. Channel Width 4' Depth 1' Avg. Water Depth < 0.5"

Has stream morphometry been altered? yes Describe type and degree:

concrete lined

Habitat and Pollutants:

Substrate (predominant type (s)): concrete

Habitat Complexity (Characterize) none

Bank Erosion: Severe ______ Moderate ______ Minor √

Describe: -

Silt Deposition: none

Pollutants (observation / potential sources): road runoff

Stormwater Outfalls: none

Riparian Zone:

Development: I-270, Frederick Plaza

Riparian vegetation: Forest ______ Shrubs ______ Herbs ______

Dominant Species: -

Approximate % shading by woody species: 0%

Steepness of adjacent slopes: 1%

Notes: ______

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	6/8/06
Applicant / Owner :	SHA	County :	Frederick
Investigator :	BG, MR ,BC	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	Yes	Community ID :	PEM2A
Is the area a potential Problem Area?	No	Transect ID :	W161
(If needed, explain below.)		Plot ID :	TP-161

Explanation: Drainage ditch

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Polygonum hydropiper*	H	OBL	9		
2 *Polygonum persicaria*	H	FACW	10		
3			11		
4			12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water 0 (in.)
Depth to Free Water in Pit: none (in.)
Depth to Saturated Soil 12 (in.)

Wetland Hydrology Indicators:
Primary Indicators
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
√ Sediment Deposits
√ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
___ Other (Explain in Remarks)

Remarks: no rain in previous week. Drought in spring/summer 2006

Soils

Map unit name
(Series and Phase): Adamstown-Funkstown complex
Taxonomy (Subgroup): Oxyaquic Hapludalfs

Drainage class moderately well drained
Field observations confirm map type?

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-2		2.5Y3/1			Loam
2-6		10YR3/3	10YR3/6	few/faint	Silt Loam Fe/Mn concr.
6-12+		2.5Y3/2	7.5YR4/6	few/distinct	

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- √ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Fill material

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks: Broadened wetland areas located downstream of culvert pipe within swale. 2 small wetland areas connected by ephemeral channels. Cracked mud on fill material and highway runoff.

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site : I-270 ETL
Date : 6/12/06
Applicant / Owner : SHA
County : Frederick
Investigator : MR, BG, HL
State : MD
Do Normal Circumstances exist on the site? Yes
Is the site significantly disturbed? (Atypical Situation)? Yes
Community ID : PEM1/2C
Is the area a potential Problem Area? No
Transect ID : W162E
(If needed, explain below.)
Plot ID : TP-162

Explanation: SWM pond inlet channel is gravel filled- no soils

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Eleocharis obtusa*	H	OBL	9		
2 *Polygonum persicaria*	H	FACW	10		
3 *Polygonum hydropiper*	H	OBL	11		
4 *Scirpus validus*	H	OBL	12		
5 *Carex vulpinoidea*	H	OBL	13		
6 *Ludwigia palustris*	H	OBL	14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water 1-2 (in.)
Depth to Free Water in Pit: ___ (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydology Indicators:
Primary Indicators
√ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
___ Other (Explain in Remarks)

Remarks: SWM pond with vegetation

Soils

Map unit name
(Series and Phase): Udorthents
Taxonomy (Subgroup): Udorthents

Drainage class ______
Field observations confirm map type?

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-2	A	2.5Y4/2	10YR6/6	few/distinct	Silt Loam with organics
2-6 +	B1	10YR6/4	7.5YR4/6	common/distinct	Silty Clay Loam

Augar refusal at 6' on coarse framents

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: soils consist of fill material that is transisting to hydric condition

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks: SWM pond with small drainage leading from pipe. Large gravel fill present throughout site. Approximately 30% open water

Stream Features
Field Sheet

Date: 6/12/06 Project Site: I-270 Wetland # : 164w

Observer(s): BG, MR

Stream Flow:

Perennial: ____ Intermittent √ Ephemeral ____

Gradient: ____ Classification: R4SB1/2

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 10' Depth 3.5' Avg. Water Depth 6"

Has stream morphometry been altered? no Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): gravel/sand

Habitat Complexity (Characterize) low, still stagnant, ponded water, no riffles

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: few unvegetated areas

Silt Deposition: minor

Pollutants (observation / potential sources): cow manure

Stormwater Outfalls: none

Riparian Zone:

Development: farm fields on both sides, narrow strip of woods

Riparian vegetation: Forest √ Shrubs √ Herbs ____

Dominant Species: cherry, elm

Approximate % shading by woody species: 90%

Steepness of adjacent slopes: 1-5%

Notes:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270	Date :	6/14/06
Applicant / Owner :		County :	Frederick
Investigator :	BG, MR	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PEM1E
Is the area a potential Problem Area?	No	Transect ID :	W165w
(If needed, explain below.)		Plot ID :	TP-165

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Carex lurida*	H	OBL	9		
2 *Juncus effusus*	H	FACW+	10		
3 *Leersia oryzoides*	H	OBL	11		
4 *Nasturtium officinale*	H	OBL	12		
5 *Carex vulpinoidea*	H	OBL	13		
6 *Agrostis gigantea*	H	NI	14		
7 *Polygonum hydropiper*	H	OBL	15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-)

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water - (in.)
Depth to Free Water in Pit: - (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydology Indicators:
Primary Indicators
___ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
___ Other (Explain in Remarks)

Remarks: emergent swale leads to stream

Soils

Map unit name
(Series and Phase): Codorus and Hatboro silt loam
Taxonomy (Subgroup): Fluvaquentic Dystrudepts

Drainage class moderately well drained
Field observations confirm map type?

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-2		2.5Y3/1	2.5Y4/4	many/faint	Silt Loam
2-6		10YR4/1	10YR4/6	few/faint	Silty Clay Loam
6-10		5Y5/1	2.5Y5/6	common/distinct	Silty Clay Loam
10+		5Y6/1	10YR4/6	many/prominent	Silty Clay Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Soils
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 6/12/06 Project Site: I-270 Wetland # : 165W

Observer(s): BG, MR

Stream Flow:

Perennial: ______ Intermittent √ Ephemeral ______

Gradient: ______ Classification: R4SB1/2

Approximate Drainage Basin: ______

Morphology:

Avg. Channel Width 10' Depth 3.5' Avg. Water Depth 6"

Has stream morphometry been altered? no Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): gravel/sand

Habitat Complexity (Characterize) low, still stagnant, ponded water, no riffles

Bank Erosion: Severe ______ Moderate ______ Minor √

Describe: few unvegetated areas

Silt Deposition: minor

Pollutants (observation / potential sources): cow manure

Stormwater Outfalls: none

Riparian Zone:

Development: farm fields on both sides, narrow strip of woods

Riparian vegetation: Forest √ Shrubs √ Herbs ______

Dominant Species: cherry, elm

Approximate % shading by woody species: 90%

Steepness of adjacent slopes: 1-5%

Notes:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270	Date :	6/14/06
Applicant / Owner :	SHA	County :	Fredrick
Investigator :	MR, BG, HL	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	UPL
Is the area a potential Problem Area?	No	Transect ID :	
(If needed, explain below.)		Plot ID :	TP-166

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Lolium pratense*	H	FACU-	9		
2 *Allium vineale*	H	FACU-	10		
3 *Festuca sp*	H		11		
4 *Thistle sp*	H		12		
5 *Apocynum flovibunda*	H		13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 0%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
 ___ Stream, Lake, or Tide Gauge
 ___ Aerial Photographs
 ___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water 0 (in.)
Depth to Free Water in Pit: none (in.)
Depth to Saturated Soil ___ (in.)

Wetland Hydology Indicators:
Primary Indicators
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
___ Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): Mt. Airy Channery Loam
Taxonomy (Subgroup): Typic Dystrudepts

Drainage class Well drained
Field observations confirm map type?

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-5	Ap	2.5Y4/2	10YR4/6	many/distinct	Silty Clay Loam
5-10	B1p	2.5Y4/2	10yr3/6	many/distinct	Silt Loam
10+	B2	2.5Y4/2	7.5YR4/6	many/prominent	Silt Loam

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
√ Gleyed or Low-Chroma Soils
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? No
Wetland Hydrology Present? No
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? No

Remarks:

Stream Features
Field Sheet

Date: 6/14/06 Project Site: I-270 Wetland # : 167E

Observer(s): BG, MR

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R2UB2

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 8' Depth 4' Avg. Water Depth 4"

Has stream morphometry been altered? yes Describe type and degree:

over widened at culvert

Habitat and Pollutants:

Substrate (predominant type (s)): sand

Habitat Complexity (Characterize) low- no cover

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: ____

Silt Deposition: heavy

Pollutants (observation / potential sources): road runoff

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: spicebush, rose, walnut, red maple, honeysuckle

Approximate % shading by woody species: 5%

Steepness of adjacent slopes: 1-5%

Notes: ____

Stream Features
Field Sheet

Date: 6/14/06 Project Site: I-270 Wetland # : 168E

Observer(s): BG, MR

Stream Flow:

Perennial: ______ Intermittent √ Ephemeral ______

Gradient: ______ Classification: R4SB2

Approximate Drainage Basin: ______

Morphology:

Avg. Channel Width 2.5' Depth 4.5' Avg. Water Depth none

Has stream morphometry been altered? no Describe type and degree:

Habitat and Pollutants:

Substrate (predominant type (s)): sand

Habitat Complexity (Characterize) none- no flow

Bank Erosion: Severe ______ Moderate √ Minor ______

Describe: Some raw areas

Silt Deposition: minor

Pollutants (observation / potential sources): road runoff

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: Lady's thumb, spicebush, garlic mustard

Approximate % shading by woody species: 75%

Steepness of adjacent slopes: 1.50%

Notes:

Stream Features
Field Sheet

Date: 6/14/06 Project Site: I-270 Wetland # : 169E

Observer(s): BG, MR, HL

Stream Flow:

Perennial: ____ Intermittent √ Ephemeral ____

Gradient: ____ Classification: R4SB2

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 3' Depth 5' Avg. Water Depth none

Has stream morphometry been altered? yes Describe type and degree:

channelized

Habitat and Pollutants:

Substrate (predominant type (s)): sand

Habitat Complexity (Characterize) low

Bank Erosion: Severe ____ Moderate √ Minor ____

Describe: raw bank

Silt Deposition: minor

Pollutants (observation / potential sources): road runoff

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs ____

Dominant Species: spicebush, tree of heaven, rose

Approximate % shading by woody species: 60%

Steepness of adjacent slopes: 1-5%

Notes:

Stream Features
Field Sheet

Date: 6/29/06 Project Site: I-270 ETL Wetland # : 170W

Observer(s): BG, BS

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R2UB1

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 4' Depth 3.5' Avg. Water Depth 2"

Has stream morphometry been altered? no Describe type and degree:

channelized near culvert

Habitat and Pollutants:

Substrate (predominant type (s)): gravel

Habitat Complexity (Characterize) moderate-riffle/pool complexes for fish

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: ____

Silt Deposition: minor

Pollutants (observation / potential sources): trash observed, tires

Stormwater Outfalls: none

Riparian Zone:

Development: none

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: spicebush, cherry, rose, garlic mustard

Approximate % shading by woody species: 89%

Steepness of adjacent slopes: 1-15%

Notes: ____

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	6/29/06
Applicant / Owner :	SHA	County :	Frederick
Investigator :	BG, BS, BC	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PSS1C
Is the area a potential Problem Area?	No	Transect ID :	W171W
(If needed, explain below.)		Plot ID :	TP-171W

Explanation:

Vegetation

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Leersia oryzoides*	H	OBL	9			
2	*Impatiens capensis*	H	OBL	10			
3	*Microstegium vimineum*	H	FAC	11			
4	*Polygonum sagittatum*	H	OBL	12			
5	*Carex lurida*	H	OBL	13			
6	*Lindera benzoin*	S	FACW-	14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water <0.2 (in.)
Depth to Free Water in Pit: 12 (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydology Indicators:
Primary Indicators
√ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): Rohrersville-Lantz silt loam
Taxonomy (Subgroup): Fragiaquic Hapludalfs

Drainage class: Somewhat poorly drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-10		2.5Y3/2	5Y4/6	many/prominent	Silty Clay Loam
10-12+		5Y4/2	10YR4/4	many/prominent	Clay Loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
_√_ Gleyed or Low-Chroma Soils
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site : I-270 ETL
Applicant / Owner : SHA
Investigator : BG, MR, JB
Do Normal Circumstances exist on the site? Yes
Is the site significantly disturbed? (Atypical Situation)? No
Is the area a potential Problem Area? No
(If needed, explain below.)

Date : 7/6/06
County : Frederick
State : MD
Community ID : POWx w/PEM fringe
Transect ID : W172
Plot ID : TP-172E

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Typha latifolia*	H	OBL	9		
2 *Pond lily sp.*	H	OBL	10		
3 *Acorus calamus*	H	OBL	11		
4			12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover; 5-6' wetland

Hydology

___ Recorded Data (Describe in Remarks)
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

√ No Recorded Data Available

Field Observations:
- Depth of Surface Water unknown (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators
- √ Inundated
- √ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized root channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ Fac-Neutral Test
- Other (Explain in Remarks)

Remarks: pond

Soils

Map unit name
(Series and Phase): Glenville-Baile silt loam
Taxonomy (Subgroup): Aquic Fragiudults

Drainage class: moderately well drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Soils
___ Concretions (Mg)
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks: soils not sampled due to inundation

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	7/6/06
Applicant / Owner :	SHA	County :	Frederick
Investigator :	BG, MR, JB	State :	MD

Do Normal Circumstances exist on the site? Yes
Is the site significantly disturbed? (Atypical Situation)? No
Is the area a potential Problem Area? No
(If needed, explain below.)

Community ID : PEM2E
Transect ID : W173
Plot ID : TP-173E

Explanation:

Vegetation

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Juncus effusus*	H	FACW+	9			
2	*Agrostis gigantea*	H	NI	10			
3	*Carex lurida*	H	OBL	11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-)
67%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water - (in.)
Depth to Free Water in Pit: - (in.)
Depth to Saturated Soil 10 (in.)

Wetland Hydology Indicators:
Primary Indicators
___ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): Linganore-Hyattstown channery silt loam

Drainage class: Well drained

Taxonomy (Subgroup): Ultic Hapludalfs

Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-6		5Y5/2	10YR5/8	many/prominent	Silty Clay Loam w/gravel
6+		5Y5/1	2.5Y5/6	few/distinct	Silty Clay Loam w/gravel
			10YR5/8	common/prominent	

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- √ Concretions (Mg)
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	7/6/06
Applicant / Owner :	SHA	County :	Frederick
Investigator :	BG, MR, JB	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PEM2E
Is the area a potential Problem Area?	No	Transect ID :	W174
(If needed, explain below.)		Plot ID :	TP-174E

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Acorus calamus*	H	OBL	9		
2 *Juncus effusus*	H	FACW+	10		
3 *Mentha sp.*	H		11		
4 *Carex lurida*	H	OBL	12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

√ No Recorded Data Available

Field Observations:
- Depth of Surface Water - (in.)
- Depth to Free Water in Pit: - (in.)
- Depth to Saturated Soil 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ___ Inundated
- √ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- √ Oxidized root channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ Fac-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): Linganore-Hyattstown channery silt loam
Taxonomy (Subgroup): Ultic Hapludalfs

Drainage class: Well drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-6	A1	2.5Y4/2	7.5YR4/6	many/prominent	Silty Clay Loam
6+	B1	5Y4/1	7.5YR3/4	many/prominent	Silty Clay Loam

Hydric Soil Indicators:

- √ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	7/12/06
Applicant / Owner :	SHA	County :	Montgomery
Investigator :	DS, HL	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PEM1C
Is the area a potential Problem Area?	No	Transect ID :	W180
(If needed, explain below.)		Plot ID :	TP-180

Explanation:

Vegetation

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Impatiens capensis*	H	FACW	9			
2	*Carex lurida*	H	OBL	10			
3	*Typha latifolia*	H	OBL	11			
4	*Polygonum sagittatum*	H	OBL	12			
5	*Ludwigia palustris*	H	OBL	13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water 0-1 (in.)
Depth to Free Water in Pit: - (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydology Indicators:
Primary Indicators
√ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
√ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
___ Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): Brinklow-Blocktown channery silt loam
Taxonomy (Subgroup): Ochreptic Hapludults

Drainage class Well drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-4		10YR4/1			Silt Loam w/organics
4+		10YR4/6	7.5YR4/6	few/distinct	Clay Loam w/coarse frag

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
√ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
√ Gleyed or Low-Chroma Soils
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	7/20/06
Applicant / Owner :	SHA	County :	Montgomery
Investigator :	DS, HL	State :	MD
Do Normal Circumstances exist on the site?	No		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PEM1C
Is the area a potential Problem Area?	No	Transect ID :	W181
(If needed, explain below.)		Plot ID :	TP-W181

Explanation: site is excavated SWM pond in uplands

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Typha latifolia*	H	OBL	9		
2			10		
3			11		
4			12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-)
67%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)	Wetland Hydrology Indicators:
___ Stream, Lake, or Tide Gauge	Primary Indicators
___ Aerial Photographs	___ Inundated
___ Other	√ Saturated in Upper 12 Inches
√ No Recorded Data Available	√ Water Marks
	___ Drift Lines
Field Observations:	___ Sediment Deposits
Depth of Surface Water - (in.)	___ Drainage Patterns in Wetlands
	Secondary Indicators (2 or more required):
Depth to Free Water in	___ Oxidized root channels in Upper 12 Inches
Pit: 1 (in.)	___ Water-Stained Leaves
	___ Local Soil Survey Data
Depth to Saturated Soil 0 (in.)	___ Fac-Neutral Test
	___ Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): ______
Taxonomy (Subgroup): ______

Drainage class ______
Field observations confirm map type? | No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-2	A1	10YR3/1			Silt Loam w/organics
2-12	C	7.5YR6/6			Sandy Clay Loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
_√_ Gleyed or Low-Chroma Soils

___ Concretions (Mg)
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks: excavated in uplands

Wetland Determination

Hydrophytic Vegetation Present?	Yes
Wetland Hydrology Present?	Yes
Hydric Soils Present?	No

Is this Sampling Point Within a Wetland? Yes

Remarks: Site is excavated in upland. Clayey soils perch water for >20 days during growing season.

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL		Date :	7/31/06
Applicant / Owner :	SHA		County :	Montgomery
Investigator :	MRS, BS, JB		State :	MD
Do Normal Circumstances exist on the site?		Yes		
Is the site significantly disturbed? (Atypical Situation)?		No	Community ID :	PEM1E
Is the area a potential Problem Area?		No	Transect ID :	W-185W
(If needed, explain below.)			Plot ID :	TP-182

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Phalaris arundinacea*	H	FACW+	9		
2 *Polygonum hydropiper*	H	OBL	10		
3 *Eleocharis obtusa*	H	OBL	11		
4 *Juncus effusus*	H	FACW+	12		
5 *Scirpus cyperinus*	H	FACW+	13		
6 *Carex lurida*		OBL	14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
√ No Recorded Data Available

Field Observations:

Depth of Surface Water 0 (in.)

Depth to Free Water in Pit: - (in.)

Depth to Saturated Soil 0 (in.)

Wetland Hydology Indicators:

Primary Indicators
___ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
Other (Explain in Remarks)

Remarks: small bowl shaped depressional area

Soils

Map unit name
(Series and Phase): Baile Silt Loam
Taxonomy (Subgroup): Typic Ochraquults
Drainage class Poorly drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-2	A1	2.5Y5/2			Silty Clay Loam
2-12+	B1	5Y5/2	10YR4/8	common/prominent	Silty Clay Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions (Mg)
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site : I-270 ETL
Date : 7/30/06
Applicant / Owner : SHA
County : Montgomery
Investigator : MRS, BS, JB
State : MD
Do Normal Circumstances exist on the site? Yes
Is the site significantly disturbed? (Atypical Situation)? No
Community ID : PEM1E
Is the area a potential Problem Area? No
Transect ID : W186W
(If needed, explain below.)
Plot ID : TP-183

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Leersia oryzoides*	H	OBL	9		
2 *Juncus effusus*	H	FACW+	10		
3 *Carex lurida*	H	OBL	11		
4 *Arthraxon hispidus*	H	NI	12		
5 *Dichanthelium clandestin*	H	FAC+	13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-)
80%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water 0 (in.)
Depth to Free Water in Pit: 12 (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydology Indicators:
Primary Indicators
___ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
___ Other (Explain in Remarks)

Remarks: hillside seep wetland

Soils

Map unit name
(Series and Phase): Baile Silt Loam
Taxonomy (Subgroup): Typic Ochraquults
Drainage class Poorly drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-2		2.5Y4/1	10YR5/8	few/distinct	Sandy Loam
2-10		2.5Y4/1	7.5YR4/6	common/prominent	Sandy Clay Loam
10+		2.5Y4/1	7.5YR4/6	many/prominent	Silty Clay Loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
√ Gleyed or Low-Chroma Soils
___ Concretions (Mg)
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes
Is this Sampling Point Within a Wetland? Yes

Remarks:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site :	I-270 ETL	Date :	8/24/06
Applicant / Owner :	SHA	County :	Montgomery
Investigator :	MR, HL, EG	State :	MD
Do Normal Circumstances exist on the site?	Yes		
Is the site significantly disturbed? (Atypical Situation)?	No	Community ID :	PSS1C/E
Is the area a potential Problem Area?	No	Transect ID :	W- 192W
(If needed, explain below.)		Plot ID :	TP-192

Explanation:

Vegetation

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 *Glyceria striata*	H	OBL	9		
2 *Lindera benzoin*	S	FACW-	10		
3 *Viburnum dentatum*	S	FAC	11		
4 *Toxicodendron radicans*	H	FAC	12		
5 *Carex sp.*	H		13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
√ No Recorded Data Available

Field Observations:
Depth of Surface Water 0-1" (in.)
Depth to Free Water in Pit: none (in.)
Depth to Saturated Soil 0 (in.)

Wetland Hydology Indicators:
Primary Indicators
√ Inundated
√ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
√ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized root channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ Fac-Neutral Test
___ Other (Explain in Remarks)

Remarks:

Soils

Map unit name
(Series and Phase): Occoquan loam
Taxonomy (Subgroup): Ochreptic Hapludults

Drainage class Well drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-4	A	2.5Y4/2	10YR3/6	common/faint	Silty Clay Loam
4-12+	A3	5Y4/1	10YR3/4	common/prominent	Silty Clay Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- √ Gleyed or Low-Chroma Soils
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 8/24/06 Project Site: I-270 Wetland # : 192W

Observer(s): MR, HL, EG

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: 2% Classification: R3UB1

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 15" Depth 2" Avg. Water Depth 2"

Has stream morphometry been altered? yes Describe type and degree:

top portion within concrete lined and rip rap bottom

Habitat and Pollutants:

Substrate (predominant type (s)): boulder

Habitat Complexity (Characterize) low flows under rip-rap

Bank Erosion: Severe ____ Moderate ____ Minor √

Describe: none

Silt Deposition: minor

Pollutants (observation / potential sources): pond effluent

Stormwater Outfalls: none

Riparian Zone:

Development: grass/forested

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: tulip poplar, red maple, spicebush, arrow-wood, and lady fern

Approximate % shading by woody species: 95% in forested area

Steepness of adjacent slopes: <5%

Notes:

Data Form
Routine Wetland Determination
(1987 COE Wetlands Delineation Manual)

Project / Site : I-270 ETL
Date : 8/25/06
Applicant / Owner : SHA
County : Frederick
Investigator : MR, HL, EG
State : MD
Do Normal Circumstances exist on the site? Yes
Is the site significantly disturbed? (Atypical Situation)? No
Community ID : PEM2E
Is the area a potential Problem Area? No
Transect ID : W195E
(If needed, explain below.)
Plot ID : TP-195E

Explanation:

Vegetation

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Impatiens capensis*	H	FACW	9			
2	*Carex sp.*	H	FAC+	10			
3	*Acer negundo*	S	FACW	11			
4	*Acer rubrum*	T	FAC	12			
5	*Glyceria striata*	H	OBL	13			
6	*Pilea pumila*	H	FACW+	14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: Visual estimation of dominance by aerial cover

Hydology

___ Recorded Data (Describe in Remarks)
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

√ No Recorded Data Available

Field Observations:
- Depth of Surface Water - (in.)
- Depth to Free Water in Pit: - (in.)
- Depth to Saturated Soil - (in.)

Wetland Hydology Indicators:

Primary Indicators
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- √ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized root channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ Fac-Neutral Test
- Other (Explain in Remarks)

Remarks: cracked mud

Soils

Map unit name
(Series and Phase): Glenville-Baile silt loam
Taxonomy (Subgroup): Aquic Fragiudults

Drainage class moderately well drained
Field observations confirm map type? No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance / Contrast	Texture, Concretions, Structure, ect.
0-6		5Y4/1	10YR4/6	C/P	Silty Clay Loam
6+		2.5Y5/2	10YR4/6	many/distinct	Silty Clay Loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
√ Gleyed or Low-Chroma Soils
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes

Is this Sampling Point Within a Wetland? Yes

Remarks:

Stream Features
Field Sheet

Date: 12/6/07 Project Site: CCT Wetland # : 197

Observer(s): S. Aitkenhead

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: ____ Classification: R3UB1

Approximate Drainage Basin: ____

Morphology:

Avg. Channel Width 2' Depth 3' Avg Water Depth 3"

Has stream morphometry been altered? yes Describe type and degree:

STRAIGHTENED 1000 FT. DOWNSTREAM FROM CULVERT

Habitat and Pollutants:

Substrate (predominant type (s)): gravel

Habitat Complexity (Characterize) LOW

Bank Erosion. Severe ____ Moderate ____ Minor √

Describe: EROSION AT OUTFALL

Silt Deposition: MINOR

Pollutants (observation / potential sources): BUSINESS PARK

Stormwater Outfalls: NONE

Riparian Zone:

Development: BUSINESSES

Riparian vegetation. Forest ____ Shrubs √ Herbs √

Dominant Species: RED MAPLE

Approximate % shading by woody species: 10%

Steepness of adjacent slopes: 20%

Notes:

Stream Features
Field Sheet

Date: 12/6/06 Project Site: CCT Wetland # : 202

Observer(s): S. AITKENHEAD/ M. KNOX

Stream Flow:

Perennial _____ Intermittent ✓ Ephemeral _____

Gradient: _____ Classification: R4SB7

Approximate Drainage Basin: _____

Morphology:

Avg. Channel Width 7' Depth 1' Avg. Water Depth 1"

Has stream morphometry been altered? yes Describe type and degree:

CONSTRUCTED FOR DRAINAGE PURPOSES

Habitat and Pollutants:

Substrate (predominant type (s)): sand

Habitat Complexity (Characterize) LOW

Bank Erosion: Severe _____ Moderate ✓ Minor _____

Describe: INLET PIPE IS UNDERSIZED AND CREATES BACKWATER

Silt Deposition: HIGH

Pollutants (observation / potential sources): NIST

Stormwater Outfalls: AT HEADWATERS

Riparian Zone:

Development: INDUSTRIAL

Riparian vegetation: Forest _____ Shrubs _____ Herbs ✓

Dominant Species: BROAD-LEAF CATTAIL

Approximate % shading by woody species: 5%

Steepness of adjacent slopes: _____

Notes: _____

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	CCT			Date:	12/5/2006
Applicant/Owner:	MdTA			County	Montgomery
Investigator	S Aitkenhead			State	Maryland
Community ID	W203	Transect ID	A	Plot ID	WET

Do Normal Conditions exist on the site?	Yes _	No X
Is the site significantly disturbed (Atypical situation)?	Yes X	No _
Is the area a potential Problem Area?	Yes X	No _

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1	Broad-leaf Cattail	*Typha latifolia*	Herbaceous	OBL

Percent of dominant species that are OBL, FACW, FACW+, FACW-, FAC, FAC+ (excluding FAC-) 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

_ Streams

_ Aerial Photographs

_ Other

_ No Recorded Data Available

Field Observations:

Depth Of Surface Water _ (in.)

Depth To Free Water In Pit _ (in.)

Depth To Saturated Soil 5 (in.)

Wetland Hydrology Indicators

Primary Indicators:

_ Inundated

X Saturated in Upper 12 Inches

Water Marks

_ Drift Lines

X Sediment Deposits

X Drainage Patterns In Wetlands

Secondary Indicators (2 or more required):

X Water-stained Leaves

_ Local Soil Survey Data

_ Local Soil Survey Data

_ Fac-neutral Test

_ Other (explain in Remarks)

Remarks:

Community ID: W203 Transect ID: A Plot ID: WET

SOILS

Soils Map Unit Name (Series And Phase) Glenville silt loam, 0 to 3 percent slopes Drainage Class: MWD

Field Observations Confirm Mapped Type? Yes YES No _

Taxonomy (subgroup) AQUIC FRAGIUDULTS

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	2.5Y 3/1			Silt Loam
12-16	B	10YR 5/1	10YR 5/6	10%	Silty Clay Loam

Hydric Soil Indicators: Yes X No _

(If yes, check them)

_ Histosol

_ Histic Epipedon

_ Sulfidic Odor

_ Aquic Moisture Regime

X Reducing Conditions

_ Gleyed Or Low-chroma Colors

_ Concretions

_ High Organic Content In Surface Layer In Sandy Soils

_ Organic Streaking In Sandy Soils

_ Listed On Local Hydric Soils List

Listed On National Hydric Soils List

_ Other (explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes X No _

Wetland Hydrology Present? Yes X No _

Hydric Soils Present? Yes X No _

Is this Sampling Point Within a Wetland? Yes X No _

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site	CCT			Date:	12/5/2006
Applicant/Owner:	MTA			County:	Montgomery
Investigator:	S Aitkenhead			State:	Maryland
Community ID:	W203	Transect ID:	A	Plot ID:	UPL

Do Normal Conditions exist on the site?	Yes _	No X
Is the site significantly disturbed (Atypical situation)?	Yes X	No
Is the area a potential Problem Area?	Yes _	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1	Grass Spp.		Herbaceous	

Percent of dominant species that are OBL, FACW,FACW+, FACW-, FAC, FAC+ (excluding FAC-) 0%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks)
- _ Streams
- _ Aerial Photographs
- _ Other
- _ No Recorded Data Available

Field Observations

Depth Of Surface Water	_	(in.)
Depth To Free Water in Pit	_	(in.)
Depth To Saturated Soil	_	(in.)

Wetland Hydrology Indicators:

Primary Indicators
- _ Inundated
- _ Saturated in Upper 12 Inches
- _ Water Marks
- _ Drift Lines
- Sediment Deposits
- _ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- _ Water-stained Leaves
- _ Local Soil Survey Data
- _ Local Soil Survey Data
- _ Fac-neutral Test
- _ Other (explain in Remarks)

Remarks: No Hydrology Present

Community ID W200 Transect ID A Plot ID. UP

SOILS

Soils Map Unit Name (series And Phase): Glenville silt loam 0 to 3 percent slopes Drainage Class MWD

Field Observations Confirm Mapped Type? Yes YES No _

Taxonomy (subgroup): AQUIC FRAGIUDULTS

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-3	A	10YR 3/1			Loam
3-9	B1	7.5YR 4/4	10YR 5/6	10%	Loam
9-16	B2	10YR 5/4	10YR 5/8	10%	Loam

Hydric Soil Indicators Yes _ No X

(If yes, check them)

- _ Histosol
- _ Histic Epipedon
- _ Sulfidic Odor
- _ Aquic Moisture Regime
- _ Reducing Conditions
- _ Gleyed Or Low-Chroma Colors
- _ Concretions
- _ High Organic Content In Surface Layer In Sandy Soils
- _ Organic Streaking In Sandy Soils
- _ Listed On Local Hydric Soils List
- _ Listed On National Hydric Soils List
- _ Other (explain In Remarks)

Remarks: No hydric soils present

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes _ No X

Wetland Hydrology Present? Yes _ No X

Hydric Soils Present? Yes _ No X

Is this Sampling Point Within a Wetland? Yes _ No X

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site	CCT			Date	11/21/2005
Applicant/Owner	MTA			County	Montgomery
Investigator	M. Knox			State	Maryland
Community ID:	W215	Transect ID:	A	Plot ID	UPL

Do Normal Conditions exist on the site?	Yes X	No _
Is the site significantly disturbed (Atypical situation)?	Yes X	No _
Is the area a potential Problem Area?	Yes _	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1	Honey-locust	*Gleditsia triacanthos*	Tree	FAC-
2	Eastern Red Cedar	*Juniperus virginiana*	Tree	FACU
3	Grass Spp		Herbaceous	

Percent of dominant species that are OBL, FACW,FACW+, FACW-, FAC, FAC+ (excluding FAC-) 00%

Remarks: Fill material

HYDROLOGY

Recorded Data (Describe in Remarks)	Wetland Hydrology Indicators
_ Streams	Primary Indicators
Aerial Photographs	_ Inundated
_ Other	_ Saturated in Upper 12 Inches
X No Recorded Data Available	Water Marks
	_ Drift Lines
	_ Sediment Deposits
Field Observations:	_ Drainage Patterns in Wetlands
Depth Of Surface Water _ (in.)	Secondary Indicators (2 or more required)
Depth To Free Water in Pit _ (in.)	_ Water-stained Leaves
Depth To Saturated Soil (in.)	_ Local Soil Survey Data
	_ Local Soil Survey Data
	_ FAC-Neutral Test
	_ Other (explain in Remarks)

Remarks: No hydrology

Community ID: W215 Transect ID: 6 Plot ID: LPL

SOILS

Soils Map Unit Name (Series And Phase): Hatboro silt loam, 0-3 percent slopes Drainage Class PD

Field Observations Confirm Mapped Type? Yes YES No _

Taxonomy (subgroup): TYPIC FLUVAQUENTS

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	B	10YR 4/6			Sand

Hydric Soil Indicators Yes _ No X

(If yes, check them)

_	Histosol	_	Concretions
	Histic Epipedon		High Organic Content In Surface Layer In Sandy Soils
_	Sulfidic Odor	_	Organic Streaking In Sandy Soils
_	Aquic Moisture Regime	_	Listed On Local Hydric Soils List
_	Reducing Conditions	_	Listed On National Hydric Soils List
_	Gleyed Or Low-chroma Colors	_	Other (explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes _	No X
Wetland Hydrology Present?	Yes _	No X
Hydric Soils Present?	Yes _	No X
Is this Sampling Point Within a Wetland?	Yes _	No X

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	CCT			Date:	11/21/2006
Applicant/Owner:	MdTA			County:	Montgomery
Investigator:	M. Kays			State:	Maryland
Community ID:	W215	Transect ID:	A	Plot ID:	WET

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes X	No _
Is the area a potential Problem Area?	Yes _	No X

If needed, explain on reverse.

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1	Broad-leaf Cattail	*Typha latifolia*	Herbacious	OBL
2	Weeping Willow	*Salix babylonica*	Tree	FACW-

Percent of dominant species that are OBL, FACW,FACW+, FACW-, FAC, FAC+ (excluding FAC-) 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
_ Streams
Aerial Photographs
_ Other
X No Recorded Data Available

Field Observations
Depth Of Surface Water 1 (in.)
Depth To Free Water In Pit 2 (in.)
Depth To Saturated Soil 1 (in.)

Wetland Hydrology Indicators:
Primary Indicators
X Inundated
X Saturated In Upper 12 Inches
X Water Marks
_ Drift Lines
X Sediment Deposits
X Drainage Patterns In Wetlands
Secondary Indicators (2 or more required):
X Water-stained Leaves
_ Local Soil Survey Data
_ Local Soil Survey Data
_ Fac-neutral Test
_ Other (explain in Remarks)

Remarks:

Community ID. W215 Transect ID A Plot ID WET

SOILS

Soils Map Unit Name (series And Phase). Hatboro silt loam, 0-3 percent slopes Drainage Class: PD

Field Observations Confirm Mapped Type? Yes YES No _

Taxonomy (subgroup). TYPIC FLUVAQUENTS

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-2	O	10YR 3/1			Muck
2-8	A	10YR 4/1			Clay
8-16					

Hydric Soil Indicators Yes X No _
(If yes, check item)

_ Histosol
_ Histic Epipedon
X Sulfidic Odor
Aquic Moisture Regime
X Reducing Conditions
X Gleyed Or Low-chroma Colors

_ Concretions
_ High Organic Content In Surface Layer In Sandy Soils
_ Organic Streaking In Sandy Soils
_ Listed On Local Hydric Soils List
_ Listed On National Hydric Soils List
Other (explain in Remarks)

Remarks: **8-16" Rip-Rap Area (Atypical)**

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No _
Hydric Soils Present?	Yes X	No _
Is this Sampling Point Within a Wetland?	Yes X	No _

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	ICC			Date:	11/21/2006
Applicant/Owner:	MdTA			County:	Montgomery
Investigator:	S Aitkenhead, M. Knox			State:	Maryland
Community ID:	W215	Transect ID:	A	Plot ID:	WET

Do Normal Conditions exist on the site?	Yes X	No _
Is the site significantly disturbed (Atypical situation)?	Yes _	No X
Is the area a potential Problem Area?	Yes _	No X
If needed, explain on reverse.		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Green Ash	*Fraxinus pennsylvanica*	Tree	FACW
2.	Small-spike False-nettle	*Boehmeria cylindrica*	Herbacious	FACW+
3.	Soft Rush	*Juncus effusus*	Herbacious	FACW+

Percent of dominant species that are OBL, FACW,FACW+, FACW-, FAC, FAC+ (excluding FAC-) 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks)

_ Streams
_ Aerial Photographs
_ Other
X No Recorded Data Available

Field Observations

Depth Of Surface Water:	1	(in.)
Depth To Free Water In Pit	1	(in.)
Depth To Saturated Soil	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators:

_ Inundated
X Saturated In Upper 12 Inches
X Water Marks
_ Drift Lines
_ Sediment Deposits
X Drainage Patterns In Wetlands

Secondary Indicators (2 or more required)

X Water-stained Leaves
_ Local Soil Survey Data
_ Local Soil Survey Data
_ Fac-neutral Test
Other (explain In Remarks)

Remarks:

Community ID: W215 Transect ID: A Plot ID: WET

SOILS

Soils Map Unit Name (series And Phase): Hatboro silt loam, 0-3 percent slopes Drainage Class: PD

Field Observations Confirm Mapped Type? Yes YES No _

Taxonomy (subgroup) TYPIC FLUVAQUENTS

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-6	A	10YR 5/1	10YR 4/6	10%	Clay Loam
6-12	B	10YR 5/1	10YR 4/6	25%	Sandy Clay
12-16	B	10YR 5/1	10YR 4/6	30%	Sandy Clay

Hydric Soil Indicators Yes X No _

(If yes, check them)

_	Histosol	_	Concretions
_	Histic Epipedon	_	High Organic Content In Surface Layer In Sandy Soils
X	Sulfidic Odor	_	Organic Streaking In Sandy Soils
_	Aquic Moisture Regime	_	Listed On Local Hydric Soils List
X	Reducing Conditions	_	Listed On National Hydric Soils List
X	Gleyed Or Low-chroma Colors		Other (explain In Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No _
Hydric Soils Present?	Yes X	No _
Is this Sampling Point Within a Wetland?	Yes X	No _

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: CCT
Date: 11/21/2008
Applicant/Owner: MdTA
County: Montgomery
Investigator: S Aitkenhead, M. Knox
State: Maryland

Community ID: W216
Transect ID: A
Plot ID: UPL

Do Normal Conditions exist on the site? Yes X No _
Is the site significantly disturbed (Atypical situation)? Yes _ No X
Is the area a potential Problem Area? Yes _ No X
If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Multiflora Rose	*Rosa multiflora*	Shrub	FACU
2	Tulip Poplar	*Liriodendron tulipifera*	Tree	FACU
3	Green Ash	*Fraxinus pennsylvanica*	Tree	FACW
4	Black Cherry	*Prunus serotina*	Tree	FACU

Percent of dominant species that are OBL, FACW, FACW+, FACW-, FAC, FAC+ (excluding FAC-) 25%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks)
- _ Streams
- _ Aerial Photographs
- _ Other
- X No Recorded Data Available

Field Observations
Depth Of Surface Water _ (in.)
Depth To Free Water In Pit _ (in.)
Depth To Saturated Soil _ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
- _ Inundated
- _ Saturated in Upper 12 Inches
- _ Water Marks
- Drift Lines
- _ Sediment Deposits
- _ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- _ Water-stained Leaves
- _ Local Soil Survey Data
- _ Local Soil Survey Data
- _ Fac-neutral Test
- _ Other (explain in Remarks)

Remarks: No hydrology

Community ID: W215 Transect ID: A Plot ID: UPL

SOILS

Soils Map Unit Name (Series And Phase) _ Drainage Class: _

Field Observations Confirm Mapped Type? Yes _ No X

Taxonomy (subgroup) _

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc
0-15	A	10YR 5/4	5YR 5/8	20%	Loam

Hydric Soil Indicators Yes _ No X
(If yes, check them)

- _ Histosol
- _ Histic Epipedon
- _ Sulfidic Odor
- _ Aquic Moisture Regime
- _ Reducing Conditions
- _ Gleyed Or Low-chroma Colors
- _ Concretions
- _ High Organic Content In Surface Layer In Sandy Soils
- _ Organic Streaking In Sandy Soils
- _ Listed On Local Hydric Soils List
- _ Listed On National Hydric Soils List
- _ Other (explain In Remarks)

Remarks: Parent material found in 1st 15". A whitish hue found but not calling hydric.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes _	No X
Wetland Hydrology Present?	Yes _	No X
Hydric Soils Present?	Yes	No X
Is this Sampling Point Within a Wetland?	Yes _	No X

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	CCT			Date:	11/21/2006
Applicant/Owner:	MdTA			County:	Montgomery
Investigator:	S Arkophead			State:	Maryland
Community ID:	W217	Transect ID:	A	Plot ID:	WET

Do Normal Conditions exist on the site?	Yes X	No _
Is the site significantly disturbed (Atypical situation)?	Yes _	No X
Is the area a potential Problem Area?	Yes _	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1	Red Maple	*Acer rubrum*	Tree	FAC
2.	Green Ash	*Fraxinus pennsylvanica*	Tree	FACW
3.	Northern Spicebush	*Lindera benzoin*	Shrub	FACW-
4	American Sycamore	*Platanus occidentalis*	Tree	FACW-
5	Northern Arrow-wood	*Viburnum recognitum*	Shrub	FACW-

Percent of dominant species that are OBL, FACW,FACW+, FACW-, FAC, FAC+ (excluding FAC-) 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks)

_ Streams
_ Aerial Photographs
_ Other
X No Recorded Data Available

Field Observations:

Depth Of Surface Water: _ (in.)
Depth To Free Water in Pit: (in.)
Depth To Saturated Soil: _ (in.)

Wetland Hydrology Indicators

Primary Indicators

_ Inundated
_ Saturated in Upper 12 Inches
_ Water Marks
Drift Lines
_ Sediment Deposits
X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)

X Water-stained Leaves
_ Local Soil Survey Data
_ Local Soil Survey Data
_ Fac-neutral Test
_ Other (explain in Remarks)

Remarks:

Community ID W217 Transect ID. A Plot ID WET

SOILS

Soils Map Unit Name (series And Phase) Hatboro silt loam, 0-3 percent Drainage Class. PD

Field Observations Confirm Mapped Type? Yes YES No _

Taxonomy (subgroup) TYPIC FLUVAQUENTS

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-6	A	10YR 3/1			Loam
6-16	B	G2 5/10B			Clay Loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol	X	Concretions
_	Histic Epipedon	_	High Organic Content In Surface Layer In Sandy Soils
_	Sulfidic Odor	_	Organic Streaking In Sandy Soils
X	Aquic Moisture Regime	_	Listed On Local Hydric Soils List
X	Reducing Conditions	_	Listed On National Hydric Soils List
X	Gleyed Or Low-chroma Colors	_	Other (explain In Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _
Wetland Hydrology Present?	Yes X	No _
Hydric Soils Present?	Yes X	No _
Is this Sampling Point Within a Wetland?	Yes X	No _

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site	CCT			Date:	11/21/2005
Applicant/Owner	MTA			County:	Montgomery
Investigator:	S Aikenhead			State:	Maryland
Community ID:	W217	Transect ID:	A	Plot ID:	UPL

Do Normal Conditions exist on the site?	Yes X	No _
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes _	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1	Red Maple	*Acer rubrum*	Tree	FAC
2	Black Cherry	*Prunus serotina*	Tree	FACU
3	American Sycamore	*Platanus occidentalis*	Tree	FACW-
4	White Oak	*Quercus alba*	Tree	FACU-

Percent of dominant species that are OBL, FACW,FACW+, FACW-, FAC, FAC+ (excluding FAC-) 50%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

_ Streams

_ Aerial Photographs

_ Other

X No Recorded Data Available

Field Observations:

Depth Of Surface Water: (in.)

Depth To Free Water in Pit: _ (in.)

Depth To Saturated Soil: _ (in.)

Wetland Hydrology Indicators

Primary Indicators:

_ Inundated

_ Saturated in Upper 12 Inches

_ Water Marks

_ Drift Lines

_ Sediment Deposits

_ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)

_ Water-stained Leaves

_ Local Soil Survey Data

_ Local Soil Survey Data

_ Fac-neutral Test

_ Other (explain in Remarks)

Remarks: No hydrology

Community ID: W217 Transect ID A Plot ID UPL

SOILS

Soils Map Unit Name (Series And Phase) Hatboro silt loam, 0-3 percent slopes Drainage Class PD

Field Observations Confirm Mapped Type? Yes YES No _

Taxonomy (subgroup) TYPIC FLUVAQUENTS

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc
0-16	B	10YR 4/6			Loam

Hydric Soil Indicators: Yes _ No X

(If yes, check them)

	Histosol	_	Concretions
_	Histic Epipedon	_	High Organic Content In Surface Layer In Sandy Soils
_	Sulfidic Odor		Organic Streaking In Sandy Soils
_	Aquic Moisture Regime		Listed On Local Hydric Soils List
_	Reducing Conditions	_	Listed On National Hydric Soils List
_	Gleyed Or Low-chroma Colors	_	Other (explain in Remarks)

Remarks: No hydric soils

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes _	No X
Wetland Hydrology Present?	Yes	No X
Hydric Soils Present?	Yes _	No X
Is this Sampling Point Within a Wetland?	Yes _	No X

Remarks:

Stream Features
Field Sheet

Date: 1/23/07 Project Site: I-270 CCT Wetland # : WUS 223

Observer(s): DS, HS, CK

Stream Flow:

Perennial: √ Intermittent ____ Ephemeral ____

Gradient: 1% Classification: R3UB1

Approximate Drainage Basin: N/A

Morphology:

Avg. Channel Width 23' Depth 3' Avg. Water Depth 6"

Has stream morphometry been altered? yes Describe type and degree:

stream placed in culvert beneath MD 124

Habitat and Pollutants:

Substrate (predominant type (s)): cobble/gravel

Habitat Complexity (Characterize) Moderate; riffles and pools present, deep pools at culvert and on bends, some woody debris present

Bank Erosion: Severe √ Moderate √ Minor ____

Describe: channel widening, bank slumping, exposed roots

Silt Deposition: moderate

Pollutants (observation / potential sources): garbage, runoff from highway and adjacent apartment complex

Stormwater Outfalls: 1 from apartment complex

Riparian Zone:

Development: left bank - apartment complex; right bank - mowed lawn

Riparian vegetation: Forest √ Shrubs √ Herbs √

Dominant Species: black willow, box elder, Japanese honeysuckle, silky dogwood

Approximate % shading by woody species: 15%

Steepness of adjacent slopes: <10%

Notes: Right bank with a thin strip of trees, left bank treeline 25-50' thick. Very disturbed area with aggredation of cobble/gravel downstream of culvert.

Multi-Modal Corridor Study

Frederick and Montgomery Counties, Maryland

Appendix D

Wetland Functional Assessment Forms

W-24E

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I 270 US 15

ASSESSMENT DATE(S): *WAA:* 7/12/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
DS, HC

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA:

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.7	
Water Quality	0.9	
Wildlife	0.1	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

PLANNED WETLAND GOALS:

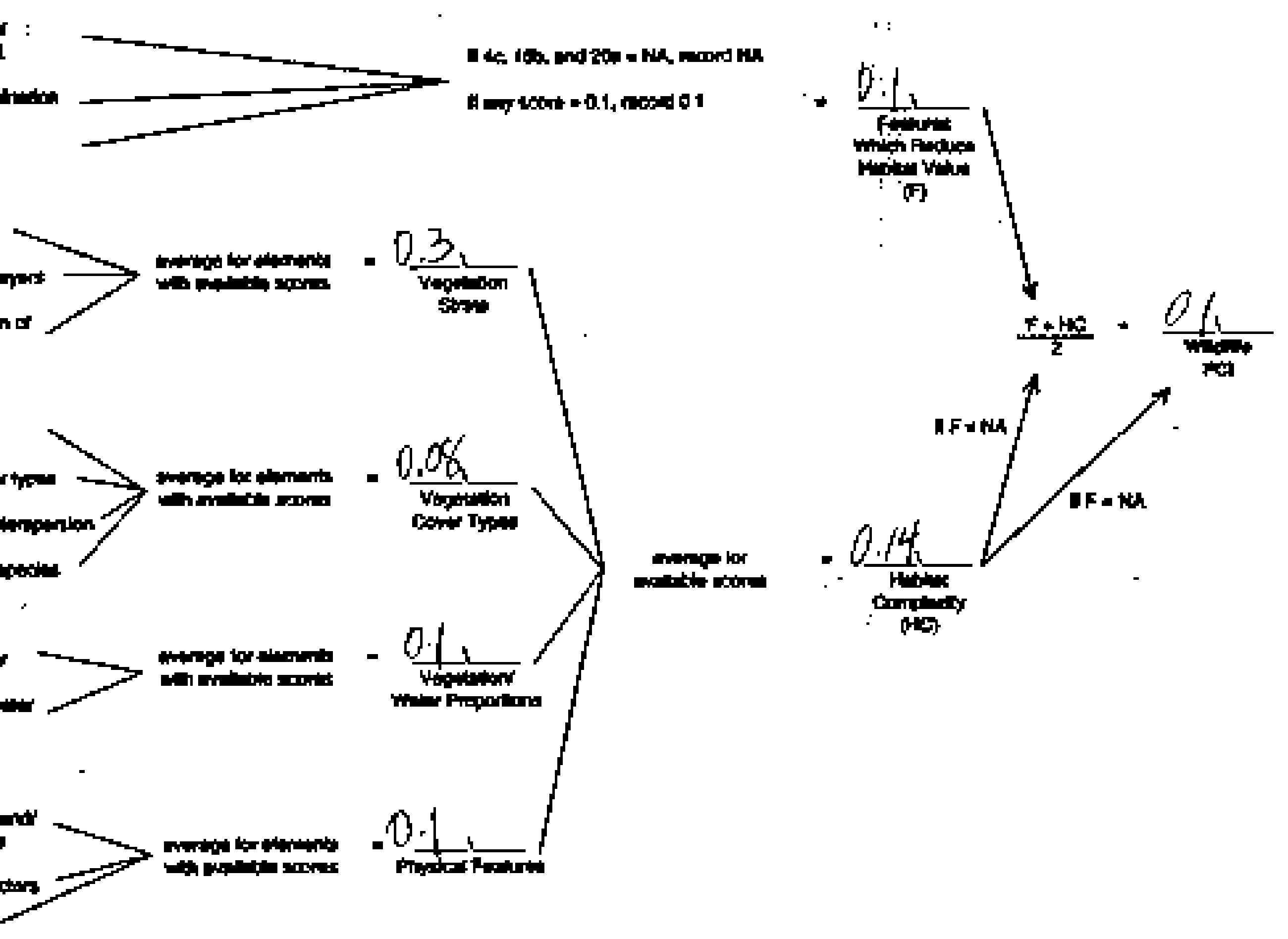
Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270 / US. 15

COMPARISON: ______ \ ______ (e.g., WAA/planned wetland)

Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
0.1	(16b)	Wetland size
0.3	(11a)	Layers
0.3	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
0.04	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12c)	Cover type interspersion
NA	(12d)	Undesirable species
0.1	(13a)	% open water
0.1	(13b)	Vegetation/water interspersion
0.1	(21a)	Shape of upland/ wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands

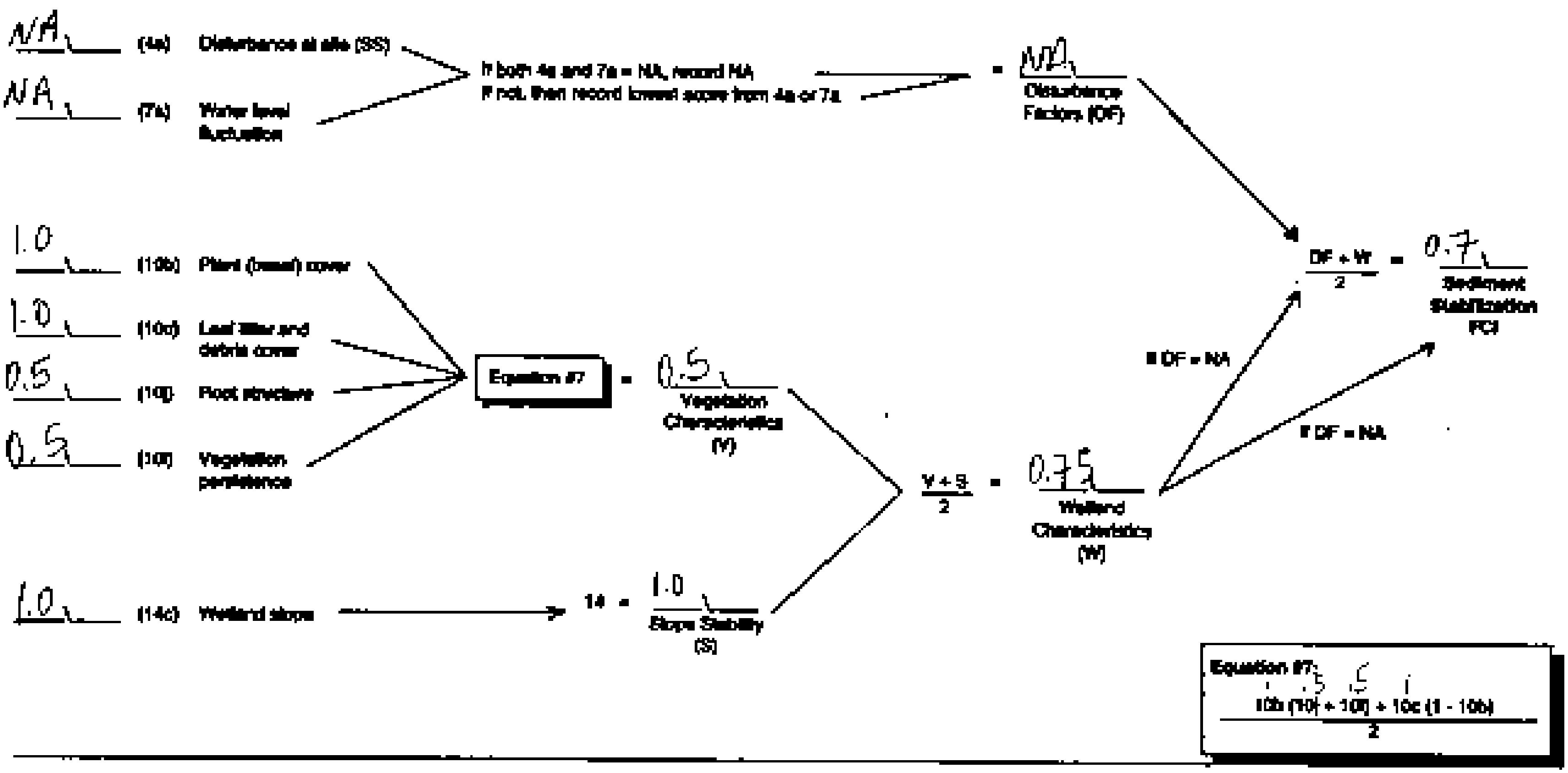


Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270/US 15

Selected Scores | (#) | Element

COMPARISON: ______ \ ______ (e.g., WAA/planned wetland)



NA (4a) Disturbance at site (SS)
NA (7a) Water level fluctuation

If both 4a and 7a = NA, record NA
If not, then record lowest score from 4a or 7a

= NA Disturbance Factors (DF)

1.0 (10b) Plant (basal) cover
1.0 (10c) Leaf litter and debris cover
0.5 (10f) Root structure
0.5 (10j) Vegetation persistence

Equation #7 = 0.5 Vegetation Characteristics (V)

1.0 (14c) Wetland slope → 14 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.75 Wetland Characteristics (W)

If DF = NA

If DF = NA

$\frac{DF + W}{2}$ = 0.7 Sediment Stabilization FCI

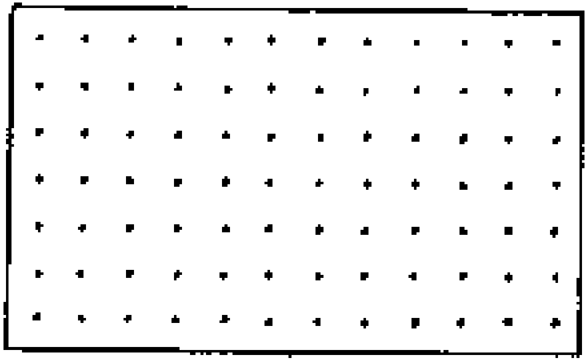
Equation #7:

$$\frac{\overset{1}{10b}\,(\overset{.5}{10f} + \overset{.5}{10j}) + \overset{1}{10c}\,(1 - 10b)}{2}$$

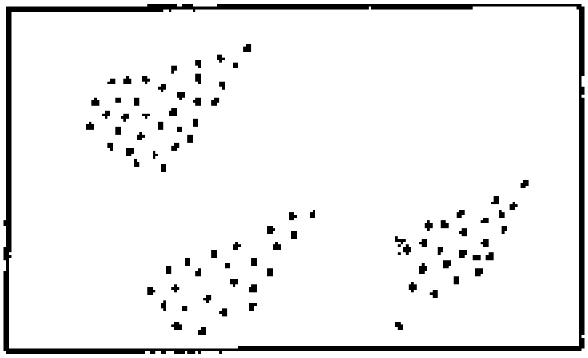
REGULAR

IRREGULAR

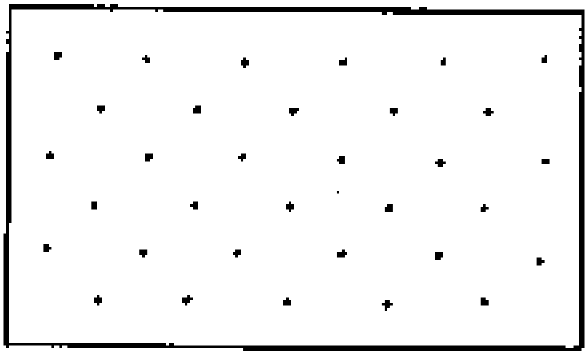
Uniform = individuals are regularly spaced.



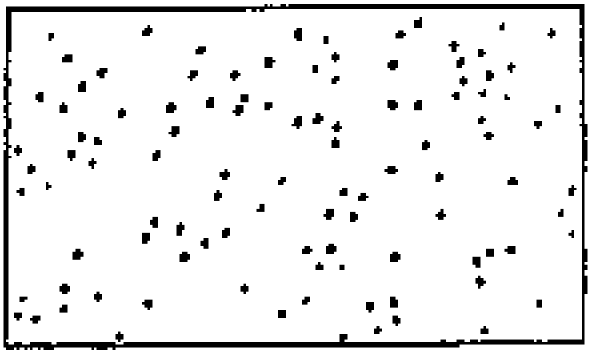
Uniform (row planting)



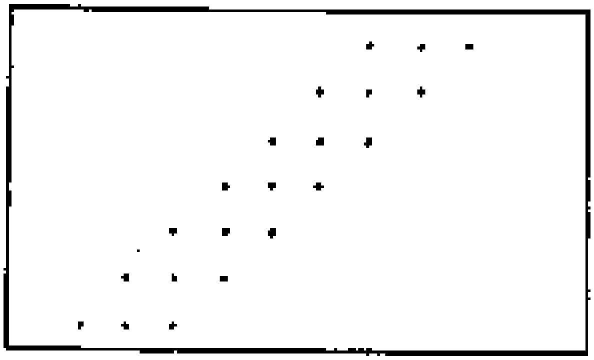
Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)



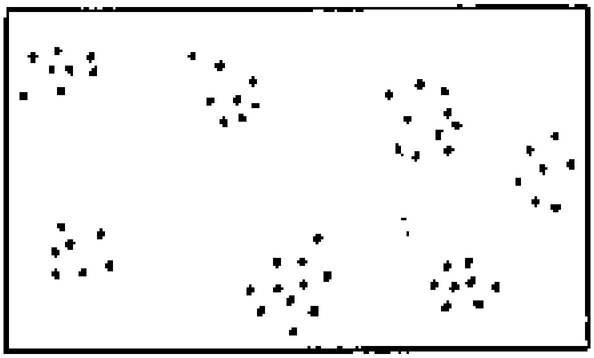
Uniform



Random
(all individuals are located
independantly of each other.)



Uniform (rows)



Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.8.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA) If both are NA, record NA
		WAA	Planned Wetland	

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent
Short nonpersistent ✓

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

__✓__ 10% _____ 5% _____ Other

Thus, an area must be at least __10%__ (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types	Calculation of Relative score $\frac{\text{\# of cover types}}{27}$
WAA : __1__ (e.g.) (1) Planned : _____ (4)	__0.04__ (example) (1/27=0.04) _____ (4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions. 1.0
b. Intermediate condition. 0.5
c. Predominantly 1 cover type. 0.1

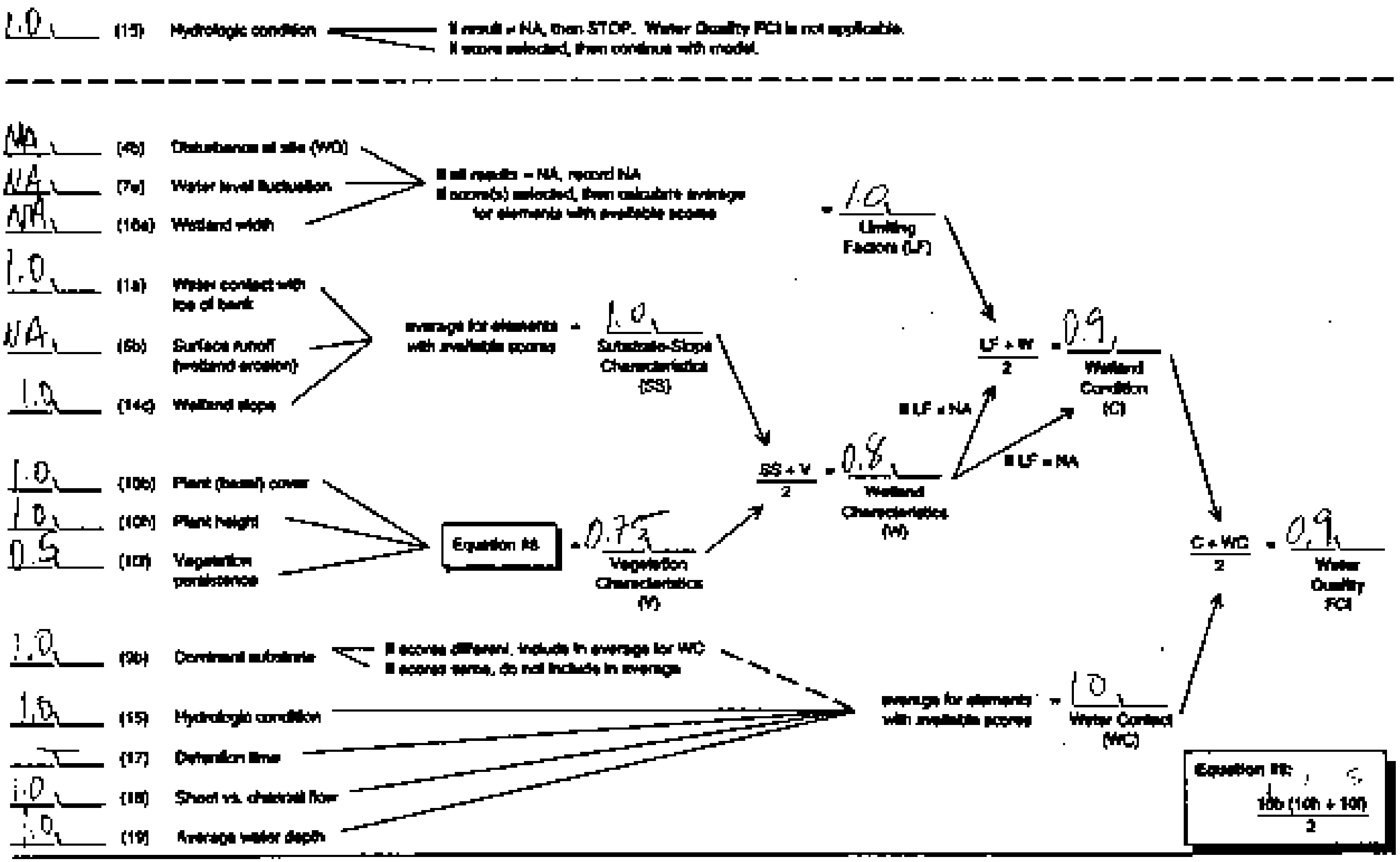
12c. Degree of cover type interspersion (See Figure A.8). [WL]

a. High. 1.0
b. Intermediate condition. 0.5
c. Low -OR- no interspersion (1 cover type) 0.1

Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270 / U.S. 15

Selected Scores (#) Element COMPARISON: ________ \ ________ (e.g., WAA/planned wetland)



W-28W

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270/U.S. 15

ASSESSMENT DATE(S): *WAA:* 7/10/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:

DS

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA: Frederick County, MD

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.6	
Water Quality	0.9	
Wildlife	0.2	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

PLANNED WETLAND GOALS:

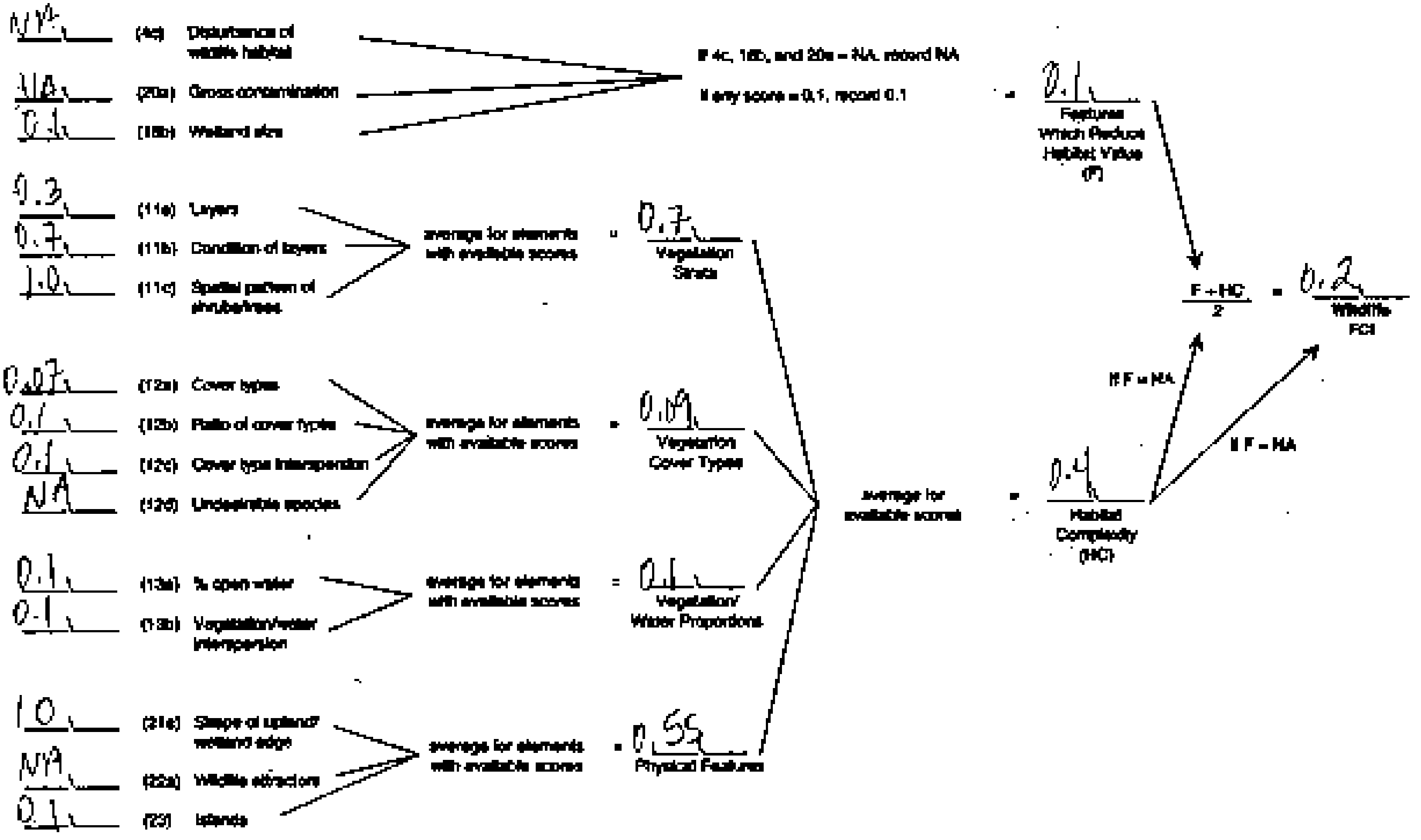
Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270/U.S 15

Selected Scores (#) Element

COMPARISON: ______ (e.g. WAA/planned wetland)



NA (4c) Disturbance of wildlife habitat

NA (20a) Gross contamination

0.1 (18b) Wetland size

If 4c, 18b, and 20a = NA, record NA

If any score = 0.1, record 0.1

= 0.1 Features Which Reduce Habitat Value (F)

0.3 (11a) Layers

0.7 (11b) Condition of layers

1.0 (11c) Spatial pattern of shrubs/trees

average for elements with available scores = 0.7 Vegetation Strata

0.07 (12a) Cover types

0.1 (12b) Ratio of cover types

0.1 (12c) Cover type interspersion

NA (12d) Undesirable species

average for elements with available scores = 0.09 Vegetation Cover Types

0.1 (13a) % open water

0.1 (13b) Vegetation/water interspersion

average for elements with available scores = 0.1 Vegetation/ Water Proportions

1.0 (21c) Slope of upland/ wetland edge

NA (22a) Wildlife attractors

0.1 (23) Islands

average for elements with available scores = 0.55 Physical Features

average for available scores = 0.4 Habitat Complexity (HC)

If F ≠ NA

If F = NA

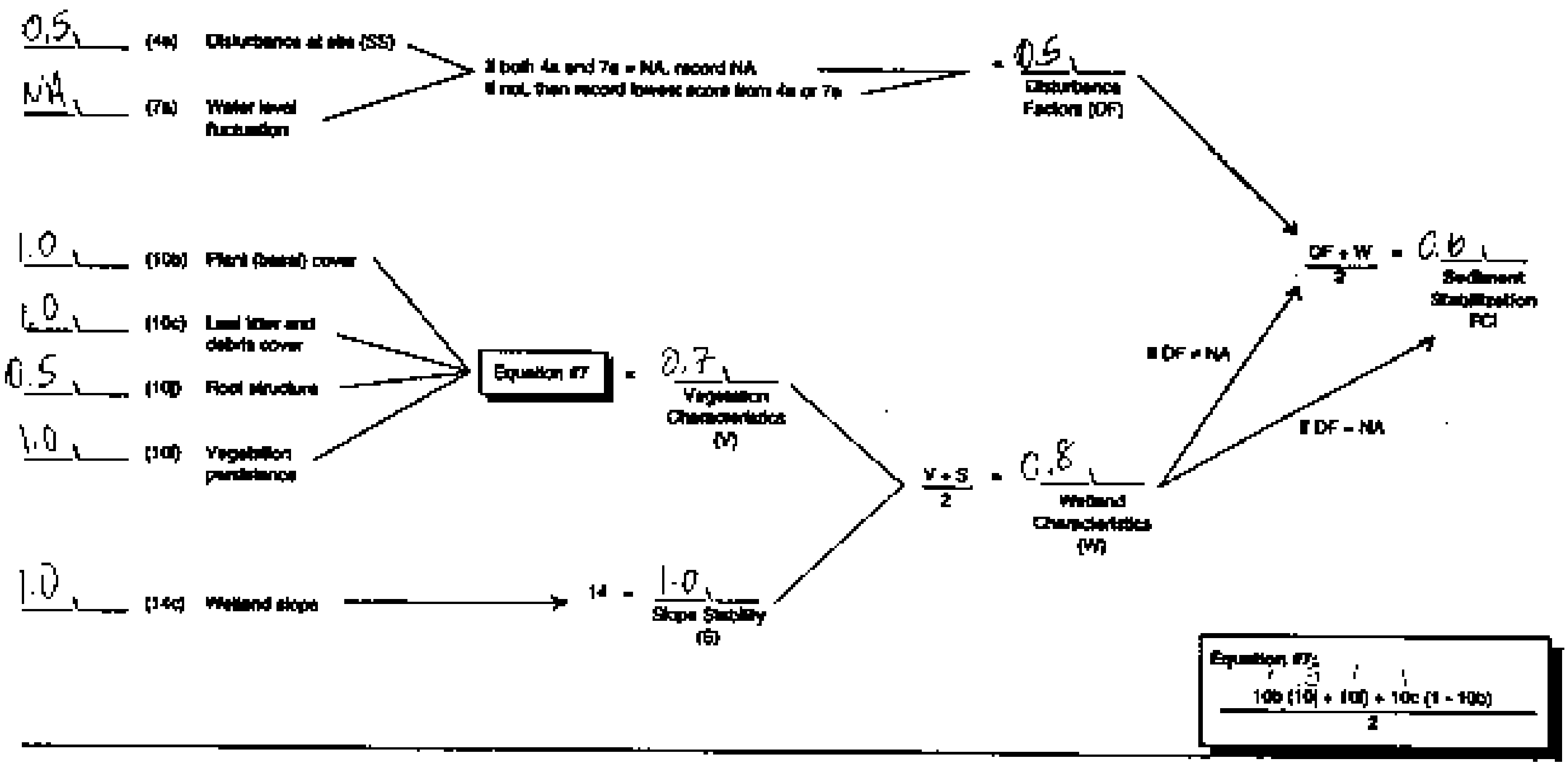
$\frac{F + HC}{2}$ = 0.2 Wildlife FCI

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270 / U.S. 15

Selected Scores | (#) | Element

*COMPARISON: \ (e.g., WAA/planned wetland)



0.5 (4a) Disturbance at site (SS)

NA (7a) Water level fluctuation

If both 4a and 7a = NA, record NA
If not, then record lowest score from 4a or 7a

= 0.5 Disturbance Factors (DF)

1.0 (10b) Plant (basal) cover

1.0 (10c) Leaf litter and debris cover

0.5 (10f) Root structure

1.0 (10f) Vegetation persistence

Equation #7 = 0.7 Vegetation Characteristics (V)

1.0 (14c) Wetland slope → 14 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.8 Wetland Characteristics (W)

If DF ≠ NA

If DF = NA

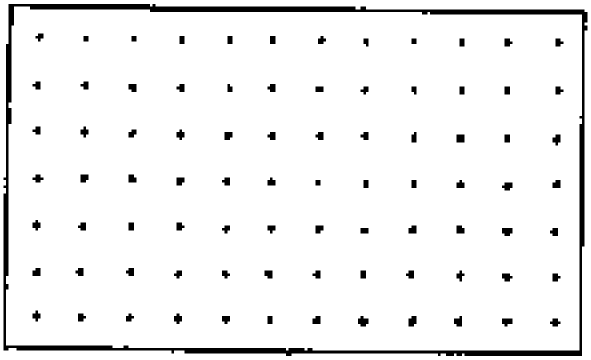
$\frac{DF + W}{2}$ = 0.6 Sediment Stabilization FCI

Equation #7:

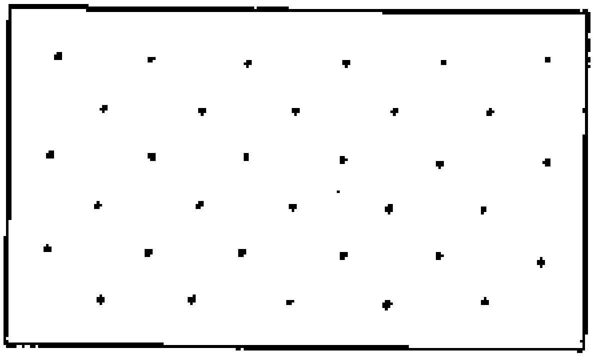
$$\frac{10b\ (10f + 10f) + 10c\ (1 - 10b)}{2}$$

REGULAR

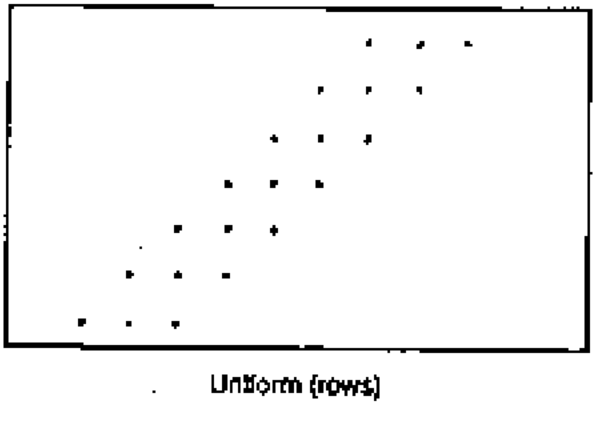
Uniform = Individuals are regularly spaced.



Uniform (row planting)

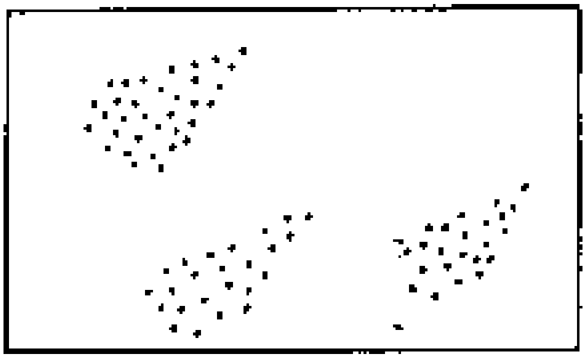


Uniform

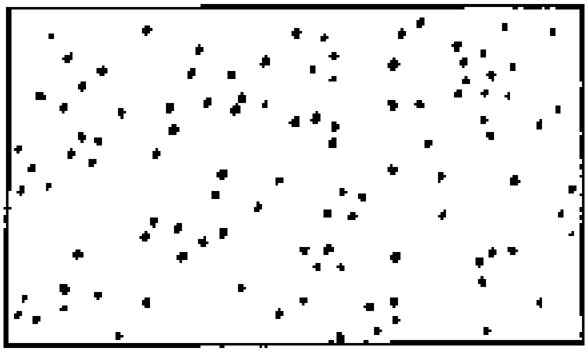


Uniform (rows)

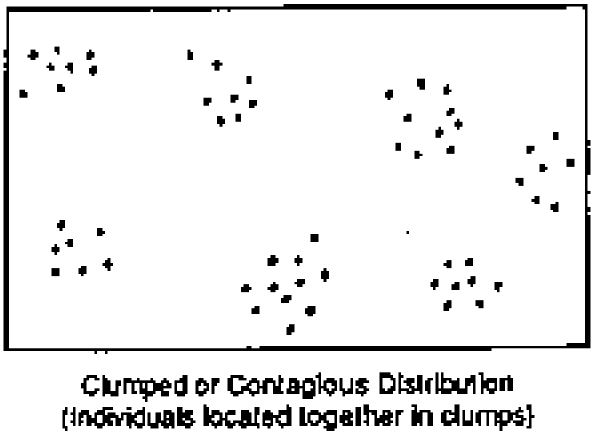
IRREGULAR



Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)



Random
(all individuals are located
independently of each other.)



Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA) If both are NA, record NA
		WAA	Planned Wetland	

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent
Short nonpersistent ✓

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous ✓
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

✓ 10% _____ 5% _____ Other

Thus, an area must be at least 10 % (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types	Calculation of Relative score $\frac{\text{\# of cover types}}{27}$
WAA: 2 (e.g.) (1)	0.07 (example) (1/27=0.04)
Planned: _____ (4)	_____ (4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions. 1.0
b. Intermediate condition. 0.5
c. Predominantly 1 cover type. 0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

a. High. 1.0
b. Intermediate condition. 0.5
c. Low -OR- no interspersion (1 cover type) 0.1

Calculation of WATER QUALITY FCI

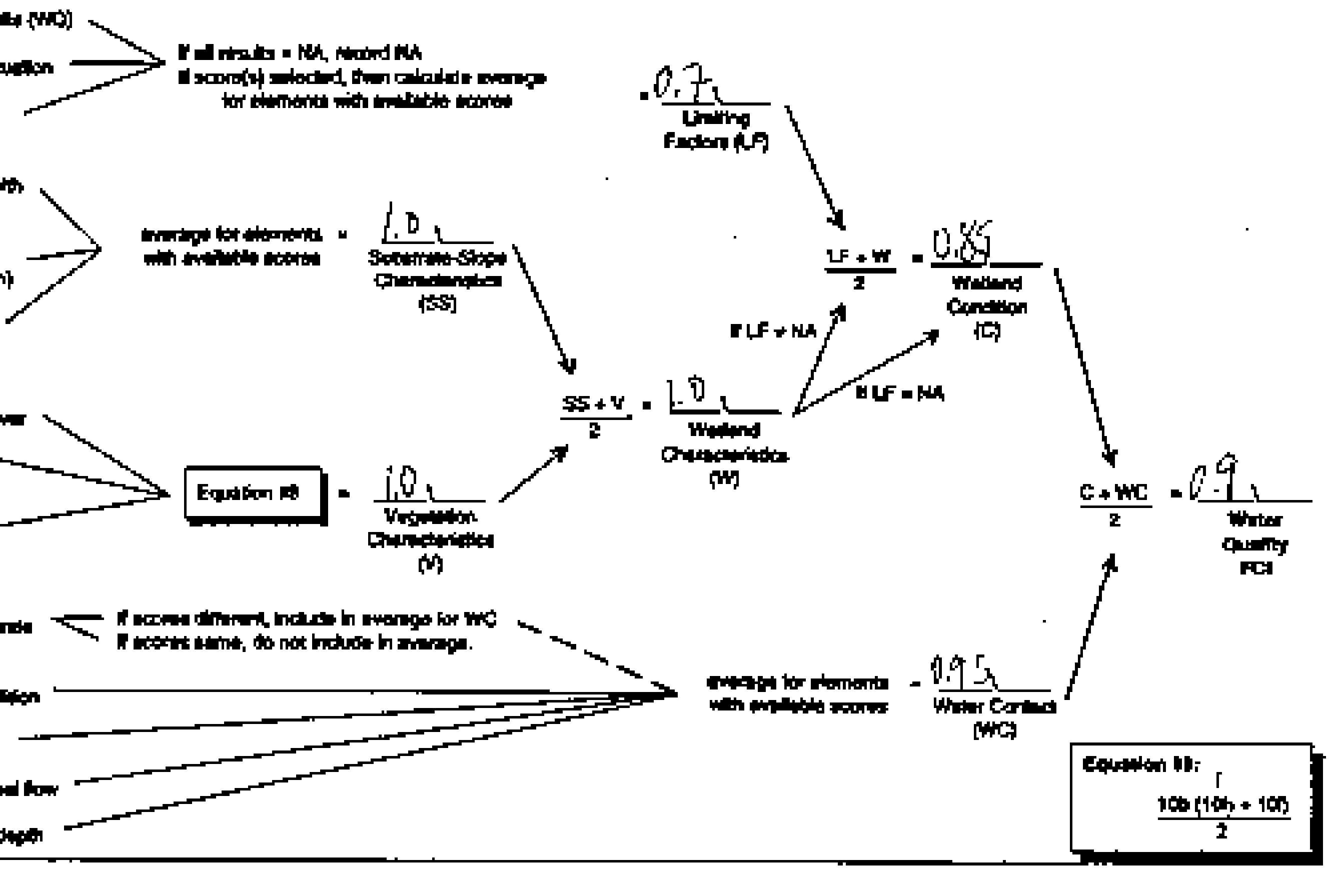
PROJECT TITLE: I-270 | U.S. 15

COMPARISON: ________ \ ________ (e.g., WAA/planned wetland)

Selected Scores	(#)	Element
0.8	(15)	Hydrologic condition

If result = NA, then STOP. Water Quality FCI is not applicable.
If score selected, then continue with model.

Selected Scores	(#)	Element
0.5	(4b)	Disturbance at site (WQ)
NA	(7a)	Water level fluctuation
NA	(10a)	Wetland width
1.0	(1a)	Water contact with toe of bank
NA	(5b)	Surface runoff (wetland erosion)
1.0	(14c)	Wetland slope
1.0	(10b)	Plant (basal) cover
1.0	(10h)	Plant height
1.0	(10f)	Vegetation persistence
1.0	(9b)	Dominant substrate
0.8	(15)	Hydrologic condition
	(17)	Detention time
1.0	(18)	Sheet vs. channel flow
1.0	(19)	Average water depth



= 0.7 Limiting Factors (LF)

1.0 Substrate-Slope Characteristics (SS)

1.0 Vegetation Characteristics (V)

1.0 Wetland Characteristics (W)

0.85 Wetland Condition (C)

0.95 Water Contact (WC)

0.9 Water Quality FCI

Equation #8:

$$\sqrt{\frac{10b\,(10h + 10f)}{2}}$$

W-46E PEM

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270/U.S 15

ASSESSMENT DATE(S): *WAA:* 7/13/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
DS, BS

LOCATION (e.g., City, County, State, Waterway/Watershed):
WAA: Montgomery County MD
planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.9	
Water Quality	0 9	
Wildlife	0.3	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

PLANNED WETLAND GOALS:

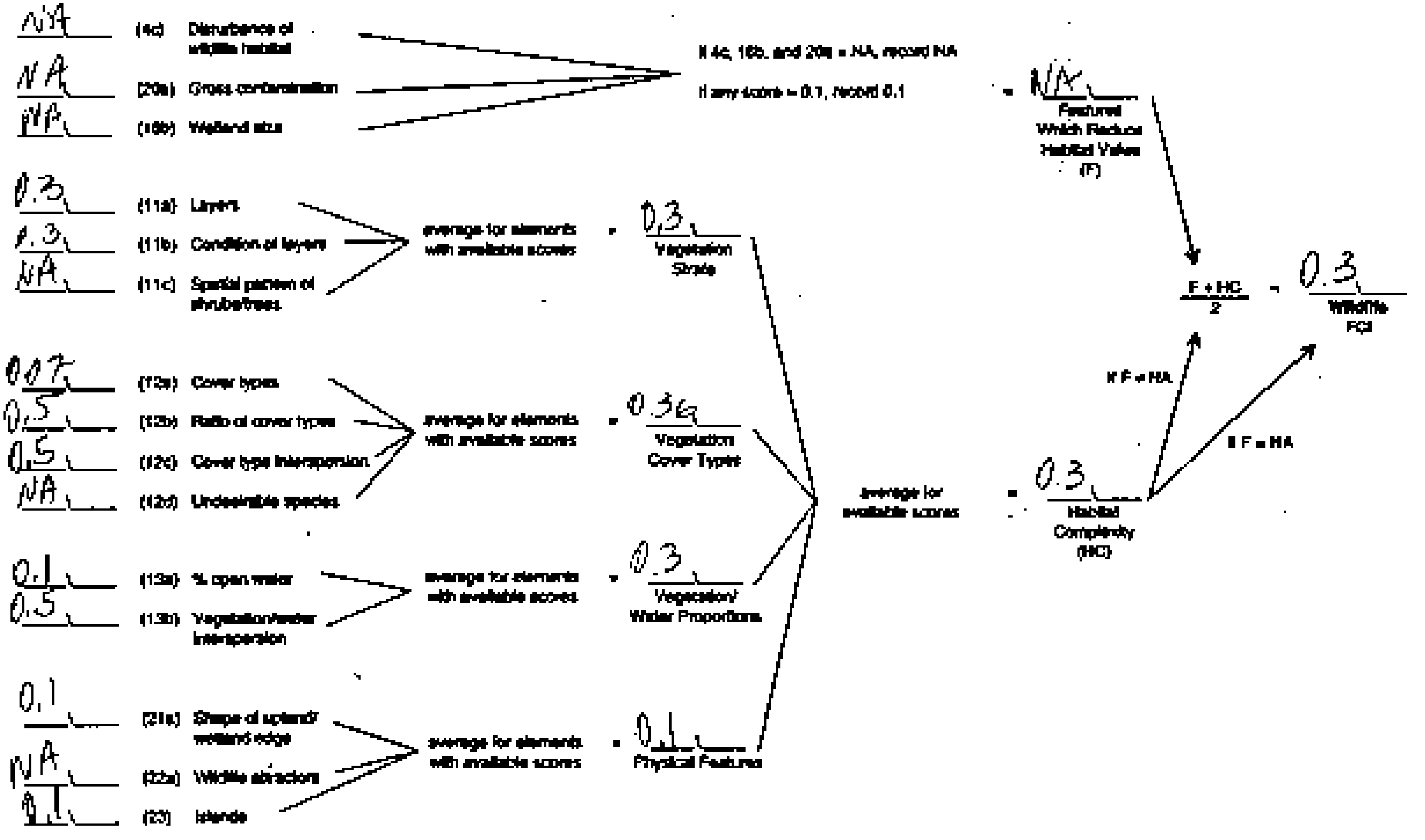
Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270 | 0.3 15

Selected Scores (√) Element

COMPARISON: ______ \ ______ (e.g., WAA/planned wetland)



NA (4c) Disturbance of wildlife habitat
NA (20a) Gross contamination
NA (16b) Wetland size

If 4c, 16b, and 20a = NA, record NA
If any score = 0.1, record 0.1
= NA Features Which Reduce Habitat Value (F)

0.3 (11a) Layers
0.3 (11b) Condition of layers
NA (11c) Spatial pattern of shrubs/trees
average for elements with available scores = 0.3 Vegetation Strata

0.07 (12a) Cover types
0.5 (12b) Ratio of cover types
0.5 (12c) Cover type interspersion
NA (12d) Undesirable species
average for elements with available scores = 0.36 Vegetation Cover Types

0.1 (13a) % open water
0.5 (13b) Vegetation/water interspersion
average for elements with available scores = 0.3 Vegetation/ Water Proportions

0.1 (21a) Shape of upland/ wetland edge
NA (22a) Wildlife attractors
0.1 (23) Islands
average for elements with available scores = 0.1 Physical Features

average for available scores = 0.3 Habitat Complexity (HC)

If F ≠ NA
If F = NA

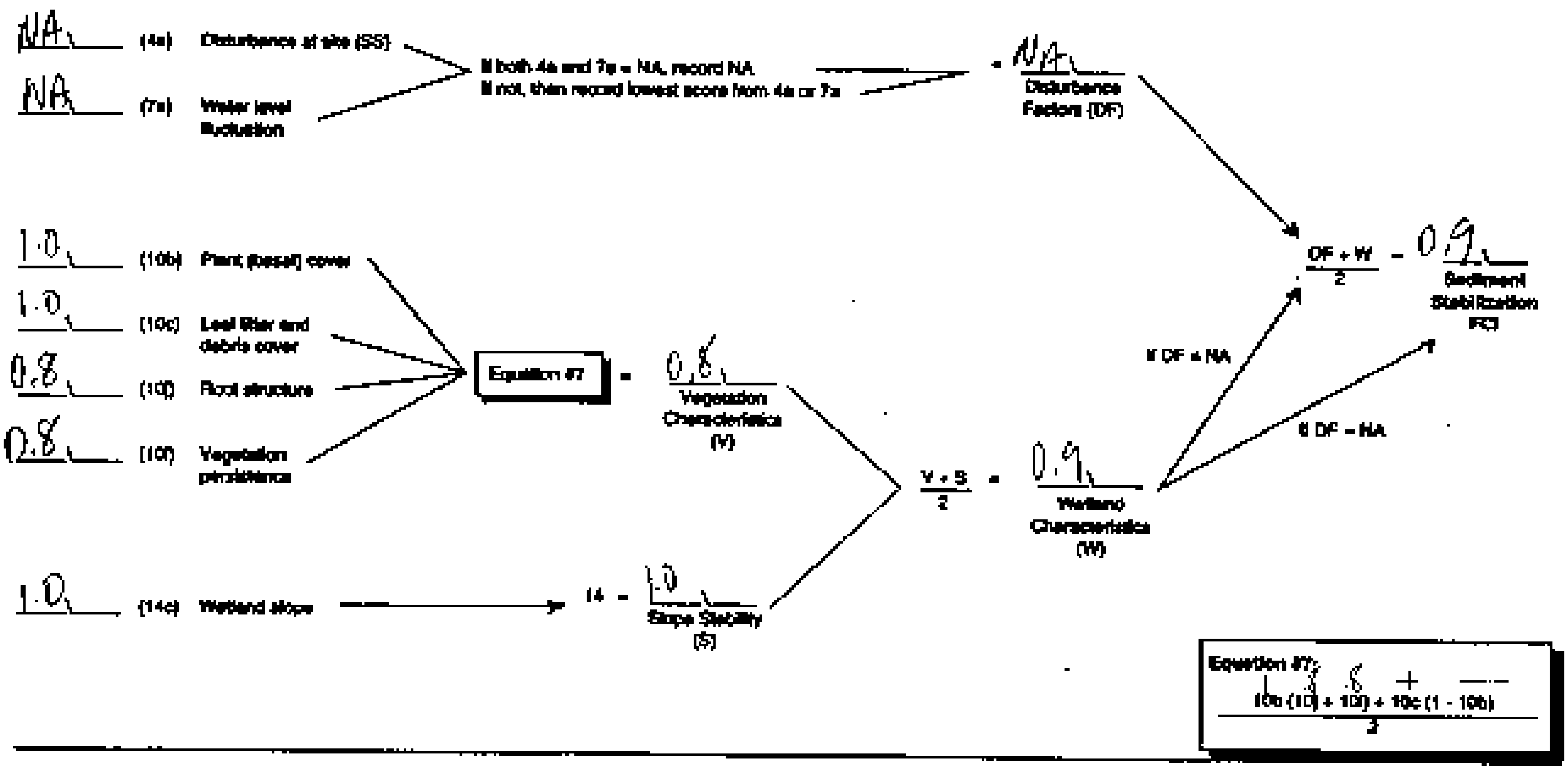
$\frac{F + HC}{2}$ = 0.3 Wildlife FCI

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270/U.S. 15

Selected Score (#) Element

*COMPARISON: ________ (e.g., WAA/planned wetland)



NA (4a) Disturbance at site (SS)

NA (7a) Water level fluctuation

If both 4a and 7a = NA, record NA
If not, then record lowest score from 4a or 7a

= NA Disturbance Factors (DF)

1.0 (10b) Plant (basal) cover

1.0 (10c) Leaf litter and debris cover

0.8 (10f) Root structure

0.8 (10g) Vegetation persistence

Equation #7 = 0.8 Vegetation Characteristics (V)

1.0 (14c) Wetland slope → 14 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.9 Wetland Characteristics (W)

If DF ≠ NA

If DF = NA

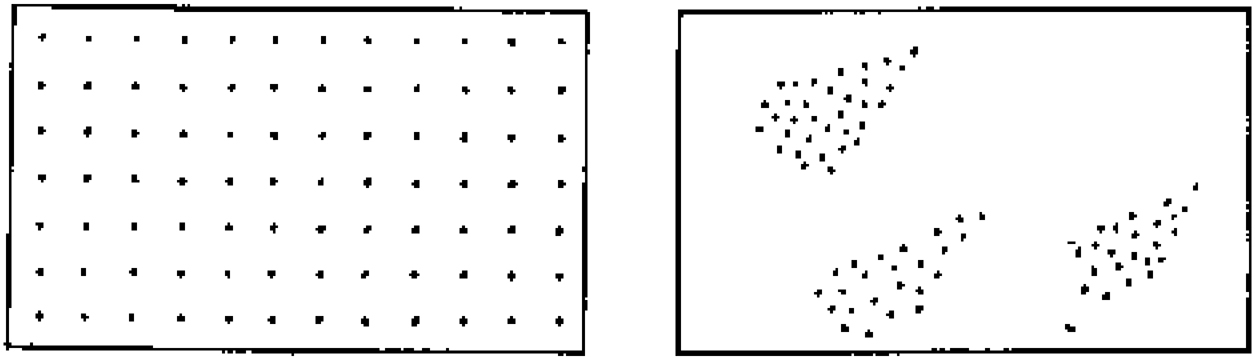
$\frac{DF + W}{2}$ = 0.9 Sediment Stabilization FCI

Equation #7: $\frac{\overset{1}{10b}\ (\overset{.8}{10f} + \overset{.8}{10g}) \overset{+}{+} 10c\ (1 - \overset{—.—}{10b})}{2}$

REGULAR

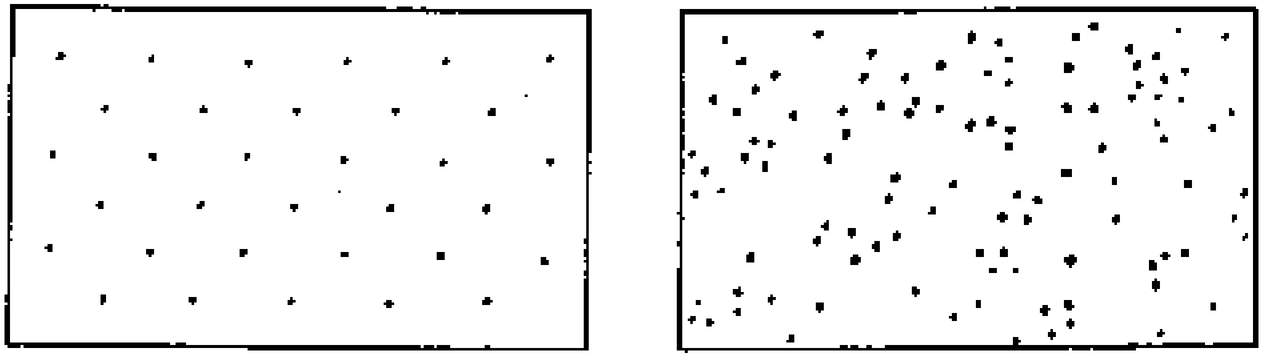
IRREGULAR

Uniform = individuals are regularly spaced.



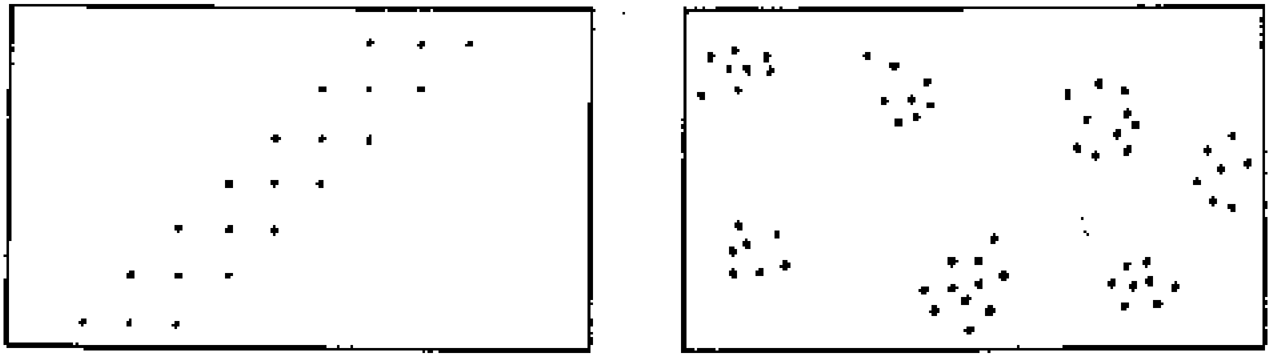
Uniform (row planting)

Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)



Uniform

Random
(all individuals are located
independently of each other.)



Uniform (rows)

Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS: WAA	SELECTED SCORES FOR ELEMENTS: Planned Wetland	DIFFERENCE IN SCORES (Planned - WAA) If both are NA, record NA

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent ✓
Tall nonpersistent
Short nonpersistent ✓

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

__✓__ 10% _____ 5% _____ Other

Thus, an area must be at least __10%__ % (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types		Calculation of Relative score $\frac{\text{\# of cover types}}{27}$	
	(e.g.)		(example)
WAA	2 (1)	0.07	(1/27=0.04)
Planned	____ (4)	____	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions.	1.0
b. Intermediate condition.	0.5
c. Predominantly 1 cover type.	0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

a. High.	1.0
b. Intermediate condition.	0.5
c. Low -OR- no interspersion (1 cover type)	0.1

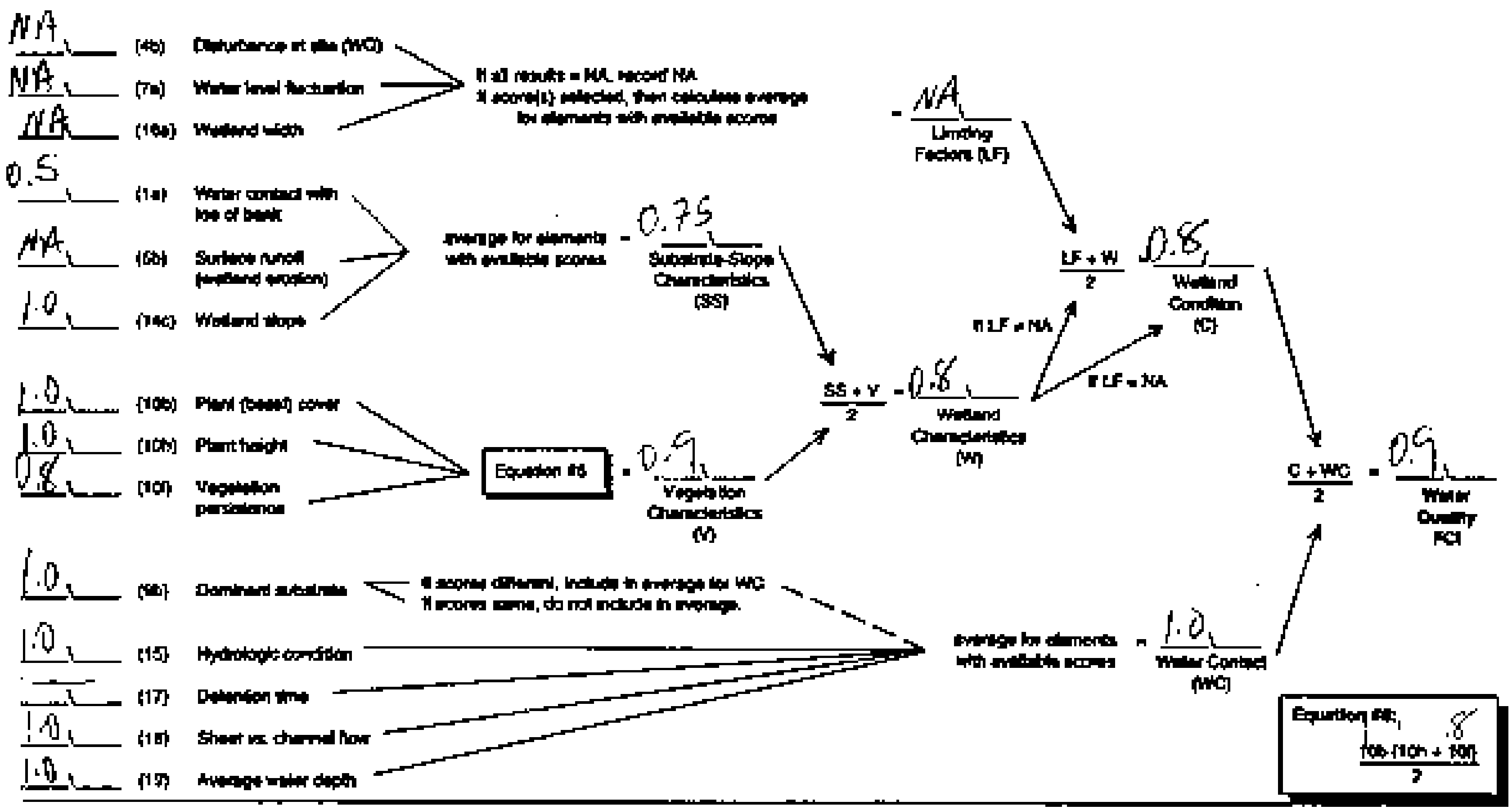
Calculation of WATER QUALITY FCI

PROJECT TITLE: I. 270/U.S. 15

Selected Scores (#) Element

COMPARISON: ______ \ ______ (e.g., WAA/planned wetland)

1.0 \ (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.



NA \ (4b) Disturbance at site (WC)
NA \ (7a) Water level fluctuation
NA (16a) Wetland width

If all results = NA, record NA. If score(s) selected, then calculate average for elements with available scores = NA Limiting Factors (LF)

0.5 \ (1a) Water contact with toe of bank
NA \ (5b) Surface runoff (wetland erosion)
1.0 \ (14c) Wetland slope

average for elements with available scores = 0.75 Substrate-Slope Characteristics (SS)

1.0 \ (10b) Plant (basal) cover
1.0 \ (10h) Plant height
0.8 \ (10i) Vegetation persistence

Equation #8 = 0.9 \ Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 0.8 \ Wetland Characteristics (W)

If LF = NA → $\frac{LF + W}{2}$ = 0.8 \ Wetland Condition (C)

If LF = NA

1.0 \ (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
1.0 \ (15) Hydrologic condition
\ (17) Detention time
1.0 \ (18) Sheet vs. channel flow
1.0 \ (19) Average water depth

average for elements with available scores = 1.0 \ Water Contact (WC)

$\frac{C + WC}{2}$ = 0.9 \ Water Quality FCI

Equation #8: .8

$\frac{10b \cdot (10h + 10i)}{2}$

W-46E PSS

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270 | U.S 15

ASSESSMENT DATE(S): *WAA:* 7/13/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:

DS, BS

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA: Montgomery County, MD

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.8	
Water Quality	0.7	
Wildlife	0.6	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

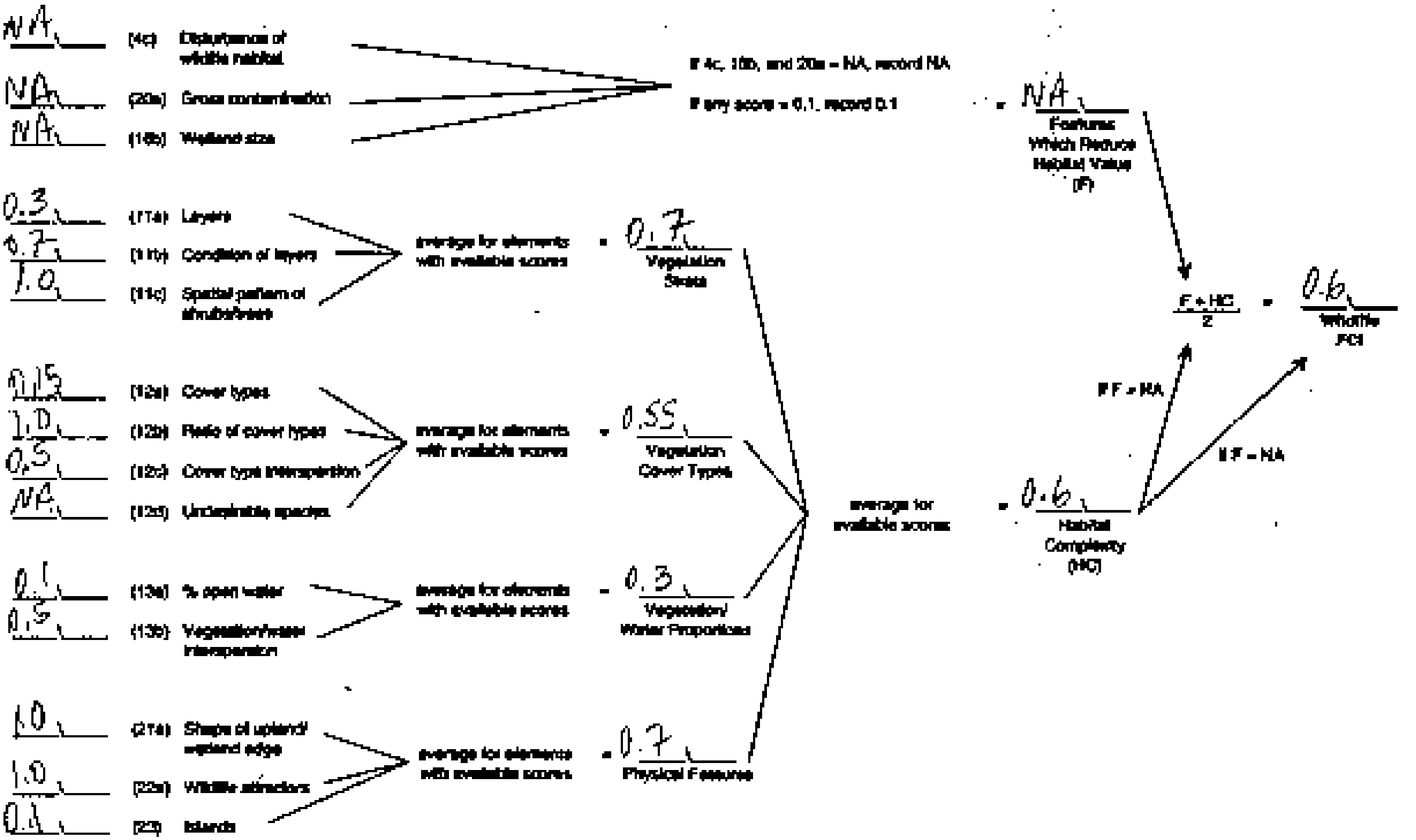
Explanations:

PLANNED WETLAND GOALS:
Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE I-270/US.15

COMPARISON ______________ / ______________ (e.g., WAA/planned wetland)



Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
NA	(16b)	Wetland size
0.3	(11a)	Layers
0.7	(11b)	Condition of layers
1.0	(11c)	Spatial pattern of shrubs/trees
0.15	(12a)	Cover types
1.0	(12b)	Ratio of cover types
0.5	(12c)	Cover type interspersion
NA	(12d)	Undesirable species
0.1	(13a)	% open water
0.5	(13b)	Vegetation/water interspersion
1.0	(21a)	Shape of upland/wetland edge
1.0	(22a)	Wildlife attractors
0.1	(23)	Islands

If 4c, 16b, and 20a = NA, record NA

If any score = 0.1, record 0.1

= NA Features Which Reduce Habitat Value (F)

average for elements with available scores = 0.7 Vegetation Strata

average for elements with available scores = 0.55 Vegetation Cover Types

average for elements with available scores = 0.3 Vegetation/Water Proportions

average for elements with available scores = 0.7 Physical Features

average for available scores = 0.6 Habitat Complexity (HC)

If F = NA

If F = NA

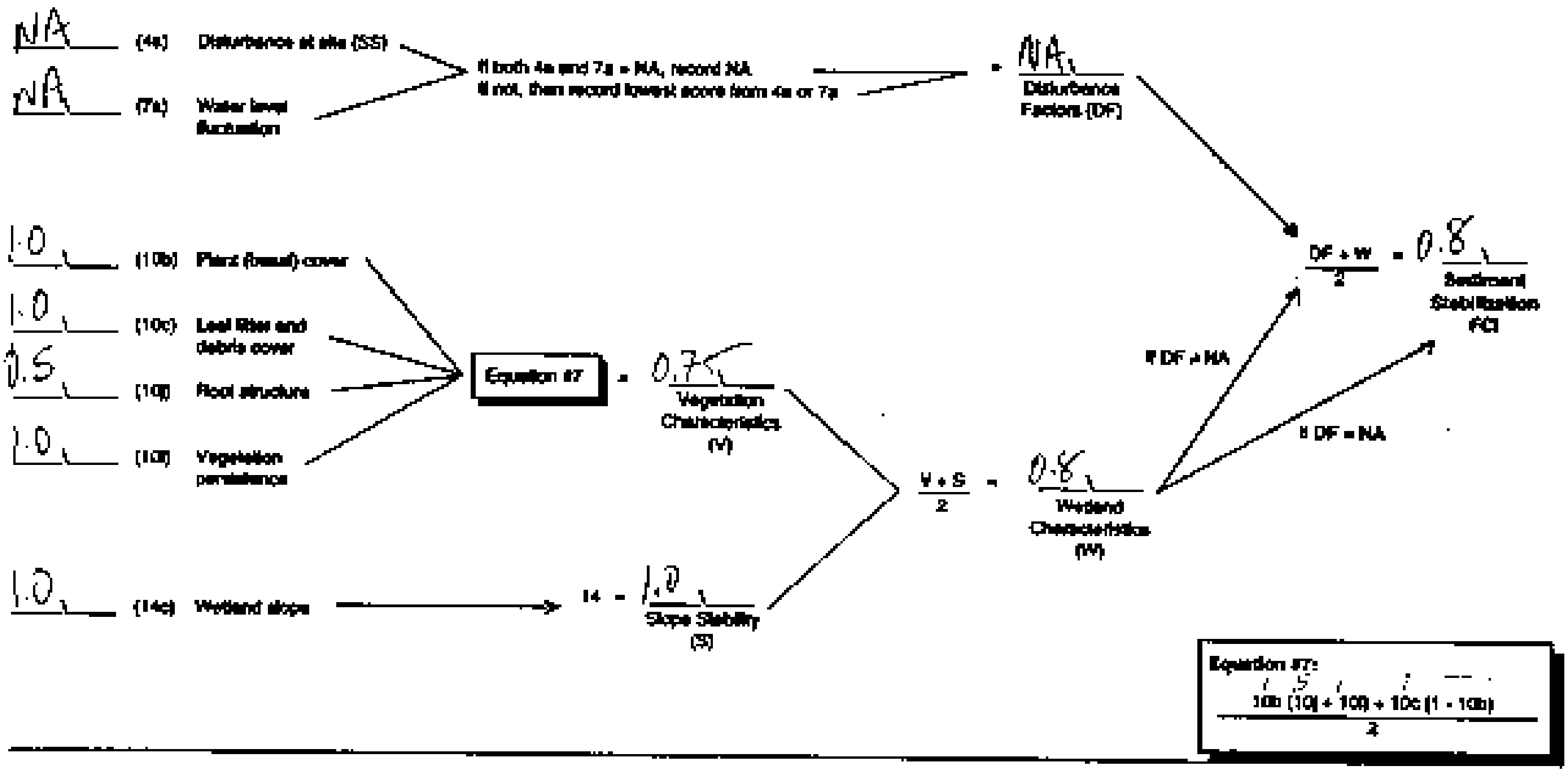
$\frac{F + HC}{2}$ = 0.6 Wildlife FCI

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270/US 15

Selected Score (#) Element

*COMPARISON: ______________________ (e.g., WAA/planned wetland)



NA (4a) Disturbance at site (SS)

NA (7a) Water level fluctuation

If both 4a and 7a = NA, record NA
If not, then record lowest score from 4a or 7a

= NA Disturbance Factors (DF)

1.0 (10b) Plant (basal) cover

1.0 (10c) Leaf litter and debris cover

0.5 (10j) Root structure

1.0 (10f) Vegetation persistence

Equation #7 = 0.75 Vegetation Characteristics (V)

1.0 (14c) Wetland slope → 14 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.8 Wetland Characteristics (W)

If DF ≠ NA

If DF = NA

$\frac{DF + W}{2}$ = 0.8 Sediment Stabilization FCI

Equation #7:

$$\frac{\overset{1}{10b}\,(\overset{.5}{10j} + \overset{1}{10f}) + \overset{1}{10c}\,(1 - 10b)}{2}$$

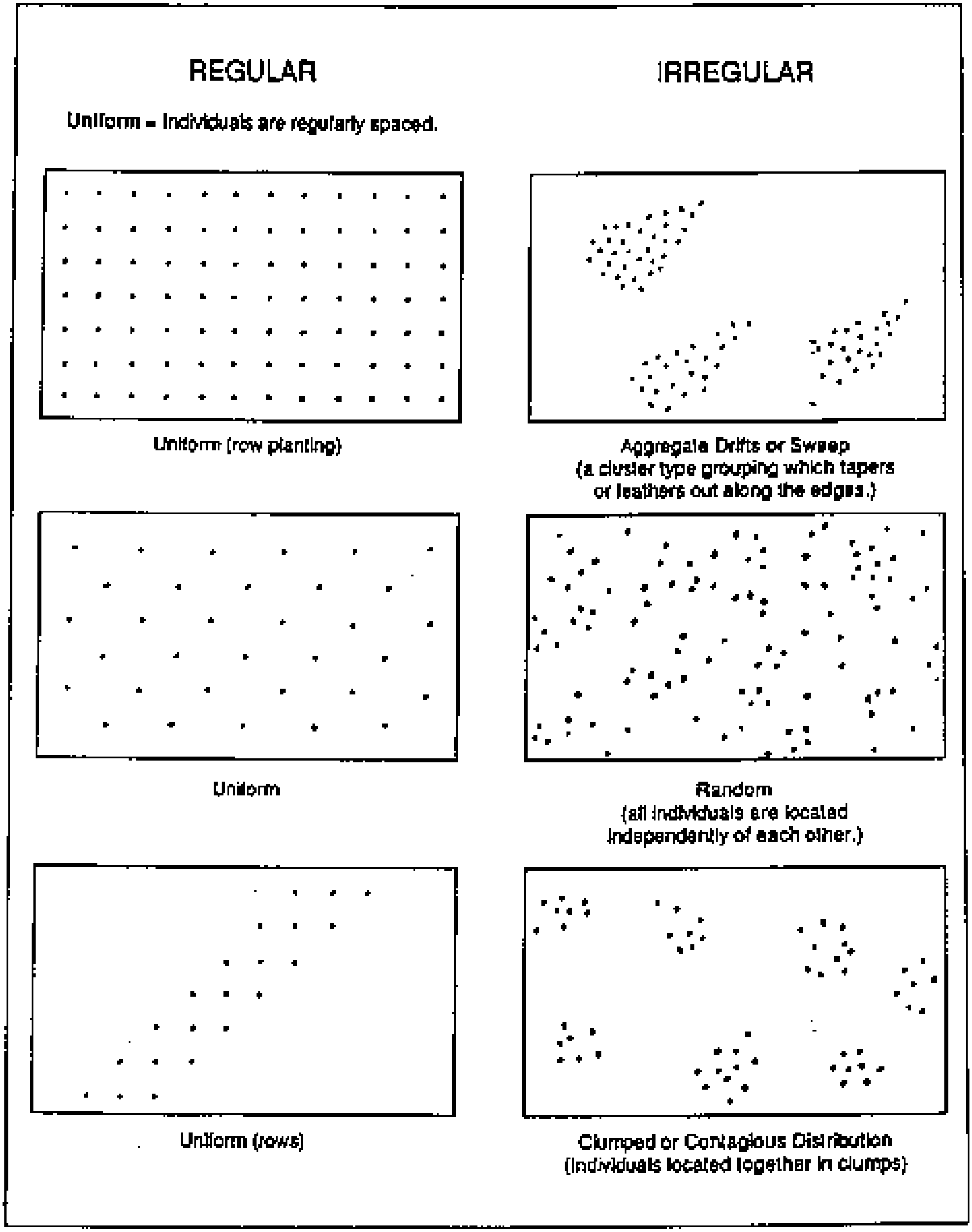


Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA)
		WAA	Planned Wetland	If both are NA, record NA

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent ✓
Short nonpersistent ✓

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous ✓
Bushy deciduous ✓
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs ✓
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation.

✓ 10% _____ 5% _____ Other

Thus, an area must be at least 10% (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland. # of cover types		Calculation of Relative score # of cover types / 27	
			(example)
WAA	: 4 (1)	0.15	(1/27=0.04)
Planned	: _____ (4)	_____	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions.	1.0
b. Intermediate condition.	0.5
c. Predominantly 1 cover type.	0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

a. High	1.0
b. Intermediate condition	0.5
c. Low -OR- no interspersion (1 cover type)	0.1

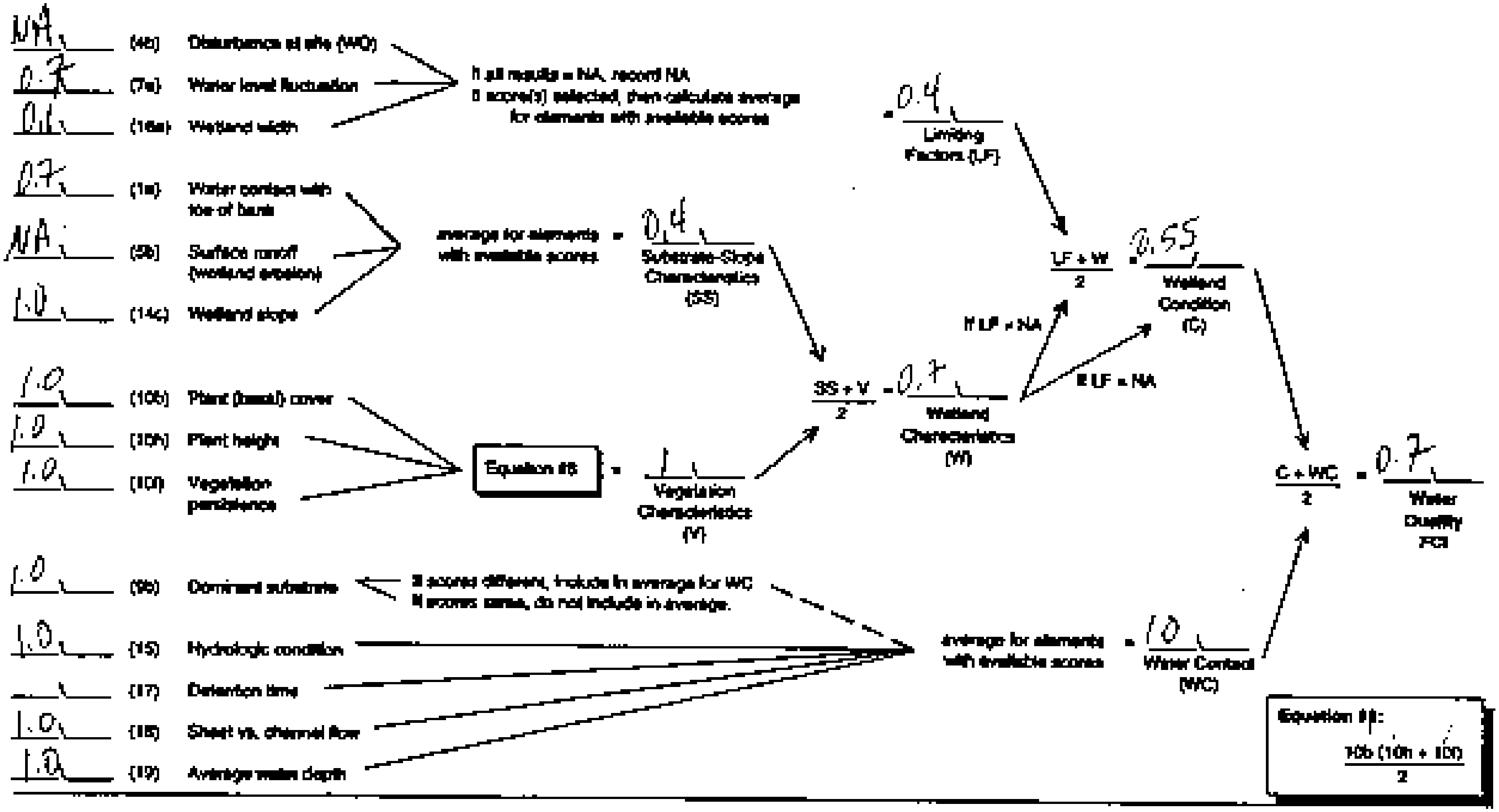
Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270 / U.S. 15

Selected Scores (#) Element

COMPARISON: ______ \ ______ (e.g., WAA/planned wetland)

1.0 \ (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.



NA \ (4b) Disturbance at site (WQ)
0.7 \ (7a) Water level fluctuation
0.1 \ (16a) Wetland width

If all results = NA, record NA. If score(s) selected, then calculate average for elements with available scores = 0.4 \ Limiting Factors (LF)

0.7 \ (1a) Water contact with toe of bank
NA \ (5b) Surface runoff (wetland erosion)
1.0 \ (14c) Wetland slope

average for elements with available scores = 0.4 \ Substrate-Slope Characteristics (SS)

1.0 \ (10b) Plant (basal) cover
1.0 \ (10h) Plant height
1.0 \ (10l) Vegetation persistence

Equation #8 = 1 \ Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 0.7 \ Wetland Characteristics (W)

If LF ≠ NA: $\frac{LF + W}{2}$ = 0.55 \ Wetland Condition (C)

If LF = NA

1.0 \ (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
1.0 \ (15) Hydrologic condition
\ (17) Detention time
1.0 \ (18) Sheet vs. channel flow
1.0 \ (19) Average water depth

average for elements with available scores = 1.0 \ Water Contact (WC)

$\frac{C + WC}{2}$ = 0.7 \ Water Quality FCI

Equation #8:

$\frac{10b\ (10h + 10l)}{2}$

W.48W

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270/U.S. 15

ASSESSMENT DATE(S): *WAA:* 6/20/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
DS

LOCATION (e.g., City, County, State, Waterway/Watershed):
WAA: Montgomery County, MD
planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.7	
Water Quality	0.8	
Wildlife	0.	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

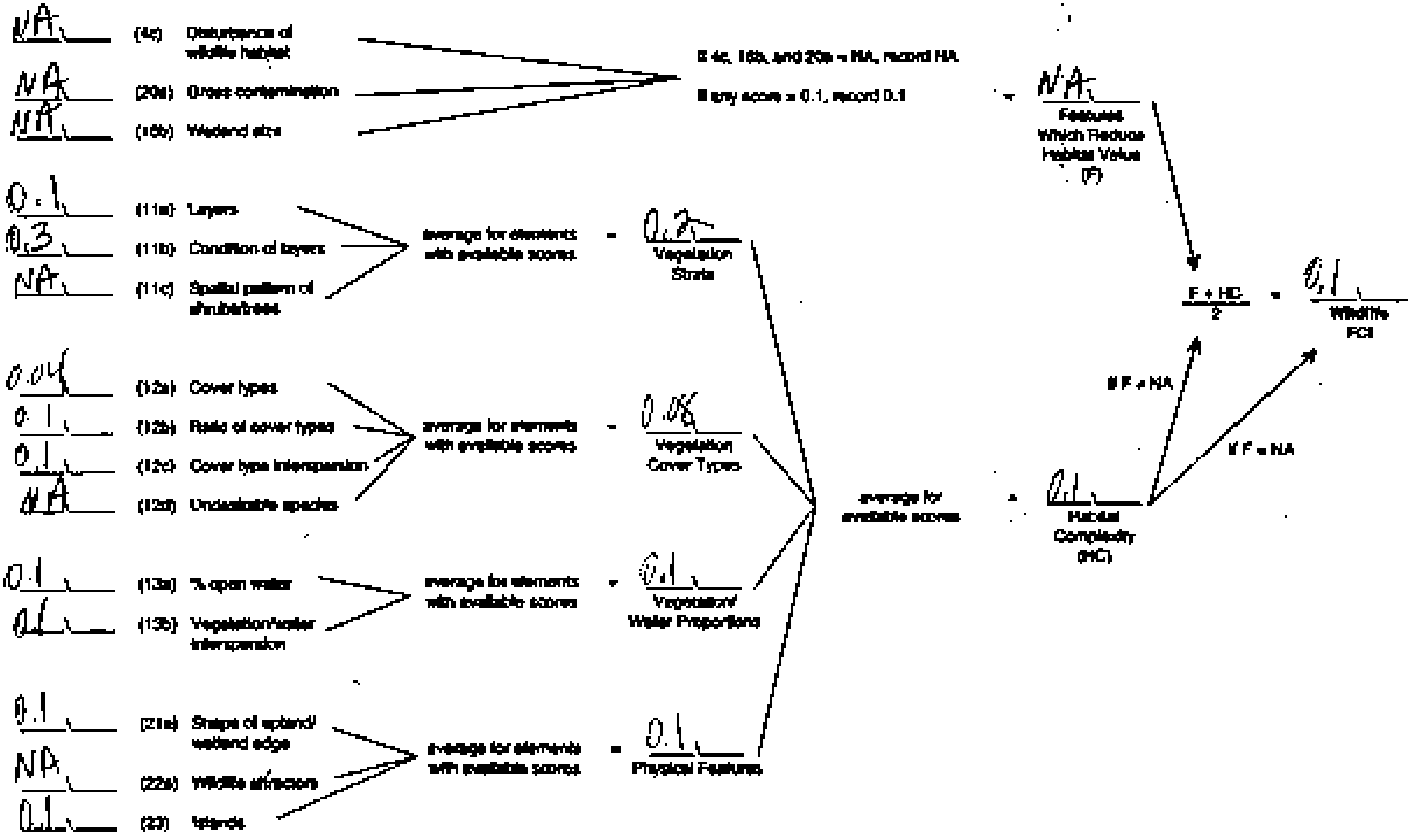
planned wetland:

...cover sheet continues on reverse

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270 / U.S. 15

COMPARISON: ______________ \ ______________ (e.g., WAA/planned wetland)



Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
NA	(16b)	Wetland size
0.1	(11a)	Layers
0.3	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
0.04	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12c)	Cover type interspersion
NA	(12d)	Undesirable species
0.1	(13a)	% open water
0.1	(13b)	Vegetation/water interspersion
0.1	(21a)	Shape of upland/wetland edge
NA	(22a)	Wildlife attractions
0.1	(23)	Islands

If 4c, 16b, and 20a = NA, record NA

If any score = 0.1, record 0.1

= NA Features Which Reduce Habitat Value (F)

average for elements with available scores = 0.2 Vegetation Strata

average for elements with available scores = 0.08 Vegetation Cover Types

average for elements with available scores = 0.1 Vegetation/ Water Proportions

average for elements with available scores = 0.1 Physical Features

average for available scores = 0.1 Habitat Complexity (HC)

If F ≠ NA

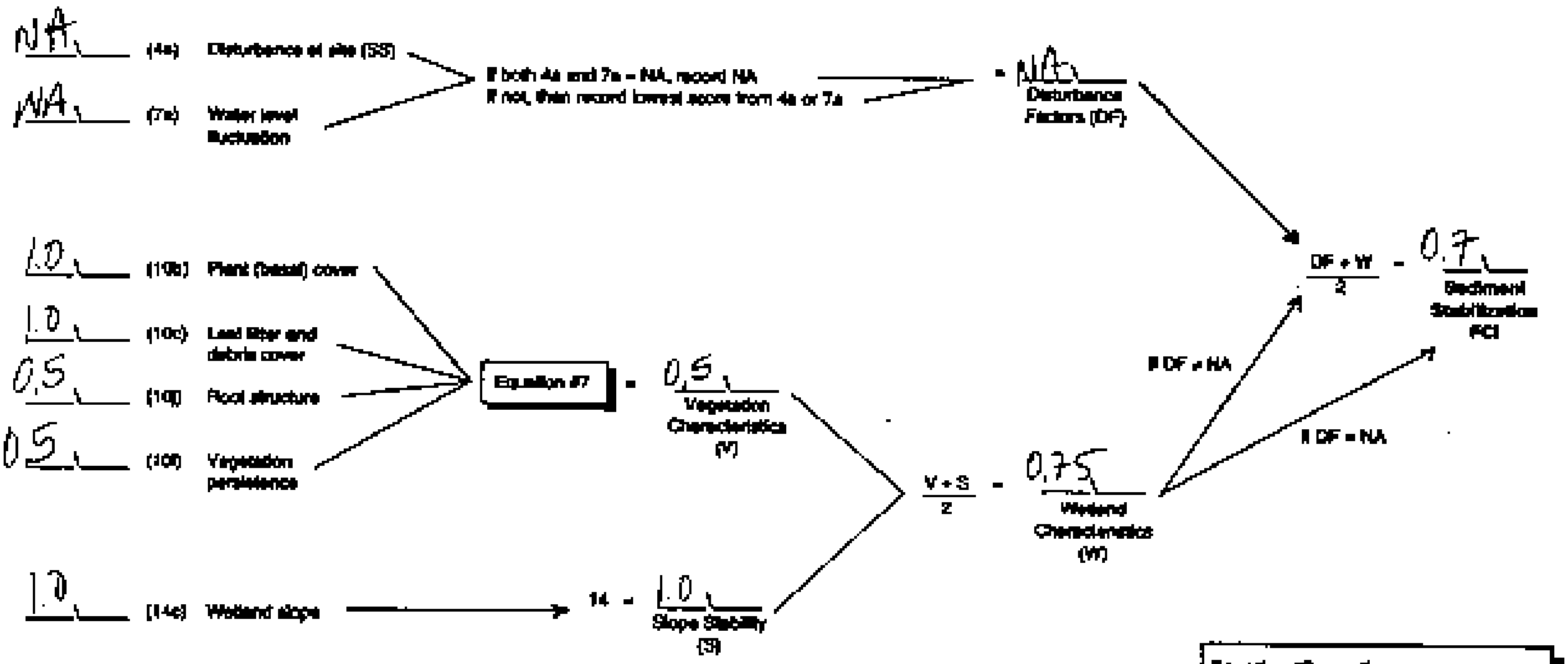
If F = NA

$\frac{F + HC}{2}$ = 0.1 Wildlife FCI

Calculation of **SEDIMENT STABILIZATION FCI**

PROJECT TITLE: I-270/U.S. 15

Selected Scores (#) Element *COMPARISON:__________________(e.g., WAA/planned wetland)



NA (4a) Disturbance at site (SS)

NA (7a) Water level fluctuation

If both 4a and 7a = NA, record NA
If not, then record lowest score from 4a or 7a

= NA Disturbance Factors (DF)

1.0 (10b) Plant (basal) cover

1.0 (10c) Leaf litter and debris cover

0.5 (10i) Root structure

0.5 (10f) Vegetation persistence

Equation #7 = 0.5 Vegetation Characteristics (V)

1.0 (14c) Wetland slope → 14 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.75 Wetland Characteristics (W)

If DF ≠ NA

If DF = NA

$\frac{DF + W}{2}$ = 0.7 Sediment Stabilization FCI

Equation #7 1 .5 .5 1

$$\frac{10b\,(10i + 10f) + 10c\,(1 - 10b)}{2}$$

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA)
		WAA	Planned Wetland	If both are NA, record NA

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent
Short nonpersistent

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

✓ 10% _____ 5% _____ Other

Thus, an area must be at least 10% (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types		Calculation of Relative score (# of cover types / 27)	
WAA : 1	(e.g.) (1)	0.04	(example) (1/27=0.04)
Planned : _____	(4)	_____	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions. 1.0
b. Intermediate condition. 0.5
c. Predominantly 1 cover type. 0.1

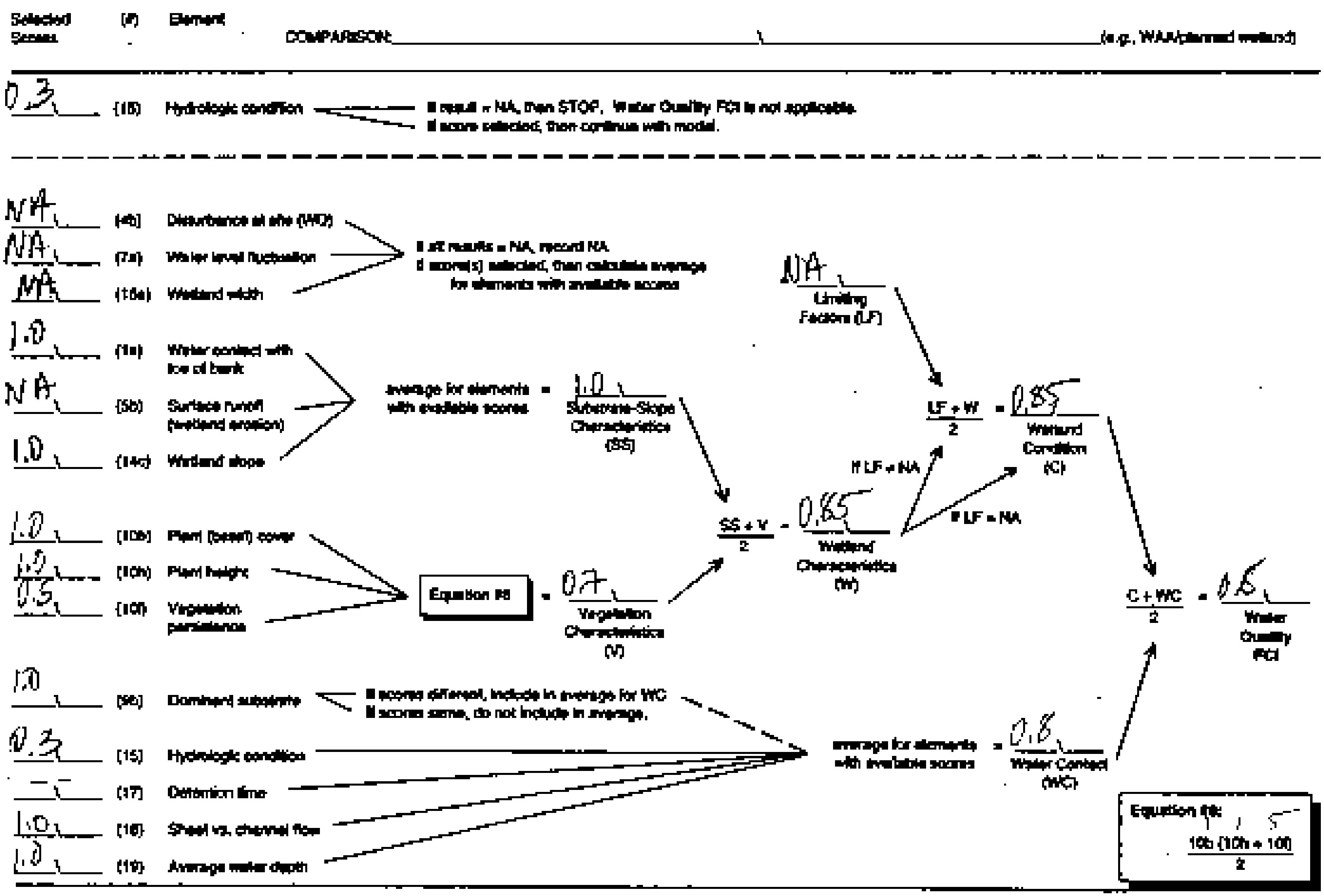
12c. Degree of cover type interspersion (See Figure A.8). [WL]

a. High. 1.0
b. Intermediate condition. 0.5
c. Low -OR- no interspersion (1 cover type) 0.1

Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270/US 15

COMPARISON: \ (e.g., WAA/planned wetland)



Selected Scores	(#)	Element
0.3	(15)	Hydrologic condition
NA	(4b)	Disturbance at site (WQ)
NA	(7a)	Water level fluctuation
NA	(16a)	Wetland width
1.0	(1a)	Water contact with toe of bank
NA	(5b)	Surface runoff (wetland erosion)
1.0	(14c)	Wetland slope
1.0	(10b)	Plant (basal) cover
1.0	(10h)	Plant height
0.5	(10f)	Vegetation persistence
1.0	(9b)	Dominant substrate
0.3	(15)	Hydrologic condition
—	(17)	Detention time
1.0	(18)	Sheet vs. channel flow
1.0	(19)	Average water depth

If result = NA, then STOP. Water Quality FCI is not applicable.
If score selected, then continue with model.

If all results = NA, record NA.
If score(s) selected, then calculate average for elements with available scores

average for elements with available scores = 1.0 Substrate-Slope Characteristics (SS)

Equation #8 = 0.7 Vegetation Characteristics (V)

If scores different, include in average for WC
If scores same, do not include in average.

average for elements with available scores = 0.8 Water Contact (WC)

NA Limiting Factors (LF)

$\frac{SS + V}{2}$ = 0.85 Wetland Characteristics (W)

If LF ≠ NA

If LF = NA

$\frac{LF + W}{2}$ = 0.85 Wetland Condition (C)

$\frac{C + WC}{2}$ = 0.6 Water Quality FCI

Equation #8: 1 / 5

$$\frac{10b\ (10h + 10f)}{2}$$

W60W

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270/US 15 ETL

ASSESSMENT DATE(S): *WAA:* Jan. 23 2007 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:

David Smith

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA: I-270 at Middlebrook Road in Montgomery Co., MD

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization		
Water Quality		
Wildlife		
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA: PFO1E W60W

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

[✓ Average] Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

PLANNED WETLAND GOALS:

Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

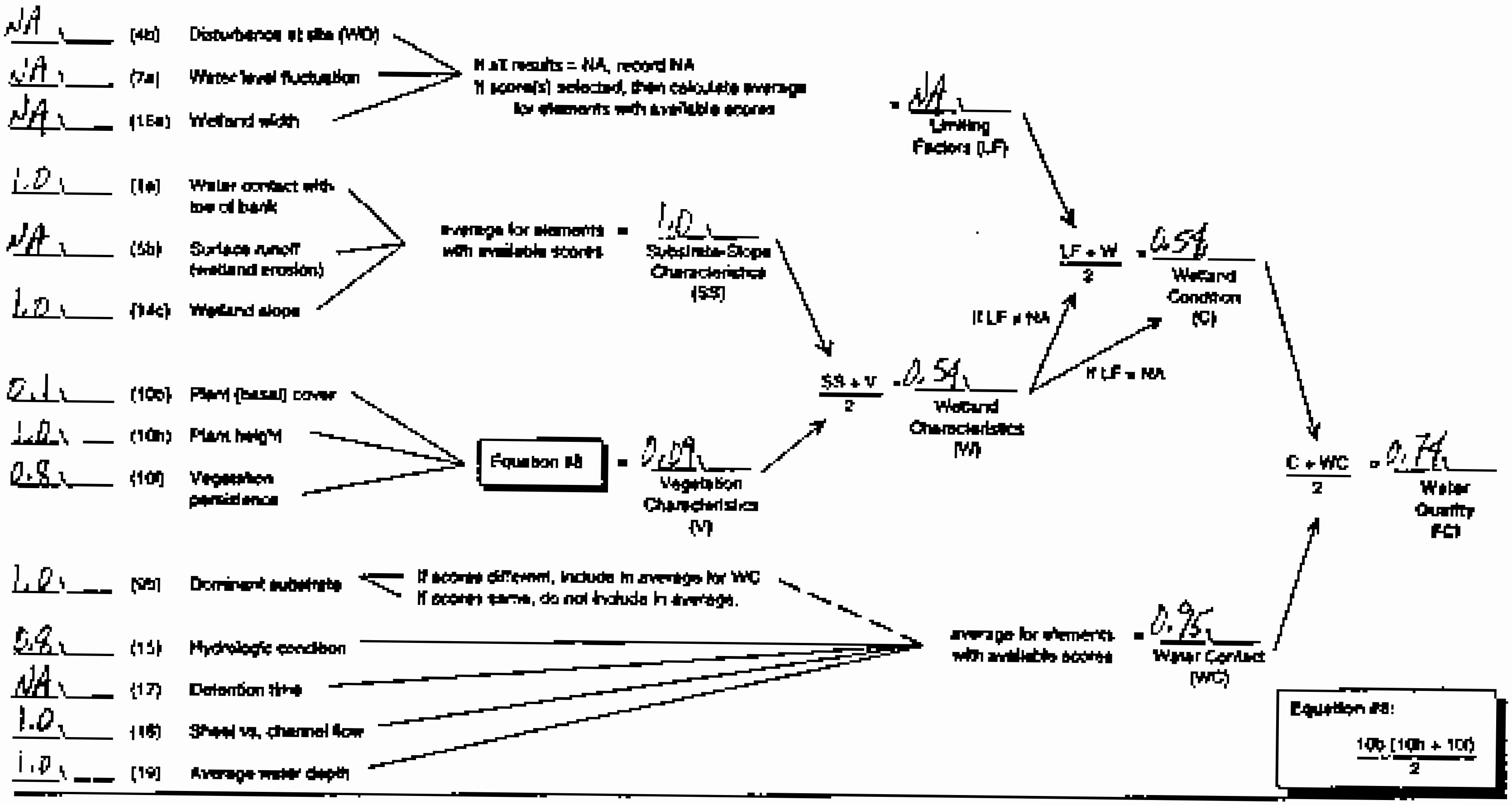
Calculation of **WATER QUALITY FCI**

PROJECT TITLE: I-270 ETL

Selected Scores (#) Element

COMPARISON: __________ __________ (e.g., WAA/planned wetland)

0.8 (15) Hydrologic condition — If result = NA, then STOP, Water Quality FCI is not applicable. If score selected, then continue with model.



NA (4b) Disturbance at site (WQ)
NA (7a) Water level fluctuation
NA (15a) Wetland width
If all results = NA, record NA. If score(s) selected, then calculate average for elements with available scores = NA Limiting Factors (LF)

1.0 (1e) Water contact with toe of bank
NA (5b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope
average for elements with available scores = 1.0 Substrate-Slope Characteristics (SS)

0.1 (10b) Plant (basal) cover
1.0 (10h) Plant height
0.8 (10f) Vegetation persistence
Equation #8 = 0.09 Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 0.54 Wetland Characteristics (W)

If LF ≠ NA: $\frac{LF + W}{2}$ = 0.54 Wetland Condition (C)

If LF = NA: Wetland Condition (C)

1.0 (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
0.8 (15) Hydrologic condition
NA (17) Detention time
1.0 (18) Sheet vs. channel flow
1.0 (19) Average water depth
average for elements with available scores = 0.95 Water Contact (WC)

$\frac{C + WC}{2}$ = 0.74 Water Quality FCI

Equation #8:

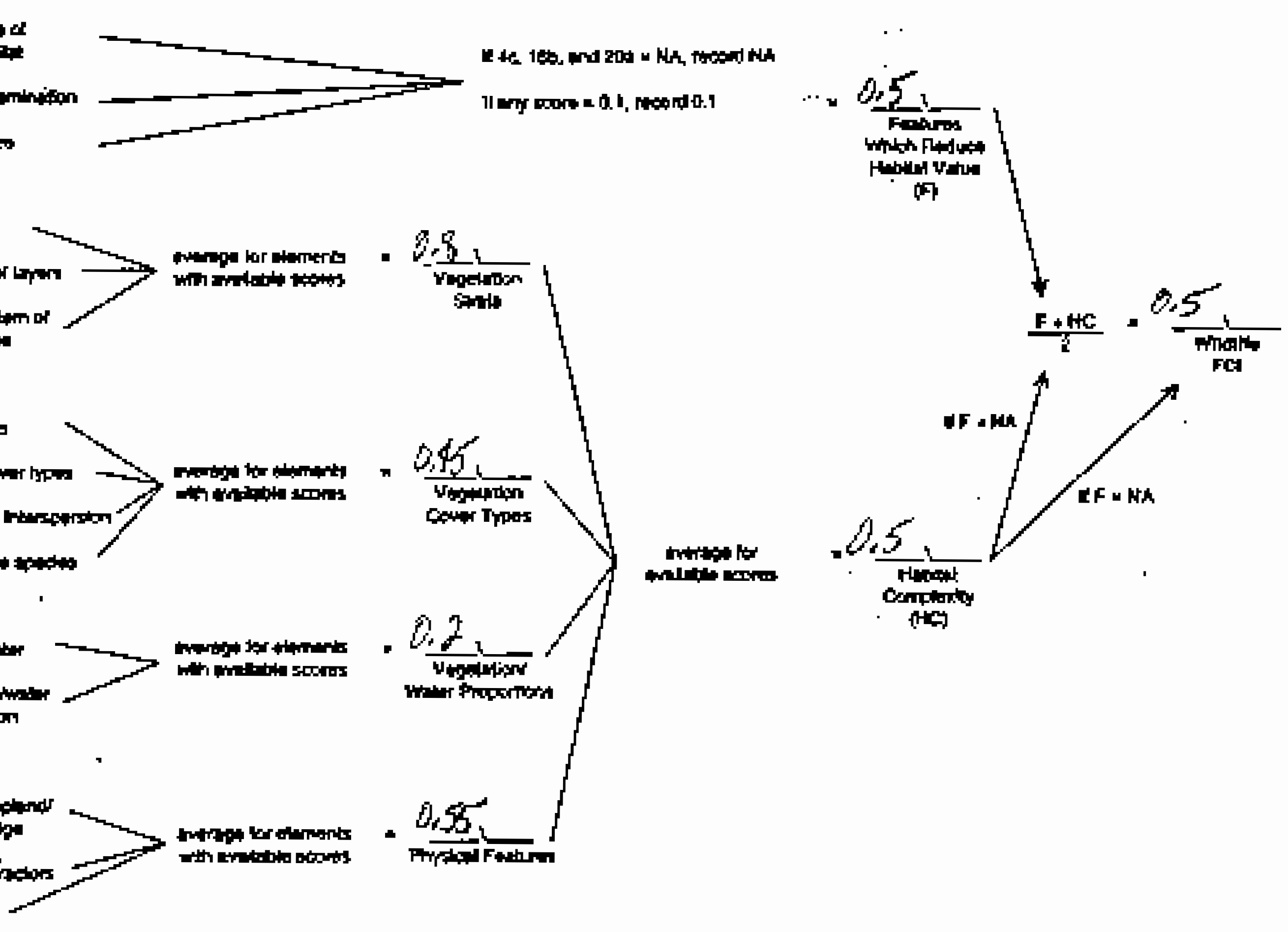
$$\frac{10b\ [10h + 10f]}{2}$$

Calculation of WILDLIFE FCI

PROJECT TITLE: I 270 ETL

COMPARISON: ____ \ ____ (e.g., WAA/planned wetland)

Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
0.5	(20a)	Gross contamination
0.5	(16b)	Wetland size
0.7	(11a)	Layers
0.7	(11b)	Condition of layers
1.0	(11c)	Spatial pattern of shrubs/trees
0.15	(12a)	Cover types
0.5	(12b)	Ratio of cover types
0.5	(12c)	Cover type interspersion
0.65	(12d)	Undesirable species
0.1	(13a)	% open water
0.3	(13b)	Vegetation/water interspersion
1.0	(21a)	Shape of upland/ wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands



= 0.5 Features Which Reduce Habitat Value (F)

= 0.8 Vegetation Strata

= 0.45 Vegetation Cover Types

= 0.2 Vegetation/ Water Proportions

= 0.55 Physical Features

= 0.5 Habitat Complexity (HC)

$\frac{F + HC}{2}$ = 0.5 Wildlife FCI

Calculation of **UNIQUENESS/HERITAGE FCI**

PROJECT TITLE: I-270 ETL

Selected Scores (#) Element

COMPARISON ______________________________ (e.g., WAA/planned wetland)

NA___	(29)	Endangered species
NA___	(30)	Rarity
NA___	(31)	Unique features
NA___	(32)	Historical or archaeological significance
NA___	(33)	Natural landmark
NA___	(34)	Connected to Wild and Scenic River
NA___	(35)	Park, sanctuary, etc
NA___	(36)	Scientific research site

average for elements with available scores = NA___ Uniqueness/ Heritage FCI

W-161W

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I 270/US 15

ASSESSMENT DATE(S): *WAA:* 1/8/00 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
BGIMR

LOCATION (e.g., City, County, State, Waterway/Watershed):
WAA: Frederick County, MD
planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control	✓	
Sediment Stabilization	✓ 0.3	
Water Quality	✓ 0.6	
Wildlife	✓ 0.1	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

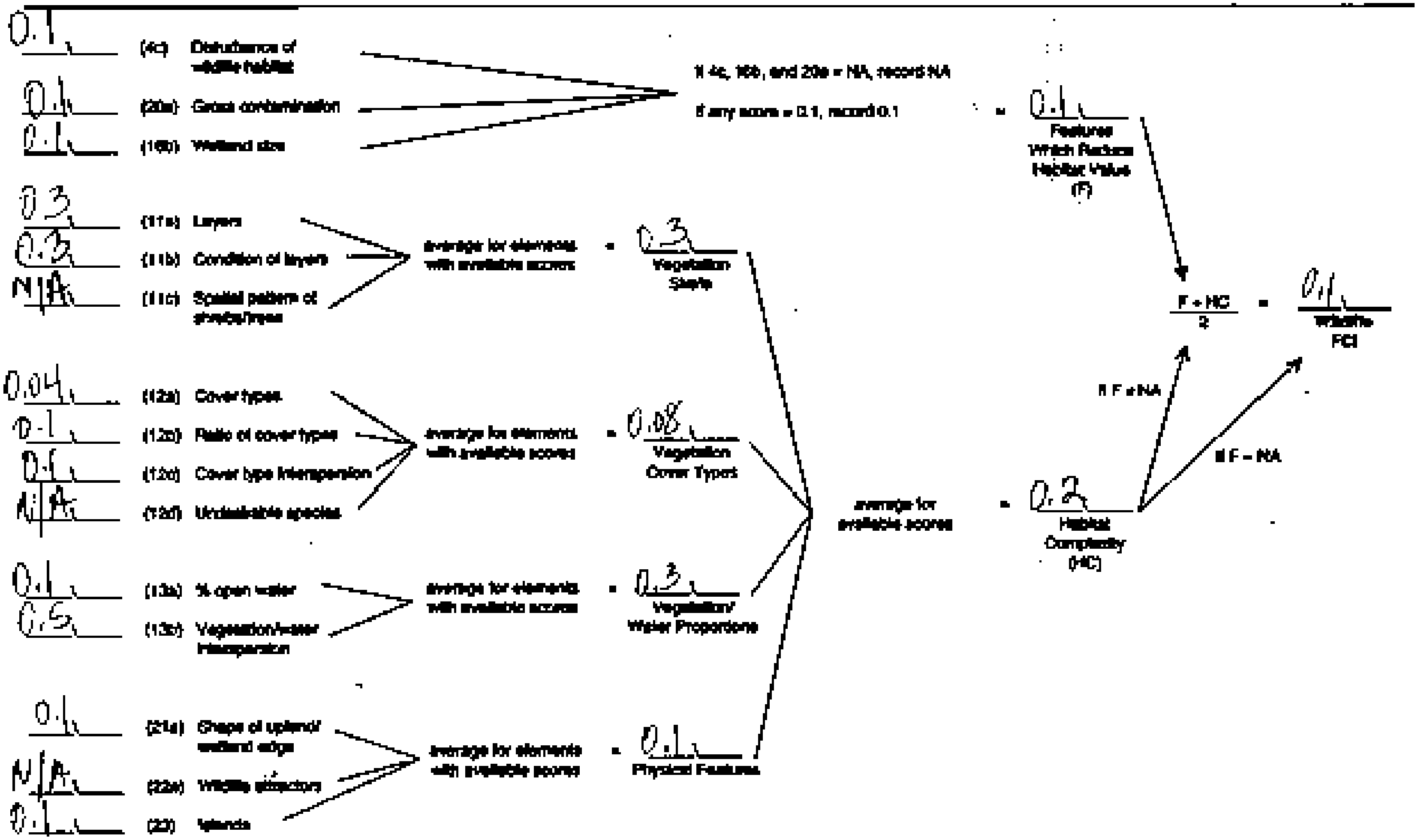
PLANNED WETLAND GOALS:

Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270/U.S. 15

COMPARISON: ________ \\ ________ (e.g., WAA/planned wetland)



Selected Scores	(#)	Element
0.1	(4c)	Disturbance of wildlife habitat
0.1	(20a)	Gross contamination
0.1	(16b)	Wetland size
0.3	(11a)	Layers
0.3	(11b)	Condition of layers
N/A	(11c)	Spatial pattern of shrubs/trees
0.04	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12d)	Cover type interspersion
N/A	(12f)	Undesirable species
0.1	(13a)	% open water
0.5	(13c)	Vegetation/water interspersion
0.1	(21a)	Shape of upland/wetland edge
N/A	(22a)	Wildlife attractors
0.1	(23)	Islands

If 4c, 16b, and 20a = NA, record NA

If any score = 0.1, record 0.1 = 0.1 Features Which Reduce Habitat Value (F)

average for elements with available scores = 0.3 Vegetation Strata

average for elements with available scores = 0.08 Vegetation Cover Types

average for elements with available scores = 0.3 Vegetation/Water Proportions

average for elements with available scores = 0.1 Physical Features

average for available scores = 0.2 Habitat Complexity (HC)

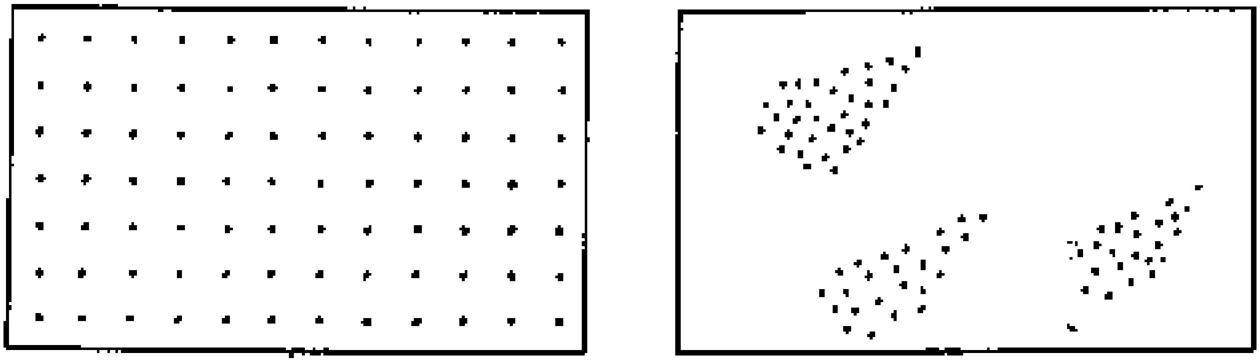
If F ≠ NA: $\frac{F + HC}{2}$ = 0.1 Wildlife FCI

If F = NA: Habitat Complexity (HC) = Wildlife FCI

REGULAR

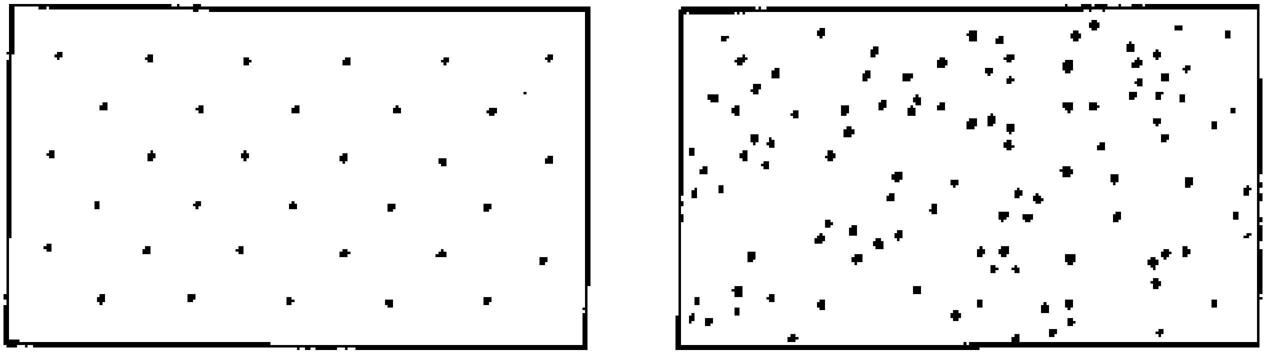
IRREGULAR

Uniform = individuals are regularly spaced.



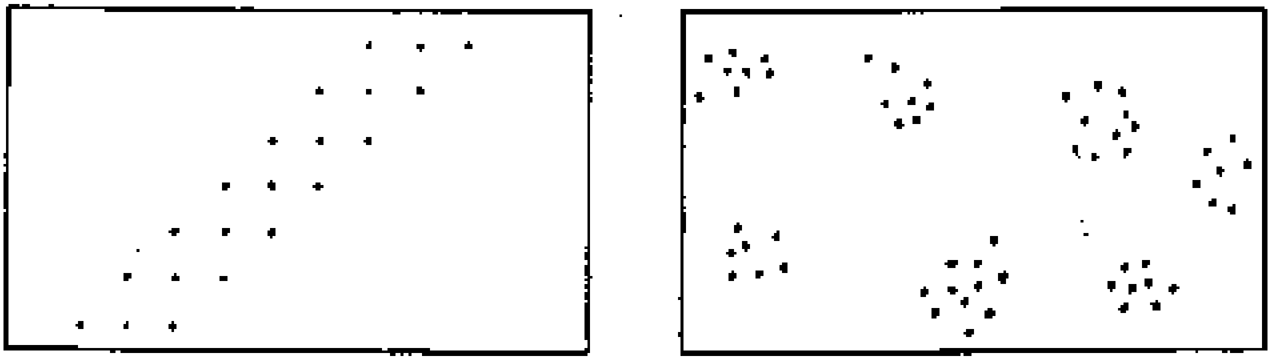
Uniform (row planting)

Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)



Uniform

Random
(all individuals are located
independently of each other.)



Uniform (rows)

Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA)
		WAA	Planned Wetland	If both are NA, record NA

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent ✓
Short nonpersistent ✓

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

__✓__ 10% _____ 5% _____ Other

Thus, an area must be at least __10%__ (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information.

Wetland: # of cover types		Calculation of Relative score $\frac{\text{\# of cover types}}{27}$	
WAA Planned	(e.g.) : __1__ (1) : _____ (4)	0.04 _____	(example) (1/27=0.04) (4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions. 1.0
b. Intermediate condition. 0.5
c. Predominantly 1 cover type. 0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

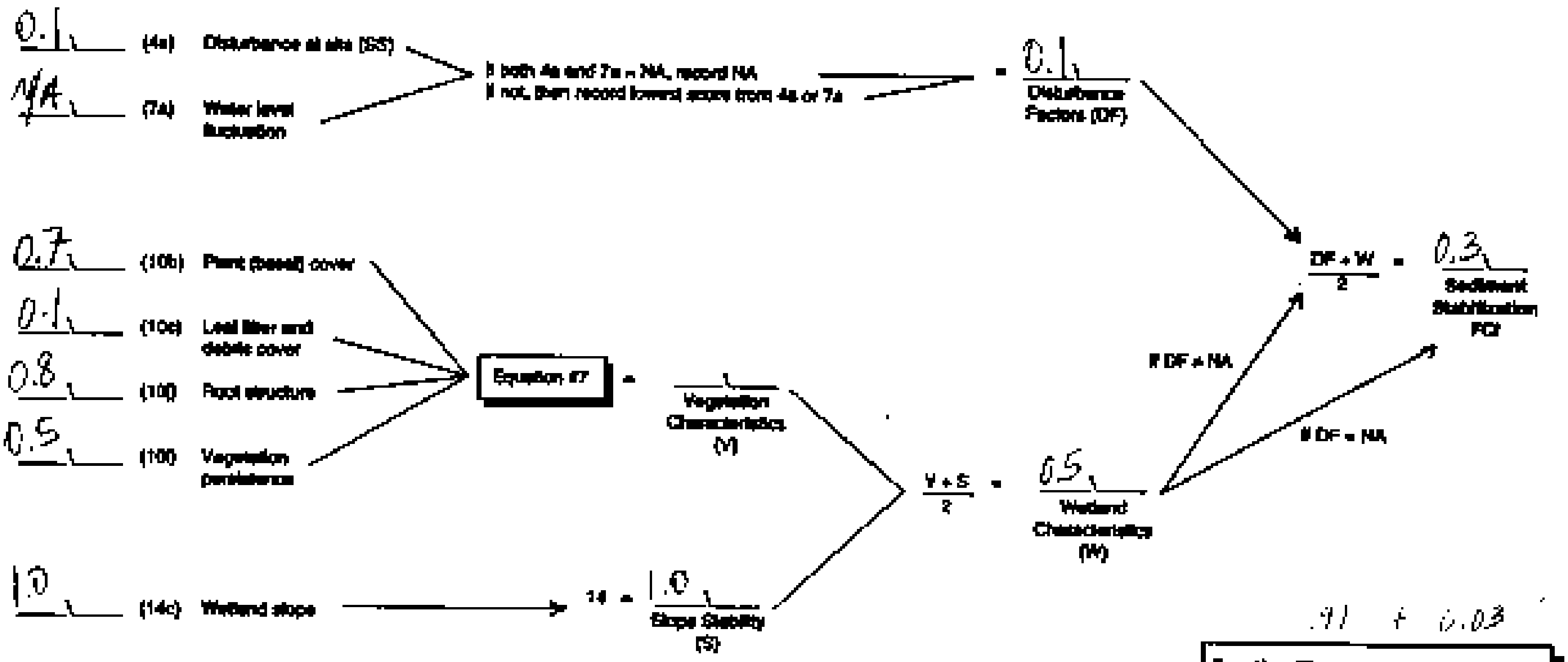
a. High. 1.0
b. Intermediate condition. 0.5
c. Low -OR- no interspersion (1 cover type) 0.1

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I - 270 / US 15

Selected Scores (#) Element

*COMPARISON: ______________________ (e.g., WAA/planned wetland)



0.1 (4a) Disturbance at site (SS)

NA (7a) Water level fluctuation

If both 4a and 7a = NA, record NA
If not, then record lowest score from 4a or 7a

= 0.1 Disturbance Factors (DF)

0.7 (10b) Plant (basal) cover

0.1 (10c) Leaf litter and debris cover

0.8 (10d) Root structure

0.5 (10f) Vegetation persistence

Equation #7 = ____ Vegetation Characteristics (V)

1.0 (14c) Wetland slope

14 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.5 Wetland Characteristics (W)

If DF ≠ NA

If DF = NA

$\frac{DF + W}{2}$ = 0.3 Sediment Stabilization FCI

.91 + 0.03

Equation #7:

$$\frac{\overset{.7}{10b}\,(\overset{.8}{10d} + \overset{.5}{10f}) + \overset{.1}{10c}\,(1 - \overset{.7}{10b})}{2}$$

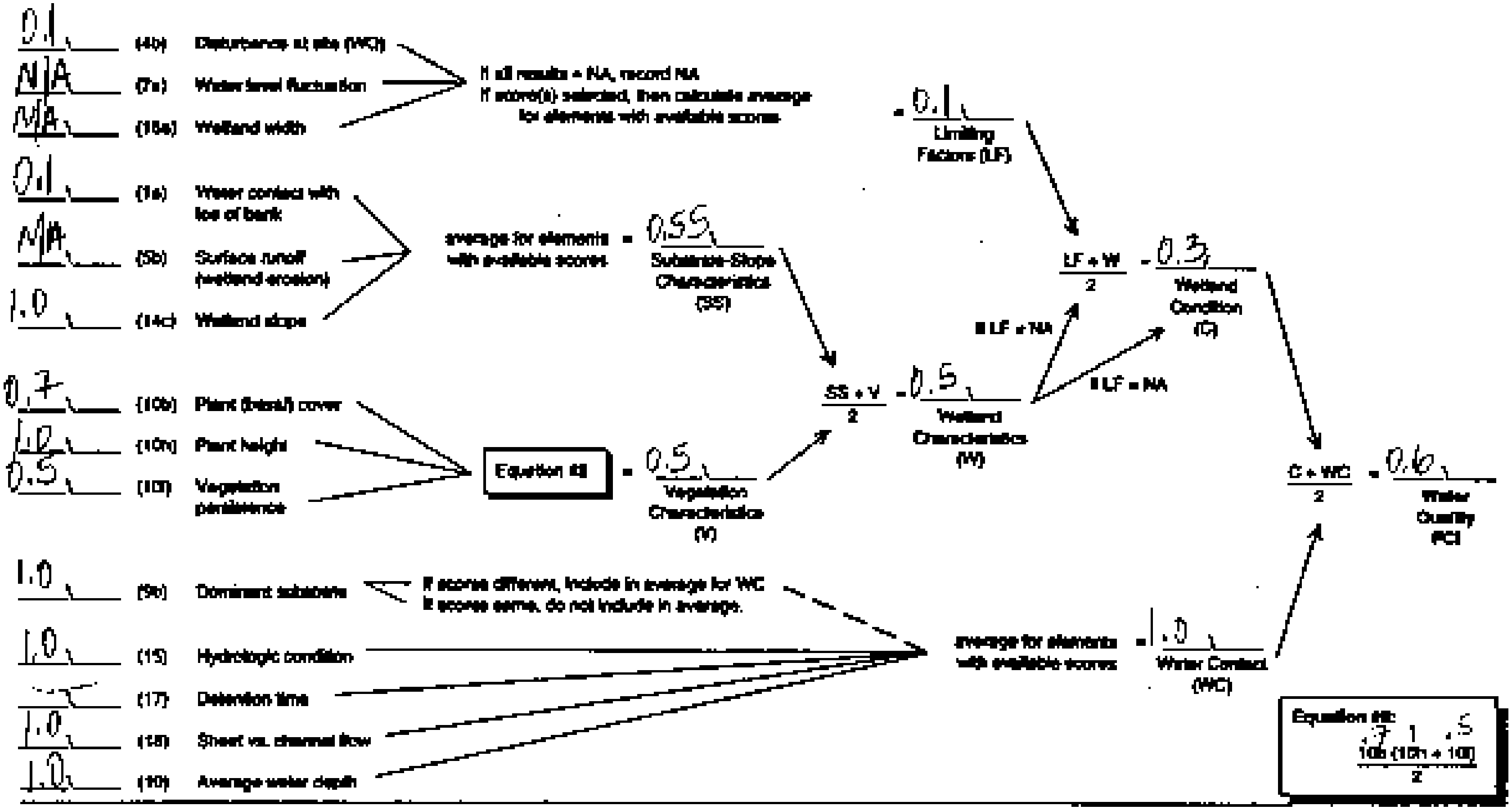
Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270 / V.C.15

Selected Scores	(#)	Element

COMPARISON: ____________ \ ____________ (e.g., WAA/planned wetland)

1.0 (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.



0.1 (4b) Disturbance at site (WC)
N/A (7a) Water level fluctuation
N/A (15a) Wetland width

If all results = NA, record NA
If score(s) selected, then calculate average for elements with available scores

= 0.1 Limiting Factors (LF)

0.1 (1a) Water contact with toe of bank
N/A (5b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope

average for elements with available scores = 0.55 Substrate-Slope Characteristics (SS)

0.7 (10b) Plant (basal) cover
1.0 (10h) Plant height
0.5 (10l) Vegetation persistence

Equation #1 = 0.5 Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 0.5 Wetland Characteristics (W)

If LF ≠ NA: $\frac{LF + W}{2}$ = 0.3 Wetland Condition (C)

If LF = NA: Wetland Condition (C)

1.0 (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
1.0 (15) Hydrologic condition
— (17) Detention time
1.0 (18) Sheet vs. channel flow
1.0 (19) Average water depth

average for elements with available scores = 1.0 Water Contact (WC)

$\frac{C + WC}{2}$ = 0.6 Water Quality FCI

Equation #1:
$\frac{\overset{.7}{10b} \, (\overset{1}{10h} + \overset{.5}{10l})}{2}$

W-165

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I 270 | U.S. 15

ASSESSMENT DATE(S): *WAA:* 6/12/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
BG, WK, HL

LOCATION (e.g., City, County, State, Waterway/Watershed):
WAA: Frederick County, MD
planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	✓ 0.9	
Water Quality	✓ 1.0	
Wildlife	✓ 0.1	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

PLANNED WETLAND GOALS:

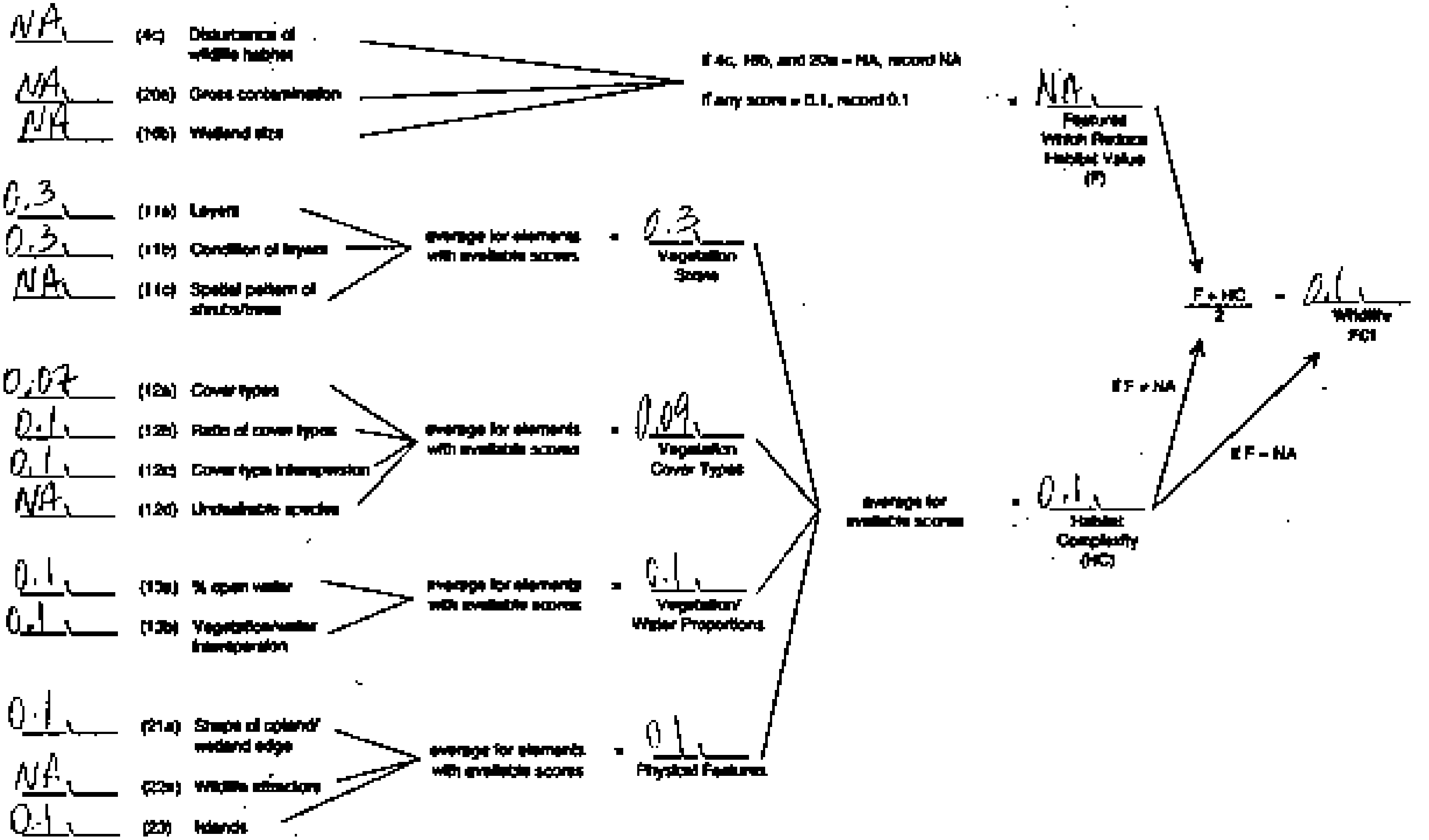
Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270 / U.S 15

Selected Scores (#) Element

COMPARISON: ____________ \ ____________ (e.g., WAA/planned wetland)



NA (4c) Disturbance of wildlife habitat

NA (20a) Gross contamination

NA (16b) Wetland size

If 4c, 16b, and 20a = NA, record NA

If any score = 0.1, record 0.1

= NA Features Which Reduce Habitat Value (F)

0.3 (11a) Layers

0.3 (11b) Condition of layers

NA (11c) Spatial pattern of shrubs/trees

average for elements with available scores = 0.3 Vegetation Scope

0.07 (12a) Cover types

0.1 (12b) Ratio of cover types

0.1 (12c) Cover type interspersion

NA (12d) Undesirable species

average for elements with available scores = 0.09 Vegetation Cover Types

0.1 (13a) % open water

0.1 (13b) Vegetation/water interspersion

average for elements with available scores = 0.1 Vegetation/ Water Proportions

0.1 (21a) Shape of upland/ wetland edge

NA (22a) Wildlife attractors

0.1 (23) Islands

average for elements with available scores = 0.1 Physical Features

average for available scores = 0.1 Habitat Complexity (HC)

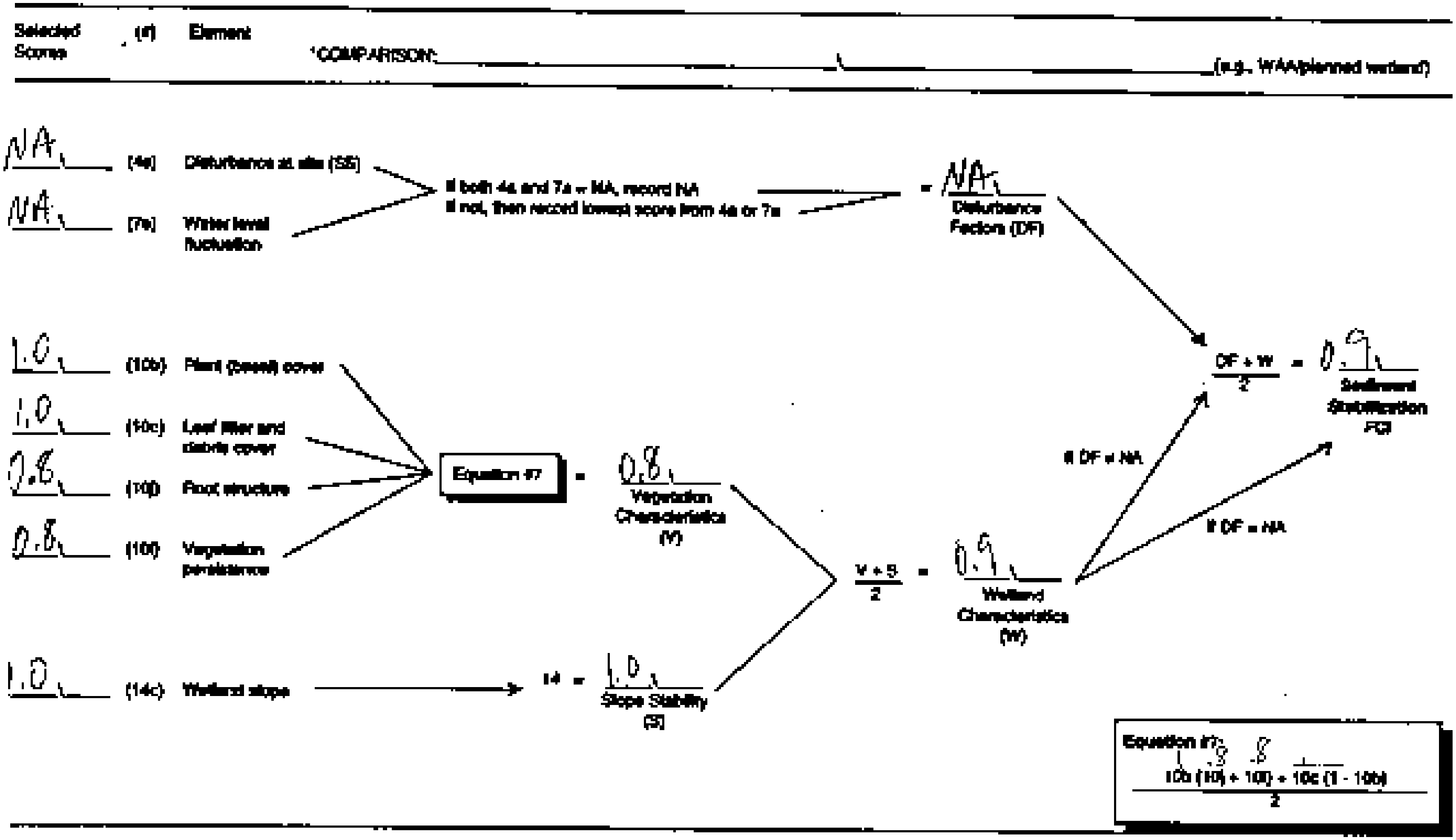
If F ≠ NA

If F = NA

$\frac{F + HC}{2}$ = 0.1 Wildlife FCI

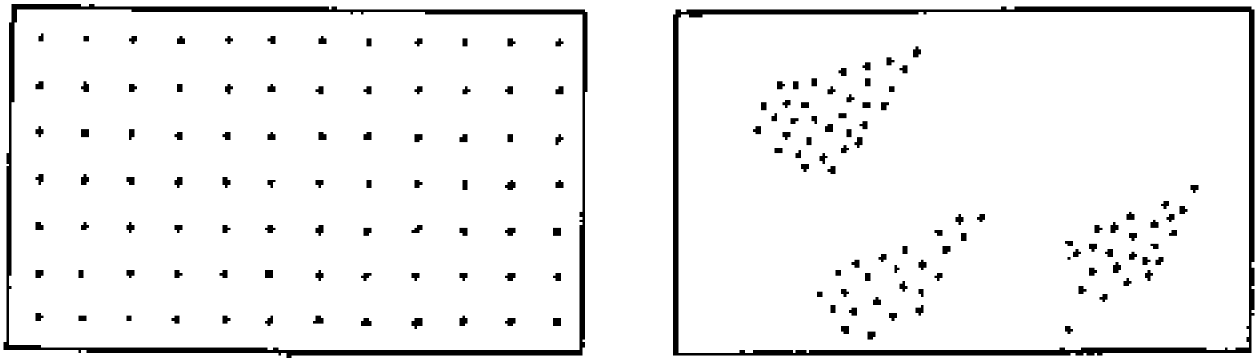
Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270/US 15



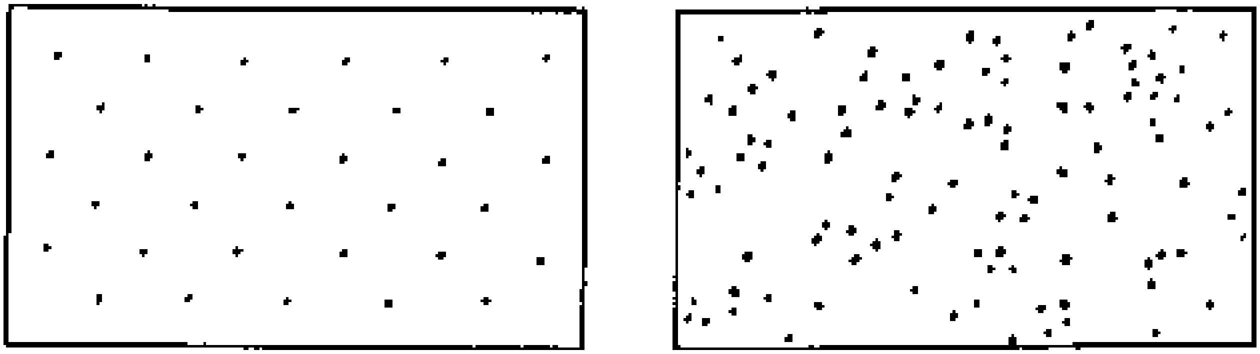
REGULAR **IRREGULAR**

Uniform = individuals are regularly spaced.



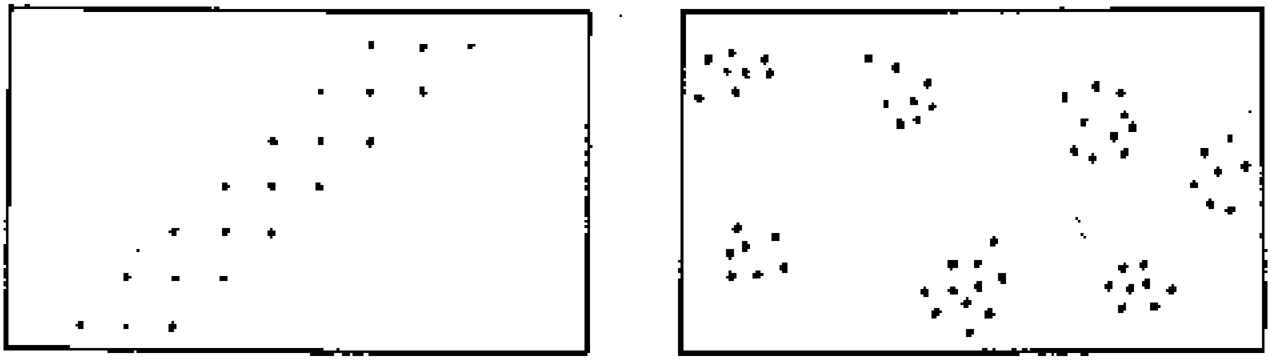
Uniform (row planting)

Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)



Uniform

Random
(all individuals are located
independently of each other.)



Uniform (rows)

Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA) If both are NA, record NA
		WAA	Planned Wetland	

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent
Short nonpersistent

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

✓ 10% ____ 5% ____ Other

Thus, an area must be at least 10% (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types			Calculation of Relative score \# of cover types / 27	
WAA	: 2	(e.g.) (1)	0.07	(example) (1/27=0.04)
Planned	: ____	(4)	____	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions. 1.0
b. Intermediate condition. 0.5
c. Predominantly 1 cover type. 0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

a. High. 1.0
b. Intermediate condition. 0.5
c. Low -OR- no interspersion (1 cover type) 0.1

Calculation of WATER QUALITY FCI

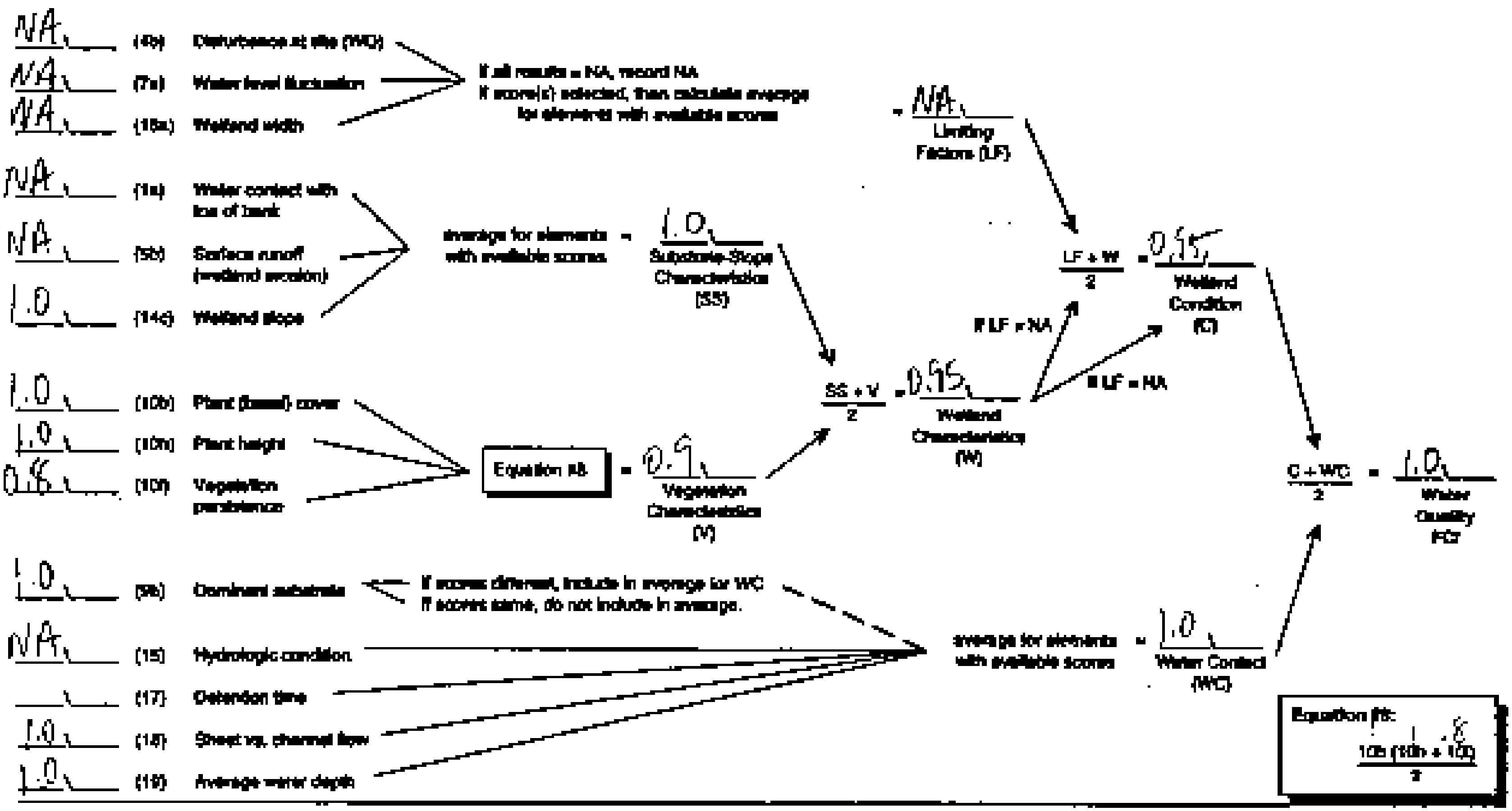
PROJECT TITLE: I-270 / U.S. 15

Selected Score (#) Element

COMPARISON: ____________________ [e.g., WAA/planned wetland]

NA (15) Hydrologic condition

If result = NA, then STOP. Water Quality FCI is not applicable.
If score selected, then continue with model.



NA (4b) Disturbance at site (WQ)
NA (7a) Water level fluctuation
NA (18a) Wetland width

If all results = NA, record NA
If score(s) selected, then calculate average for elements with available scores

= NA Limiting Factors (LF)

NA (1a) Water contact with toe of bank
NA (5b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope

average for elements with available scores = 1.0 Substrate-Slope Characteristics (SS)

1.0 (10b) Plant (basal) cover
1.0 (10h) Plant height
0.8 (10f) Vegetation persistence

Equation #8 = 0.9 Vegetation Characteristics (V)

$$\frac{SS + V}{2} = 0.95$$ Wetland Characteristics (W)

If LF ≠ NA

If LF = NA

$$\frac{LF + W}{2} = 0.95$$ Wetland Condition (C)

1.0 (9b) Dominant substrate

If scores different, include in average for WC
If scores same, do not include in average.

NA (15) Hydrologic condition
(17) Detention time
1.0 (18) Sheet vs. channel flow
1.0 (19) Average water depth

average for elements with available scores = 1.0 Water Contact (WC)

$$\frac{C + WC}{2} = 1.0$$ Water Quality FCI

Equation #8:

$$\frac{10b\ (\overset{1}{10h} + \overset{.8}{10f})}{2}$$

W-171W

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270 / U.S. 15

ASSESSMENT DATE(S): *WAA:* 6/29/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
BG/BS

LOCATION (e.g., City, County, State, Waterway/Watershed):
WAA: Frederick County, MD
planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.9	
Water Quality	0.9	
Wildlife	0.4	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

PLANNED WETLAND GOALS:

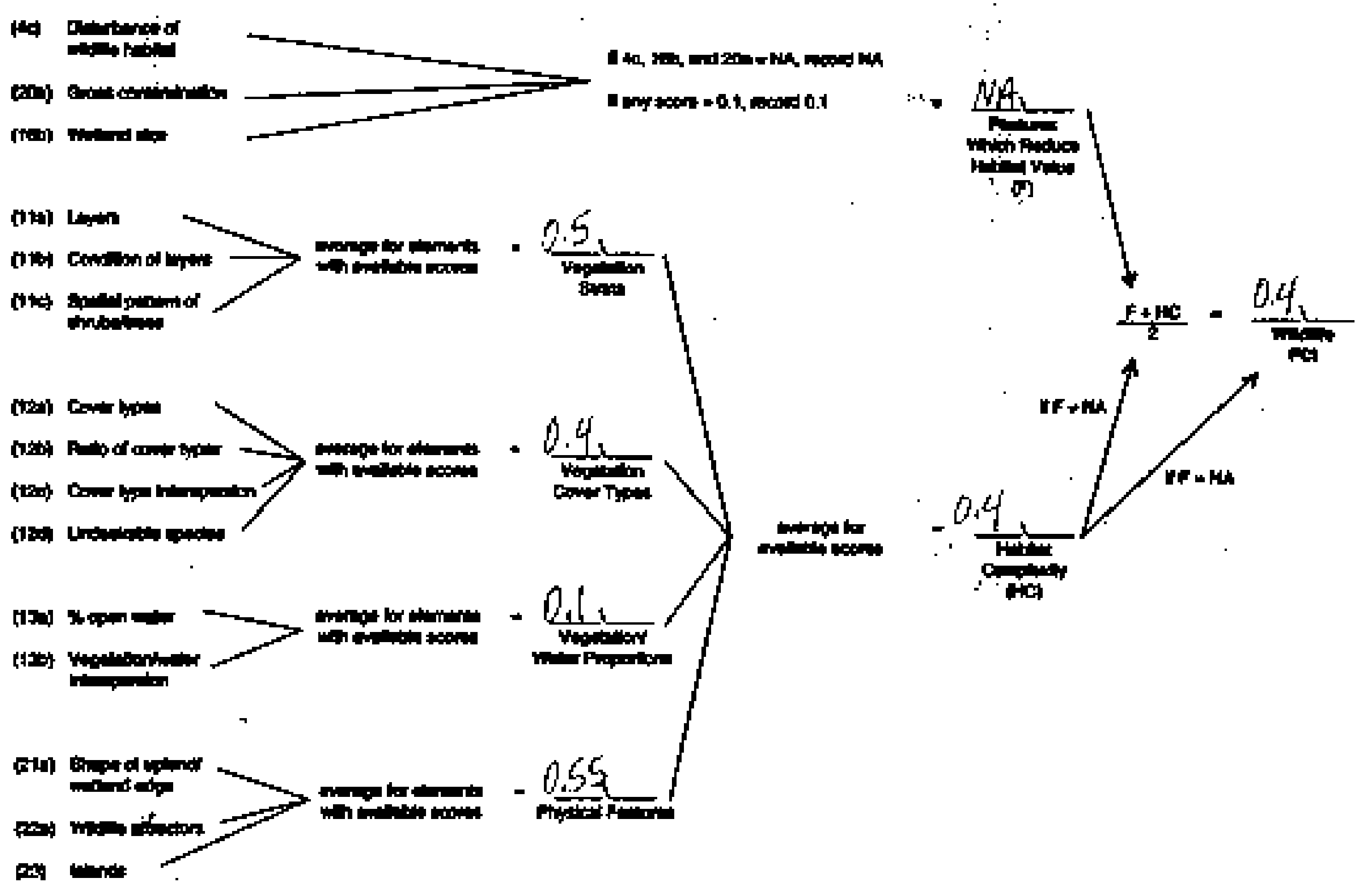
Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270 | US 15

COMPARISON: ______________________ (e.g., WAA/planned wetland)

Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
NA	(16b)	Wetland size
0.3	(11a)	Layers
0.7	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
0.11	(12a)	Cover types
0.5	(12b)	Ratio of cover types
0.5	(12c)	Cover type interspersion
	(12d)	Undesirable species
NA	(13a)	% open water
0.1	(13b)	Vegetation/water interspersion
1.0	(21a)	Shape of upland/wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands



(4c), (20a), (16b): If 4c, 16b, and 20a = NA, record NA; If any score = 0.1, record 0.1 = NA Features Which Reduce Habitat Value (F)

(11a), (11b), (11c): average for elements with available scores = 0.5 Vegetation Strata

(12a), (12b), (12c), (12d): average for elements with available scores = 0.4 Vegetation Cover Types

(13a), (13b): average for elements with available scores = 0.1 Vegetation/Water Proportions

(21a), (22a), (23): average for elements with available scores = 0.55 Physical Features

Vegetation Strata, Vegetation Cover Types, Vegetation/Water Proportions, Physical Features: average for available scores = 0.4 Habitat Complexity (HC)

If F ≠ NA: $\frac{F + HC}{2}$ = 0.4 Wildlife FCI

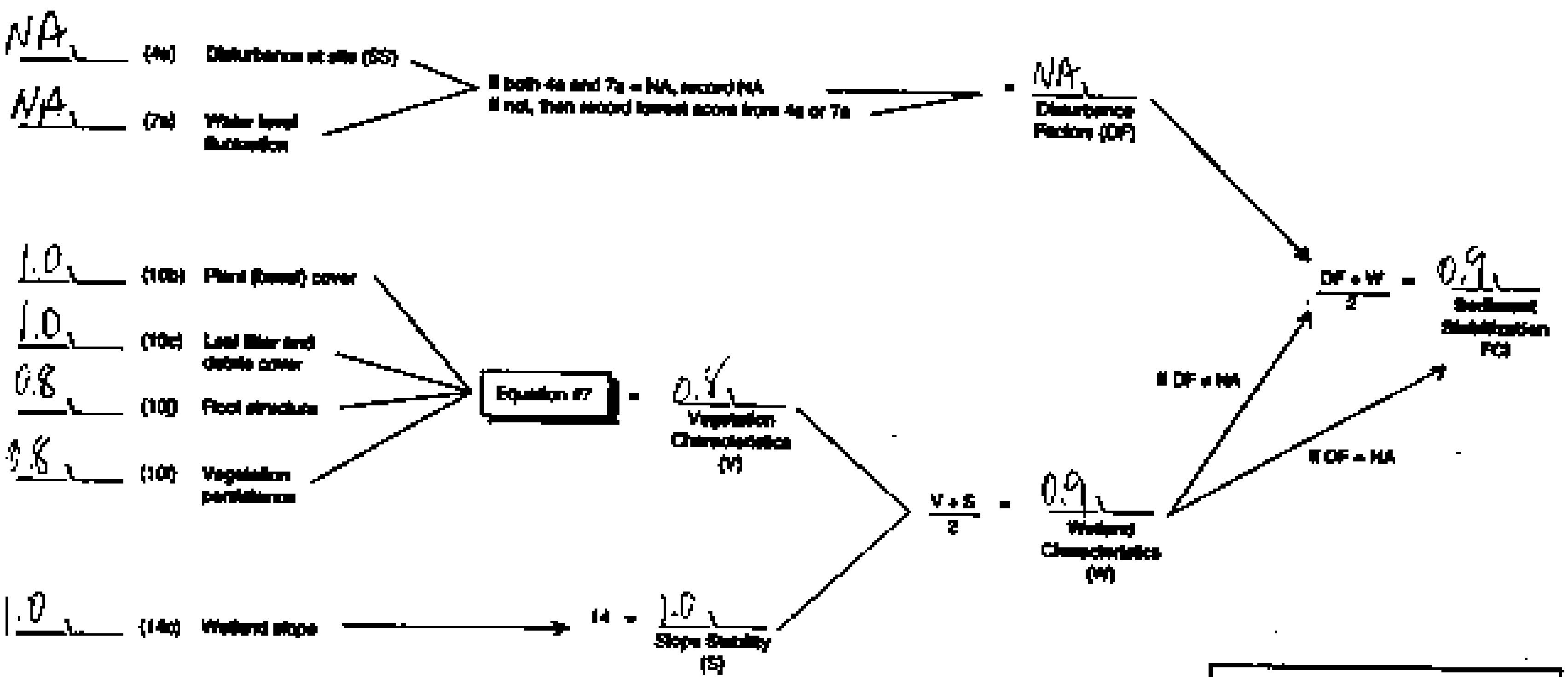
If F = NA: Habitat Complexity (HC) → 0.4 Wildlife FCI

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I 370/U.S. 15

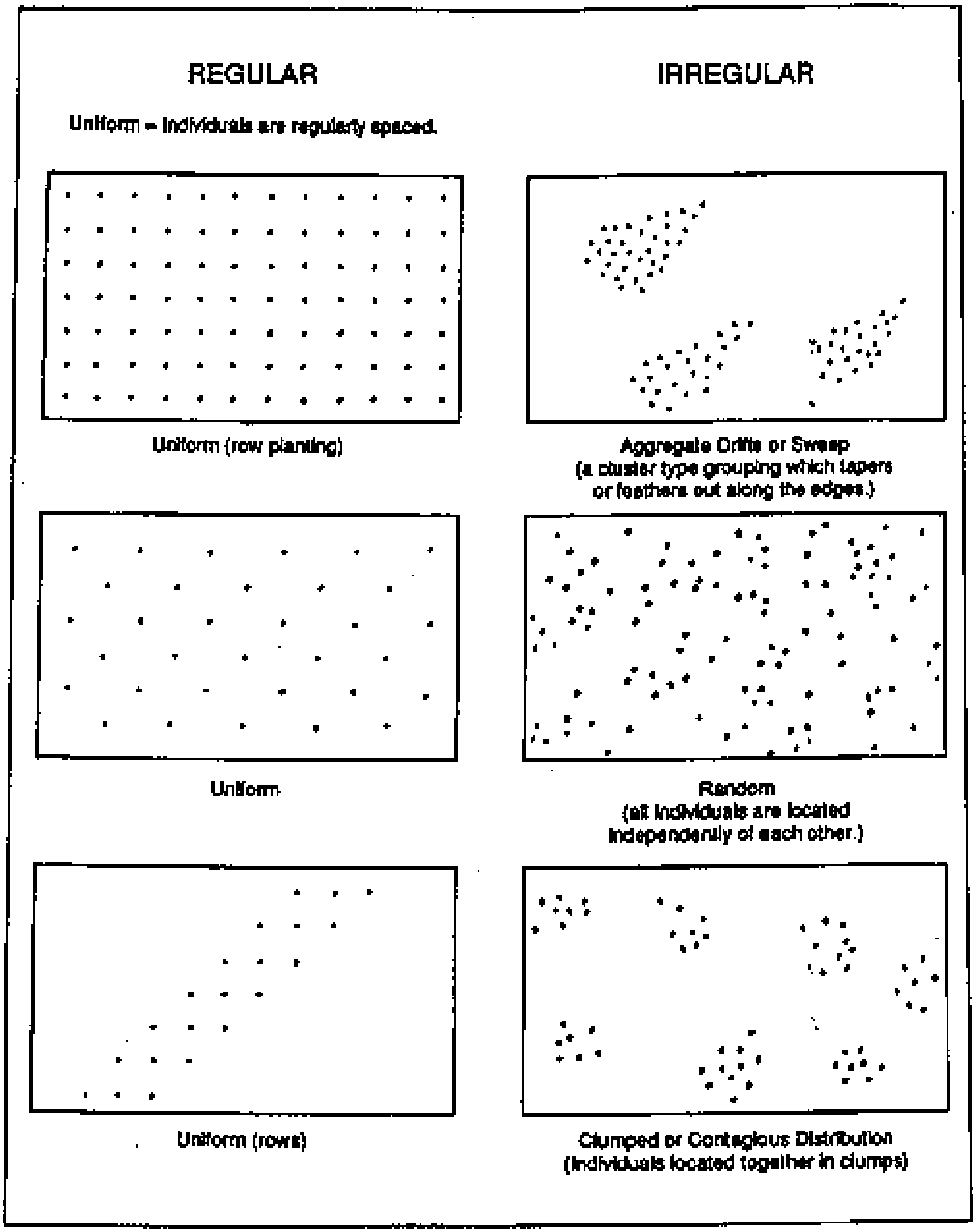
Selected Scores (#) Element

*COMPARISON: ______ (e.g., WAA/planned wetland)



Equation #7:

$$\frac{\overset{1}{10b}\,(\overset{.8}{10j} + \overset{.8}{10f}) + \overset{1}{10c}\,(1 - \overset{1}{10b})}{2}$$



Uniform = Individuals are regularly spaced.

Uniform (row planting)

Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)

Uniform

Random
(all individuals are located
independently of each other.)

Uniform (rows)

Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA) If both are NA, record NA
		WAA	Planned Wetland	

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent ✓
Short nonpersistent ✓

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous ✓
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

✓ 10% ____ 5% ____ Other

Thus, an area must be at least 10% (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types		Calculation of Relative score # of cover types / 27	
WAA	3 (e.g.) (1)	0.11	(example) (1/27=0.04)
Planned	____ (4)	____	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions.	1.0
b. Intermediate condition.	0.5
c. Predominantly 1 cover type.	0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

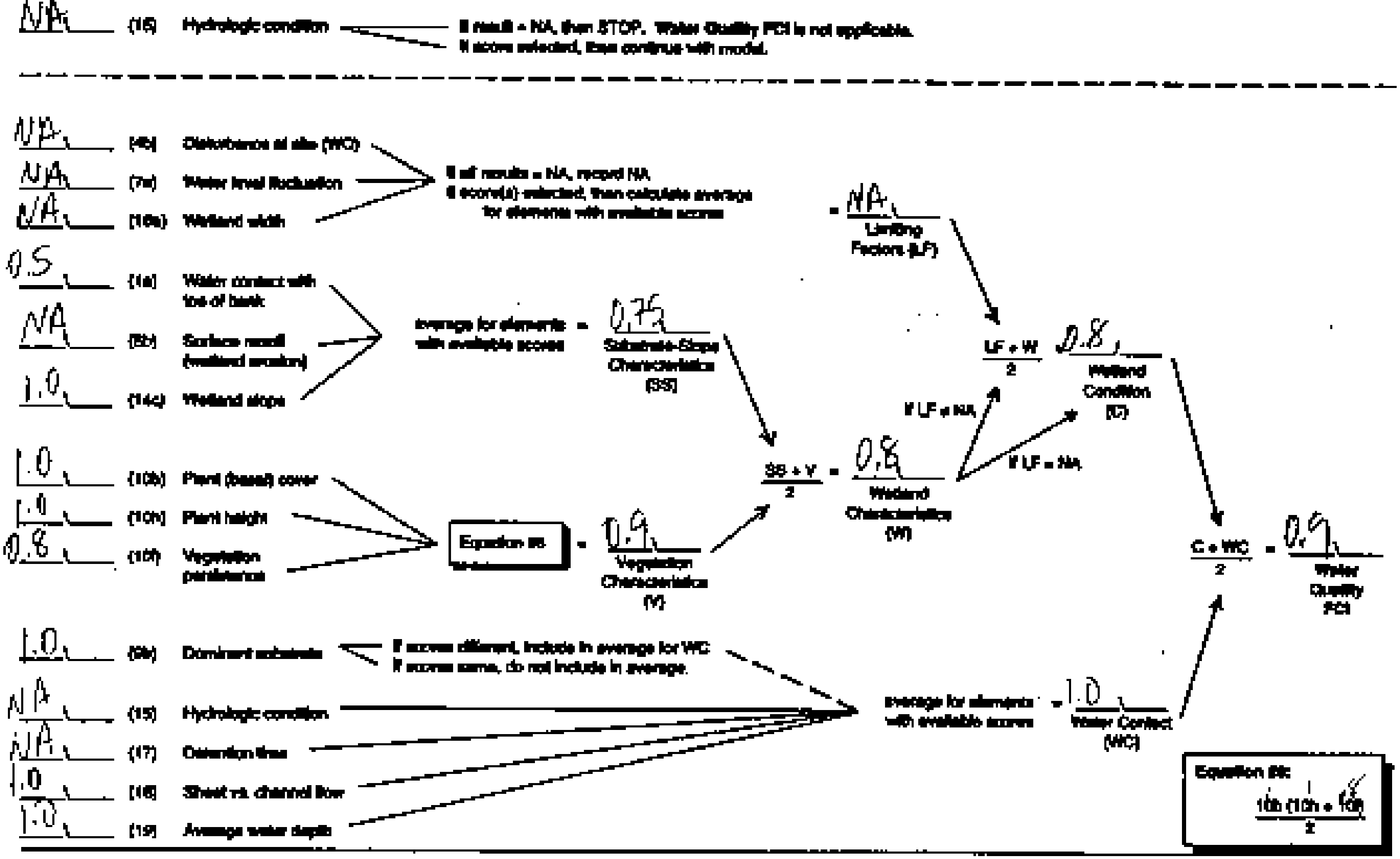
a. High.	1.0
b. Intermediate condition.	0.5
c. Low -OR- no interspersion (1 cover type)	0.1

Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270/U.S.15

Selected Score (#) Element

COMPARISON: \ (e.g., WAA/planned wetland)



NA (15) Hydrologic condition

NA (4b) Disturbance at site (WC)
NA (7a) Water level fluctuation
NA (10a) Wetland width

0.5 (1a) Water contact with toe of bank
NA (5b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope

1.0 (10b) Plant (basal) cover
1.0 (10h) Plant height
0.8 (10f) Vegetation persistence

1.0 (9b) Dominant substrate
NA (15) Hydrologic condition
NA (17) Detention time
1.0 (18) Sheet vs. channel flow
1.0 (19) Average water depth

W-172E

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270 | U.S. 15

ASSESSMENT DATE(S): *WAA:* 7/6/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
BO, MR

LOCATION (e.g., City, County, State, Waterway/Watershed):
WAA: Frederick County, MD
planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.7	
Water Quality	0.5	
Wildlife	0.3	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)	0.6	
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

PLANNED WETLAND GOALS:

Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of FISH (Non-tidal Pond/Lake) FCI

PROJECT TITLE: I. 270 | U.S. 15

Selected Score (#) Element

COMPARISON: ______ (e.g. WAA/planned wetland)

NA (24) Obstruction to fish passage

0.1 (28) Refuge during drought/freeze

If score = 0.1 for either element, STOP. There is no potential for providing pond/lake fish habitat.
If score ≠ 0.1, then continue with model.

NA (1b) Shoreline bank stability

NA (4a) Disturbance at site (SS)

NA (4d) Disturbance in channel/open water

NA (18c) Fish habitat size

NA (24) Obstruction to fish passage

average for elements with available scores = NA Limiting Factors

0.1 (10m) Vegetative overhang

1.0 (10o) Plant biomass

0.5 (21b) Shape of wetland/water edge

0.3 (22b) Available fish cover/attractors

average for elements with available scores = 0.6 Food/Cover

1.0 (27a) Spawning substrate

NA (27b) Spawning structure

0.5 (27c) Drawdown

average for elements with available scores = 0.75 Reproduction

NA (20b) Water quality ratings

If score available, record score for WQ.
If information not available, continue.

0.5 (20c) Nutrient/sediment/contaminant sources

NA (20d) Dissolved oxygen

NA (20e) pH

NA (20f) Maximum water temperature

NA (20g) Turbidity

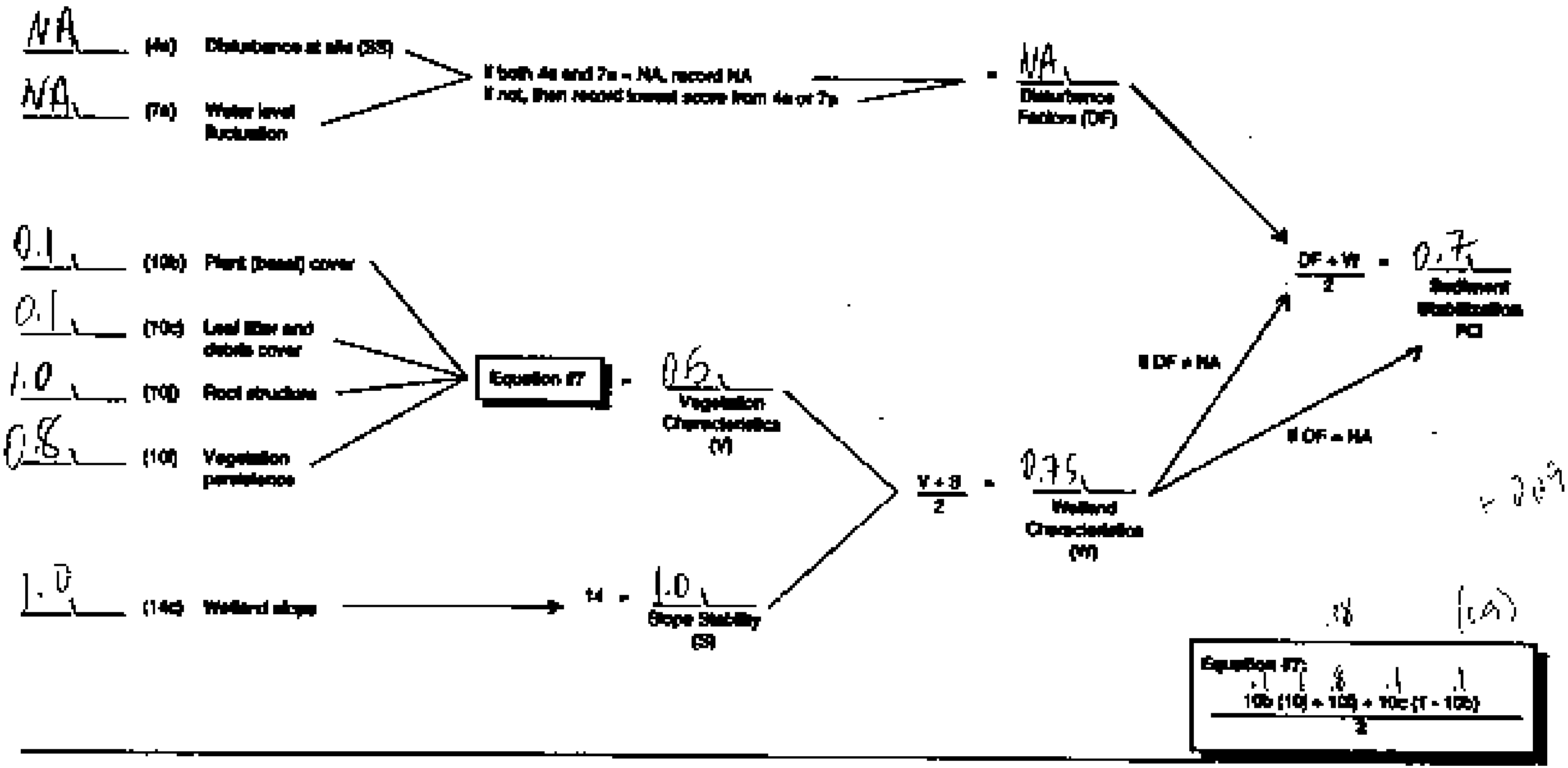
average for elements with available scores = 0.5 Water Quality (WQ)

average for available scores = 0.6 Fish (Non-tidal Pond/Lake) FCI

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270 / U.S. 15

*COMPARISON: ______________________ (e.g., WAA/planned wetland)



Equation #7:

$$\frac{\overset{.1}{10b}\,(\overset{1}{10j} + \overset{.8}{10f}) + \overset{.1}{10c}\,(1 - \overset{.1}{10b})}{2}$$

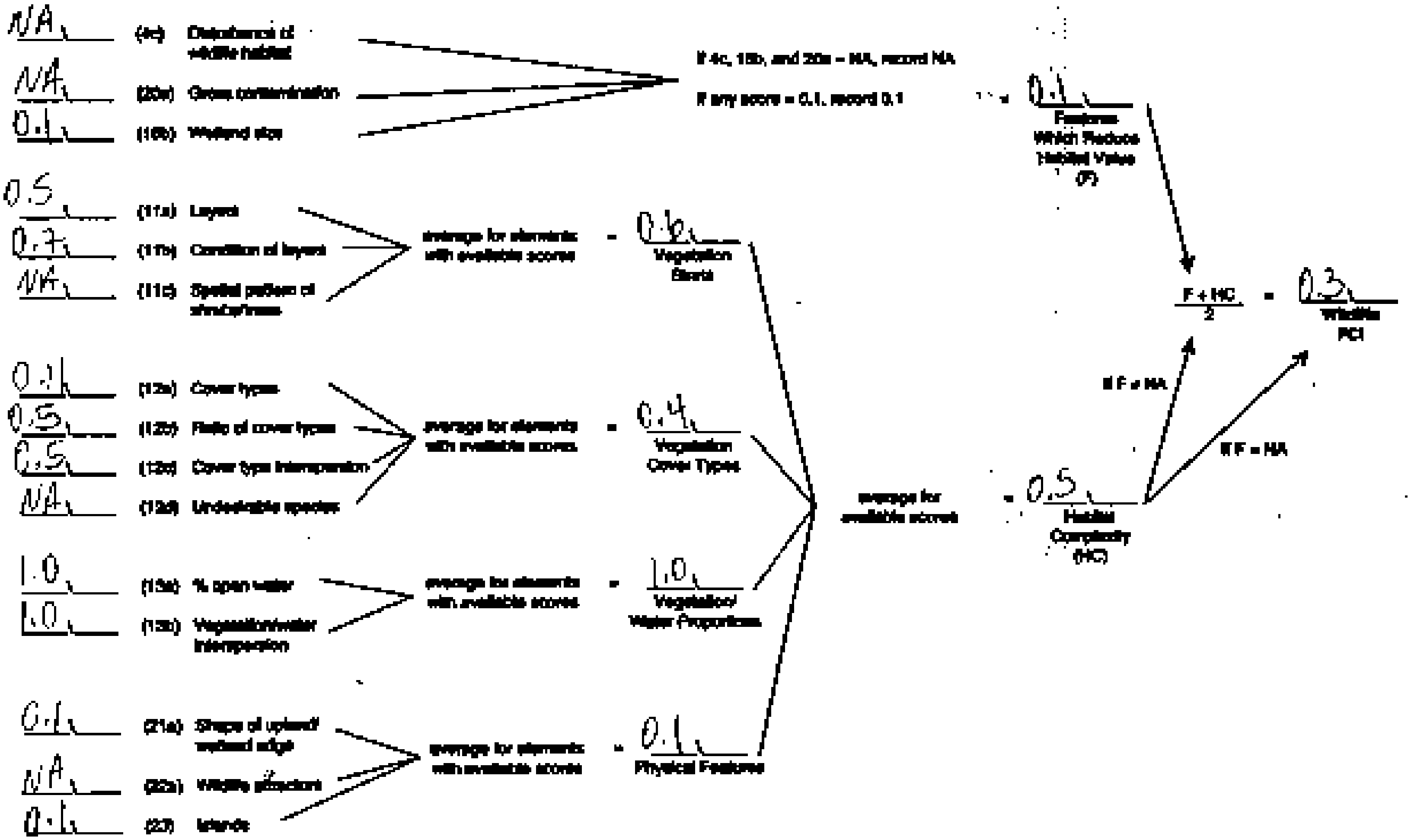
A 18 Evaluation for Planned Wetlands (EPW)

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270 / U.S. 15

Selected Score (#) Element

COMPARISON: ______ \ ______ (e.g., WAA/planned wetland)



NA (4c) Disturbance of wildlife habitat
NA (20a) Gross contamination
0.1 (18b) Wetland size

If 4c, 18b, and 20a = NA, record NA
If any score = 0.1, record 0.1
= 0.1 Features Which Reduce Habitat Value (F)

0.5 (11a) Layers
0.7 (11b) Condition of layers
NA (11c) Spatial pattern of shrubs/trees
average for elements with available scores = 0.6 Vegetation Strata

0.1 (12a) Cover types
0.5 (12b) Ratio of cover types
0.5 (12c) Cover type interspersion
NA (12d) Undesirable species
average for elements with available scores = 0.4 Vegetation Cover Types

1.0 (13a) % open water
1.0 (13b) Vegetation/water interspersion
average for elements with available scores = 1.0 Vegetation/Water Proportions

0.1 (21a) Shape of upland/wetland edge
NA (22a) Wildlife attractors
0.1 (23) Islands
average for elements with available scores = 0.1 Physical Features

average for available scores = 0.5 Habitat Complexity (HC)

If F ≠ NA: $\frac{F + HC}{2}$ = 0.3 Wildlife FCI

If F = NA

Calculation of WATER QUALITY FCI

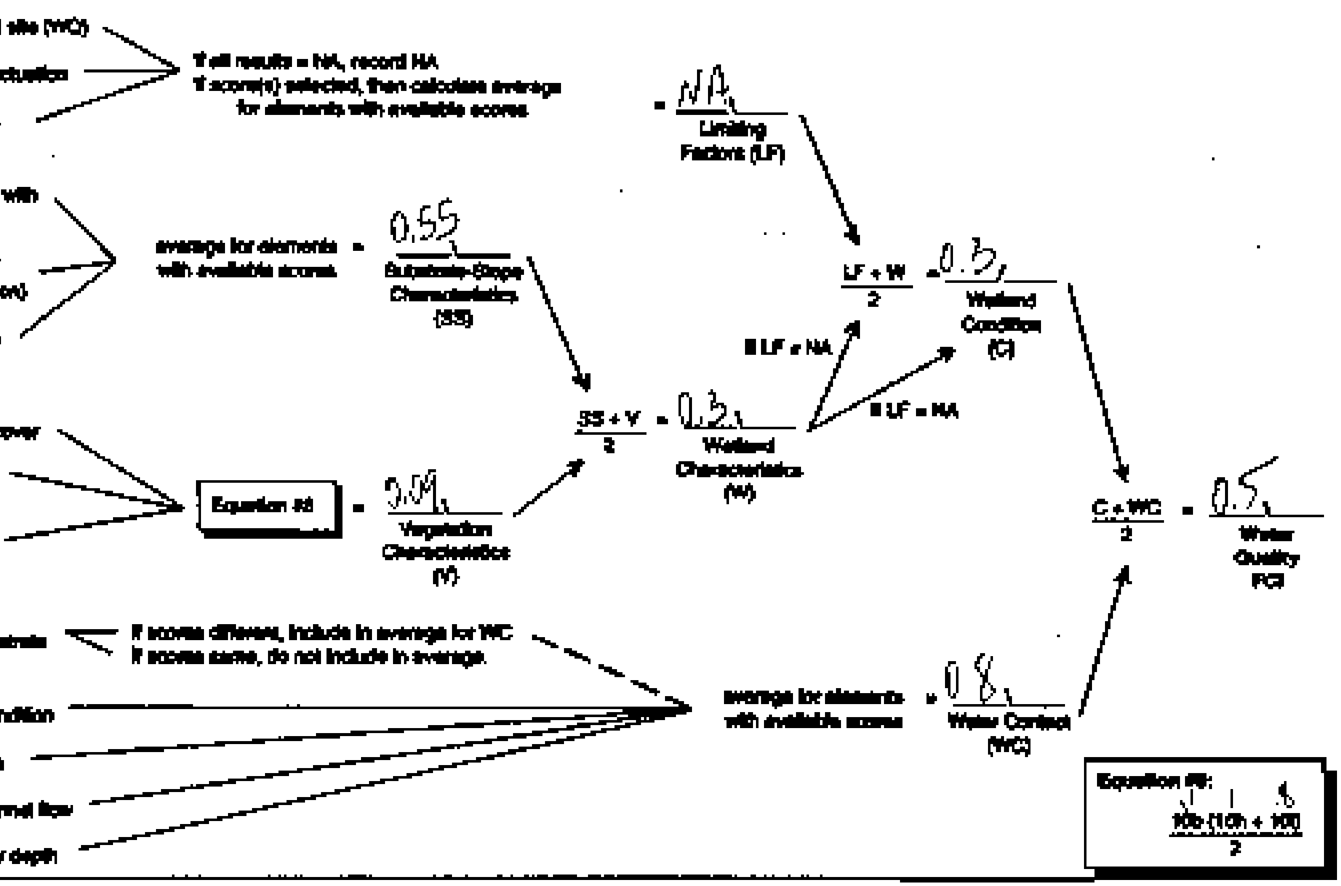
PROJECT TITLE: I-270 / U.S. 15

Selected Scores (#) Element

COMPARISON: \ (e.g., WAA/planned wetland)

NA (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.

NA (4b) Disturbance at site (WC)
NA (7a) Water level fluctuation
NA (10a) Wetland width
0.1 (1a) Water contact with toe of bank
NA (6b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope
0.1 (10b) Plant (basal) cover
1.0 (10h) Plant height
0.8 (10i) Vegetation persistence
1.0 (9b) Dominant substrate
NA (15) Hydrologic condition
(17) Detention time
1.0 (18) Sheet vs. channel flow
0.4 (19) Average water depth

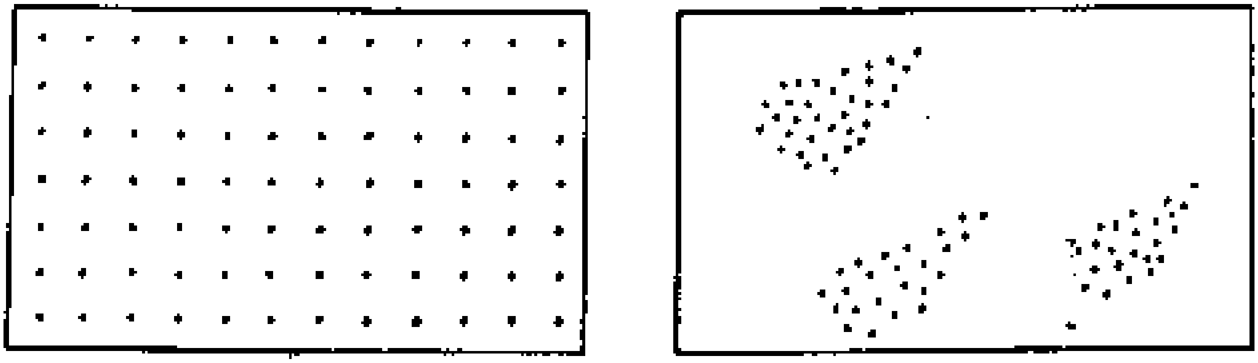


Equation #8:
.1 1 .8
$$\frac{10b\ (10h + 10i)}{2}$$

REGULAR

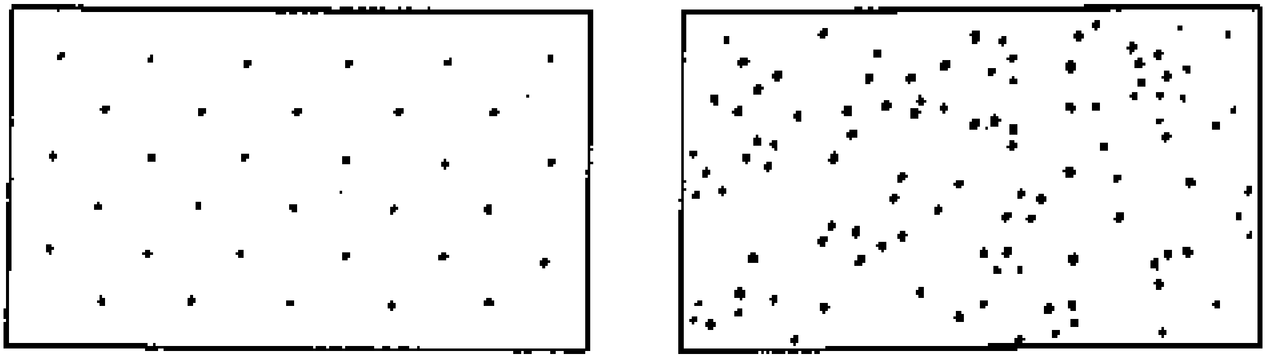
IRREGULAR

Uniform = Individuals are regularly spaced.



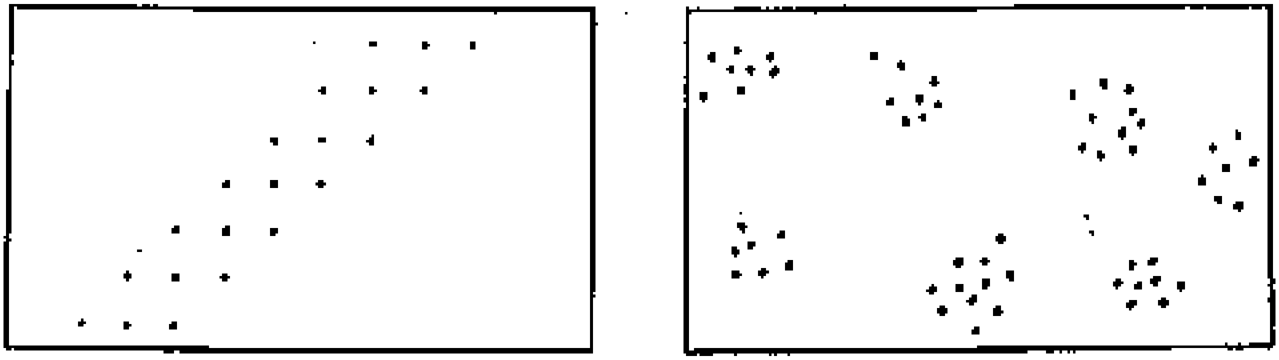
Uniform (row planting)

Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)



Uniform

Random
(all individuals are located
independently of each other.)



Uniform (rows)

Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA)
		WAA	Planned Wetland	If both are NA, record NA

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
[✓ Short persistent]
Tall nonpersistent
[✓ Short nonpersistent]

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
[✓ Open Water]

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

_____ 10% _____ 5% _____ [✓ Other]

Thus, an area must be at least _____ (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types		Calculation of Relative score $\frac{\text{\# of cover types}}{27}$	
WAA	: 3	0.11	(example)
	(e.g.) (1)		(1/27=0.04)
Planned	: _____ (4)	_____	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions.	1.0
b. Intermediate condition.	0.5
c. Predominantly 1 cover type.	0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

a. High.	1.0
b. Intermediate condition.	0.5
c. Low -OR- no interspersion (1 cover type)	0.1

W-173E

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270 / U.S. 15

ASSESSMENT DATE(S): *WAA:* 7/6/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
DG, ML

LOCATION (e.g., City, County, State, Waterway/Watershed):
WAA: Frederick County, MD
planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.8	
Water Quality	0.9	
Wildlife	0.1	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

PLANNED WETLAND GOALS:

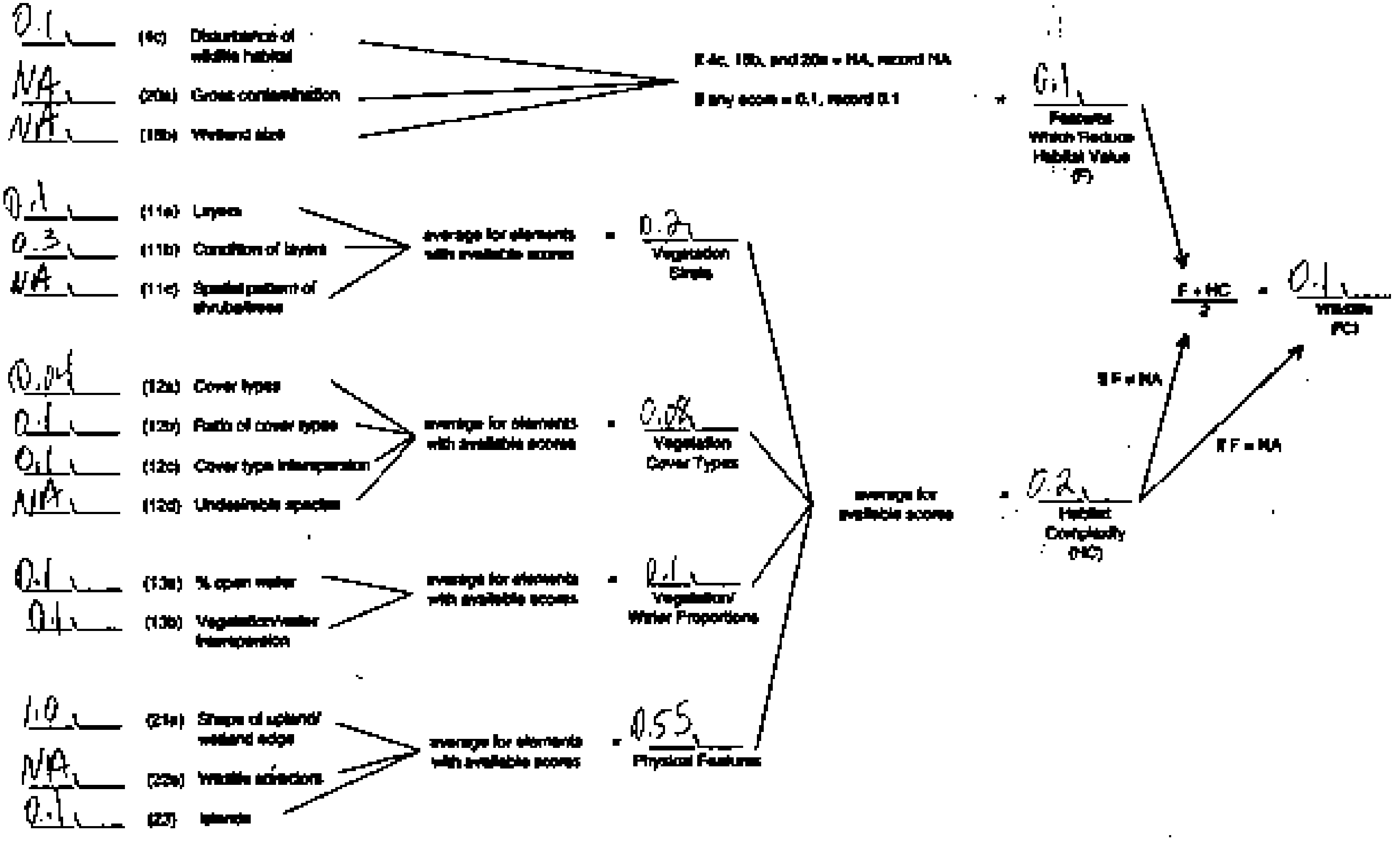
Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I.270 / V.5.15

Selected Scores | (#) | Element

COMPARISON: ______________________ (e.g., WAA/planned wetland)



0.1 (4c) Disturbance of wildlife habitat
NA (20a) Gross contamination
NA (15b) Wetland size

If 4c, 15b, and 20a = NA, record NA
If any score = 0.1, record 0.1
= 0.1 Features Which Reduce Habitat Value (F)

0.1 (11a) Layers
0.3 (11b) Condition of layers
NA (11c) Spatial pattern of shrubs/trees
average for elements with available scores = 0.2 Vegetation Strata

0.04 (12a) Cover types
0.1 (12b) Ratio of cover types
0.1 (12c) Cover type interspersion
NA (12d) Undesirable species
average for elements with available scores = 0.08 Vegetation Cover Types

0.1 (13a) % open water
0.1 (13b) Vegetation/water interspersion
average for elements with available scores = 0.1 Vegetation/Water Proportions

1.0 (21a) Shape of upland/wetland edge
NA (22a) Wildlife attractors
0.1 (23) Islands
average for elements with available scores = 0.55 Physical Features

average for available scores = 0.2 Habitat Complexity (HC)

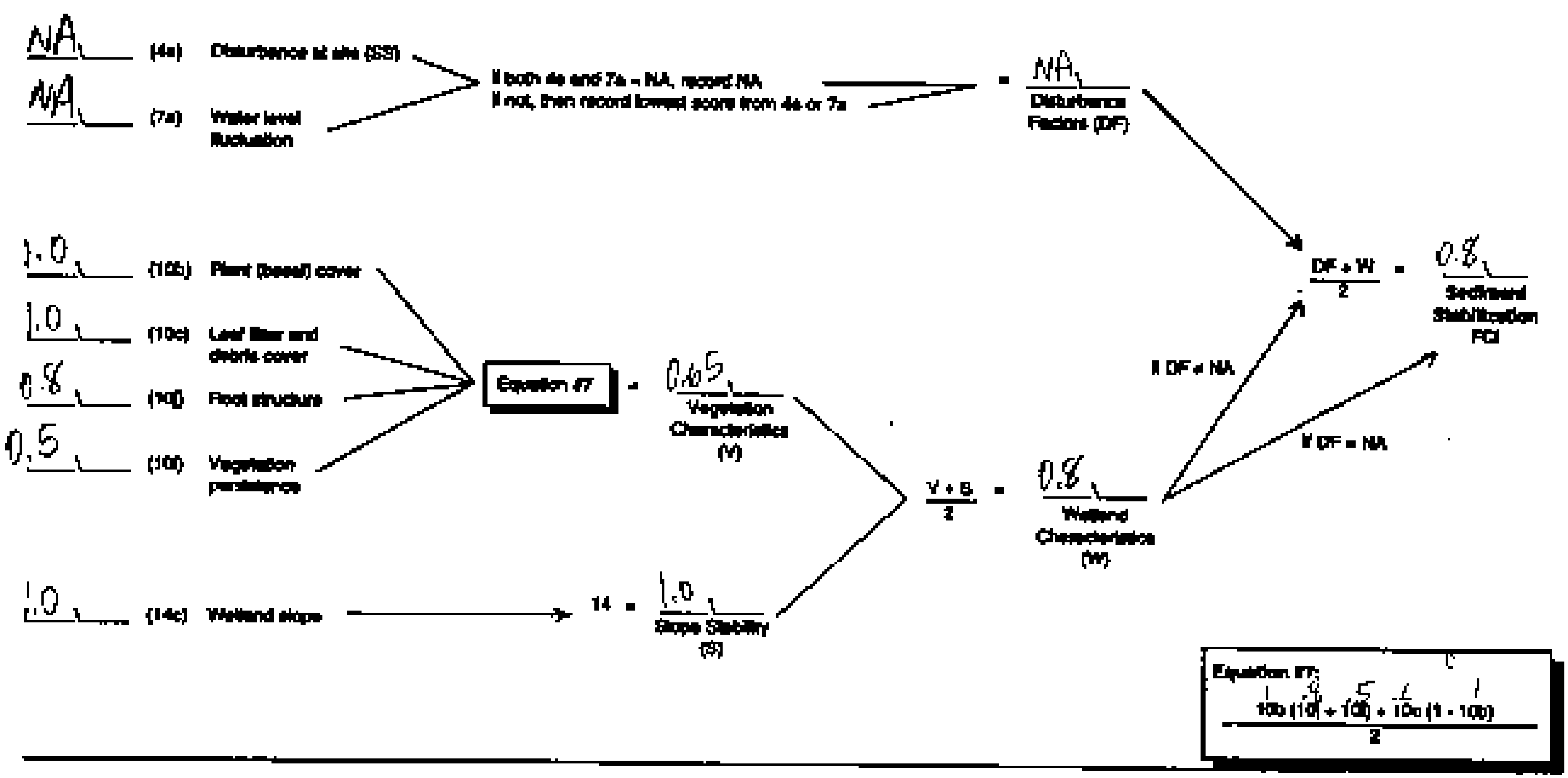
$\frac{F + HC}{2}$ = 0.1 Wildlife FCI

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270/U.S.15

Selected Scores (#) Element

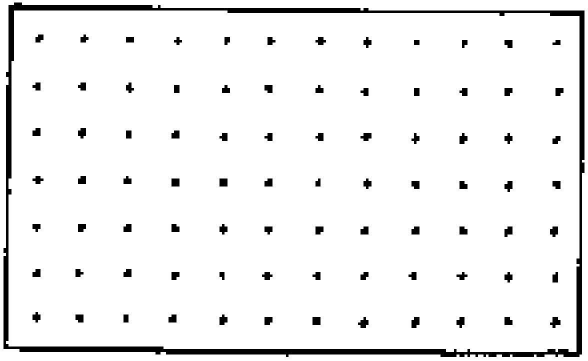
*COMPARISON: ______ (e.g., WAA/planned wetland)



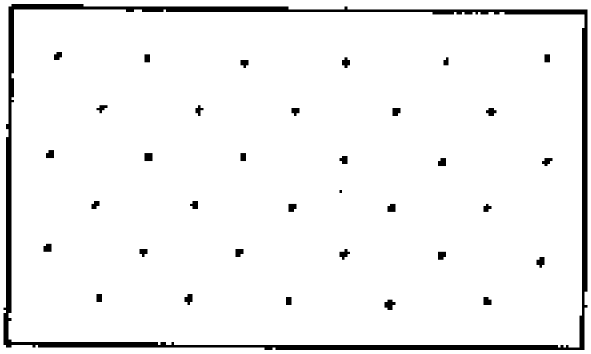
U-098-2-EW

REGULAR

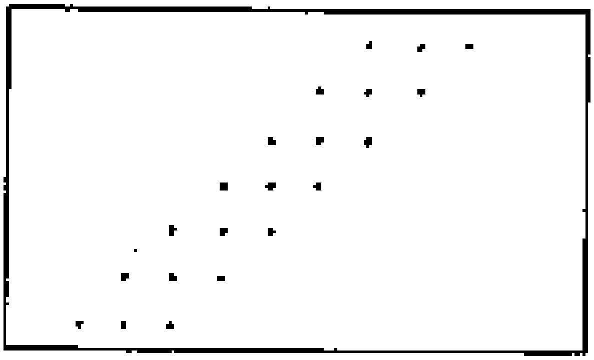
Uniform = individuals are regularly spaced.



Uniform (row planting)

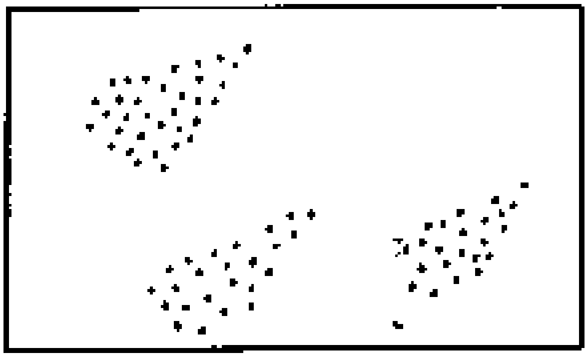


Uniform

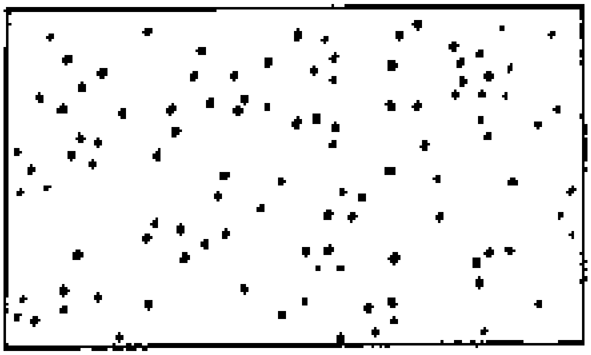


Uniform (rows)

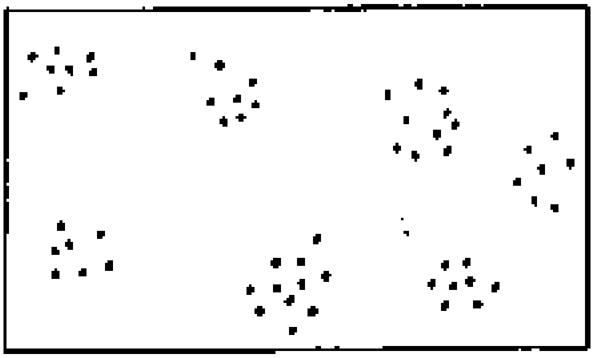
IRREGULAR



Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)



Random
(all individuals are located
independently of each other.)



Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA)
		WAA	Planned Wetland	If both are NA, record NA

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent
Short nonpersistent ✓

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

✓ 10% ____ 5% ____ Other

Thus, an area must be at least 10% (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types	Calculation of Relative score (# of cover types / 27)
WAA : 1 (e.g.) (1) Planned : ____ (4)	0.04 (example) (1/27=0.04) ____ (4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a.	Approximately equal proportions.	1.0
b.	Intermediate condition.	0.5
c.	Predominantly 1 cover type.	0.1

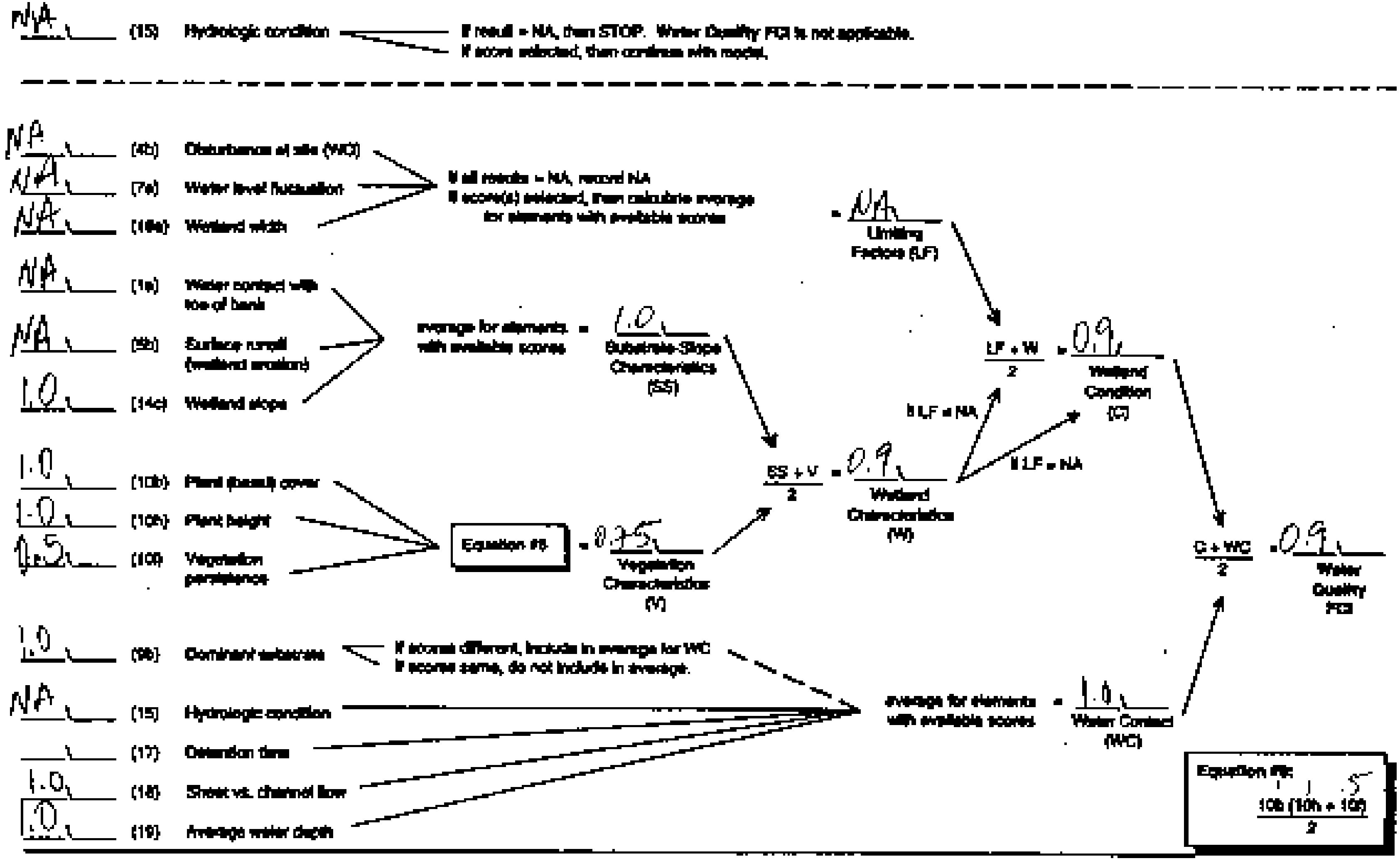
12c. Degree of cover type interspersion (See Figure A.8). [WL]

a.	High.	1.0
b.	Intermediate condition.	0.5
c.	Low -OR- no interspersion (1 cover type)	0.1

Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270 / U.S. 15

Selected Scores (#) Element COMPARISON: ______ (e.g., WAA/planned wetland)



NA (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.

NA (4b) Disturbance at site (WC)
NA (7a) Water level fluctuation
NA (16a) Wetland width
If all results = NA, record NA
If score(s) selected, then calculate average for elements with available scores
= NA Limiting Factors (LF)

NA (1a) Water contact with toe of bank
NA (5b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope
average for elements with available scores = 1.0 Substrate-Slope Characteristics (SS)

1.0 (10b) Plant (basal) cover
1.0 (10h) Plant height
0.5 (10f) Vegetation persistence
Equation #6 = 0.75 Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 0.9 Wetland Characteristics (W)

If LF = NA / If LF ≠ NA

$\frac{LF + W}{2}$ = 0.9 Wetland Condition (C)

1.0 (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
NA (15) Hydrologic condition
(17) Detention time
1.0 (18) Sheet vs. channel flow
1.0 (19) Average water depth
average for elements with available scores = 1.0 Water Contact (WC)

$\frac{C + WC}{2}$ = 0.9 Water Quality FCI

Equation #6:

$$\frac{\overset{1}{10b}\ (\overset{1}{10h} + \overset{.5}{10f})}{2}$$

W-174

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270 / U.S. 15

ASSESSMENT DATE(S): *WAA:* 7/6/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA: Frederick County, MD

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.6	
Water Quality	0.9	
Wildlife	0.2	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

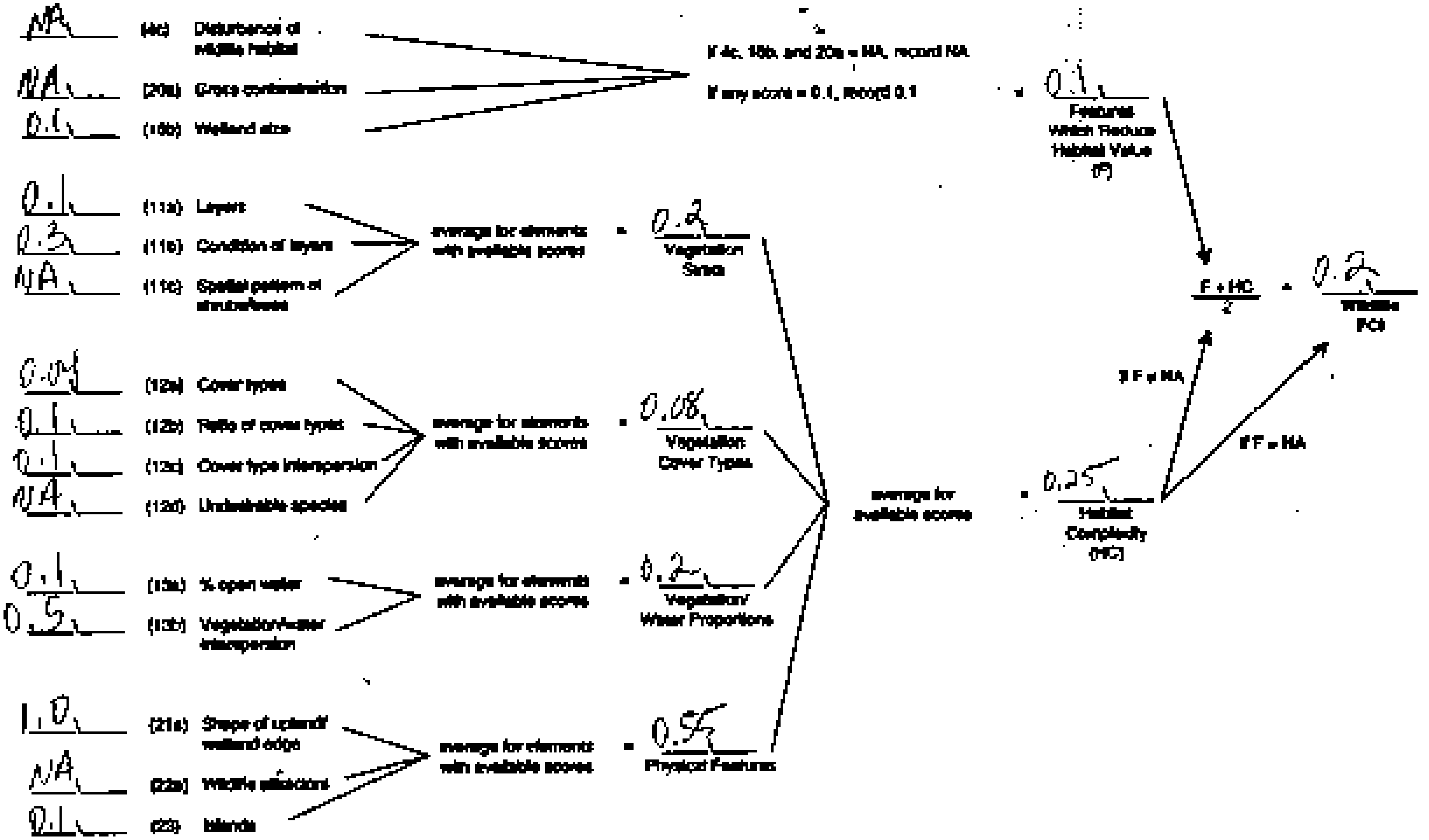
PLANNED WETLAND GOALS:

Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270/U.S.15

Selected Scores (#) Element COMPARISON: ______________________ (e.g. WAA/planned wetland)



NA (4c) Disturbance of wildlife habitat
NA (20a) Gross contamination
0.1 (18b) Wetland size

If 4c, 18b, and 20a = NA, record NA.
If any score = 0.1, record 0.1 = 0.1 Features Which Reduce Habitat Value (F)

0.1 (11a) Layers
0.3 (11b) Condition of layers
NA (11c) Spatial pattern of shrubs/trees

average for elements with available scores = 0.2 Vegetation Strata

0.04 (12a) Cover types
0.1 (12b) Ratio of cover types
0.1 (12c) Cover type interspersion
NA (12d) Undesirable species

average for elements with available scores = 0.08 Vegetation Cover Types

0.1 (13a) % open water
0.5 (13b) Vegetation/water interspersion

average for elements with available scores = 0.2 Vegetation/Water Proportions

1.0 (21a) Shape of upland/wetland edge
NA (22a) Wildlife attractions
0.1 (23) Islands

average for elements with available scores = 0.55 Physical Features

average for available scores = 0.25 Habitat Complexity (HC)

If F ≠ NA

If F = NA

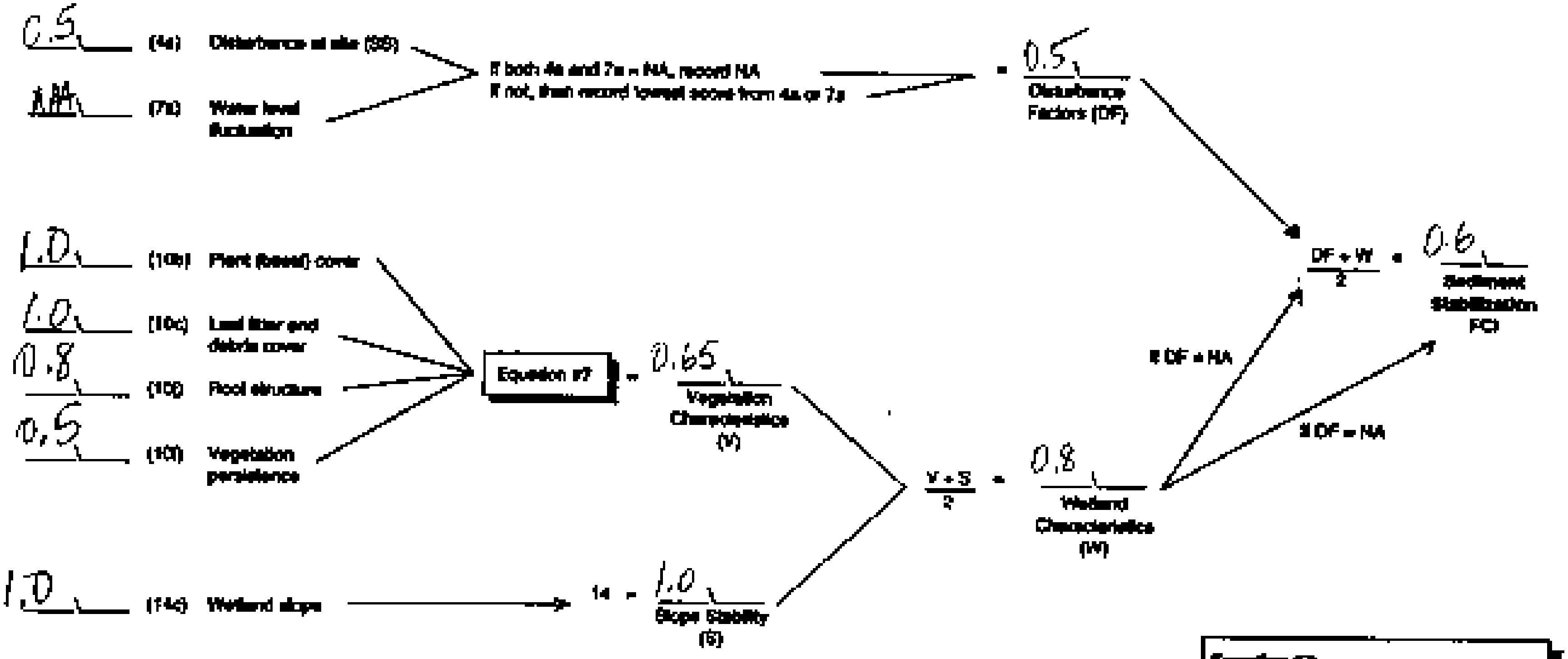
$\frac{F + HC}{2}$ = 0.2 Wildlife FCI

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270/U.S. 15

Selected Score (#) Element

*COMPARISON: ______ / ______ (e.g., WAA/planned wetland)



0.5 (4a) Disturbance at site (SS)

NA (7a) Water level fluctuation

If both 4a and 7a = NA, record NA
If not, then record lowest score from 4a or 7a = 0.5 Disturbance Factors (DF)

1.0 (10b) Plant (basal) cover

1.0 (10c) Leaf litter and debris cover

0.8 (10e) Root structure

0.5 (10f) Vegetation persistence

Equation #7 = 0.65 Vegetation Characteristics (V)

1.0 (14c) Wetland slope → 14 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.8 Wetland Characteristics (W)

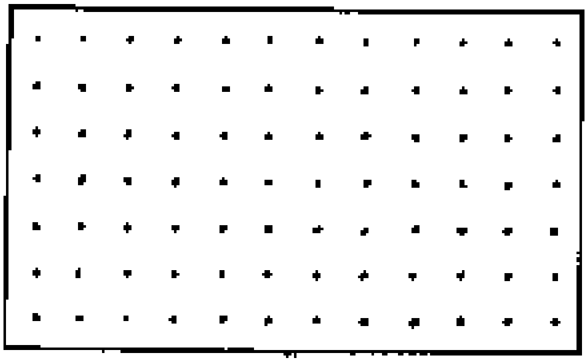
$\frac{DF + W}{2}$ = 0.6 Sediment Stabilization FCI

Equation #7:

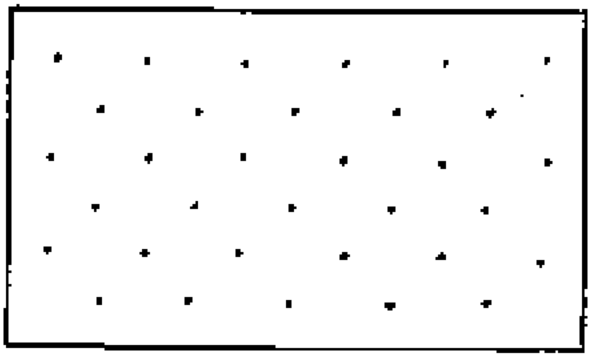
$$\frac{\overset{1}{10b}\,(\overset{.8}{10e} + \overset{.5}{10f}) + \overset{1}{10c}\,(1 - 10b)}{2}$$

REGULAR

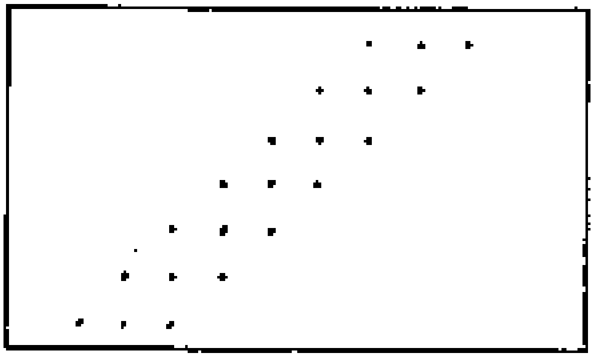
Uniform = Individuals are regularly spaced.



Uniform (row planting)

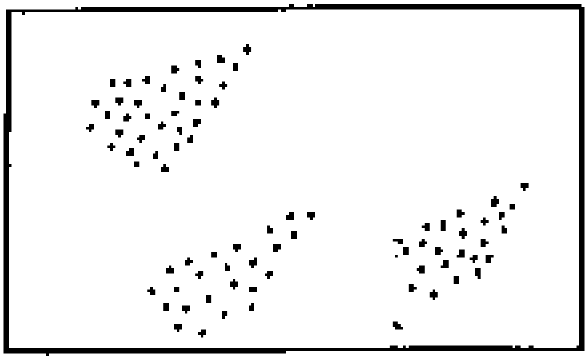


Uniform

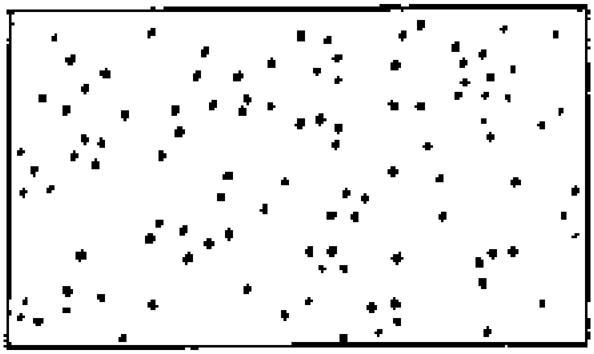


Uniform (rows)

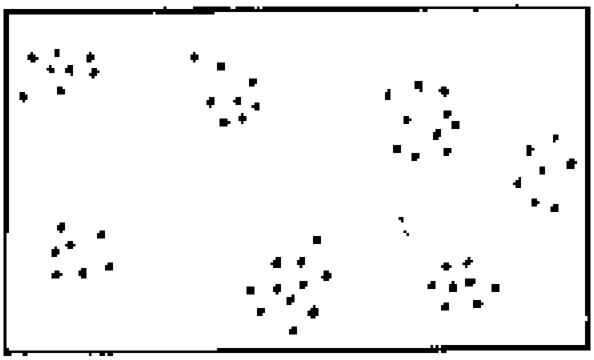
IRREGULAR



Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)



Random
(all individuals are located
independently of each other.)



Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA) If both are NA, record NA
		WAA	Planned Wetland	

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent
Short nonpersistent ✓

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

__✓__ 10% _____ 5% _____ Other

Thus, an area must be at least __10%__ (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland; # of cover types		Calculation of Relative score $\frac{\text{\# of cover types}}{27}$	
	(e.g.)	0.04	(example)
WAA : __1__	(1)	____	(1/27=0.04)
Planned : ____	(4)	____	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions. 1.0
b. Intermediate condition. 0.5
c. Predominantly 1 cover type. 0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

a. High. 1.0
b. Intermediate condition. 0.5
c. Low -OR- no interspersion (1 cover type) 0.1

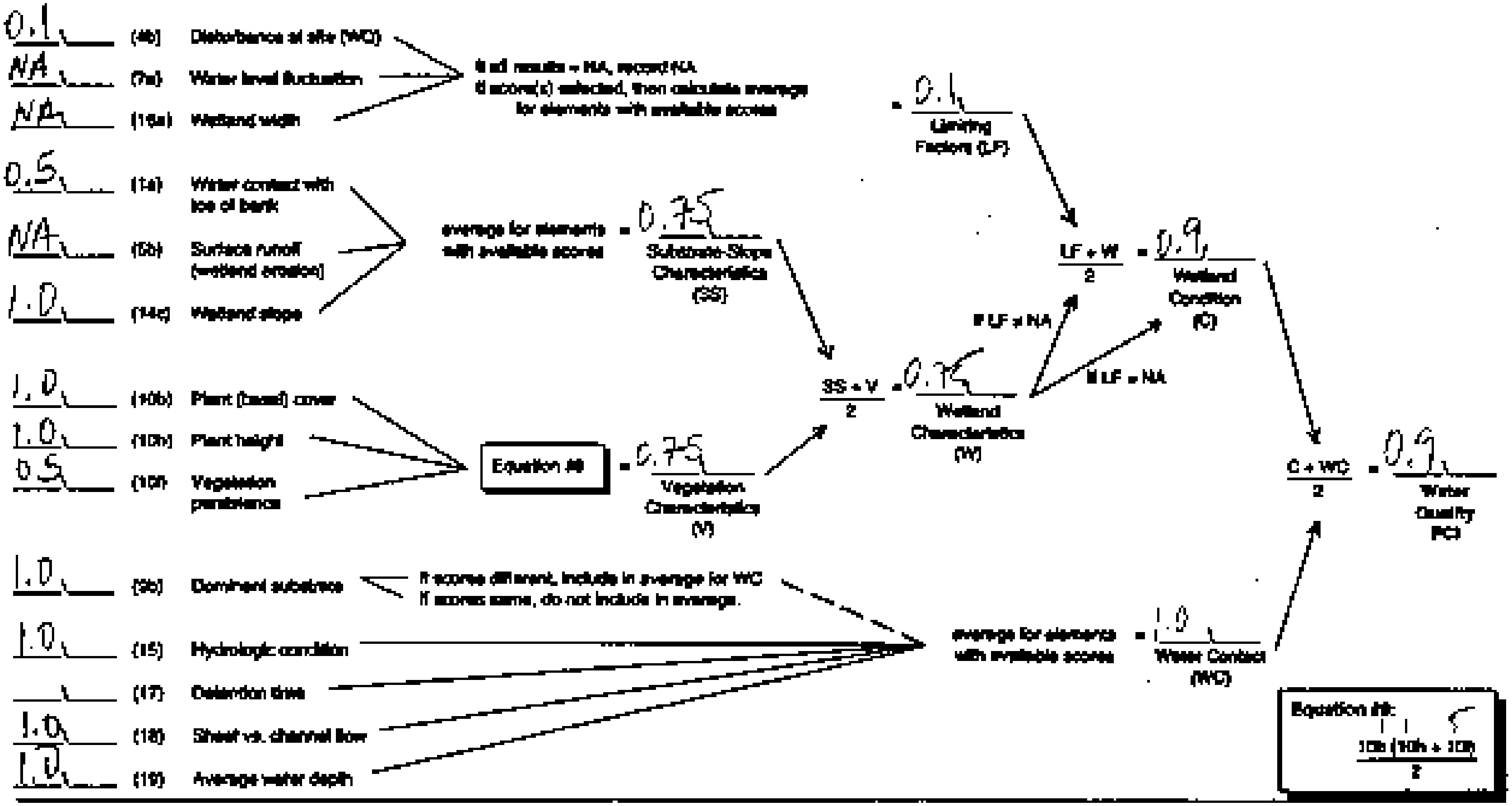
Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270 / US 15

Selected Score | (#) | Element

COMPARISON: ________ \ ________ (e.g., WAA/planned wetland)

1.0 \ (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.



0.1 \ (4b) Disturbance at site (WC)
NA \ (7a) Water level fluctuation
NA \ (16a) Wetland width

If all results = NA, record NA. If score(s) selected, then calculate average for elements with available scores = 0.1 Limiting Factors (LF)

0.5 \ (14) Water contact with toe of bank
NA \ (5b) Surface runoff (wetland erosion)
1.0 \ (14c) Wetland slope

average for elements with available scores = 0.75 Substrate-Slope Characteristics (SS)

1.0 \ (10b) Plant (basal) cover
1.0 \ (10h) Plant height
0.5 \ (10f) Vegetation persistence

Equation # = 0.75 Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 0.75 Wetland Characteristics (W)

If LF ≠ NA → $\frac{LF + W}{2}$ = 0.9 Wetland Condition (C)

If LF = NA → Wetland Condition (C)

1.0 \ (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
1.0 \ (15) Hydrologic condition
\ (17) Detention time
1.0 \ (18) Sheet vs. channel flow
1.0 \ (19) Average water depth

average for elements with available scores = 1.0 Water Contact (WC)

$\frac{C + WC}{2}$ = 0.9 Water Quality FCI

Equation #:

$$\frac{\overset{1}{10b}\,(\overset{1}{10h} + \overset{5}{10f})}{2}$$

W-180 W

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270/U.S. 15

ASSESSMENT DATE(S): *WAA:* 7/12/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
DS, HL

LOCATION (e.g., City, County, State, Waterway/Watershed):
WAA: Frederick County, MD
planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.9	
Water Quality	1.0	
Wildlife	0.1	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

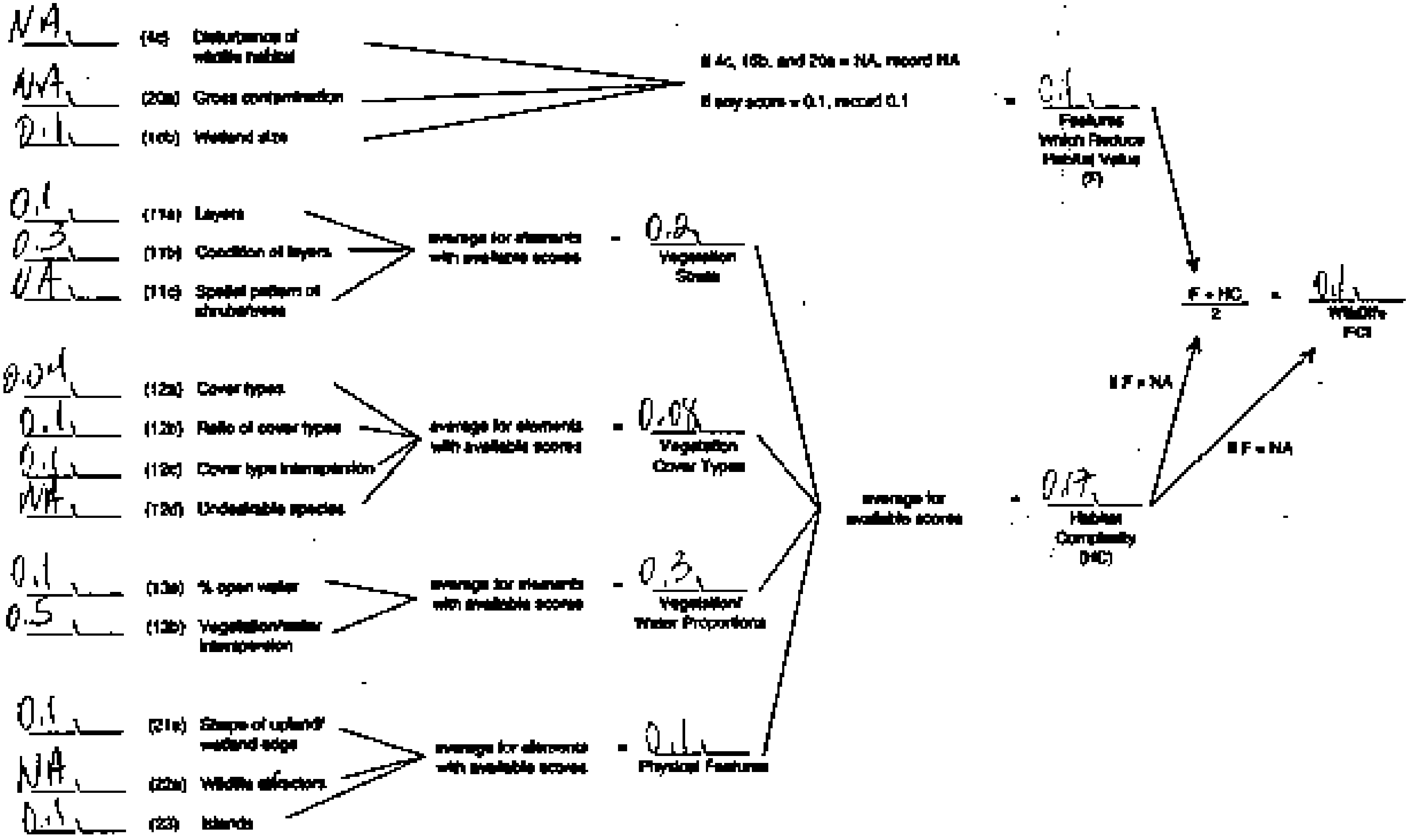
PLANNED WETLAND GOALS:

Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270 / U.S. 15

COMPARISON: ____ \ ____ (e.g., WAA/planned wetland)



Selected Score	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
0.1	(16b)	Wetland size
0.1	(11a)	Layers
0.3	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
0.04	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12c)	Cover type interspersion
NA	(12d)	Undesirable species
0.1	(13a)	% open water
0.5	(13b)	Vegetation/water interspersion
0.1	(21a)	Shape of upland/wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands

If 4c, 16b, and 20a = NA, record NA
If any score = 0.1, record 0.1
= 0.1 Features Which Reduce Habitat Value (F)

(11a), (11b), (11c): average for elements with available scores = 0.2 Vegetation Strata

(12a), (12b), (12c), (12d): average for elements with available scores = 0.08 Vegetation Cover Types

(13a), (13b): average for elements with available scores = 0.3 Vegetation/Water Proportions

(21a), (22a), (23): average for elements with available scores = 0.1 Physical Features

average for available scores = 0.17 Habitat Complexity (HC)

If F = NA

If F = NA

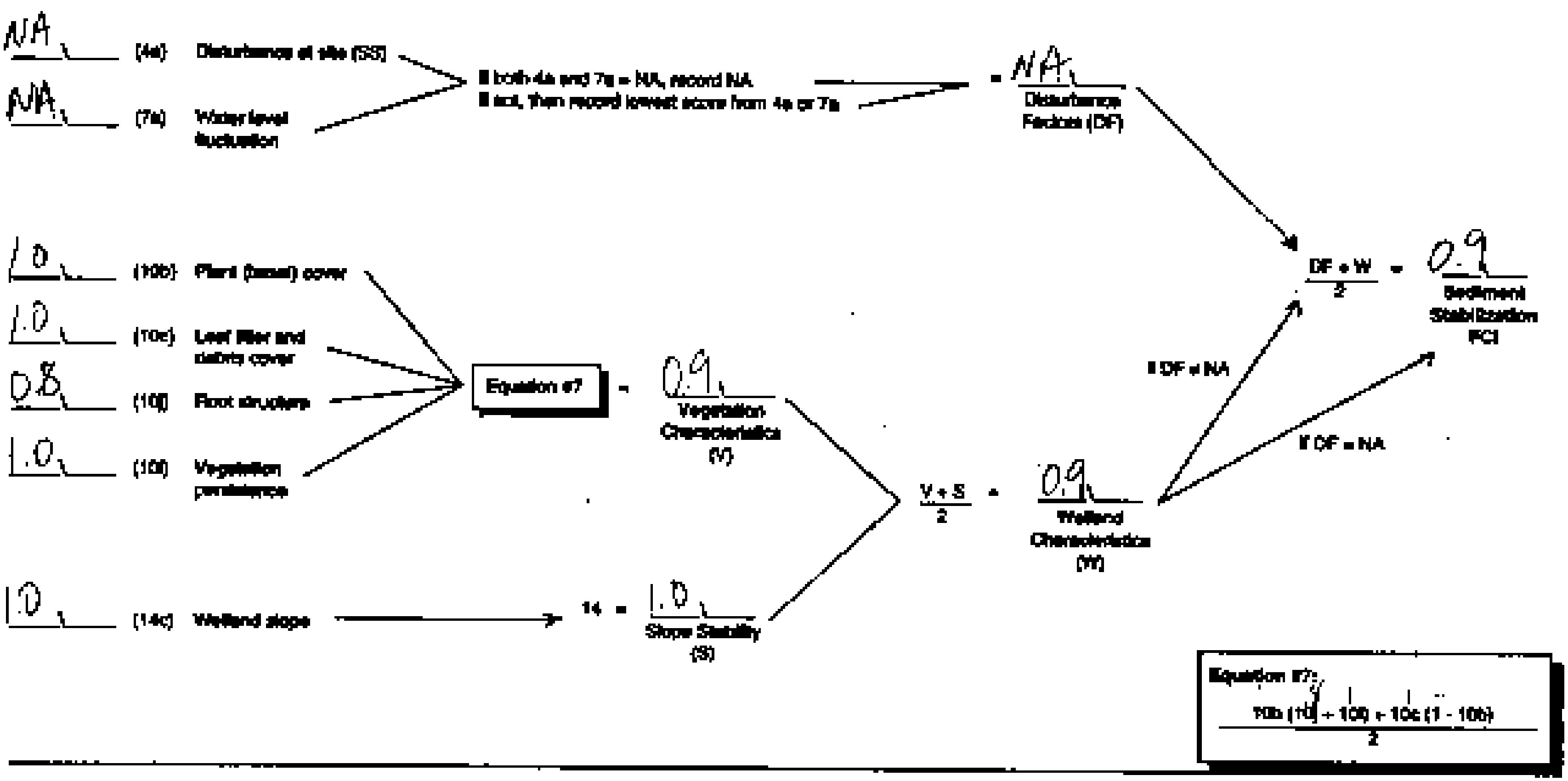
$\frac{F + HC}{2}$ = 0.1 Wildlife FCI

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270/U.S.15

Selected Scores	(#)	Element

*COMPARISON: ______________________ (e.g., WAA/planned wetland)



NA (4a) Disturbance at site (SS)

NA (7a) Water level fluctuation

If both 4a and 7a = NA, record NA

If not, then record lowest score from 4a or 7a

= NA Disturbance Factors (DF)

1.0 (10b) Plant (basal) cover

1.0 (10c) Leaf litter and debris cover

0.8 (10f) Root structure

1.0 (10g) Vegetation persistence

Equation #7 = 0.9 Vegetation Characteristics (V)

1.0 (14c) Wetland slope → 14 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.9 Wetland Characteristics (W)

If DF ≠ NA

If DF = NA

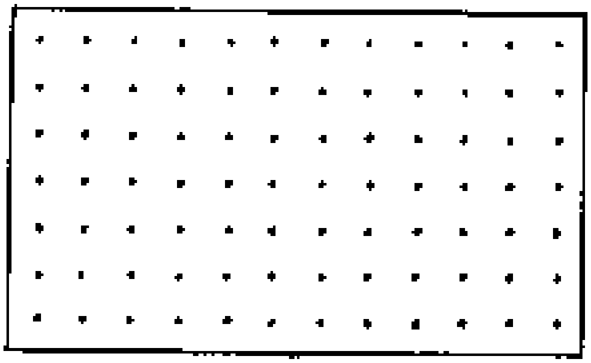
$\frac{DF + W}{2}$ = 0.9 Sediment Stabilization FCI

Equation #7:

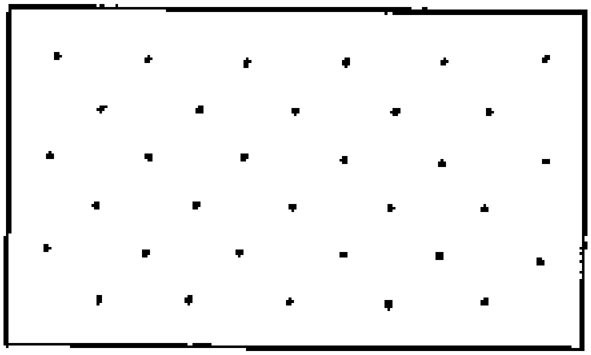
$$\frac{10b\ (10f + 10g) + 10c\ (1 - 10b)}{2}$$

REGULAR

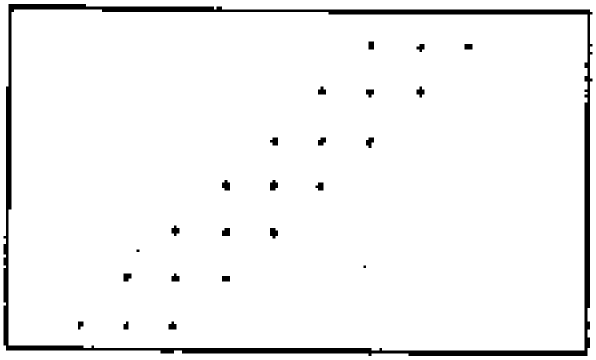
Uniform = individuals are regularly spaced.



Uniform (row planting)

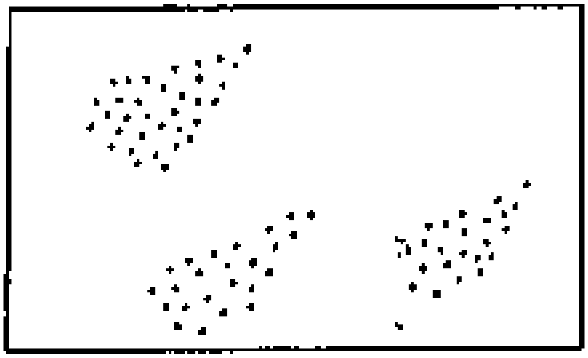


Uniform

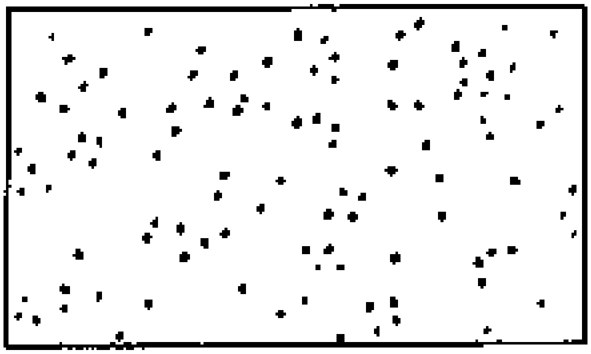


Uniform (rows)

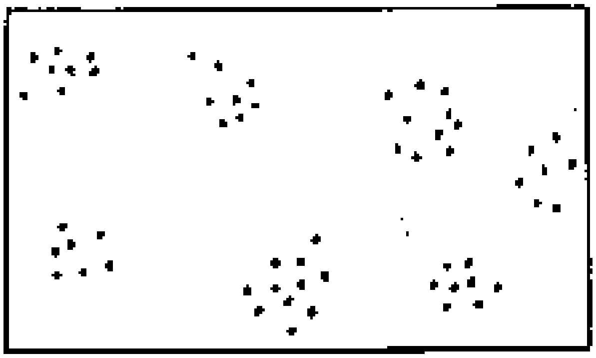
IRREGULAR



Aggregate Drifts or Sweep
(a cluster type grouping which tapers
or feathers out along the edges.)



Random
(all individuals are located
independently of each other.)



Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA) If both are NA, record NA
		WAA	Planned Wetland	

12. Cover types (27 listed) (refer to Table A.3):

Trees:
- Needle-leaved evergreen
- Broad-leaved evergreen
- Needle-leaved deciduous
- Broad-leaved deciduous
- Dead

Emergent:
- Tall persistent
- Short persistent
- Tall nonpersistent
- Short nonpersistent

Scrub-Shrub:
- Tall evergreen
- Bushy evergreen
- Low compact evergreen
- Tall deciduous
- Bushy deciduous
- Low compact deciduous
- Dead

Moss-lichen:
- Moss
- Lichen

Non-vegetative:
- Bedrock
- Rubble
- Cobble-gravel
- Sand
- Mud
- Organic
- Dead fallen trees/shrubs
- Open Water

Aquatic-bed:
- Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

✓ 10% _____ 5% _____ Other

Thus, an area must be at least 10% (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland. # of cover types			Calculation of Relative score $\frac{\text{\# of cover types}}{27}$	
		(e.g.)		(example)
WAA	: 1	(1)	0.04	(1/27=0.04)
Planned	: ___	(4)	___	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a.	Approximately equal proportions.	1.0
b.	Intermediate condition.	0.5
c.	Predominantly 1 cover type.	0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

a.	High.	1.0
b.	Intermediate condition.	0.5
c.	Low -OR- no interspersion (1 cover type)	0.1

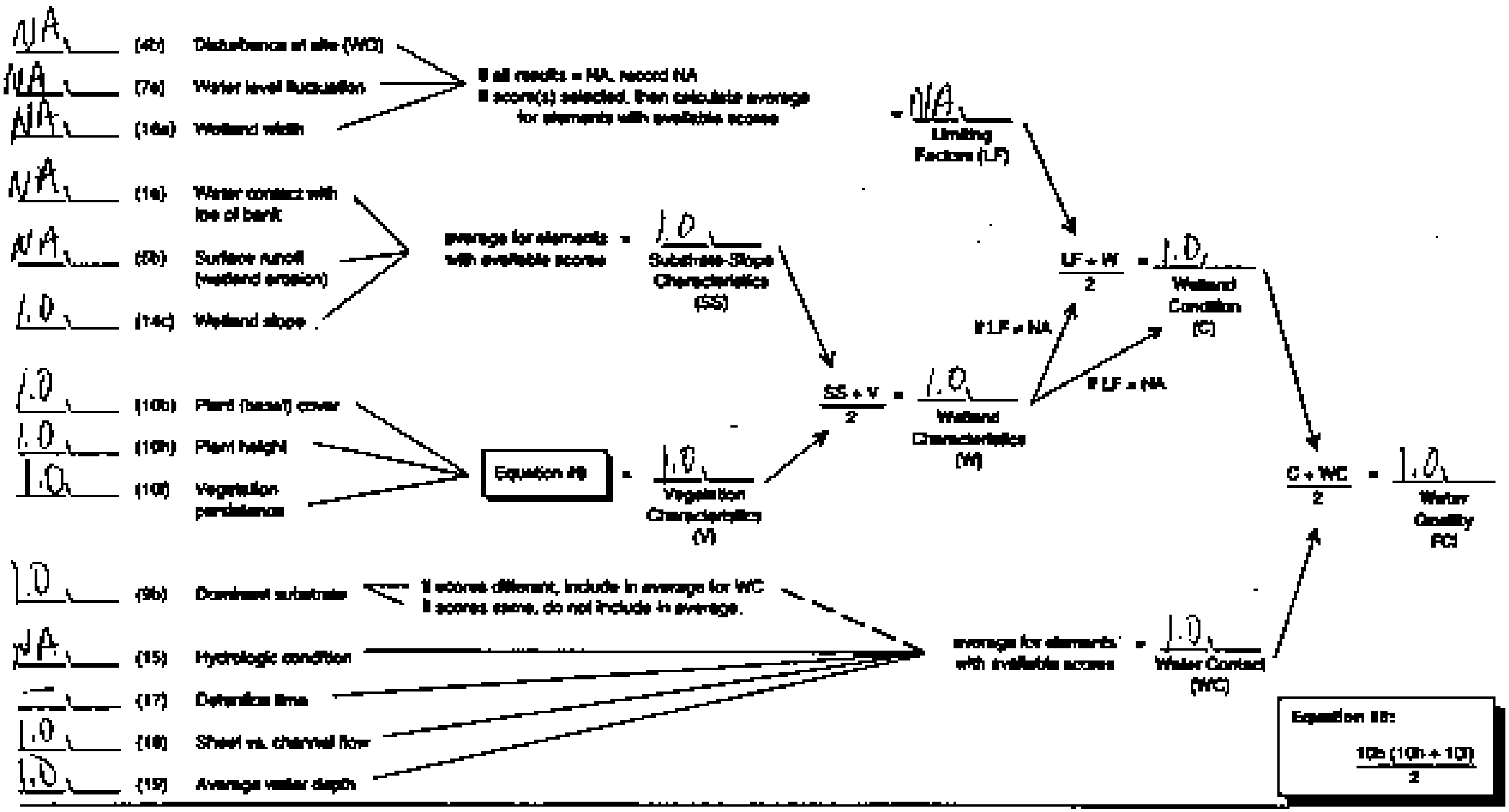
Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270 | U.S. 15

Selected Scores (#) Element

COMPARISON: ____________ \ ____________ (e.g., WAA/planned wetland)

NA (15) Hydrologic condition
If result = NA, then STOP. Water Quality FCI is not applicable.
If score selected, then continue with model.



NA (4b) Disturbance at site (WC)
NA (7a) Water level fluctuation
NA (16a) Wetland width
If all results = NA, record NA
If score(s) selected, then calculate average for elements with available scores
= NA Limiting Factors (LF)

NA (1a) Water contact with toe of bank
NA (5b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope
average for elements with available scores = 1.0 Substrate-Slope Characteristics (SS)

1.0 (10b) Plant (basal) cover
1.0 (10h) Plant height
1.0 (10l) Vegetation persistence
Equation #9 = 1.0 Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 1.0 Wetland Characteristics (W)

If LF = NA

If LF ≠ NA

$\frac{LF + W}{2}$ = 1.0 Wetland Condition (C)

1.0 (9b) Dominant substrate
If scores different, include in average for WC
If scores same, do not include in average.
NA (15) Hydrologic condition
— (17) Detention time
1.0 (18) Sheet vs. channel flow
1.0 (19) Average water depth
average for elements with available scores = 1.0 Water Contact (WC)

$\frac{C + WC}{2}$ = 1.0 Water Quality FCI

Equation #9:

$$\frac{10b\ (10h + 10l)}{2}$$

W 185W & 186W

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270 / U.S. 15

ASSESSMENT DATE(S): *WAA:* 7/30/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:

MR/BS

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA:

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.9	
Water Quality	1.0	
Wildlife	0.5	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

CHECK SEASONAL CONTEXT OF THE ASSESSMENT:

Average Dry Wet

In most situations, the wetland can be readily evaluated by considering average site conditions. However, in some regions (e.g., arid) it may be preferable to evaluate the wetland for different conditions. Please provide explanation if average conditions are not used.

EXPLANATION OF CHANGES OR MODIFICATIONS TO EPW:

	Yes	No
Were any changes, deletions, or additions to element conditions and/or assigned scores made? If so, explain below. Cite literature and/or document personal communication(s) with experts.		
Were any changes made to the FCI models? If so, explain.		
Is the planned wetland designed with the goal of removing specific nutrients? If so, explain. Note: modification of the Water Quality FCI model and elements may be required to insure a focus on the removal efficiency for specified nutrients. Refer to Chapter 6 and available literature.		

Explanations:

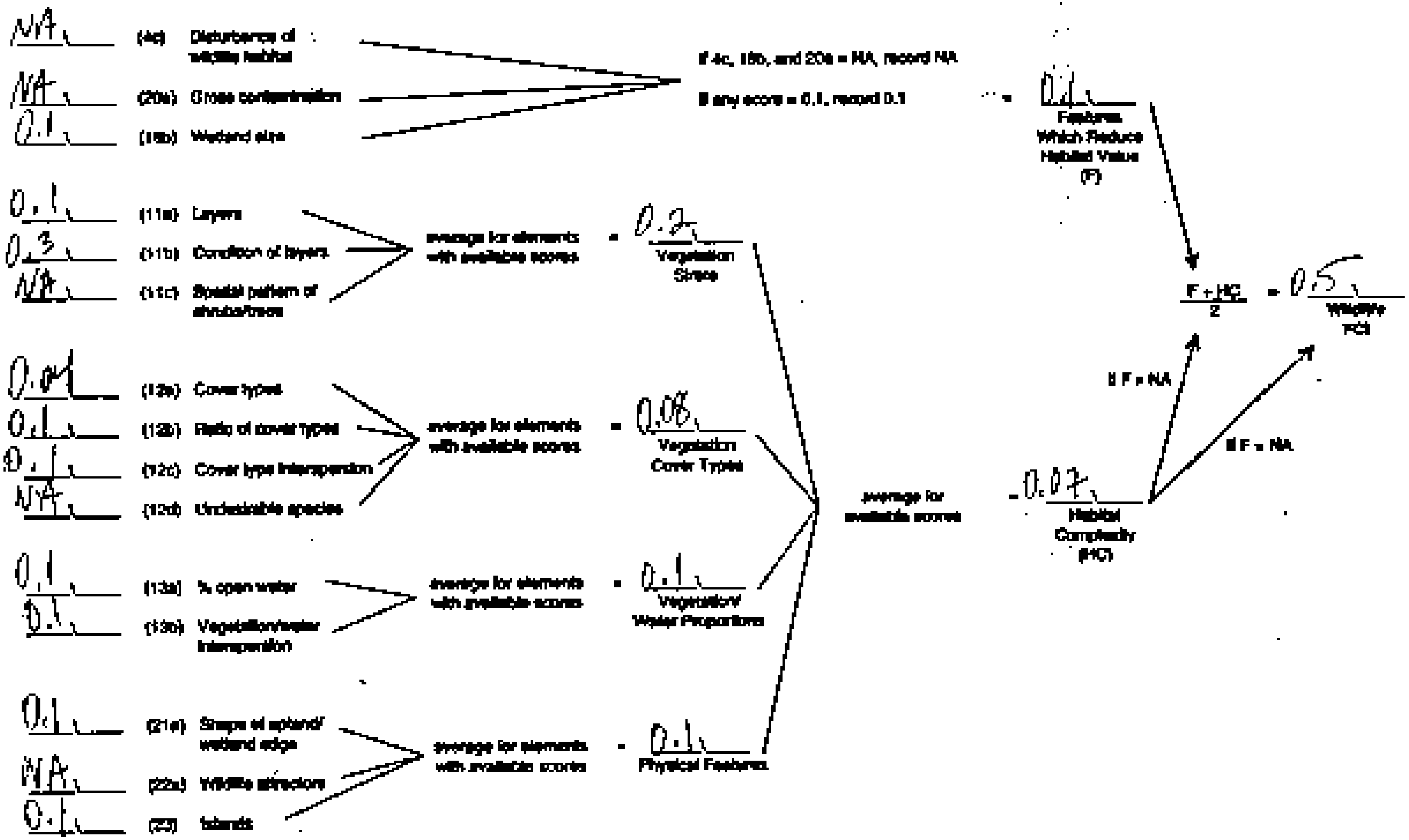
PLANNED WETLAND GOALS:

Target FCIs and Target FCUs are recorded in Table A. 1 and Table A. 2. Other pertinent information may be provided here.

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270 / US 15

COMPARISON: ______ (e.g., WAA/planned wetland)



Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
0.1	(18b)	Wetland size
0.1	(11a)	Layers
0.3	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
0.04	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12c)	Cover type interspersion
NA	(12d)	Undesirable species
0.1	(13a)	% open water
0.1	(13b)	Vegetation/water interspersion
0.1	(21a)	Shape of upland/ wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands

4c, 20a, 18b: If 4c, 18b, and 20a = NA, record NA. If any score = 0.1, record 0.1 = 0.1 Features Which Reduce Habitat Value (F)

11a, 11b, 11c: average for elements with available scores = 0.2 Vegetation Strata

12a, 12b, 12c, 12d: average for elements with available scores = 0.08 Vegetation Cover Types

13a, 13b: average for elements with available scores = 0.1 Vegetation/ Water Proportions

21a, 22a, 23: average for elements with available scores = 0.1 Physical Features

Vegetation Strata, Vegetation Cover Types, Vegetation/ Water Proportions, Physical Features: average for available scores = 0.07 Habitat Complexity (HC)

$\frac{F + HC}{2}$ = 0.5 Wildlife FCI

If F ≠ NA: HC → $\frac{F + HC}{2}$

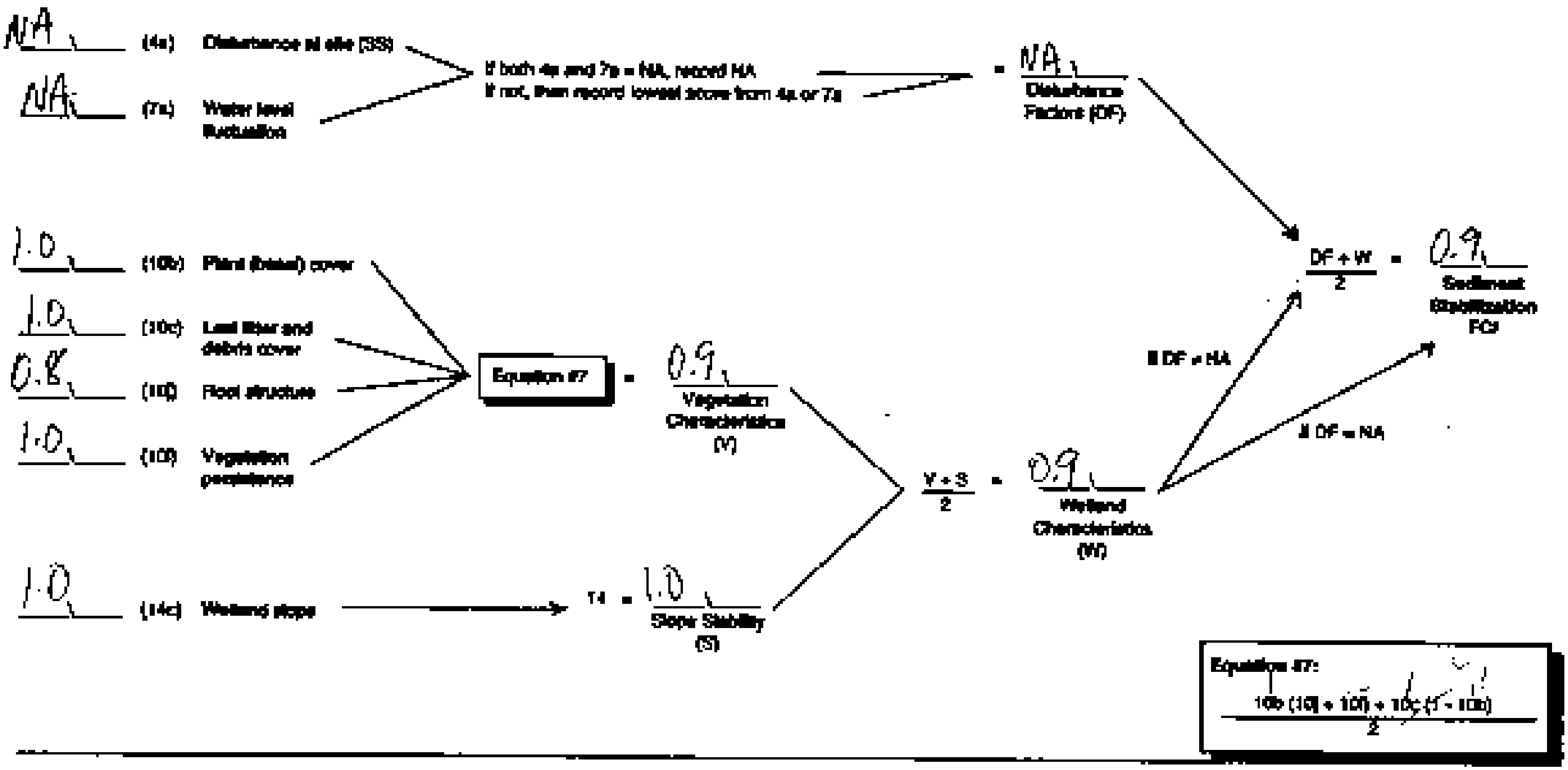
If F = NA: HC → Wildlife FCI

Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270 / US 15

Selected Scores	(#)	Element

*COMPARISON: ______ \ ______ (e.g., WAA/planned wetland)



NA (4a) Disturbance at site (SS)

NA (7a) Water level fluctuation

If both 4a and 7a = NA, record NA
If not, then record lowest score from 4a or 7a

= NA Disturbance Factors (DF)

1.0 (10b) Plant (basal) cover

1.0 (10c) Leaf litter and debris cover

0.8 (11d) Root structure

1.0 (11f) Vegetation persistence

Equation #7 = 0.9 Vegetation Characteristics (V)

1.0 (14c) Wetland slope

T4 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.9 Wetland Characteristics (W)

If DF ≠ NA

If DF = NA

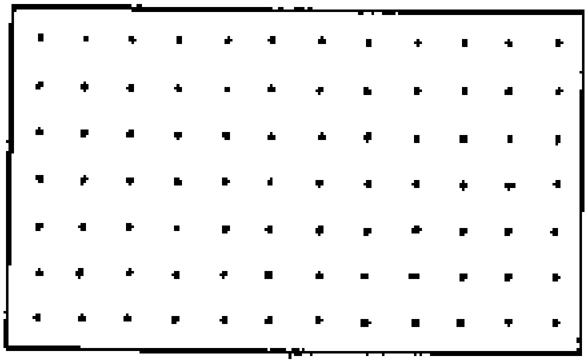
$\frac{DF + W}{2}$ = 0.9 Sediment Stabilization FCI

Equation #7:

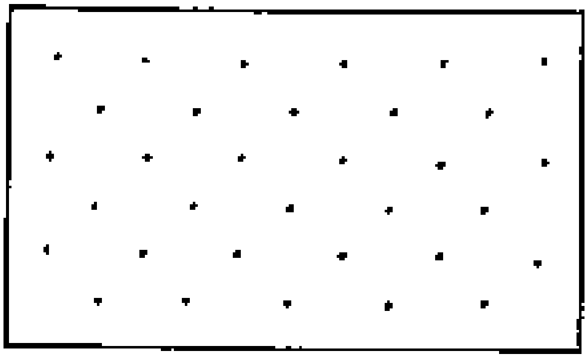
$$\frac{10b\,(11d + 11f) + 10c\,(1 - 10b)}{2}$$

REGULAR

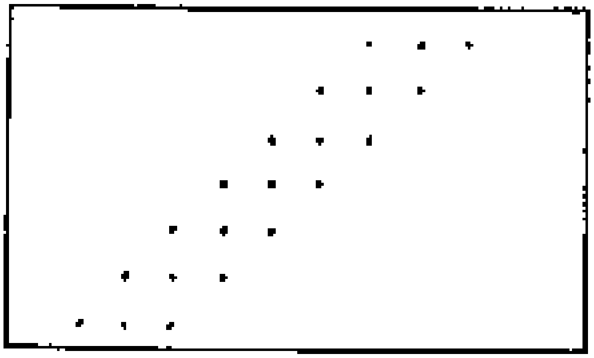
Uniform = Individuals are regularly spaced.



Uniform (row planting)

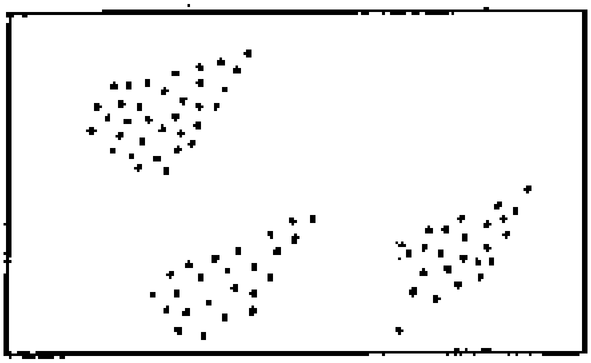


Uniform

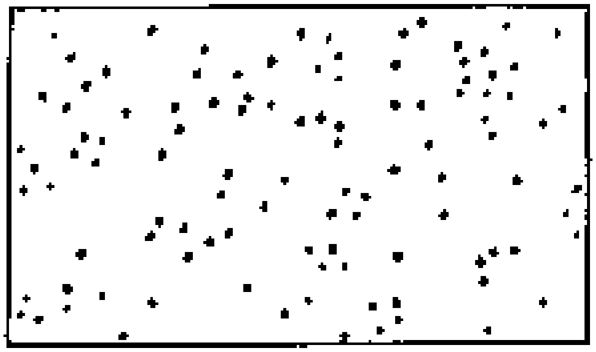


Uniform (rows)

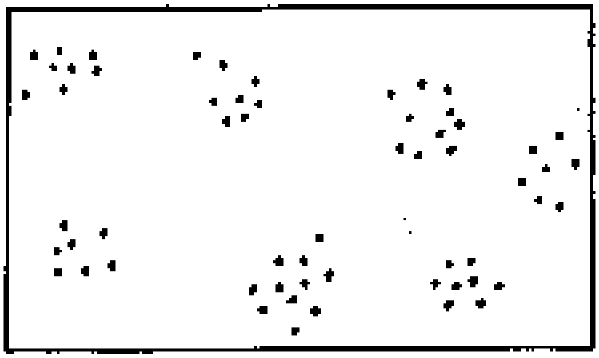
IRREGULAR



Aggregate Drifts or Sweep
(a cluster type grouping which tapers or feathers out along the edges.)



Random
(all individuals are located independently of each other.)



Clumped or Contagious Distribution
(individuals located together in clumps)

Figure A.6.
Examples of spatial patterns (element 11c)

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA)
		WAA	Planned Wetland	If both are NA, record NA

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent
Short persistent
Tall nonpersistent
Short nonpersistent

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site (WL)

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

✓ 10% ____ 5% ____ Other

Thus, an area must be at least ✓ (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types		Calculation of Relative score # of cover types / 27	
WAA: 1	(e.g.) (1)	0.04	(example) (1/27=0.04)
Planned: ____	(4)	____	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) (WL)

a. Approximately equal proportions.	1.0
b. Intermediate condition.	0.5
c. Predominantly 1 cover type.	0.1

12c. Degree of cover type interspersion (See Figure A.8). (WL)

a. High.	1.0
b. Intermediate condition.	0.5
c. Low -OR- no interspersion (1 cover type)	0.1

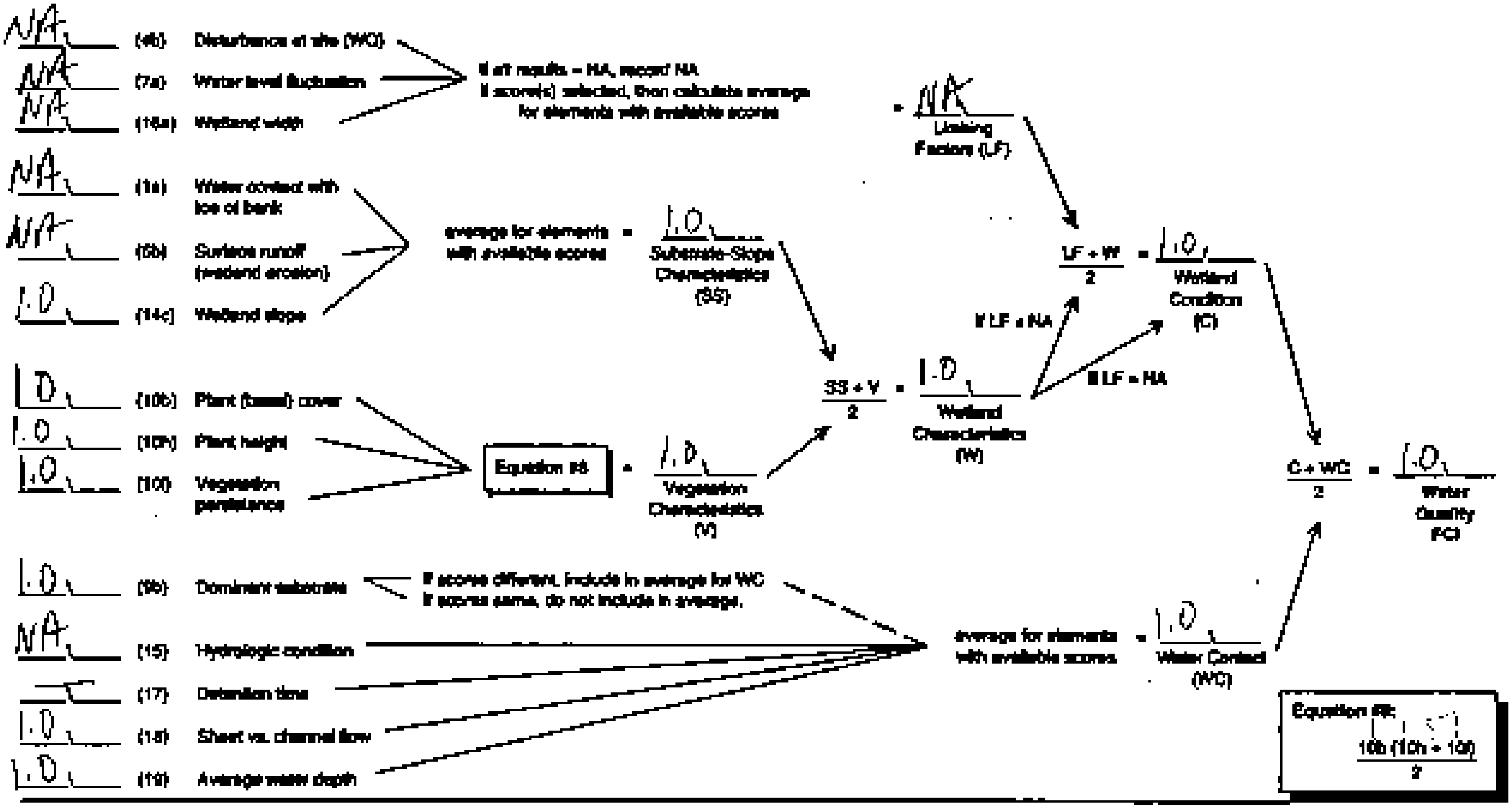
Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270/U.S. 15

Selected Scores (#) Element

COMPARISON: \ (e.g., WAA/planned wetland)

NA (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.



NA (4b) Disturbance at site (WQ)
NA (7a) Water level fluctuation
NA (14a) Wetland width

If all results = NA, record NA
If score(s) selected, then calculate average for elements with available scores = NA Linking Factors (LF)

NA (1a) Water contact with toe of bank
NA (5b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope

average for elements with available scores = 1.0 Substrate-Slope Characteristics (SS)

1.0 (10b) Plant (basal) cover
1.0 (10h) Plant height
1.0 (10i) Vegetation persistence

Equation #8 = 1.0 Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 1.0 Wetland Characteristics (W)

If LF ≠ NA: $\frac{LF + W}{2}$ = 1.0 Wetland Condition (C)

If LF = NA: Wetland Characteristics (W) = Wetland Condition (C)

1.0 (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
NA (15) Hydrologic condition
— (17) Detention time
1.0 (18) Sheet vs. channel flow
1.0 (19) Average water depth

average for elements with available scores = 1.0 Water Contact (WC)

$\frac{C + WC}{2}$ = 1.0 Water Quality FCI

Equation #8:

$$\frac{10b\ (10h + 10i)}{2}$$

W-198W

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270/U.S 15

ASSESSMENT DATE(S): *WAA:* 8/24/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:
WR, HL

LOCATION (e.g., City, County, State, Waterway/Watershed):
WAA: Montgomery County, MD
planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.8	
Water Quality	0.9	
Wildlife	0.4	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

...cover sheet continues on reverse

Calculation of WILDLIFE FCI

PROJECT TITLE: I. 270/US. 15

COMPARISON: ______________________ (e.g., WAA/planned wetland)

Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
NA	(16b)	Wetland size
0.3	(11a)	Layers
0.3	(11b)	Condition of layers
1.0	(11c)	Spatial pattern of shrubs/trees
0.1	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12c)	Cover type interspersion
NA	(12d)	Undesirable species
0.1	(13a)	% open water
0.5	(13b)	Vegetation/water interspersion
1.0	(21a)	Shape of upland/wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands

(4c), (20a), (16b): If 4c, 16b, and 20a = NA, record NA. If any score = 0.1, record 0.1 = NA Features Which Reduce Habitat Value (F)

(11a), (11b), (11c): average for elements with available scores = 0.53 Vegetation Strata

(12a), (12b), (12c), (12d): average for elements with available scores = 0.1 Vegetation Cover Types

(13a), (13b): average for elements with available scores = 0.3 Vegetation/Water Proportions

(21a), (22a), (23): average for elements with available scores = 0.55 Physical Features

Vegetation Strata, Vegetation Cover Types, Vegetation/Water Proportions, Physical Features: average for available scores = 0.4 Habitat Complexity (HC)

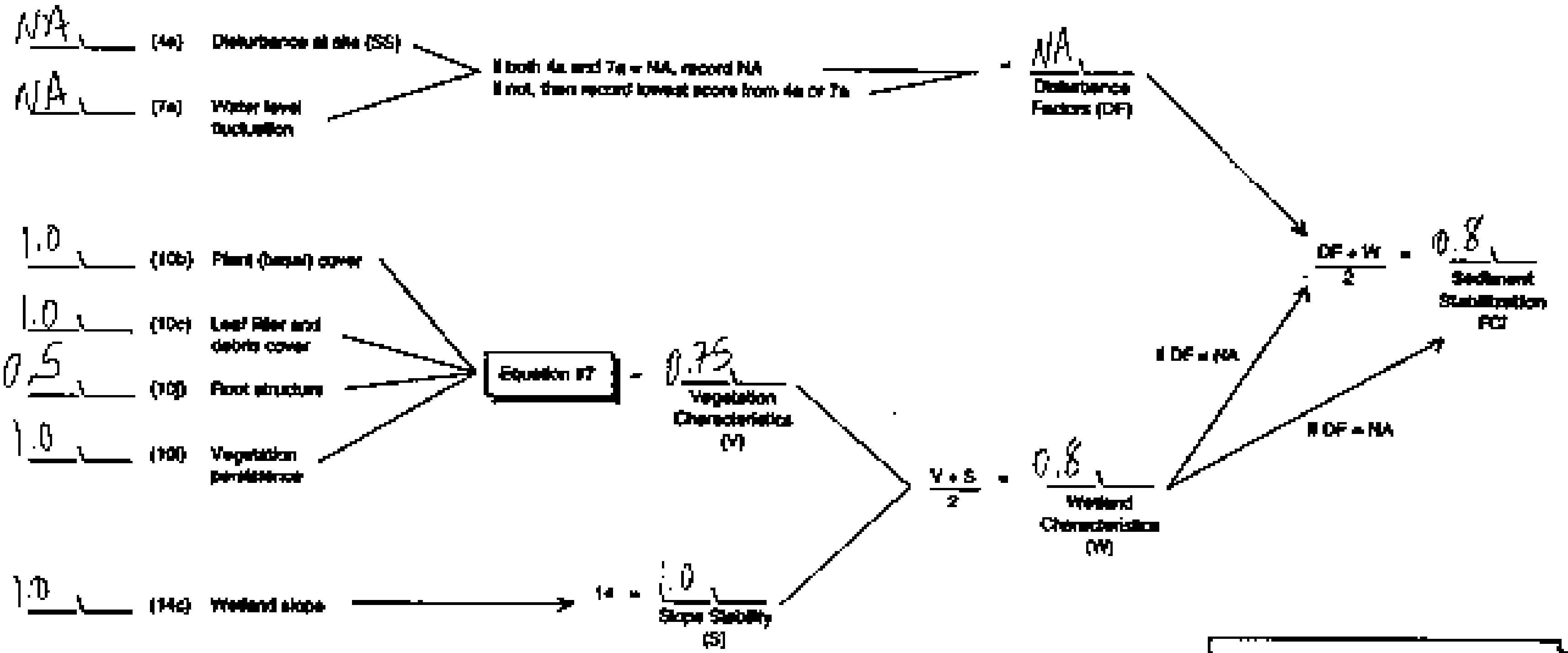
If F ≠ NA: $\frac{F + HC}{2}$ = 0.4 Wildlife FCI

If F = NA: Habitat Complexity (HC) = 0.4 Wildlife FCI

Calculation of **SEDIMENT STABILIZATION** FCI

PROJECT TITLE: I-Z7/US 15

¹COMPARISON: ____ \ ____ (e.g., WAA/planned wetland)



Selected Scores	(#)	Element
NA	(4a)	Disturbance at site (SS)
NA	(7a)	Water level fluctuation
1.0	(10b)	Plant (basal) cover
1.0	(10c)	Leaf litter and debris cover
0.5	(10j)	Root structure
1.0	(10f)	Vegetation persistence
1.0	(14c)	Wetland slope

If both 4a and 7a = NA, record NA
If not, then record lowest score from 4a or 7a

= NA Disturbance Factors (DF)

Equation #7 = 0.75 Vegetation Characteristics (V)

14 = 1.0 Slope Stability (S)

$\frac{V + S}{2}$ = 0.8 Wetland Characteristics (W)

$\frac{DF + W}{2}$ = 0.8 Sediment Stabilization FCI

Equation #7:

$$\frac{\overset{1}{10b}\,(\overset{.5}{10j} + \overset{1}{10f}) + \overset{1}{10c}\,(1 - 10b)}{2}$$

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA)
		WAA	Planned Wetland	If both are NA, record NA

12. Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
[✓ Broad-leaved deciduous]
Dead

Emergent:
Tall persistent
[✓ Short persistent]
Tall nonpersistent
Short nonpersistent

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
[✓ Tall deciduous]
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

[✓ ____ 10%] ____ 5% ____ Other

Thus, an area must be at least 10% (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types	Calculation of Relative score \# of cover types / 27
WAA : 3 (e.g.) (1)	0.11 (example) (1/27=0.04)
Planned : ____ (4)	____ (4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a. Approximately equal proportions. 1.0
b. Intermediate condition. 0.5
c. Predominantly 1 cover type. 0.1

12c. Degree of cover type interspersion (See Figure A.8). [WL]

a. High. 1.0
b. Intermediate condition. 0.5
c. Low -OR- no interspersion (1 cover type) 0.1

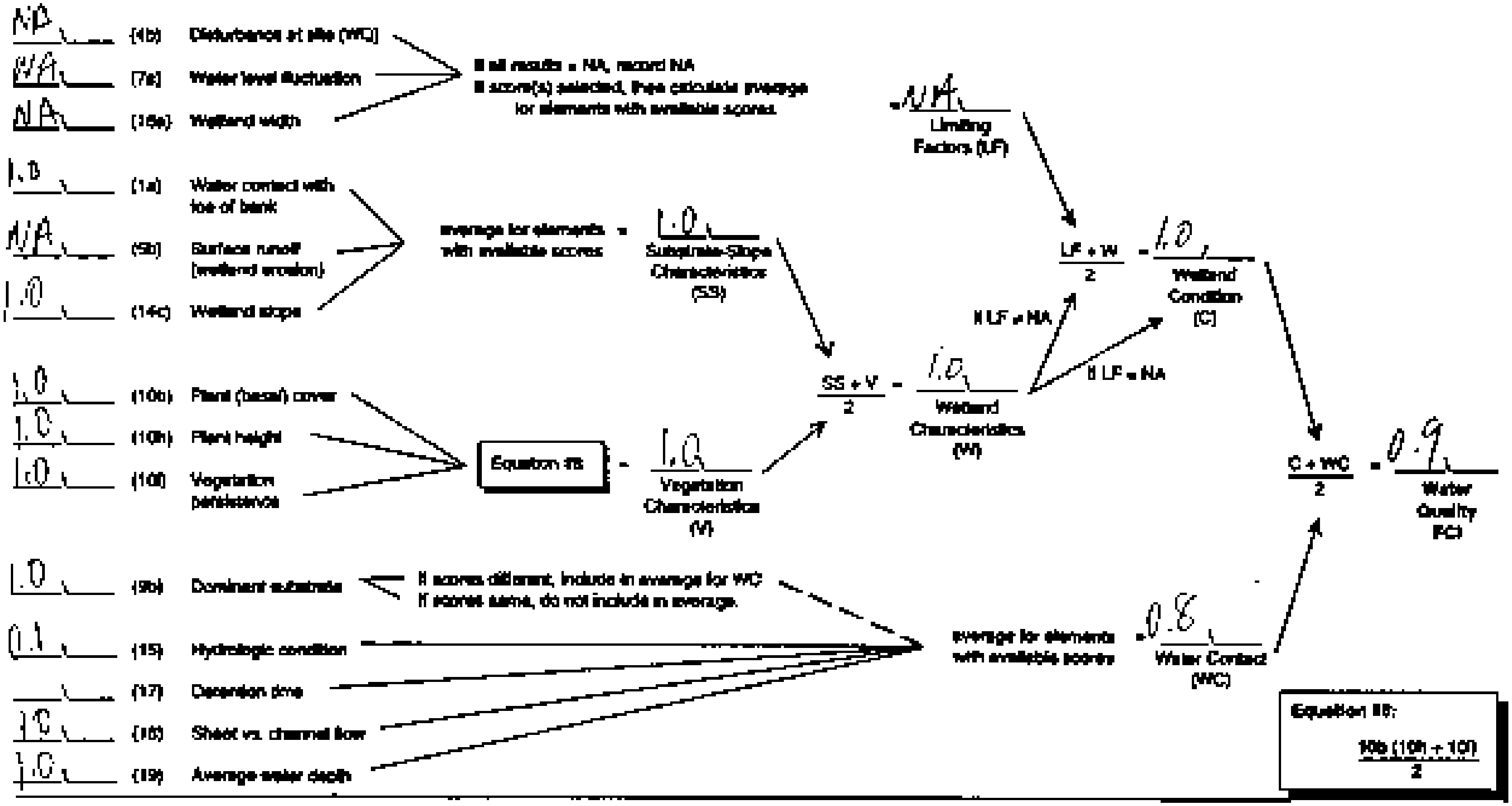
Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270 / U.S 15

Selected Score (#) Element

COMPARISON: ____________ \ ____________ (e.g., WAA/planned wetland)

0.1 __ (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.



NA __ (4b) Disturbance at site (WC)
NA __ (7a) Water level fluctuation
NA __ (16a) Wetland width

If all results = NA, record NA
If score(s) selected, then calculate average for elements with available scores.

= NA __ Limiting Factors (LF)

1.0 __ (1a) Water contact with toe of bank
NA __ (5b) Surface runoff (wetland erosion)
1.0 __ (14c) Wetland slope

average for elements with available scores = 1.0 __ Substrate-Slope Characteristics (SS)

1.0 __ (10b) Plant (basal) cover
1.0 __ (10h) Plant height
1.0 __ (10l) Vegetation persistence

Equation #8 = 1.0 __ Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 1.0 __ Wetland Characteristics (W)

If LF = NA

If LF = NA

$\frac{LF + W}{2}$ = 1.0 __ Wetland Condition (C)

1.0 __ (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
0.1 __ (15) Hydrologic condition
__ __ (17) Detention time
1.0 __ (18) Sheet vs. channel flow
1.0 __ (19) Average water depth

average for elements with available scores = 0.8 __ Water Contact (WC)

$\frac{C + WC}{2}$ = 0.9 __ Water Quality FCI

Equation #8:

$$\frac{10b (10h + 10l)}{2}$$

W-195E

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: I-270/U.S.15

ASSESSMENT DATE(S): *WAA:* 8/25/06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:

BG

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA:

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.8	
Water Quality	1.0	
Wildlife	0.2	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

planned wetland:

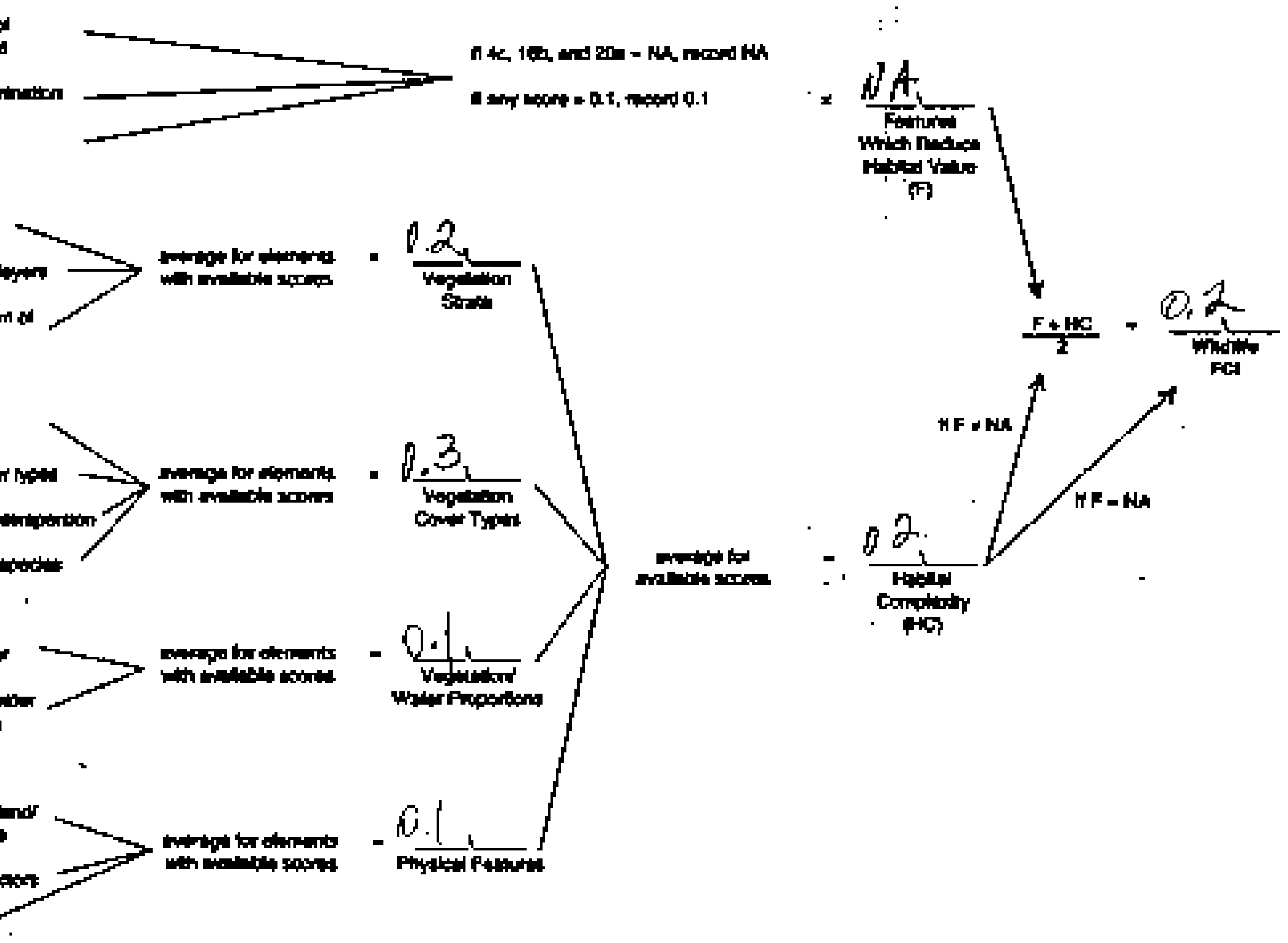
...cover sheet continues on reverse

Calculation of WILDLIFE FCI

PROJECT TITLE: I-270/U.S.15

COMPARISON: ____________________ \ ____________________ (e.g., WAA/planned wetland)

Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Cross contamination
NA	(16b)	Wetland size
0.1	(11a)	Layers
0.3	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
0.07	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12c)	Cover type interspersion
NA	(12d)	Undesirable species
0.1	(13a)	% open water
0.1	(13b)	Vegetation/water interspersion
0.1	(21a)	Shape of upland/ wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands

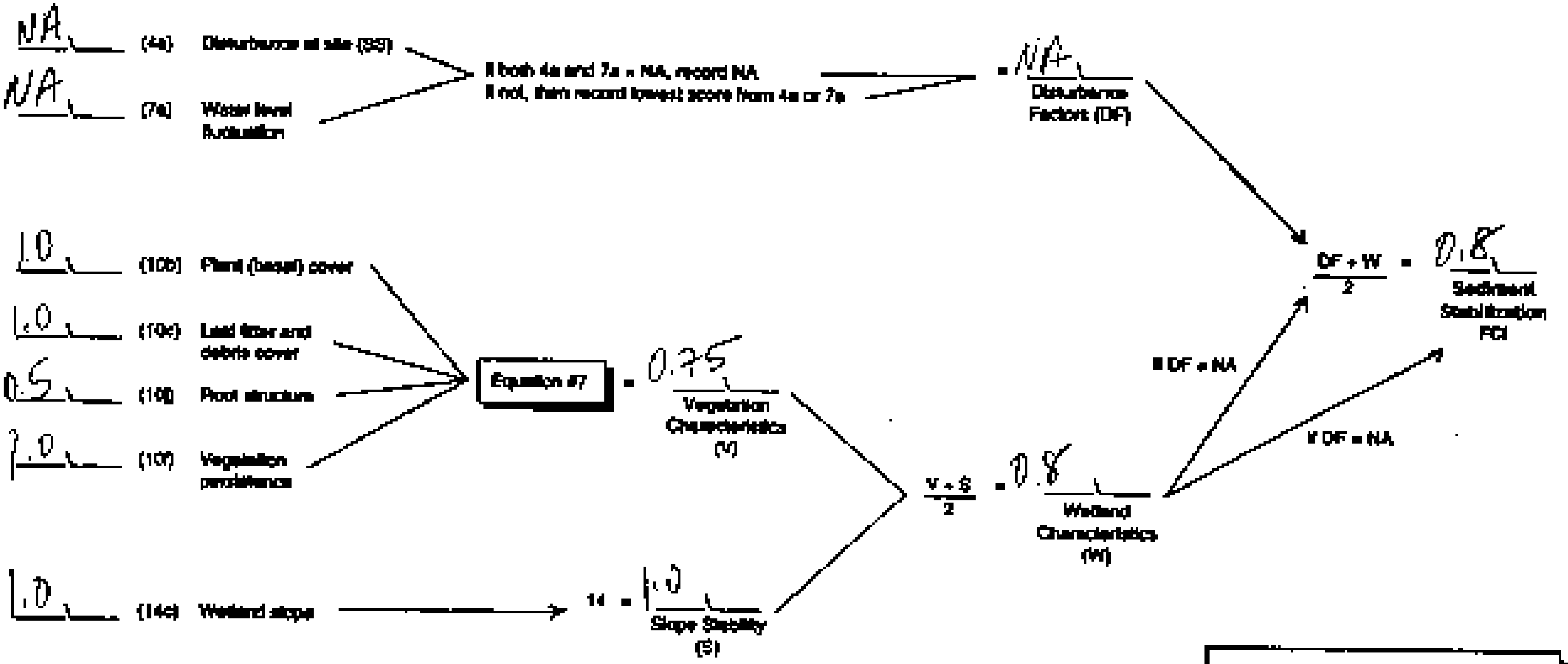


Calculation of SEDIMENT STABILIZATION FCI

PROJECT TITLE: I-270/U.S. 15

Selected Scores (#) Element

*COMPARISON: ____________ (e.g., WAA/planned wetland)



Equation #7:

$$\frac{10b\ (10e + 10f) + 10c\ (1 - 10b)}{2}$$

ELEMENT	SELECTION OF SCORES FOR ELEMENT CONDITIONS	SELECTED SCORES FOR ELEMENTS		DIFFERENCE IN SCORES (Planned - WAA)
		WAA	Planned Wetland	If both are NA, record NA

12 Cover types (27 listed) (refer to Table A.3):

Trees:
Needle-leaved evergreen
Broad-leaved evergreen
Needle-leaved deciduous
Broad-leaved deciduous
Dead

Emergent:
Tall persistent ✓
Short persistent ✓
Tall nonpersistent
Short nonpersistent

Scrub-Shrub:
Tall evergreen
Bushy evergreen
Low compact evergreen
Tall deciduous
Bushy deciduous
Low compact deciduous
Dead

Moss-lichen:
Moss
Lichen

Non-vegetative:
Bedrock
Rubble
Cobble-gravel
Sand
Mud
Organic
Dead fallen trees/shrubs
Open Water

Aquatic-bed:
Rooted-vascular

12a. Number of cover types in each layer at site [WL]

Decide minimum coverage and use this minimum to determine which cover types at the site will be included in the evaluation:

✓ 10% ____ 5% ____ Other

Thus, an area must be at least 10% (e.g., 10%) of the wetland site size to be recognized as a separate cover type.

Fill in the following information:

Wetland: # of cover types		Calculation of Relative score \# of cover types / 27	
WAA	: 2	0.07	(example)
	(e.g.) (1)		(1/27=0.04)
Planned	: ____ (4)	____	(4/27=0.15)

12b. Ratio of cover types (See Figure A.7). (Consider canopy cover of each cover type in each layer.) [WL]

a.	Approximately equal proportions.	1.0
b.	Intermediate condition.	0.5
c.	Predominantly 1 cover type.	0.1

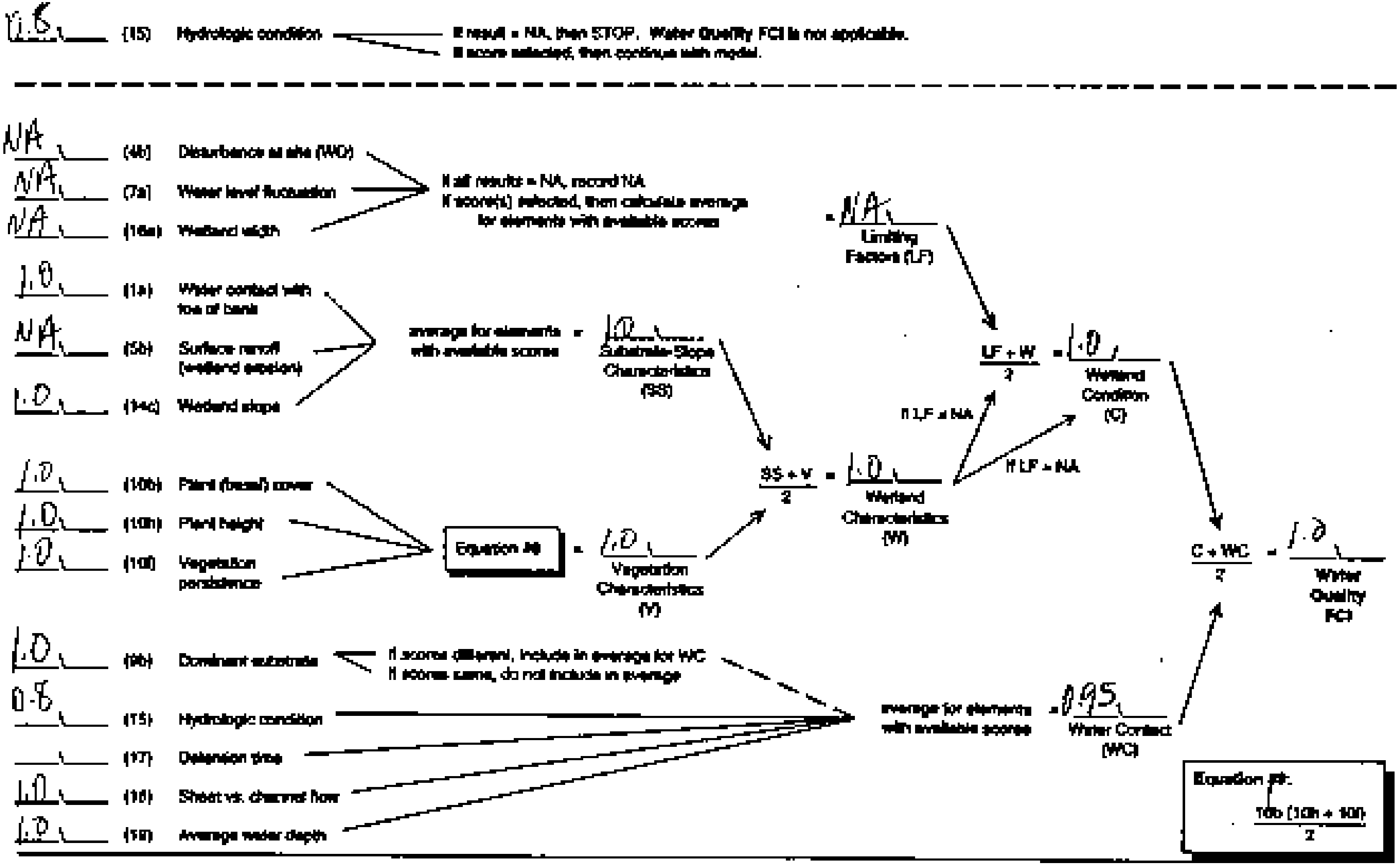
12c. Degree of cover type interspersion (See Figure A.8). [WL]

a.	High.	1.0
b.	Intermediate condition.	0.5
c.	Low -OR- no interspersion (1 cover type)	0.1

Calculation of WATER QUALITY FCI

PROJECT TITLE: I-270/05.15

Selected Scores (#) Element COMPARISON: ____________ (e.g., WAA/planned wetland)



0.8 \ (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.

NA \ (4b) Disturbance at site (WQ)
NA \ (7a) Water level fluctuation
NA \ (16a) Wetland width

If all results = NA, record NA. If score(s) selected, then calculate average for elements with available scores = NA \ Limiting Factors (LF)

1.0 \ (1a) Water contact with toe of bank
NA \ (5b) Surface runoff (wetland erosion)
1.0 \ (14c) Wetland slope

average for elements with available scores = 1.0 \ Substrate-Slope Characteristics (SS)

1.0 \ (10b) Plant (basal) cover
1.0 \ (10h) Plant height
1.0 \ (10i) Vegetation persistence

Equation #1 = 1.0 \ Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 1.0 \ Wetland Characteristics (W)

If LF ≠ NA: $\frac{LF + W}{2}$ = 1.0 \ Wetland Condition (C)

If LF = NA: Wetland Condition (C)

1.0 \ (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
0.8 \ (15) Hydrologic condition
\ (17) Detention time
1.0 \ (18) Sheet vs. channel flow
1.0 \ (19) Average water depth

average for elements with available scores = 0.95 \ Water Contact (WC)

$\frac{C + WC}{2}$ = 1.0 \ Water Quality FCI

Equation #1:

$$\frac{10b\ (10h + 10i)}{2}$$

W203

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: CCT

ASSESSMENT DATE(S): WAA: 12-7-06 planned wetland:

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:

Scot Aitkenhead

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA: Montgomery Co., MD

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.65	
Water Quality	0.32	
Wildlife	0.12	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA: ≃ 60°, sunny PEM

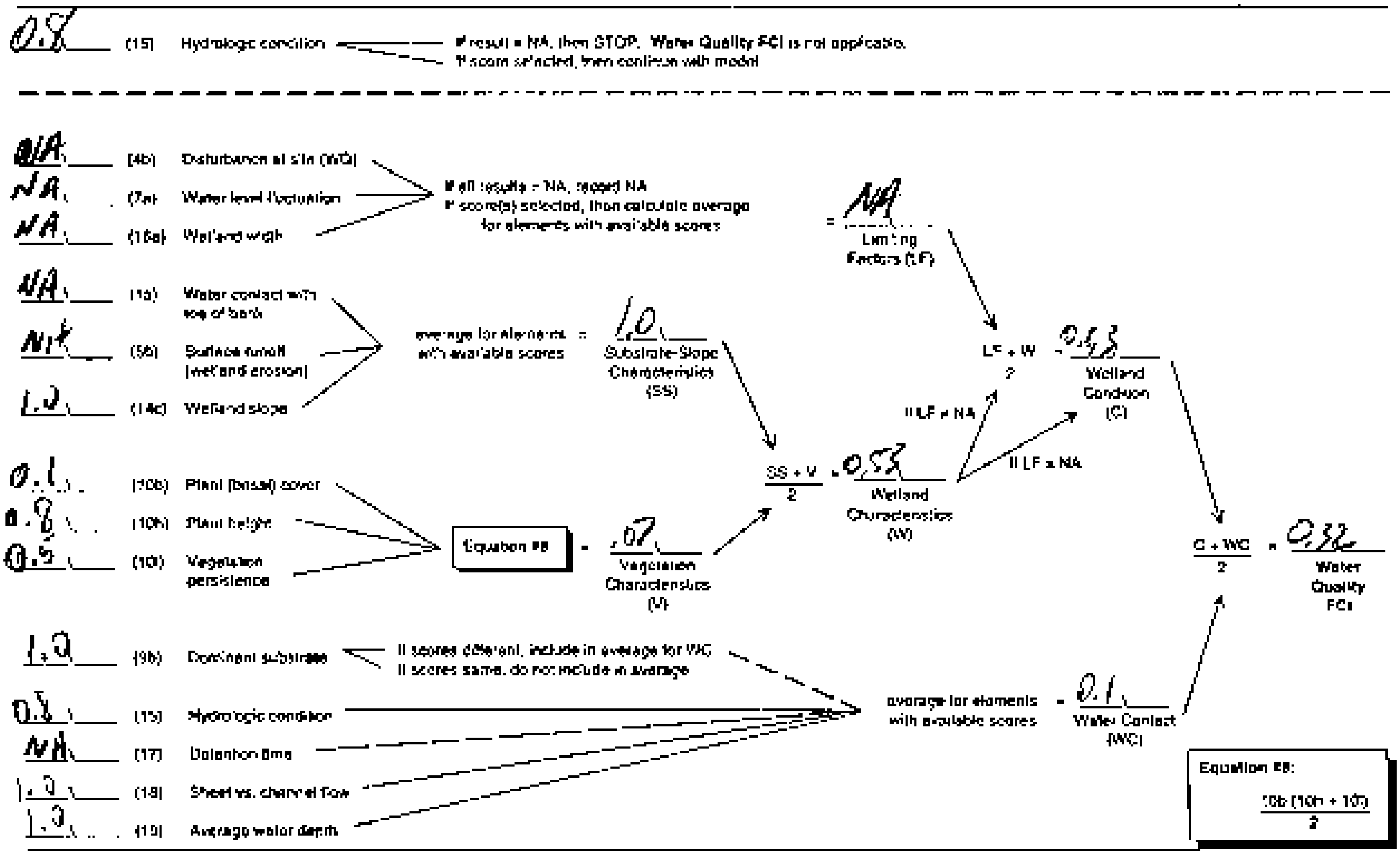
planned wetland:

...cover sheet continues on reverse

Calculation of **WATER QUALITY FCI**

PROJECT TITLE

COMPARISON (e.g., WAA/planned wetland)



Selected Scores (#) Element

0.8 (15) Hydrologic condition

If result = NA, then STOP. Water Quality FCI is not applicable.
If score selected, then continue with model

NA (4b) Disturbance at site (WQ)
NA (7a) Water level fluctuation
NA (16a) Wetland width

If all results = NA, record NA
If score(s) selected, then calculate average for elements with available scores

= NA Limiting Factors (LF)

NA (13) Water contact with toe of bank
NA (5b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope

average for elements with available scores = 1.0 Substrate-Slope Characteristics (SS)

0.1 (10b) Plant (basal) cover
0.8 (10h) Plant height
0.5 (10l) Vegetation persistence

Equation #8 = .07 Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 0.53 Wetland Characteristics (W)

If LF ≠ NA: $\frac{LF + W}{2}$ = 0.53 Wetland Condition (C)

If LF = NA: Wetland Condition (C)

1.0 (9b) Dominant substrate

If scores different, include in average for WC
If scores same, do not include in average

0.8 (15) Hydrologic condition
NA (17) Detention time
1.0 (18) Sheet vs. channel flow
1.0 (19) Average water depth

average for elements with available scores = 0.1 Water Contact (WC)

$\frac{C + WC}{2}$ = 0.32 Water Quality FCI

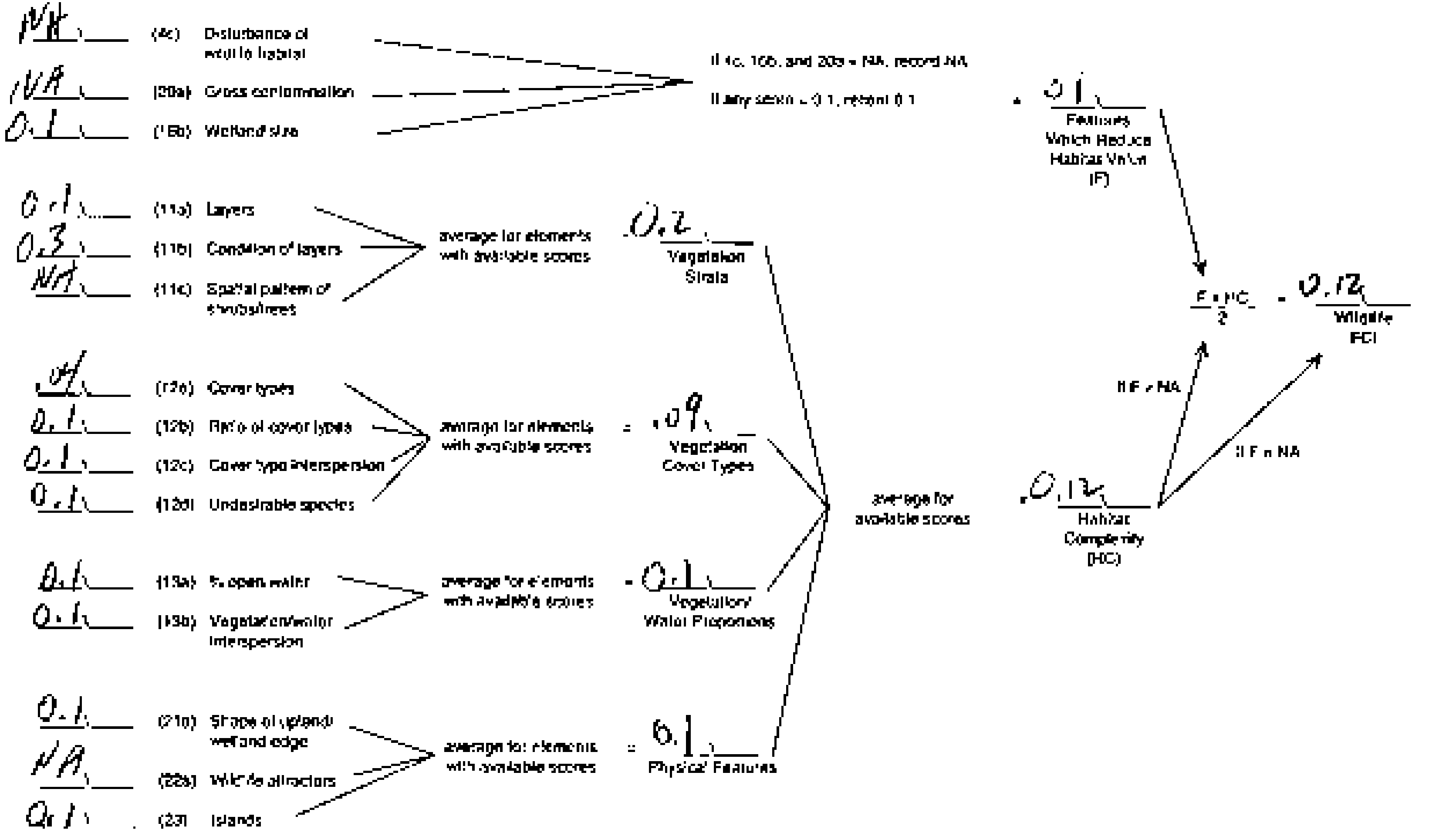
Equation #8:

$$\frac{10b\ (10h + 10l)}{2}$$

Calculation of **WILDLIFE** FCI

PROJECT TITLE: ______________________

COMPARISON: ______________________ (e.g., WA/planned wetland)



Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
0.1	(16b)	Wetland size
0.1	(11a)	Layers
0.3	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
.04	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12c)	Cover type interspersion
0.1	(12d)	Undesirable species
0.1	(13a)	% open water
0.1	(13b)	Vegetation/water interspersion
0.1	(21b)	Shape of upland/wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands

If 4c, 16b, and 20a = NA, record NA.

If any score ≤ 0.1, record 0.1 = 0.1 Features Which Reduce Habitat Value (F)

(11a–11c) average for elements with available scores = 0.2 Vegetation Strata

(12a–12d) average for elements with available scores = .09 Vegetation Cover Types

(13a–13b) average for elements with available scores = 0.1 Vegetation/Water Proportions

(21b–23) average for elements with available scores = 0.1 Physical Features

average for available scores = 0.12 Habitat Complexity (HC)

If F ≠ NA: $\frac{F + HC}{2}$ = 0.12 Wildlife FCI

If F = NA: Habitat Complexity (HC) = Wildlife FCI

W215

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: CCT

ASSESSMENT DATE(S): *WAA:* 12-7-06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:

Scot Aitkenhead

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA: Montgomery Co., MD

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.65	
Water Quality	0.32	
Wildlife	0.12	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA: ≅ 60°, sunny PEM

planned wetland:

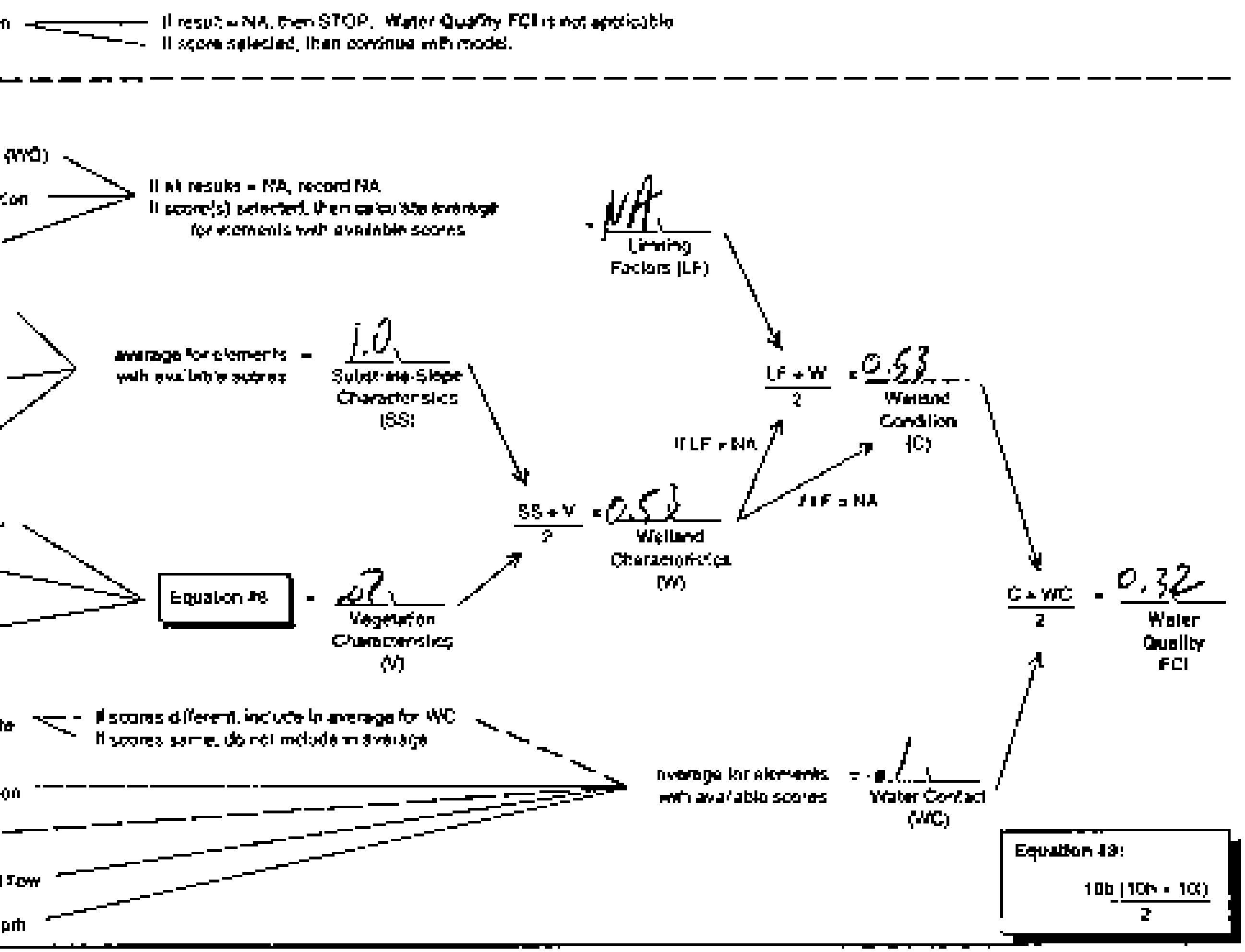
...cover sheet continues on reverse

Calculation of WATER QUALITY FCI

PROJECT TITLE: ____________

COMPARISON ________________________ (e.g., WAA/bounded wetland)

Selected Scores	(#)	Element
0.8	(15)	Hydrologic condition
NA	(4b)	Disturbance at site (WQ)
NA	(7a)	Water level fluctuation
NA	(16a)	Wetland width
NA	(1a)	Water contact with toe of bank
NA	(5b)	Surface runoff (wetland erosion)
1.0	(14c)	Wetland slope
0.1	(10b)	Plant (basal) cover
0.8	(10h)	Plant height
0.5	(10i)	Vegetation persistence
1.0	(9a)	Dominant substrate
0.8	(15)	Hydrologic condition
NA	(17)	Detention time
1.0	(18)	Sheet vs. channel flow
1.0	(19)	Average water depth



Calculation of WILDLIFE FCI

PROJECT TITLE: ______________________

COMPARISON ______________ (______________) (e.g., WAA/planned wetland)

Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
0.1	(16b)	Wetland size
0.1	(11a)	Layers
0.3	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
0.04	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12c)	Cover type interspersion
0.1	(12d)	Undesirable species
0.1	(13a)	% open water
0.1	(13b)	Vegetation/water interspersion
0.1	(21a)	Shape of upland/ wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands

(4c), (20a), (16b): If 4c, 16b, and 20a = NA, record NA. If any score = 0.1, record 0.1 = 0.1 Features Which Reduce Habitat Value (F)

(11a), (11b), (11c): average for elements with available scores = 0.2 Vegetation Strata

(12a), (12b), (12c), (12d): average for elements with available scores = .09 Vegetation Cover Types

(13a), (13b): average for elements with available scores = 0.1 Vegetation/Water Proportions

(21a), (22a), (23): average for elements with available scores = 0.1 Physical Features

Vegetation Strata, Vegetation Cover Types, Vegetation/Water Proportions, Physical Features: average for available scores = 0.12 Habitat Complexity (HC)

$\frac{(F + HC)}{2}$ = 0.12 Wildlife FCI

If F = NA

If F = NA

W216

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: CCT

ASSESSMENT DATE(S): *WAA.* 12-7-06 *planned wetland.*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION

Scot A. Henlead

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA: Montgomery Co, MD

planned wetland:

ASSESSMENT OBJECTIVES:
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.76	
Water Quality	0.74	
Wildlife	0.1	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA

≅ 60°, Sunny PEM

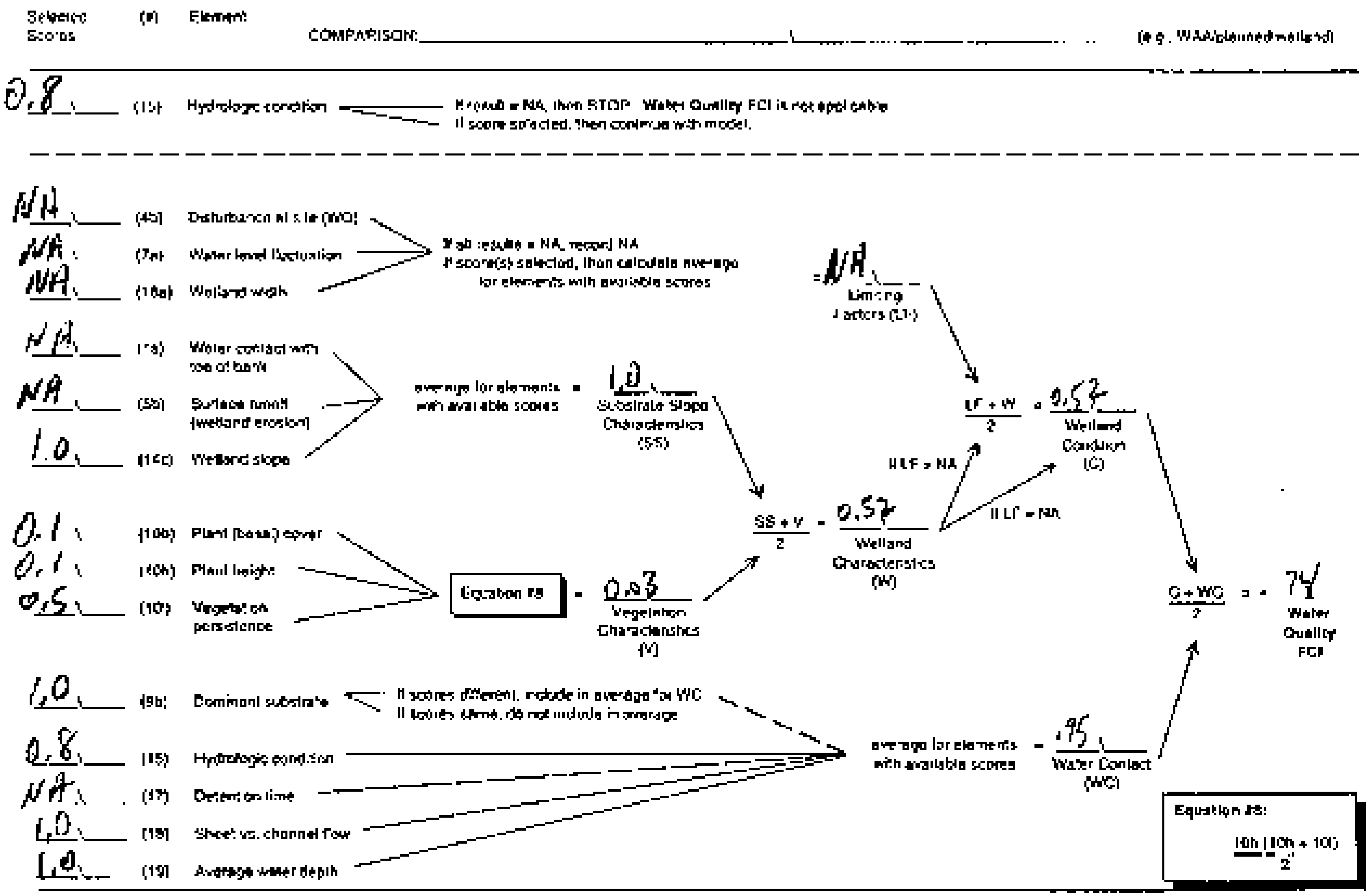
planned wetland

...cover sheet continues on reverse

Calculation of **WATER QUALITY FCI**

PROJECT TITLE: ______________________

COMPARISON: ______________________ (e.g., WAA/planned wetland)



Selected Scores (#) Element

0.8 (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model.

NA (45) Disturbance at site (WQ)
NA (7a) Water level fluctuation
NA (16a) Wetland width

If all results = NA, record NA. If score(s) selected, then calculate average for elements with available scores = NA Limiting Factors (LF)

NA (13) Water contact with toe of bank
NA (5b) Surface runoff (wetland erosion)
1.0 (14c) Wetland slope

average for elements with available scores = 1.0 Substrate Slope Characteristics (SS)

0.1 (10b) Plant (basal) cover
0.1 (10h) Plant height
0.5 (10i) Vegetation persistence

Equation #8 = 0.03 Vegetation Characteristics (V)

$\frac{SS + V}{2}$ = 0.57 Wetland Characteristics (W)

If LF ≠ NA: $\frac{LF + W}{2}$ = 0.57 Wetland Condition (C)

If LF = NA: Wetland Condition (C) = W

1.0 (9b) Dominant substrate — If scores different, include in average for WC. If scores same, do not include in average.
0.8 (15) Hydrologic condition
NA (17) Detention time
1.0 (18) Sheet vs. channel flow
1.0 (19) Average water depth

average for elements with available scores = .95 Water Contact (WC)

$\frac{C + WC}{2}$ = .74 Water Quality FCI

Equation #8:

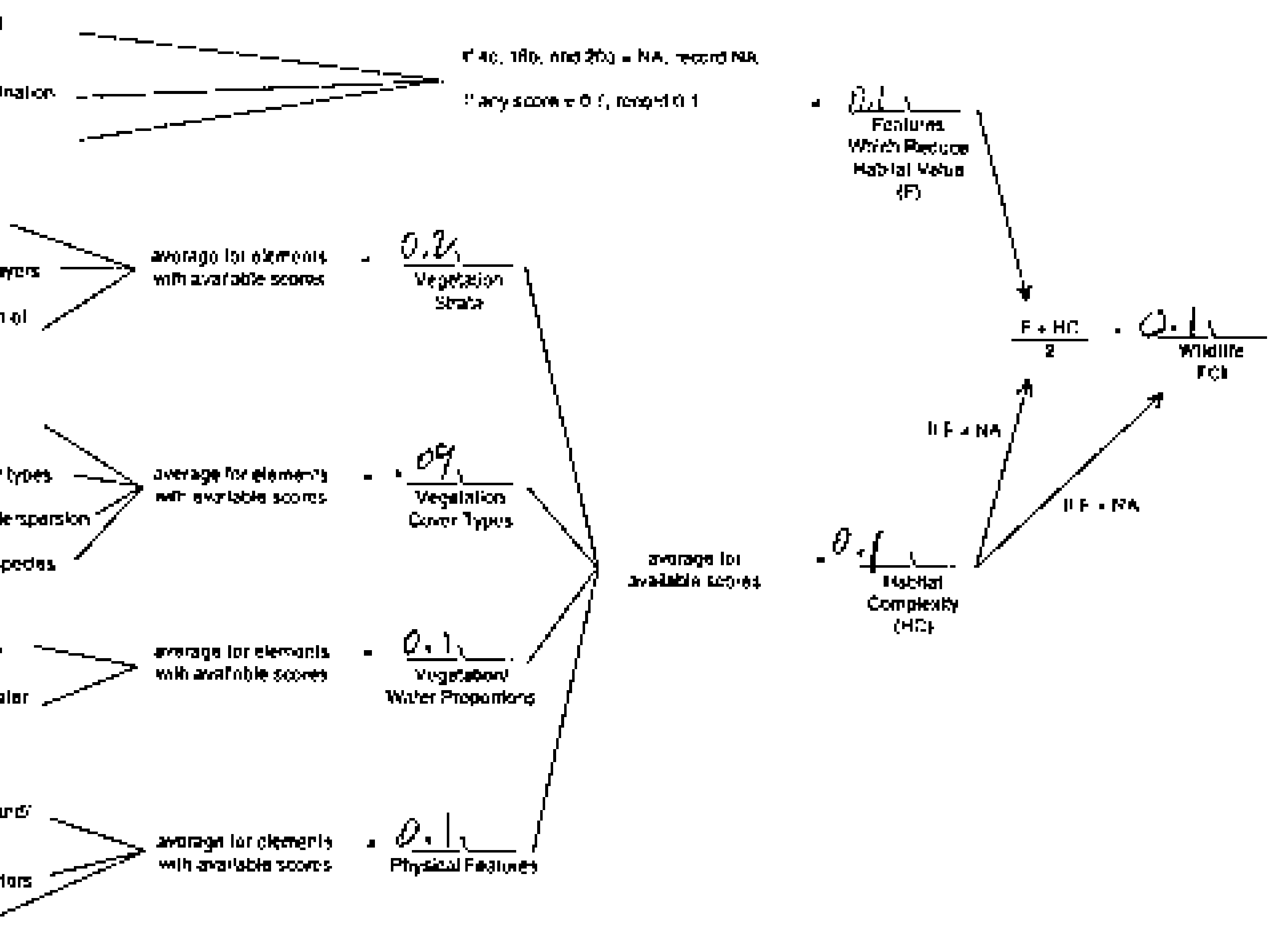
$\frac{10b\ (10h + 10i)}{2}$

Calculation of WILDLIFE FCI

PROJECT TITLE ____________

COMPARISON ____________ \ ____________ ____________ (e.g. WAA/planned wetland)

Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
0.1	(16b)	Wetland size
0.1	(11a)	Layers
0.3	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
.04	(12a)	Cover types
0.1	(12b)	Ratio of cover types
0.1	(12c)	Cover type interspersion
0.1	(12d)	Undesirable species
0.1	(13a)	% open water
0.1	(13b)	Vegetation/water interspersion
0.1	(21a)	Shape of upland/wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands



If 4c, 16b, and 20a = NA, record NA.
If any score = 0.1, record 0.1 = 0.1 Features Which Reduce Habitat Value (F)

(11a), (11b), (11c): average for elements with available scores = 0.2 Vegetation Strata

(12a), (12b), (12c), (12d): average for elements with available scores = .04 Vegetation Cover Types

(13a), (13b): average for elements with available scores = 0.1 Vegetation/Water Proportions

(21a), (22a), (23): average for elements with available scores = 0.1 Physical Features

average for available scores = 0.1 Habitat Complexity (HC)

$\frac{F + HC}{2}$ = 0.1 Wildlife FCI

If F ≠ NA

If F = NA

W 217

EVALUATION FOR PLANNED WETLANDS (EPW)
Cover Sheet

PROJECT TITLE: CCT

ASSESSMENT DATE(S): *WAA:* 12-7-06 *planned wetland:*

INDIVIDUAL(S) PERFORMING EVALUATION AND AFFILIATION:

Scott Aitkenhead

LOCATION (e.g., City, County, State, Waterway/Watershed):

WAA: Montgomery Co., MD

planned wetland:

ASSESSMENT OBJECTIVES
(note assumed point in time, e.g., peak of first growing season for planned wetland)

CHECK FUNCTIONS ASSESSED:	*WAA*	*planned wetland*
Shoreline Bank Erosion Control		
Sediment Stabilization	0.9	
Water Quality	0.7	
Wildlife	0.3	
Fish (Tidal)		
Fish (Non-tidal Stream/River)		
Fish (Non-tidal Pond/Lake)		
Uniqueness/Heritage		

DESCRIPTION OF PROJECT AREA:
Include information relevant to the assessment (e.g., NWI classification, description of hydrogeomorphic class(es), land use, climate).

WAA:

≅ 60°, sunny #0

planned wetland:

...cover sheet continues on reverse

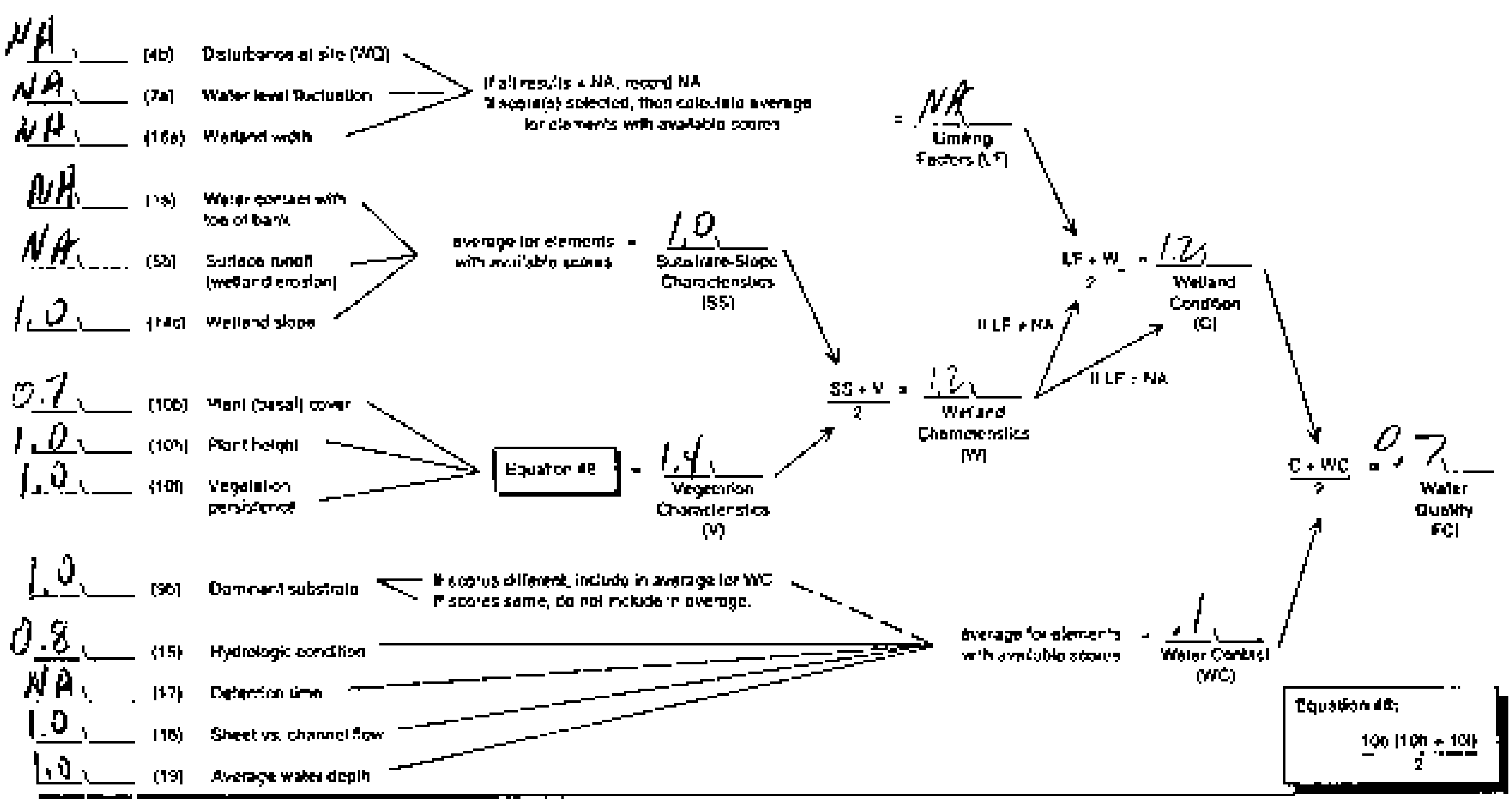
Calculation of **WATER QUALITY FCI**

PROJECT TITLE: ____________________

Selected Scores (4) Element

COMPARISON: ____________________ \ ____________ (e.g., WAA/planned wetland)

0.8 ____ (15) Hydrologic condition — If result = NA, then STOP. Water Quality FCI is not applicable. If score selected, then continue with model



NA ____ (4b) Disturbance at site (WQ)

NA ____ (7a) Water level fluctuation

NA ____ (16a) Wetland width

NA ____ (14a) Water contact with toe of bank

NA ____ (5a) Surface runoff (wetland erosion)

1.0 ____ (14c) Wetland slope

0.7 ____ (10b) Plant (basal) cover

1.0 ____ (10h) Plant height

1.0 ____ (10l) Vegetation persistence

1.0 ____ (9b) Dominant substrate

0.8 ____ (15) Hydrologic condition

NA ____ (17) Detention time

1.0 ____ (18) Sheet vs. channel flow

1.0 ____ (19) Average water depth

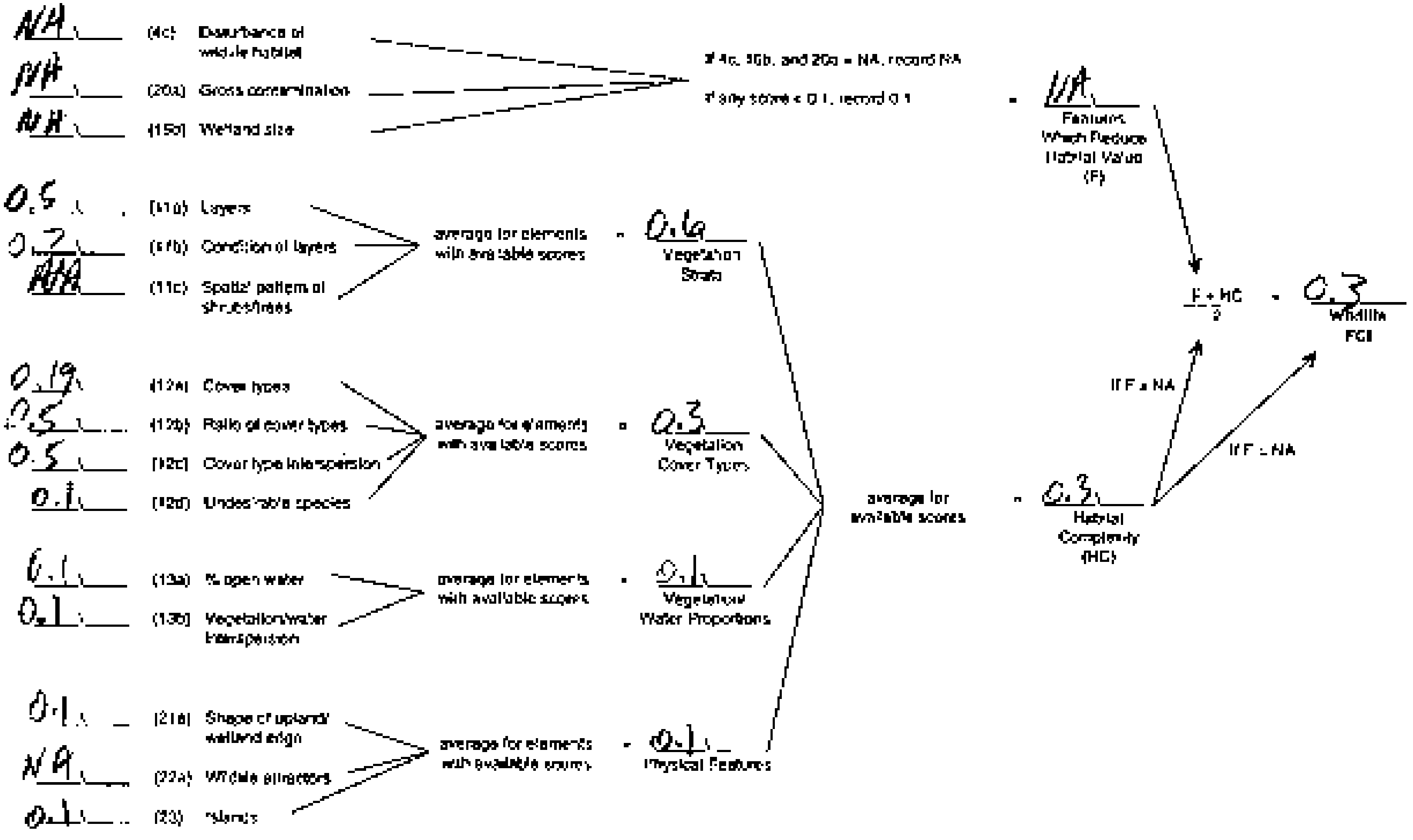
Equation #8:

$$\frac{10a\,(10h + 10l)}{2}$$

Calculation of WILDLIFE FCI

PROJECT TITLE ____________________

COMPARISON ____________________ (e.g., WAA/planned wetland)



Selected Scores	(#)	Element
NA	(4c)	Disturbance of wildlife habitat
NA	(20a)	Gross contamination
NA	(15b)	Wetland size
0.5	(11a)	Layers
0.2	(11b)	Condition of layers
NA	(11c)	Spatial pattern of shrubs/trees
0.19	(12a)	Cover types
0.5	(12b)	Ratio of cover types
0.5	(12c)	Cover type interspersion
0.1	(12d)	Undesirable species
0.1	(13a)	% open water
0.1	(13b)	Vegetation/water interspersion
0.1	(21a)	Shape of upland/wetland edge
NA	(22a)	Wildlife attractors
0.1	(23)	Islands

If 4c, 15b, and 20a = NA, record NA
If any score < 0.1, record 0.1 = NA Features Which Reduce Habitat Value (F)

(11a)–(11c): average for elements with available scores = 0.6 Vegetation Strata

(12a)–(12d): average for elements with available scores = 0.3 Vegetation Cover Types

(13a)–(13b): average for elements with available scores = 0.1 Vegetation/Water Proportions

(21a)–(23): average for elements with available scores = 0.1 Physical Features

average for available scores = 0.3 Habitat Complexity (HC)

$\frac{F + HC}{2}$ = 0.3 Wildlife FCI

Multi-Modal Corridor Study

Frederick and Montgomery Counties, Maryland

Appendix E

Agency Correspondence

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Robert L. Ehrlich, Jr., *Governor*
Michael S. Steele, *Lt. Governor*
C. Ronald Franks, *Secretary*

May 8, 2006

Mr. Bruce M. Grey
State Highway Administration
Maryland Department of Transportation
707 North Calvert Street
Baltimore, MD 21202

RE: **Environmental Review for Project No. FR192B11, I-270: from North of Shady Grove Road to North of Biggs Ford Road, Frederick and Montgomery Counties, Maryland.**

Dear Mr. Grey:

The Wildlife and Heritage Service has determined that there is a Bald Eagle nest known to occur within the study area as delineated. The bald eagle is listed as a threatened species by the state and the federal government. State law requires that appropriate protection measures be incorporated into actions by state agencies. The approximate location of the eagle nest is indicated on the attached map. To protect this nest site the following guidelines should be implemented:

1. Establish a protection area of 1/4 mile radius around the nest tree. Within this area, establish three zones of protection: Zone 1 extends from the nest tree 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 1/4 mile (1320 ft.)

2. No land use changes, including development or timber harvesting should occur in Zone 1.

3. Construction activities, including clearing, grading, building, etc., should not occur within Zones 1 and 2 and ideally no closer than 750 feet from the nest.

4. No construction or timber harvesting activities should occur within the 1/4 mile protection zone during the eagle nesting season, which is from December 15 through June 15.

These general guidelines are used by our biologists for bald eagle nest site protection. Specific protection measures depend on the site conditions, planned activities, nest history and other factors. For more specific technical assistance regarding your project relative to bald eagle protection contact the WHS.

Also within the study area is a site known as Germantown Bog, which is located in between I-270, Route 27, Route 118 and Route 355 in the Germantown area. This wetland is designated in state regulations as a Nontidal Wetland of Special State Concern (NTWSSC) and regulated by Maryland Department of the Environment. This wetland and its adjacent 100' upland buffer are regulated as an NTWSSC. Your project may need to be reviewed by Maryland Department of the Environment for any necessary wetland permits associated with the NTWSSC.

This bog habitat is known to support:

Scientific Name	Common Name	State Status
Carex buxbaumii	Buxbaum's Sedge	Threatened
Sanguisorba canadensis	Canada Burnet	Threatened
Spenophilis pensylvanica	Swamp-oats	Threatened

Another site known to support RT&E species is a site known as Travilah Woods which is located in between Travilah Road, Shady Grove Road, Darnestown Road and Piney Meetinghouse Road in the Gaithersburg area. This serpentine barren habitat is known to support state-listed endangered Potato Dandelion (*Krigia dandelion*).

There is another site known as Hoyles Mill Diabase Complex which is located along Clopper Road/Route 117 and is known to support the following RT&E species:

Scientific Name	Common Name	State Status
Juglans cinerea	Butternut	Rare
Gentiana andrewsii	Fringe-tip Closed Gentian	Threatened
Carex meadii	Mead's Sedge	Endangered
Polygala senega	Seneca Snakeroot	Threatened
Papilio cresphontes	Giant Swallowtail	In Need of Conservation
Zanthoxylum americanum	Northern Prickly-ash	Endangered
Scirpus verecundus	Bashful Bulrush	Rare
Scutellaria nervosa	Veined Skullcap	Endangered
Phlox glaberrima	Smooth Phlox	Endangered
Krigia dandelion	Potato Dandelion	Endangered
Quercus shumardii	Shumard's Oak	Threatened
Melica mutica	Narrow-leaved Melicgrass	Threatened

There is a site known as Chick Road Springs that is located between the C&O Canal National Historic Park, Route 28 and Nolands Road in the Tuscarora area within the study area. This spring habitat is known to support the Roundtop Amphipod (*Stygobromus* sp. 14) and the Pizzini's Amphipod (*Stygobromus pizzinii*), both state rare subterranean invertebrate species. There is also a site along Mouth of Monocacy Road near the Frederick/Montgomery County Line that is known as Monocacy Spring that also is known to support these two subterranean invertebrates.

The site known as Nolands Ferry Floodplain which is located along the Potomac River is known to support the following RT&E species:

Scientific Name	Common Name	State Status
Quercus shumardii	Shumard's Oak	Threatened
Carex davisii	Davis' Sedge	Endangered
Agalinis auriculata	Auricled Gerardia	Endangered

Our analysis of the information provided suggests that the forested area on or adjacent to the study area contains Forest Interior Dwelling Bird habitat. Populations of many Forest Interior Dwelling Bird Species (FIDS) are declining in Maryland and throughout the eastern United States. The conservation of FIDS habitat is strongly encouraged by the Department of Natural Resources. The following guidelines will help minimize the project's impacts on FIDS and other native forest plants and wildlife:

1. Avoid placement of new roads or related construction in the forest interior. If forest loss or disturbance is absolutely 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 high quality FIDS habitat (e.g., old-growth forest). Maximize the amount of remaining contiguous forested habitat.

2. Do not remove or disturb forest habitat during May-August, the breeding season for most FIDS. This seasonal restriction may be expanded to February-August if certain early nesting FIDS (e.g., Barred Owl) are present.

3. Maintain forest habitat as close as possible to the road, and maintain canopy closure where possible.

4. Maintain grass height at least 10" during the breeding season (May-August).

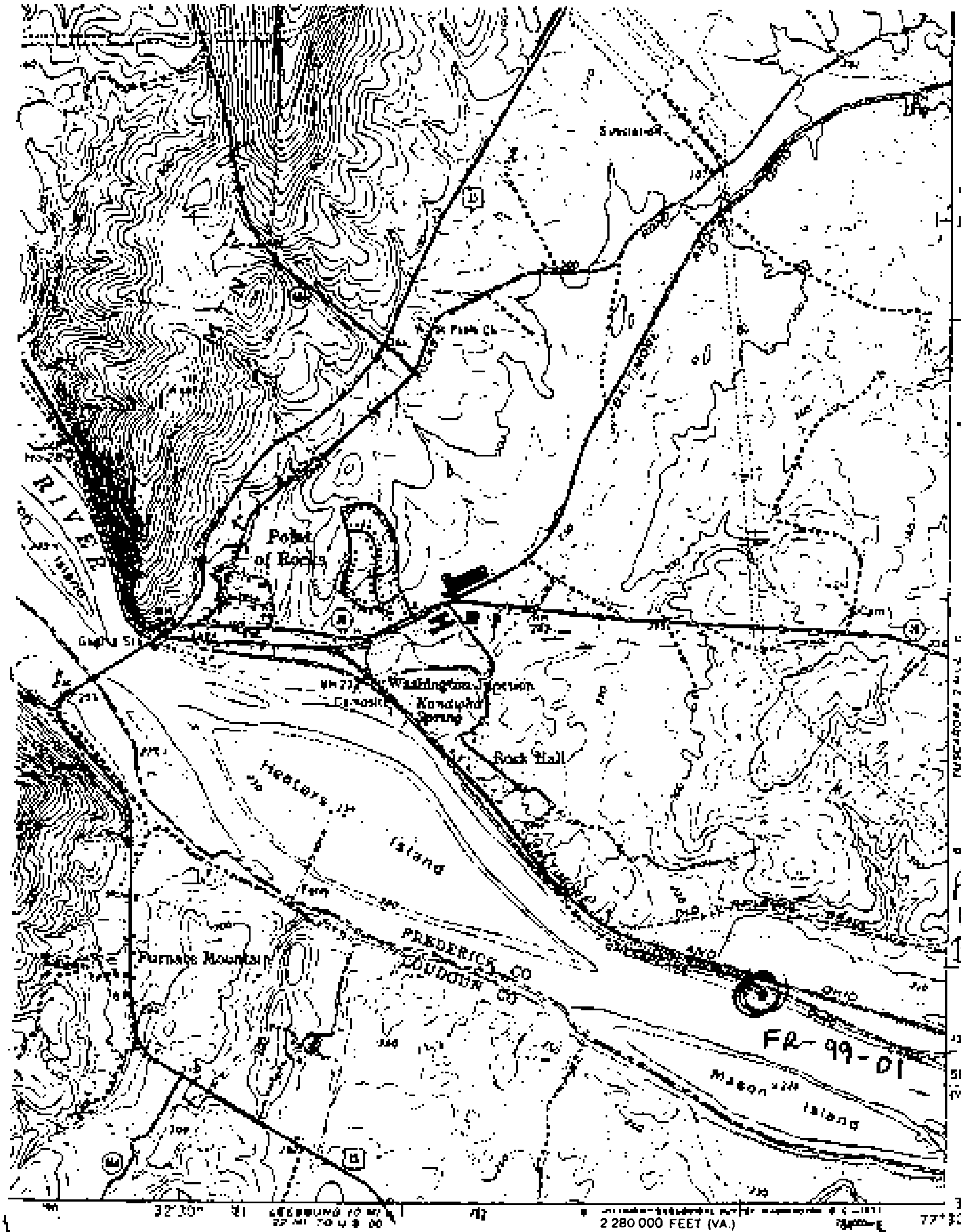
Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER #2006.0371.fr/mo
Cc: R. Dintaman, ERU
D. Brinker, WHS
Attachment



Approximate location of Bald Eagle nest

FR-99-01

1 MILE
7000 FEET
1 KILOMETER

Point of Rocks quad

ROAD CLASSIFICATION

Primary highway, hard surface	Light-duty road, hard or improved surface
Secondary highway, hard surface	Unimproved road. .

Interstate Route U. S. Route State Route

Fx: 41. 235-3363

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

C. Ronald Franks
Secretary

W. P. Jensen
Deputy Secretary

Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

April 28, 2003

Ms. Cynthia D. Simpson
Maryland Department of Transportation
State Highway Administration
P.O. Box 717
Baltimore, MD 21203-0717

RE: Environmental Review for Project No. FR192B11, I-270/US 15 Multi-modal Study, Frederick and Montgomery Counties, Maryland.

Dear Ms. Simpson:

The Wildlife and Heritage Service has no records for Federal or State rare, threatened or endangered plants or animals within this project site. This statement should not be interpreted as meaning that no rare, threatened or endangered species are present. Such species could be present but have not been documented because an adequate survey has not been conducted or because survey results have not been reported to us.

The known bald eagle nest depicted on your map is well over ¼ mile from the boundaries of the project, and therefore is too distant to be a concern for this project. However, the Short's Rockcress (*Arabis shortii*) could potentially occur on the project site itself, especially in areas of appropriate habitat. Habitat for Short's Rockcress is described as: Rich woods, bluffs and calcareous ledges (Fernald 1950); rich moist woods (Gleason & Cronquist 1991). A survey for this state listed threatened species should be conducted in any areas of potential habitat that occur on the project site. Please refer to the Wildlife and Heritage Service's rare plant survey protocol, enclosed.

In addition, the forested area on or adjacent to the project site contains Forest Interior Dwelling Bird habitat. Populations of many Forest Interior Dwelling Bird species (FIDS) are declining in Maryland and throughout the eastern United States. The conservation of this habitat is strongly encouraged by the Department of Natural Resources. The following guidelines will help minimize the project's impacts on FIDS and other native forest plants and wildlife:

1. Avoid placement of new roads or related construction in the forest interior. If forest loss or disturbance is absolutely 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 high quality FIDS habitat (e.g., old-growth forest). Maximize the amount of remaining contiguous forested habitat.

2. Do not remove or disturb forest habitat during May-August, the breeding season for most FIDS. This seasonal restriction may be expanded to February-August if certain early nesting FIDS (e.g., Barred Owl) are present.

3. Maintain forest habitat as close as possible to the road, and maintain canopy closure where possible.

4. Maintain grass height at least 10" during the breeding season (May-August).

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, feel free to contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne
Environmental Review Coordinator,
Wildlife and Heritage Service
Maryland Department of Natural Resources

ER# 2003.0469.fr/mo

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

C. Ronald Franks
Secretary

W. P. Jensen
Deputy Secretary

Information Required to Document Surveys for Rare Plants

The Wildlife and Heritage Service recommends that you conduct a survey for rare plant(s) that may be affected by your proposed development project. The following are guidelines which should be followed when conducting the survey and reporting your survey findings.

1) Provide date(s) of survey, time spent surveying (~~man~~ staff hours, etc.), and name(s) of surveyor(s).

2) Provide a habitat description giving dominant tree species, shrub species and herb species.

3) Include a copy of a USGS topographic map with scale or a County ADC map with scale showing the precise location of potential habitat and a sketch map of habitat(s) showing areas covered by surveyor. If found, the rare species population(s) should be marked on both maps.

4) If the species was located, give size and condition of the rare species' population(s). Indicate what proportion of the population was flowering and what proportion was fruiting. Indicate the area (sq. ft, acres, etc.) of occupied habitat and estimate the area of potential habitat. State whether a photograph was taken and if a specimen was collected and where it is held. A specimen should be collected when the population is large, a photograph should be taken if the population is small or fragile. The population should also be flagged, marked off or otherwise identified on the ground so that the population can be found by Wildlife and Heritage personnel, if necessary, to complete review of the project.

5) Indicate evidence of habitat disturbance, ie., presence of non-native exotics, hydrologic alterations, logging or other active management.

6) If the rare species is not found during survey efforts, indicate how much potential habitat exists. If no potential habitat is found, explain why habitat appears unsuitable.

Survey results should be submitted to:

Director
Wildlife and Heritage Service
Department of Natural Resources
580 Taylor Avenue E-1
Annapolis, MD 21401

The Survey must be conducted by a competent/qualified biologist familiar with identification of the species, during the time period when the rare species is readily identifiable (for all but a few species, this is during the flowering/fruiting period). The entire area of potential habitat must be checked; transects or other methods that sample a portion of the habitat are not sufficient. Surveys are often most efficiently accomplished by a group of people rather than a single individual. The group may be arranged to walk parallel lines through the potential habitat area in order to obtain complete coverage. If you have questions concerning the appropriate method or timing for a survey, please contact the Wildlife and Heritage Service at (410) 260-8540.

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Robert L. Ehrlich, Jr., *Governor*
Michael S. Steele, *Lt. Governor*
C. Ronald Franks, *Secretary*

February 13, 2006

Mr. Joseph Kresslein
Project Planning Division
Maryland Department of Transportation
State Highway Administration
P.O. Box 717
Baltimore, Maryland 21203-0717

Dear Mr. Kresslein:

This letter is in response to your letter of request, dated February 8, 2006, for information on the presence of finfish species in the vicinity of the Maryland Department of Transportation's Project No. FR192B11: I-270 from north of Shady Grove Road to north of Biggs Ford Road in Frederick and Montgomery Counties.

The following streams are in the vicinity of your project area (note that some streams may have two or more reaches managed under different Use classifications). Only the classifications of reaches near your study area have been listed:

WASHINGTON METROPOLITAN AREA SUB-BASIN

Muddy Branch and tributaries (Use I-P)
Long Draught Branch and tributaries (Use I-P)
Great Seneca Creek, unnamed tributaries, and Gunners Branch (Use I-P)
Little Seneca Creek and tributaries (Use IV-P above Little Seneca Lake)
Little Seneca Lake, unnamed tributaries, Cabin Branch, and Tenmile Creek (Use I-P)

MIDDLE POTOMAC RIVER SUB-BASIN

Little Bennett Creek, unnamed tributaries, Sopers Branch and Wildcat Branch (Use III-P for Little Bennett Creek mainstem upstream of MD 355 and tributaries entering this reach; Use I-P for Little Bennett Creek mainstem downstream of MD 355 and tributaries entering this reach).
Bennett Creek, unnamed tributaries, Urbana Branch, and North Branch (Use I-P).
Monocacy River (below US 40), unnamed tributaries to this reach of the Monocacy River, Tabler Run and Bush Creek (Use I-P).
Ballenger Creek, unnamed tributaries, and Pike Branch, King Branch, Arundel Branch, Quarry Branch (Use III-P).
Carroll Creek, unnamed tributaries, and Rock Creek (Use III-P for Carroll Creek mainstem downstream of US 15 and tributaries entering this reach).
Monocacy River (above US 40) and unnamed tributaries to this reach of the Monocacy River (Use IV-P).
Tuscarora Creek, unnamed tributaries, and Little Tuscasrora Creek (Use III-P). Glade Creek (Use IV-P).

Tawes State Office Building • 580 Taylor Avenue • Annapolis, Maryland 21401
410.260.8DNR or toll free in Maryland 877.620.8DNR • www.dnr.maryland.gov • TTY users call via Maryland Relay

Generally, no instream work is permitted in Use I streams during the period of March 1 through June 15, inclusive, during any year. No instream work is permitted in Use III streams during the period of October 1 through April 30, inclusive, during any year. No instream work is permitted in Use IV streams during the period of March 1 through May 31, inclusive, during any year.

Of the streams listed above, Little Tuscarora Creek and tributaries to upper reaches of Tuscarora Creek support self-sustaining wild populations of brook trout upstream from US 15. Ballenger Creek supports a self-sustaining wild population of brown trout in reaches upstream from I-270. Little Bennett Creek supports wild and stocked brown trout in reaches upstream from I-270. Individual trout may be present in the lower reaches of these streams from time to time.

Adult rainbow trout are stocked by the State for recreational fishing in Lake Needwood (on Rock Creek), Great Seneca Creek downstream from I-270, Urbana Lake (on a tributary to Bennett Creek), and Carroll Creek in the vicinity of US 15.

Populations of warmwater gamefish that provide notable recreational fisheries can be found in Lake Needwood, Great Seneca Creek, Little Seneca Lake, Urbana Lake, and the Monococy River. Gamefish species that may be found in one or more of these areas include largemouth bass, smallmouth bass, various sunfish species, catfish, and tiger musky.

The perennial portions of the streams in your study area also support resident populations of non-game fish species. Tables IV-2 and V-2 (attached) list fish species documented by our Fisheries Service in the Middle Potomac River sub-basin and the Washington Metropolitan Area sub-basin, respectively. Many of these species could be found in the streams listed for your study area.

Anadromous fish species do not access any of the streams in your study area due to the presence of natural barriers located downstream. The spawning periods for the fish species likely to reside and spawn near your project site will be adequately protected by the instream work prohibition periods mentioned above and by sediment and erosion control methods and other Best Management Practices typically used for the protection of stream resources.

If you have any questions concerning these comments, you may contact me at 410-260-8331.

Sincerely,

C. Dintaman Jr.

Ray C. Dintaman, Jr., Director
Environmental Review Unit

RCD
Attachment

Table IV-2.: Fish Species Collected in the Middle Potomac River Basin, 1974-1984.

Salmonidae	
Brook trout	*Salvelinus fontinalis* (Mitchill)
Brown trout	*Salmo trutta* Linnaeus
Rainbow trout	*Salmo gairdneri* Richardson
Cyprinidae	
Stoneroller	*Campostoma anomalum* (Rafinesque)
Blacknose dace	*Rhinichthys atratulus* (Hermann)
Longnose dace	*Rhinichthys cataractae* (Valenciennes)
Cutlips minnow	*Exoglossum maxillingua* (Lesueur)
Creek chub	*Semotilus atromaculatus* (Mitchill)
River chub	*Nocomis micropogon* (Cope)
Fallfish	*Semotilus corporalis* (Mitchill)
Rosyside dace	*Clinostomus funduloides* Girard
Common shiner	*Notropis cornutus* (Mitchill)
Bluntnose minnow	*Pimephales notatus* (Rafinesque)
* Peal dace	*Semotilus margarita* (Cope)
Catostomidae	
Northern hogsucker	*Hypentelium nigricans* (Lesueur)
White sucker	*Catostomus commersoni* (Lacepede)
Ictaluridae	
Margined madtom	*Noturus insignis* (Richarson)
Brown bullhead	*Ictalurus nebulosus* (Lesueur)
Cottidae	
Mottled sculpin	*Cottus hairdi* Girard
Centrarchidae	
Bluegill sunfish	*Lepomis macrochirus* (Rafinesque)
Smallmouth bass	*Micropterus dolomieui* Lacepede
Largemouth bass	*Micropterus salmoides* Lacepede
Rock bass	*Ambloplites rupestris* (Rafinesque)
Pumpkinseed sunfish	*Lepomis gibbosus* (Linnaeus)
Longear sunfish	*Lepomis megalotis* (Rafinesque)
Percidae	
Tessellated darter	*Etheostoma olmstedi* Storer
Greenside darter	*Etheostoma blennioides* Rafinesque
Fantail darter	*Etheostoma flabellare* Rafinesque
Anguillidae	
American eel	*Anguilla rostrata* (Lesueur)

* Additional fish species collected, 1980-1984.

Table V-2. Fish Species Collected in the Washington Metropolitan Area During 1974 through 1984. (New species collected in 1980 to 1984 study designated by *.)

Salmonidae		
Brook trout	*Salvelinus fontinalis* (Mitchill)	
Brown trout	*Salmo trutta* Linnaeus	
Rainbow trout	*Salmo gairdneri* Richardson	
Cyprinidae		
Stoneroller	*Campostoma anomalum* (Rafinesque)	
Blacknose dace	*Rhinichthys atratulus* (Hermann)	
Longnose dace	*Rhinichthys cataractae* (Valenciennes)	
Cutlips minnow	*Exoglossum maxillingua* (Lesueur)	
Creek chub	*Semotilus atromaculatus* (Mitchill)	
River chub	*Nocomis micropogon* (Cope)	
Fallfish	*Semotilus corporalis* (Mitchill)	
Rosyside dace	*Clinostomus funduloides* Girard	
Common shiner	*Notropis cornutus* (Mitchill)	
Bluntnose minnow	*Pimephales notatus* (Rafinesque)	
Golden shiner	*Notemigonus crysoleucas* (Mitchill)	
Spotfin shiner	*Notropis spilopterus* (Cope)	
Spottail shiner	*Notropis hudsonius* (Clinton)	
Silverjaw minnow	*Ericymba buccata* Cope	
Swallowtail shiner	*Notropis procne* (Cope)	
Satinfin shiner	*Notropis analostanus* (Mitchill)	
Catostomidae		
Northern hogsucker	*Hypentelium nigricans* (Lesueur)	
White sucker	*Catostomus commersoni* (Lacepede)	
Creek chubsucker	*Erimyzon oblongus* (Mitchill)	*
Ictaluridae		
Margined madtom	*Noturus insignis* (Richardson)	
Brown bullhead	*Ictalurus nebulosus* (Lesueur)	
Yellow bullhead	*Ictalurus natalis* (Lesueur)	*
Cottidae		
Mottled sculpin	*Cottus bairdi* Girard	
Percidae		
Tessellated darter	*Etheostoma olmstedi* Storer	
Greenside darter	*Etheostoma blennioides* Rafinesque	
Fantail darter	*Etheostoma flabellare* Rafinesque	
Centrarchidae		
Bluegill sunfish	*Lepomis macrochirus* (Rafinesque)	
Smallmouth bass	*Micropterus dolomieui* Lacepede	
Largemouth bass	*Micropterus salmoides* (Lacepede)	
Greenside sunfish	*Lepomis cyanellus* Rafinesque	
Pumpkinseed sunfish	*Lepomis gibbosus* (Linnaeus)	
Red breasted sunfish	*Lepomis auritis* (Linnaeus)	
Rock bass	*Ambloplites rupestris* (Rafinesque)	
Anguillidae		
American eel	*Anguilla rostrata* (Lesueur)	

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

September 19, 2006

State Highway Administration
Maryland Department of Transportation
707 North Calvert Street
Baltimore, Maryland 21202

ATTN: Mary F. Barse

RE: Project No. FR 192B11 I-270 from North of Shady Grove RD Frederick and Montgomery Counties MD

Dear Ms. Barse

This responds to your letter, received June 20, 2006, requesting information on the presence of species which are federally listed or proposed for listing as endangered or threatened within the vicinity of the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

Except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project impact area. Therefore, no biological assessment or further section 7 consultation is required with the U.S. Fish and Wildlife Service. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. It does not address the Service's concerns pursuant to the Fish and Wildlife Coordination Act or other legislation. For information on the presence of other rare species, you should contact Ms. Lori Byrne of the Maryland Heritage and Wildlife Division at (410) 260-8573.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interest in these resources. If you have any questions or need further assistance, please contact Devin Ray at (410) 573-4531.

Sincerely,

Mary Ratnaswamy

Mary J. Ratnaswamy, Ph.D.
Program Supervisor, Threatened and Endangered Species