McCORMICK TAYLOR

April 3, 2020

Maryland Department of Environment
Water and Science Administration
Regulatory Services Section
Montgomery Park Business Center – STE 430
1800 Washington Boulevard
Baltimore, Maryland 21230-1708

Re: Howard County Department of Public Works, Storm Water Management Division
Bureau of Environmental Service – Ellicott City Safe and Sound Plan, Flood Mitigation Projects
Howard County, Maryland
Application No. 20196164719/19-NT-3250/AI166463
Water Quality Certification Application

The Howard County Department of Public Works, Storm Water Management Division, Bureau of Environmental Services respectfully submits the Water Quality Certification Application for Application Number 20196164719/19-NT-3250 for the Ellicott City, Safe and Sound Plan (ECSSP), Flood Mitigation Project.

1. The assigned Army Corps of Engineers and Maryland Department of Environment tracking numbers along with a copy of the Joint Permit Application (JPA) shall be included with the Application for a Water Quality Certification, as well as any supplemental documents that address all of the following not contained in the JPA:

Tracking no. 20196164719/19-NT-3250, the Joint Permit Application (JPA) dated September 20, 2019 and Amendment dated January 27, 2020 are included as Attachment A.

a. Name, address, phone number, email address of the application and as applicable to authorized agent.

Howard County Department of Public Works
Storm Water Management Division, Bureau of Environmental Service
9801 Broken Land Parkway
Columbia, MD 21046
Attn.: Mark Richmond, PE
msrichmond@howardcountymd.gov
410-313-6413

b. The project site address, including coordinates in degrees, minutes, seconds, 12 digit HUC no., Watershed name.

The project involves the seven projects listed below and is located along the Frederick Road/Main Street corridor in Ellicott City. The project is within the 02060003150- 11 digit HUC, 021309061017- 12-digit MD watershed, and the Patapsco River Lower N Branch MDE 8-digit watershed.

- *8777 Frederick Road Culvert Improvement Project (76°48'46" W, 39°16'11"N)*
- *8600 Frederick Road High Flow Bypass Pipe Project (76°48'25" W, 39°16'11"N)*
- *8552 Main Street Flood Berm/8534 Main Street High Flow Bypass Pipe Project (76°48'25" W, 39°16'11"N)*
- *Lower Main Street Channel Constriction Removal Project (76°48'46" W, 39°16'02"N)*
- *Lower Main Street Terraced Floodplain Project (76°47'43" W, 39°16'02"N)*
- *Maryland Avenue High Flow Bypass Culverts Project (76°47'41" W, 39°16'03"N)*
- *North Tunnel Project (76°48'01" W, 39°16'08"N)*

c. The name(s) and address(es) of adjacent property owners

Adjacent Property Owners are included in Attachment B.

d. Signed Public Notice Billing Form

This form is included in Attachment C.

e. Description of the facility or activity

Howard County has taken an integrated approach to developing a preferred Phase II Flood Mitigation plan to address flooding in Ellicott City by including agencies, stakeholders and the public during the decision making process. The preferred plan includes seven key sites located along Frederick Road/Main Street from approximately 8777 Frederick Road east to the Patapsco River in downtown Ellicott City. The objective of these projects is to reduce flooding extents, depths, and velocities to improve public safety by providing additional conveyance capacity to the stream. The seven projects included in this plan and discussed below are in various stages of design, and generally include floodplain grading, construction of enlarged conveyance structures and additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity. A brief description of each of the seven projects is provided below:

- *8777 Frederick Road Culvert Improvement Project– Project includes channel and floodplain grading upstream and downstream of existing crossing below Frederick Road to increase channel conveyance capacity and improve overall channel and*

floodplain stability. Existing crossing below Frederick Road will be expanded to approximately 40' wide.

- *8600 Frederick Road High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream of current entrance to existing 96"/108" CMP cross culvert to expand the channel and increase capacity. A headwall structure at the upstream end will include a weir to direct high flows into four (4) bypass culverts, while maintaining base flow through the existing culvert. The downstream end of the existing culvert will be shifted upstream to a new endwall location, opening up stream that is currently inside the 96"/108" CMP cross culvert. The bypass pipes will discharge at this same outfall location.*
- *8552 Main Street Flood Berm/8534 Main Street High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream and downstream of a proposed 8' diameter cross culvert that will be placed parallel to the existing 8' CMP culvert. The proposed cross culvert will improve conveyance of high flows through the area. The flood berm at 8552 Main Street is designed to minimize floodplain flows from entering Frederick Road.*
- *Lower Main Street Channel Constriction Removal Project – Project includes removing constrictions over the existing stream channel to restore conveyance capacity of the channel. The back of 6 buildings located over the existing stream channel will be removed from the 100-year floodplain, for 8081 Main Street (deck only), 8085-8089 Main Street, 8095-8101 Main Street (first floor only), 8109-8111-8113 Main Street, and 8125 Main Street.*
- *Lower Main Street Terraced Floodplain Project – Project includes removing Tiber Alley, and 4 buildings located over the existing stream channel (8069, 8059, 8055, and 8049 Main Street).*
- *Maryland Avenue High Flow Bypass Culverts Project – Project includes channel grading in Hudson/Tiber to facilitate bypass of high flows into a proposed headwall for bypass culverts to relieve flooding. Bypass culverts will convey high flows between B&O museum buildings, below CSX railroad to the Patapsco River. MD Ave bypass culverts outfall will be stabilized with riprap and adequate energy dissipation measures.*
- *North Tunnel Project – Project includes channel and floodplain grading at upstream end of proposed tunnel location to install entrance structure for the proposed high flow, bypass. High flow bypass will be approximately 15' in diameter and will convey flow beneath Court Avenue approximately 1600' to outfall in the Patapsco River, upstream of the Main Street bridge. The details of the entrance structure have not been defined, but impact plates provide schematic representation of potential design. The tunnel outfall will be stabilized with riprap and adequate energy dissipation measures.*

f. A plan showing the proposed activities to scale including:

Impact Plates including the locations and boundaries of proposed activities; and the locations, dimensions, and types of any existing and/or proposed structures are included for you review in Attachment A. The locations, names, identification numbers, and extent of all potentially affected surface water bodies are included in the Joint Permit Application (JPA) for your review in Attachment A.

g. A description of any discharge which may result from the conduct of any activity including:

i. Biological, chemical, thermal or other characteristics of the potential discharge;

a. A description of any other aspect of associated with construction and operation of the activity that would affect the chemical composition, flow, or physical aquatic habitat of the surface water.

Projects may include disturbance and impacts to the existing stream channel as noted in the JPA, and all required projects will have an approved erosion and sediment control plans to minimize potential for discharge from work areas. Characteristics of potential discharge likely include those typically associated with normal construction activities, including but not limited to potential for increased sediment, and/or concrete/grout placement by-products.

b. The characteristics of the discharge

- Flow rate (cfs)

  Projects will be completed offline from the stream as much as possible. Flow rates from the project work areas are anticipated to be negligible, for normal conditions. At some phase of their construction, all projects will need to divert flows along the mainstem of the Tiber-Hudson Branch. Tiber-Hudson Branch mainstem flow rates vary depending project location, 2yr, 24hr peak discharges at the upstream project limits (8777 Culvert Project) are approximately 650cfs in the stream, while 2yr,24hr peak discharge near the confluence with the Patapsco River (Maryland Avenue Bypass Culvert project) is approximately 1630 cfs.

- Potential chemical, physical, biological constituents

  See description above for Section g.i.a.

- Frequency (e.g. daily, hourly)

  Discharge frequency will be determined as project designs progress.

- Duration

Discharge duration will be determined as project designs progress.

- Temperature (Celsius)

  Discharge temperature will be determined as project designs progress.

ii. The location or locations at which any discharge may enter navigable waters;

a. Latitude and longitude

The locations below are for three different outfall points. All projects along the Tiber-Hudson Branch will discharge in various points, but the Tiber-Hudson Branch discharges to Patapsco River at the location below. Other discharge points are for projects which discharge directly to the Patapsco River.

Tiber-Hudson Branch/Patapsco River:
39°16'03.8"N 76°47'40.2"W

North Tunnel Project Outfall/Patapsco River:
39°16'09.1"N 76°47'40.3"W

MD Avenue Project Outfall/Patapsco River:
39°16'02.3"N 76°47'40.7"W

b. An original or color copy/reproduction of the United States Geological Survey Quadrangle Map that clearly shows the location of the activity and all potential discharge points

Please find the United States Geological Survey Quadrangle in Attachment D.

iii. Data supporting existing aquatic life us for each waterway:

Based on letter dated October 18, 2019 from the Maryland Department of Natural Resources (DNR), Environmental Review Program, the project will impact unnamed tributaries to Patapsco River which is classified as a Use I stream. No in-stream work is allowed from March 1st to June 15th in any given year to protect spawning fish. The Patapsco River and its tributaries support many residential fish species.

iv. Antidegredation alternatives analysis as applicable to Tier II waters.

The project will not impact any Tier II waters or catchments; therefore, the antidegradation alternatives analysis is not applicable.

v. The existing and designated use(s) that are potentially affected by the proposed activities.

Unnamed tributaries to Patapsco River are designated as Use I waterways (Water Contact Recreation and Protection of Nontidal Warmwater Aquatic Life). The proposed activities are designed to reduce flooding and will not likely have an adverse effect on the designated Use Class of these waterways, or adjacent waterways.

h. A description, if applicable, of the function and operation of any equipment of facilities to treat any discharge and the degree of treatment to be attained. A description of any other aspect of associated with construction and operation of the activity that would affect the chemical composition, temperature, flow, or physical aquatic habitat of the surface water.

Discharge treatment practices and details will be developed as project design progress. All required projects will have an approved erosion and sediment control plan to control and limit disturbance and project impacts to areas within the limit of disturbance.

i. The date on which the activity will begin or end, if known, and the date of dates on which discharge may occur.

Activity dates are not currently known and will be determined as project designs progress.

j. A description, if applicable, of the methods proposed or employed to monitor the quality and characteristics of any discharge.

Monitoring measures are not currently known and will be determined as project designs progress.

k. A specific and detailed mitigation plan as applicable for projects requiring mitigation.

Not applicable at this time. A mitigation plan, as required, will be developed as part of the Section 106 USACE permitting process. A programmatic agreement will be developed to include framework for the mitigation plans for the individual projects.

2. Other related permits issued or required (individual 404 Permit, Nationwide Permit No. , Erosion and Sediment Control Plan Approval, NPDES permit [including

Stormwater Permits], Regional Permit).

- *Section 106 of the National Historic Preservation Act of 1966:Leading Authority-USACE*
- *Erosion and Sediment Control Plan Approval – may be required for all individual projects (each project likely permitted independently): Leading Authority - Howard Soil Conservation District*
- *Joint Permit Application (JPA)-Tracking no. 20196164719/19-NT-3250, dated September 20, 2019 and Amendment dated January 27, 2020 are included as Attachment A.*

Attachments:

Attachment A – Joint Permit Application dated September 20, 2019 and Amendment dated January 27, 2020.
Attachment B – Adjacent Property Owners and Elected Officials List
Attachment C – Signed Public Notice Billing Form
Attachment D – US Geological Survey Quadrangle Map

Attachment A - Joint Permit Application

-Original (9/20/19)
-Amendment (1/27/20)

509 S. Exeter Street, 4th Floor | Baltimore, MD 21202 | 410.662.7400
www.mccormicktaylor.com

McCORMICK TAYLOR

September 20, 2019

Ms. Janice Vettel
Maryland Department of the Environment
Regulatory Services Coordination Office
Mailstop – 430
1800 Washington Boulevard
Baltimore, Maryland 21230

RE: Howard County Department of Public Works, Storm Water Management Division Bureau of Environmental Service – Ellicott City Safe and Sound Plan, Flood Mitigation Projects
Howard County, Maryland
Joint Permit Application

Dear Ms. Vettel:

The Howard County Department of Public Works, Storm Water Management Division, Bureau of Environmental Services respectfully submits this JPA package for improving conveyance for large storm events and reducing the potential of flooding within the Ellicott City Main Street corridor as part of the Safe and Sound plan for Ellicott City. The proposed project consists of seven projects located along Frederick Road/Main Street from approximately 8777 Frederick Road east to the Patapsco River in downtown Ellicott City.

The seven projects are in various stages of design, and generally include floodplain grading, construction of enlarged conveyance structures and additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity. The seven projects included within this package are listed below, along with brief descriptions of each:

- 8777 Frederick Road Culvert Improvement Project– Project includes channel and floodplain grading upstream and downstream of existing crossing below Frederick Road to increase channel conveyance capacity. Existing crossing below Frederick Road will be expanded to approximately 40' wide. The existing structure at 8777 Frederick Road may potentially be displaced from its current location for floodplain grading and installation of the new crossing. The property at 8777 Frederick Road (HO-364) has been determined to be eligible for the National Register of Historic Places.
- 8600 Frederick Road High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream of current entrance to existing 96"/108" CMP cross culvert to expand the channel and increase capacity. A headwall structure at the upstream end will include a weir to direct high flows into five (5) bypass culverts, while maintaining base flow through the existing culvert. The downstream end of the existing culvert will be shifted upstream to a new endwall location, opening up stream that is currently inside the 96"/108" CMP cross culvert. The bypass pipes will discharge at this same outfall location. The bypass pipe installation may potentially displace four existing structures at addresses: 8611 Frederick Road, 8601 Frederick Road, 8590 Main Street, and 8578 Main Street. The project may potentially impact historic resources at addresses 8637-8639 Frederick Road, and 8629 Main Street, which are located within the National Register listed Ellicott City Historic District (HO-78) and National Register eligible Frederick Road Survey District (H)-899).
- 8552 Main Street Flood Berm/8534 Main Street High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream and downstream of a proposed 8' diameter cross culvert that will be placed parallel to the existing 8' CMP culvert. The proposed cross culvert will improve

conveyance of high flows through the area. The flood berm at 8552 Main Street is designed to minimize floodplain flows from entering Frederick Road. Grading at downstream end of culverts may include potential displacement of structures with addresses 8526 – 8522 Main Street, 8518 Main Street, and 8512 Main Street. The flood berm may potentially displace or impact historical resources at addresses 8548-8552 West Main Street and 8556-8560 West Main Street. These properties are located within the Ellicott City Historic District.

- Lower Main Street Channel Constriction Removal Project – Project includes removing constrictions over the existing stream channel to restore conveyance capacity of the channel. The back of 6 buildings located over the existing stream channel will be removed from the 100-year floodplain, for 8081 Main Street (deck only), 8085-8089 Main Street, 8095-8101 Main Street (first floor only), 8109-8111-8113 Main Street, and 8125 Main Street. This includes HO-359, HO-586, HO-360 in MHT records and are located within the Ellicott City Historic District.
- Lower Main Street Terraced Floodplain Project – Project includes removing Tiber Alley, and 4 buildings located over the existing stream channel (8069, 8059, 8055, and 8049 Main Street). This includes HO-330 and HO-669 in MHT records. All of the buildings are located within the Ellicott City Historic District.
- Maryland Avenue High Flow Bypass Culverts Project – Project includes channel grading in Hudson/Tiber to facilitate bypass of high flows into a proposed headwall for two 10' diameter bypass culverts to relieve flooding. Bypass culverts will convey high flows between B&O museum buildings, below CSX railroad to the Patapsco River. MD Ave bypass culverts outfall will be stabilized with riprap and adequate energy dissipation measures. Project may potentially impact the historic Ellicott City Station of the B&O Railway (HO-71), which is located within the Ellicott City Historic District.
- North Tunnel Project – Project includes channel and floodplain grading at upstream end of proposed tunnel location to install entrance structure for the proposed high flow, bypass. High flow bypass will be approximately 15' in diameter and will convey flow beneath Court Avenue approximately 1600' to outfall in the Patapsco River, upstream of the Main Street bridge. The details of the entrance structure have not been defined, but impact plates provide schematic representation of potential design. The tunnel outfall will be stabilized with riprap and adequate energy dissipation measures. The project is set within the Ellicott City Historic District.

Proposed impacts include 3,181 linear feet (50,345 square feet) of permanent impacts to the Patapsco River, Tiber Run, and perennial tributaries, and 280,799 square feet of permanent impacts in the 100-year floodplain.

Attached are one original and six copies of the Application, including the Impact Plates, requesting authorization for this proposed work. Coordination among agencies is ongoing, and additional information relative to agency and Section 106 coordination, the hydraulic analysis, design and Erosion and Sediment Control plans, property owner notifications, and alternatives analysis will be provided at a later date. Please contact me at 410-662-7400 if there are any questions with this application.

Sincerely,

Amy Hribar, PE
Senior Manager, Water Resources
McCormick Taylor

Enc.

cc: Mark Richmond, PE, Howard County SWM Division Chief
Chris Brooks, PE, McCormick Taylor
Andy McLean, PE, McCormick Taylor

JOINT FEDERAL/STATE APPLICATION FOR THE ALTERATION OF ANY FLOODPLAIN, WATERWAY, TIDAL OR NONTIDAL WETLAND IN MARYLAND

FOR AGENCY USE ONLY

Application Number _____ **Date Determined Complete** _____
Date Received by State _____ **Date(s) Returned** _____
Date Received by Corps _____ _____
Type of State permit needed _____ **Date of Field Review** _____
Type of Corps permit needed _____ **Agency Performed Field Review** _____

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- Please submit 1 original and 6 copies of this form, required maps and plans to the Wetlands and Waterways Program as noted on the last page of this form.
- Any application that is not completed in full or is accompanied by poor quality drawings may be considered incomplete and result in a time delay to the applicant.

Please check one of the following:

RESUBMITTAL: _____ APPLICATION AMENDMENT: _____ MODIFICATION TO AN EXISTING PERMIT: _____
JURISDICTIONAL DETERMINATION ONLY: __ APPLYING FOR AUTHORIZATION X
PREVIOUSLY ASSIGNED NUMBER (RESUBMITTALS AND AMENDMENTS) _____

DATE September 20, 2019

APPLICATION DESCRIPTION: Ellicott City Safe and Sound Plan Flood Mitigation Projects

1. APPLICANT INFORMATION:
APPLICANT NAME:

A. Name: Mr. Mark Richmond B. Daytime Telephone: 410-313-6413
C. Company: Howard County Government-SWM Division D. Email Address: msrichmond@howardcountymd.gov
E. Address: 9801 Broken Land Parkway
F. City: Columbia State: MD Zip: 21046

AGENT/ENGINEER INFORMATION:
A. Name: Ms. Amy Hribar B. Daytime Telephone: 410-662-7400
C. Company: McCormick Taylor, Inc. D. Email Address: alhribar@mccormicktaylor.com
E. Address: 509 South Exeter Street, 4th Floor
F. City: Baltimore State: Maryland Zip: 21202

ENVIRONMENTAL CONSULTANT:
A. Name: Mr. Adam Tatone B. Daytime Telephone: 410-662-7400
C. Company: McCormick Taylor, Inc. D. Email Address: adtatone@mccormicktaylor.com
E. Address: 509 South Exeter Street, 4th Floor
F. City: Baltimore State: Maryland Zip: 21202

CONTRACTOR (If known): _____

A. Name: _____ B. Daytime Telephone: _____
C. Company: _____ D. Email Address: _____
E. Address: _____
F. City: _____ State: _____ Zip: _____

PRINCIPAL CONTACT:

A. Name: Ms. Amy Hribar B. Daytime Telephone: 410-662-7400
C. Company: McCormick Taylor, Inc. D. Email Address: alhribar@mccormicktaylor.com
E. Address: 509 South Exeter Street, 4th Floor
F. City: Baltimore State: Maryland Zip: 21202

PCA 13910
OBJ 4142

2. PROJECT DESCRIPTION

a. GIVE WRITTEN DESCRIPTION OF PROJECT:

This project involves seven projects along the Frederick Road/Main Street corridor in Ellicott City to provide improved conveyance of large storm events and reduce potential of flooding. The projects generally include floodplain grading, construction of enlarged conveyance structures and additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity. The westernmost project is located at approximately 8777 Frederick Road and the easternmost project is located along the Patapsco River in downtown Ellicott City.

Has any portion of the project been completed? _____ Yes __X__ No If yes, explain

Is this a residential subdivision or commercial development? _____ Yes __X__ No
If yes, total number of acres on property _____ acres

Will there be temporary or permanent tree clearing occurring on the overall project site (i.e., uplands and wetlands), including but not limited to, tree clearing for site development, road/highways, utilities, mining, stormwater management, restoration, energy production and transmission, etc.)?
__X__ Yes _____ No
If yes, total estimated acres of tree clearing for the overall project site: __<1__ acres

b. ACTIVITY: Check all activities that are proposed in the wetland, waterway, floodplain, and nontidal wetland buffer as appropriate.

A. _____	Filling	D. _____	flooding or impounding water	F. __X__	Grading
B. _____	Dredging	E. _____	draining	G. __X__	removing or destroying vegetation
C. __X__	Excavating			__X__	building structures

Wetlands

Nontidal Wetlands – *Permanent* __0__ sq. ft
Nontidal Wetlands – *Temporary* __0__ sq. ft
Tidal Wetlands – *Permanent* __0__ sq. ft
Tidal Wetlands – *Temporary* __0__ sq. ft

Wetland Buffers

Nontidal Wetlands Buffer – *Permanent* __0__ sq. ft.
Nontidal Wetlands Buffer –*Temporary* __0__ sq. ft.

Waters of the U.S./Streams

Waters of the U.S./Streams – *Permanent* 3,181 LF 50,345 SF
Waters of the U.S./Streams – *Temporary* 0 LF 0 SF
Tidal Waters – *Permanent* 0 LF 0 sq. ft
Tidal Waters – *Temporary* 0 LF 0 sq. ft
Ephemeral Waters of U.S./Streams – *Permanent* 0 LF 0 SF
Ephemeral Waters of U.S./Streams – *Temporary* 0 LF 0 SF

100-Year Floodplain

Disturbance on Floodplain 280,799 sq. ft.
Net Volume of Cut in the Floodplain TBD CY

c. TYPE OF PROJECTS: Project Dimensions

For each activity, give overall length and width (in feet), in columns 1 and 2. For multiple activities, give total area of disturbance in square feet in column 3. For activities in tidal waters, give maximum distance channelward (in feet) in column 4. For dam or small ponds, give average depth (in feet) for the completed project in column 5. Give the volume of fill or dredged material in column 6.

		Length (Ft.) 1	Width (Ft.) 2	Area (Sq. Ft.) 3	Maximum/Average Channelward Encroachment 4		Pond Depth 5	Volume of fill/dredge material (cubic yards) below MHW or OHW 6
A.	Bulkhead							
B.	Revetment							
C.	Vegetative Stabilization							
D.	Gabions							
E.	Groins							
F.	Jetties							
G.	Boat Ramp							
H.	Pier							
I.	Breakwater							
J.	Repair & Maintenance							
K.	Road Crossing							
L.	Utility Line							
M.	Outfall Construction							
N.	Small Pond							
O.	Dam							
P.	Lot Fill							
Q.	Building Structures							
R.	Culvert							
S.	Bridge							
T.	Stream Channelization							

U. _____ Parking Area
V. _____ Dredging

1. _____ New 2. _____ Maintenance 3. _____ Hydraulic 4. _____ Mechanical
W. X Other (explain) Floodplain grading, construction of enlarged conveyance structures and bypass culverts, removal of channel restrictions

d. PROJECT PURPOSE: Give brief written description of the project purpose:

The purpose of this project is to improve conveyance for large storm events and reduce the potential of flooding in downtown Ellicott City.

3. PROJECT LOCATION:
a. LOCATION INFORMATION:

A. County: Howard B. City: Ellicott City C. Name of waterway or closest waterway Tiber River
D. State stream use class designation: Use I
E. Site Address or Location: Several sites along Frederick Road/Main Street (MD 144) from US 29 east to the Patapsco River
F. Directions from nearest intersection of two state roads: From I-695 take the exit for US 40 west (Baltimore National Pike) toward Ellicott City. Turn left onto Rogers Ave south and continue for about 1 mile. Rogers Ave ends at Frederick Rd/Main St within the project corridor.

G. Is your project located in the Chesapeake Bay Critical Area (generally within 1,000 feet of tidal waters or tidal wetlands)?:
_____ Yes X No
H. County Book Map Coordinates (Alexandria Drafting Co.); Excluding Garrett and Somerset Counties:
Map: 12 Letter: D-G Number: 9 (to the nearest tenth)
I. FEMA Floodplain Map Panel Number (if known): 24027C0090D
24027C0095D
J. 1. 39.269517 Latitude 2. -76.805593 longitude

b. ACTIVITY LOCATION: Check one or more of the following as appropriate for the type of wetland/waterway where you are proposing an activity:

A. _____ Tidal Waters
B. _____ Tidal Wetlands
C. _____ Special Aquatic Site (e.g., mudflat, vegetated shallows)
D. _____ Nontidal Wetland
E. _____ 25-foot buffer (nontidal wetlands only)
F. _____ 100-foot buffer (nontidal wetland of special State concern)
G. X In stream channel
1. _____ Tidal 2. X Nontidal
H. X 100-year floodplain (outside stream channel)
I. _____ River, lake, pond
J. _____ Other (Explain)

c. LAND USE:

A. Current Use of Parcel Is: 1. ___ Agriculture: Has SCS designated project site as a prior converted cropland? ___Yes X No
2. _____Wooded 3. _____ Marsh/Swamp 4. __X___ Developed
5. _____ Other

B. Present Zoning Is: 1. X Residential 2. X Commercial/Industrial 3. _____ Agriculture 4. _____ Marina 5. _____ Other

C. Project complies with current zoning X Yes _____ No

THE FOLLOWING INFORMATION IS REQUIRED BY THE STATE (blocks 4-7):

4. REDUCTION OF IMPACTS: Explain measures taken or considered to avoid or minimize wetland losses in F. Also check Items A-E if any of these apply to your project.

A. _____ Reduced the area of Disturbance
B. _____ Reduced size/scope of project
C. _____ Relocated structures
D. _____ Redesigned project

E. X Other No wetland impacts are anticipated for this project.
F. Explanation

Describe reasons why impacts were not avoided or reduced in Q. Also check Items G-P that apply to your project.

G. ____ Cost
H. ____ Extensive wetlands on site
I. ____ Engineering/design Constraints
J. ____ Other natural features
K. ____ Parcel size
L. ____ Other regulatory requirement
M. X Failure to accomplish project purpose
N. X Safety/public welfare issue
O. ____ Inadequate zoning
P. ____ Other ____

Q. Description Removal of buildings and channel bank grading are necessary to protect lives and property from flooding during large storm events.

5. LETTER OF EXEMPTION: If you are applying for a letter of exemption for activities in nontidal wetlands and/or their buffers, explain why the project qualifies:

A. ____ No significant plant or wildlife value and wetland impact
1. ____ Less than 5,000 square Feet
2. ____ In an isolated nontidal wetland less than 1 acre in size
B. ____ Repair existing structure/fill
C. ____ Mitigation Project
D. ____ Utility Line
1. ____ Overhead
2. ____ Underground
E. Other (explain)

F. X Check here if you are **not** applying for a letter of exemption.

IF YOU ARE APPLYING FOR A LETTER OF EXEMPTION, PROCEED TO BLOCK 10

6. ALTERNATIVE SITE ANALYSIS: Explain why other sites that were considered for this project were rejected in M. Also check any items in D-L if they apply to your project. **(If you are applying for a letter of exemption, do not complete this block.)**

A. ____ 1 site
B. ____ 2 - 4 sites
C. ____ 5 or more sites

Alternative sites were rejected/not considered for the following reason(s):

D. ____ Cost
E. ____ Lack of availability
F. X Failure to meet project Purpose
G. ____ Located outside general/market area
H. ____ Greater wetlands impact
I. ____ Water dependency
J. ____ Inadequate zoning
K. ____ Engineering/design constraints
L. X Other Alternative Analysis will be provided at a later date.
M. Explanation:

7. PUBLIC NEED: Describe the public need or benefits that the project will provide in F. Also check Items in A-E that apply to your project. **(If you are applying for a letter of exemption, do not complete this block.)**

A. X Economic
B. X Safety
C. ____ Health/welfare
D. ____ Does not provide public benefits
E. ____ Other ____

F. Description Project is proposed to alleviate potential of flash flooding during large storm events in order to protect life and property.

8. MITIGATION PLAN: Please provide the following information. **(If you are applying for a letter of exemption, do not complete this block.)**

a. Description of a monetary compensation proposal, if applicable (for **state requirements** only). Attach another sheet if necessary. Not Applicable.

b. Give a brief description of the proposed mitigation project. Not Applicable.

c. Describe why you selected your proposed mitigation site, including what other areas were considered and why they were rejected. Not Applicable.

d. Describe how the mitigation site will be protected in the future. Not Applicable.

9. HAVE ADJACENT PROPERTY OWNERS BEEN NOTIFIED? A. ___ Yes B. X No
Provide names and mailing addresses below (Use separate sheet, if necessary). **(If you are applying for a letter of exemption, do not complete this block.)**

a. ___ b. ___ c. ___

Adjacent Property Owners and the Public in general have been made aware of projects through multiple project meetings and in some cases through individual conversations. Formal notifications specific to adjacent property owners for this JPA have not been submitted.

10. OTHER APPROVALS NEEDED/GRANTED:

A. Agency	B. Date Sought	C. Decision 1. Granted	2. Denied	D. Decision Date	E. Other Status
Maryland DNR-ERP					Pending
Maryland DNR-WHS					Pending
USFWS					Pending
MHT					Pending
Howard Co. Soil Conservation District					Pending
Howard County DPZ-Historic Preservation					Pending
Howard County DILP					Pending

11. HISTORIC PROPERTIES: Is your project located in the vicinity of historic properties? (For example: structures over 50 years old, archeological sites, shell mounds, Indian or Colonial artifacts). Provide any supplemental information in Section 12.

A. X Yes B. ___ No C. ___ Unknown

12. ADDITIONAL INFORMATION: Use this space for detailed responses to any of the previous items. Attach another sheet if necessary:

Six of the seven projects are located within the Ellicott City Historic District, and the one project outside the Historic District (at 8777 Frederick Rd) may impact an historic resource. The Ellicott City Station, B&O Railway is another historical resource within the study area. A section 106 process will be required as determined through previous correspondence with agencies, and USACE will function as the lead agency.

Check box if data is enclosed for any one or more of the following (see checklist for required information):

A.	____ Soil borings	D.	____ Field surveys	G.	____ Site plan
B.	X Wetland data sheets	E.	____ Alternate site analysis	H.	____ Avoidance and minimization analysis
C.	X Photographs	F.	____ Market analysis		

I. X Other (explain) Impact Plates (Attachment A), Wetland Delineation/NRI Reports (Attachment B), Agency Coordination (Attachment C), Plan Sheets for previously constructed emergency repair project at Ellicott Mills Drive (Attachment D)

CERTIFICATION:

I hereby designate and authorize the agent named above to act on my behalf in the processing of this application and to furnish any information that is requested. I certify that the information on this form and on the attached plans and specifications is true and accurate to the best of my knowledge and belief. I understand that any of the agencies involved in authorizing the proposed works may request information in addition to that set forth herein as may be deemed appropriate in considering this proposal. I certify that all Waters of the United States have been identified and delineated on site, and that all jurisdictional wetlands have been delineated in accordance with the Corps of Engineers Wetlands Delineation Manual (Wetlands Research Program Technical Report Y-87-1). I grant permission to the agencies responsible for authorization of this work, or their duly authorized representative, to enter the project site for inspection purposes during working hours. I will abide by the conditions of the permit or license if issued and will not begin work without the appropriate authorization. I also certify that the proposed works are consistent with Maryland's Coastal Zone Management Plan. All information, including permit applications and related materials, submitted to MDE may be subject to public disclosure consistent with the Maryland Public Information Act, §4-101 *et seq.*, General Provisions Article of the Maryland Code and the Freedom of Information Act, 5 USC Section 552 et seq. Pursuant to Clean Water Act Section 404(o), 33 USC 1344 (o), permit applications and permits will be available to the public. I understand that I may request that additional required information be considered confidential under applicable laws. I further understand that failure of the landowner to sign the application will result in the application being deemed incomplete.

LANDOWNER MUST SIGN: Mark S. Richmond DATE: 9/19/19

Mark Richmond, P.E., Chief, Howard County Government- Storm Water Management Division

WHERE TO MAIL APPLICATION

Maryland Department of the Environment
Water and Science Administration
Regulatory Services Coordination Office
1800 Washington Boulevard, Suite 430
Baltimore, Maryland 21230
Telephone: (410) 537-3762
1-800-633-6101

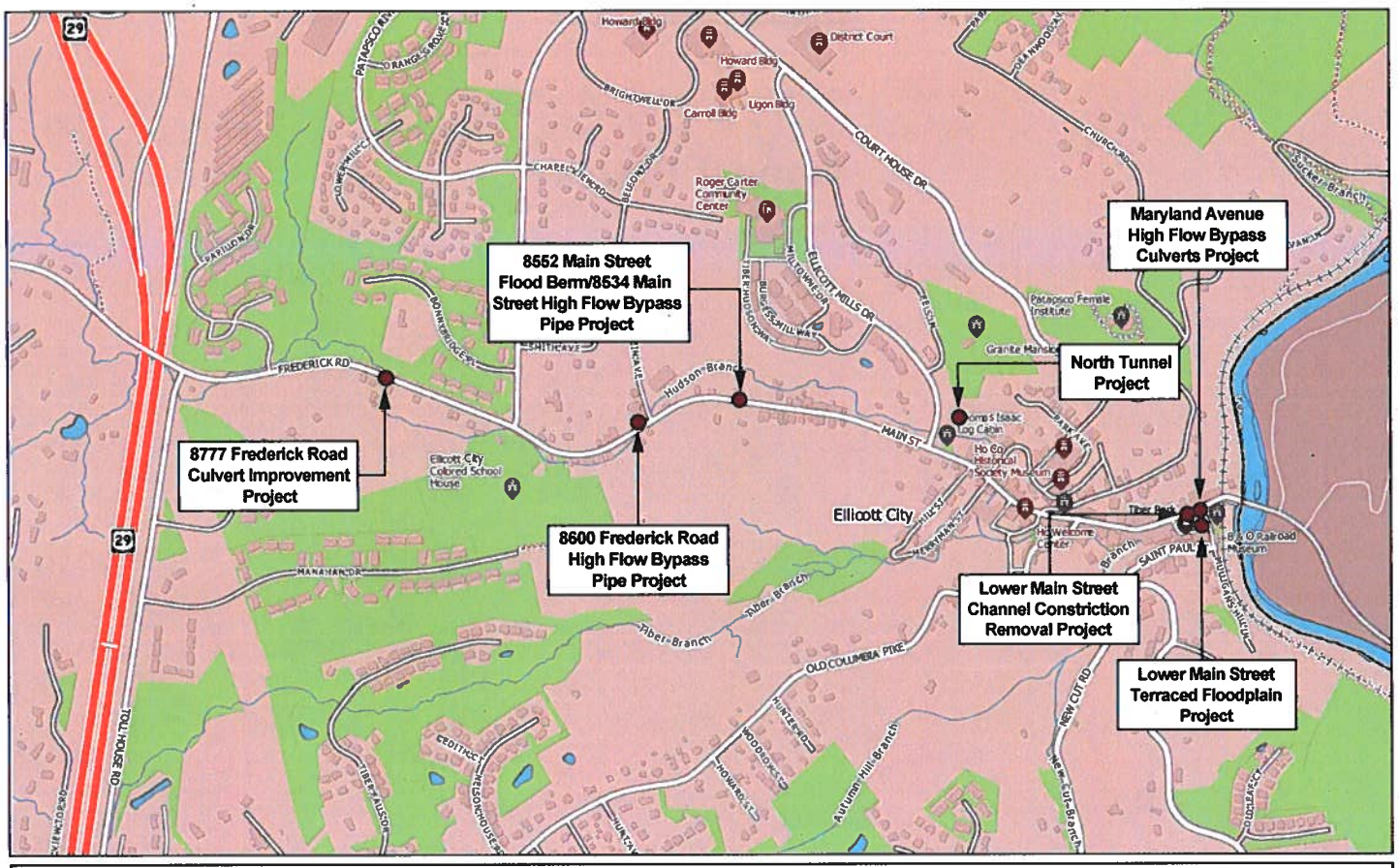
BEFORE YOU MAIL... DON'T FORGET...

- **SIGN AND DATE THE APPLICATION. THE LANDOWNER MUST SIGN.**
- **SEVEN (7) COPIES OF ALL DOCUMENTS (APPLICATION, PLANS, MAPS, REPORTS, ETC.) MUST BE RECEIVED TO BEGIN OUR REVIEW.**
- **INCLUDE SEVEN (7) COPIES OF A VICINITY MAP (LOCATION MAP) WITH THE PROJECT SITE PINPOINTED.**
- **SEND AN APPLICATION FEE OF $750 ALONG WITH A COPY OF THE FIRST PAGE OF THE APPLICATION TO MARYLAND DEPARTMENT OF THE ENVIRONMENT, P.O. BOX 2057, BALTIMORE, MD 21230-2057. PLEASE REFER TO OUR WEBSITE *http://www.mde.maryland.gov* FOR FURTHER INSTRUCTIONS.**

Revised 4/2018

Attachment A

Impact Plates



HOWARD COUNTY MARYLAND

McCORMICK TAYLOR

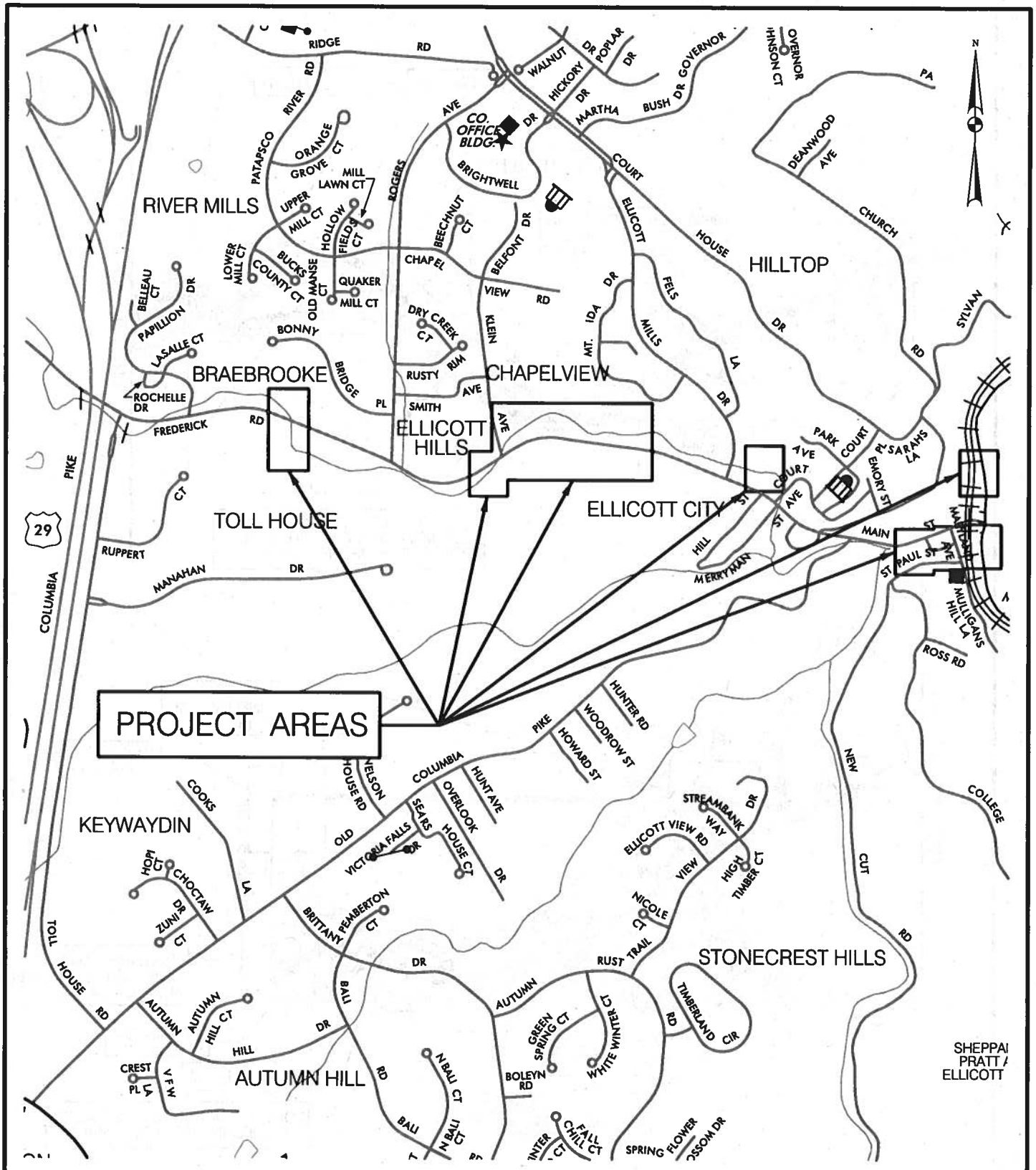
Ellicott City Safe and Sound Plan Flood Mitigation Projects

Ellicott City, Howard County, MD

N W E S

1,000 feet

Source: https://data.howardcountymd.gov/InteractiveMap.html?Workspace=EC_Flood_Mitigation_Projects



Howard County MARYLAND	**Revisions**	**Howard County**
McCORMICK TAYLOR		**ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS**
		Location Map
		SCALE: 1" = 1,000' | DATE: SEPTEMBER, 2019 | PLATE 1 of 16

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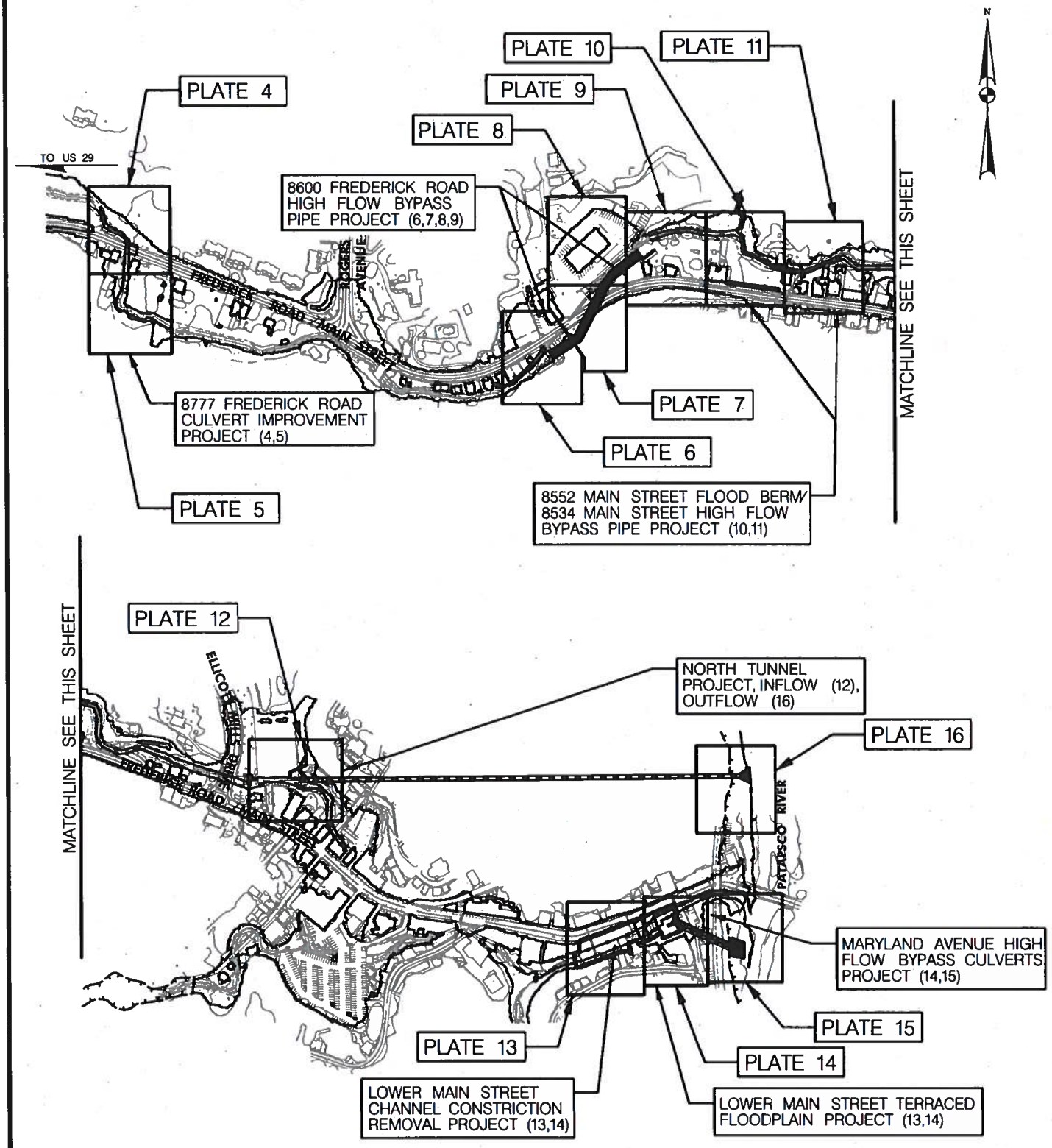

Howard County
MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Overall Site Plan
	SCALE: 1" = 500' | DATE: SEPTEMBER, 2019 | PLATE 2 of 16

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LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- WOODS
- PROPERTY LINE
- SAN — EXISTING SANITARY SEWER
- LOD — LIMIT OF DISTURBANCE
- WUS — WATERS OF THE US
- 100 YEAR MODELED FLOODPLAIN
- 100 YEAR FEMA FLOODPLAIN

IMPACT LEGEND

PERMANENT W.U.S ----------

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		*WUS (S.F.)*	
TEMP.	*PERM.*	*TEMP.*	*PERM.*
0	3,181	0	50,345

FLOODPLAIN IMPACTS
PERM. (SF)
280,799

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Legend and Waterway Impacts
	SCALE: NTS | DATE: SEPTEMBER, 2019 | PLATE 3 of 16

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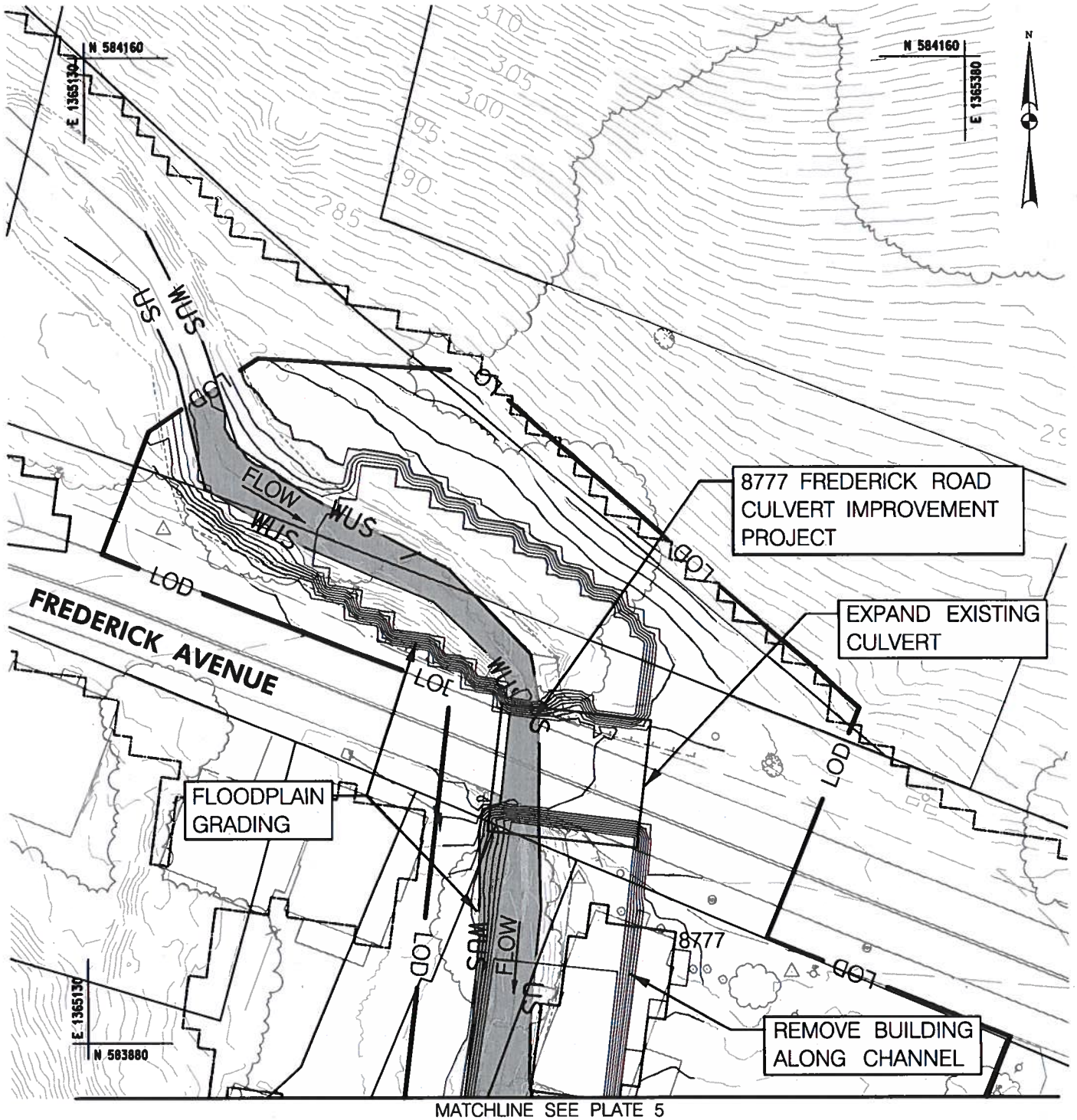

MATCHLINE SEE PLATE 5

FLOODPLAIN IMPACTS	
PERM. (SF)	
22,425	

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	246	0	3,248

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY
SAFE AND SOUND PLAN
FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40'	DATE: SEPTEMBER, 2019	PLATE 4 of 16

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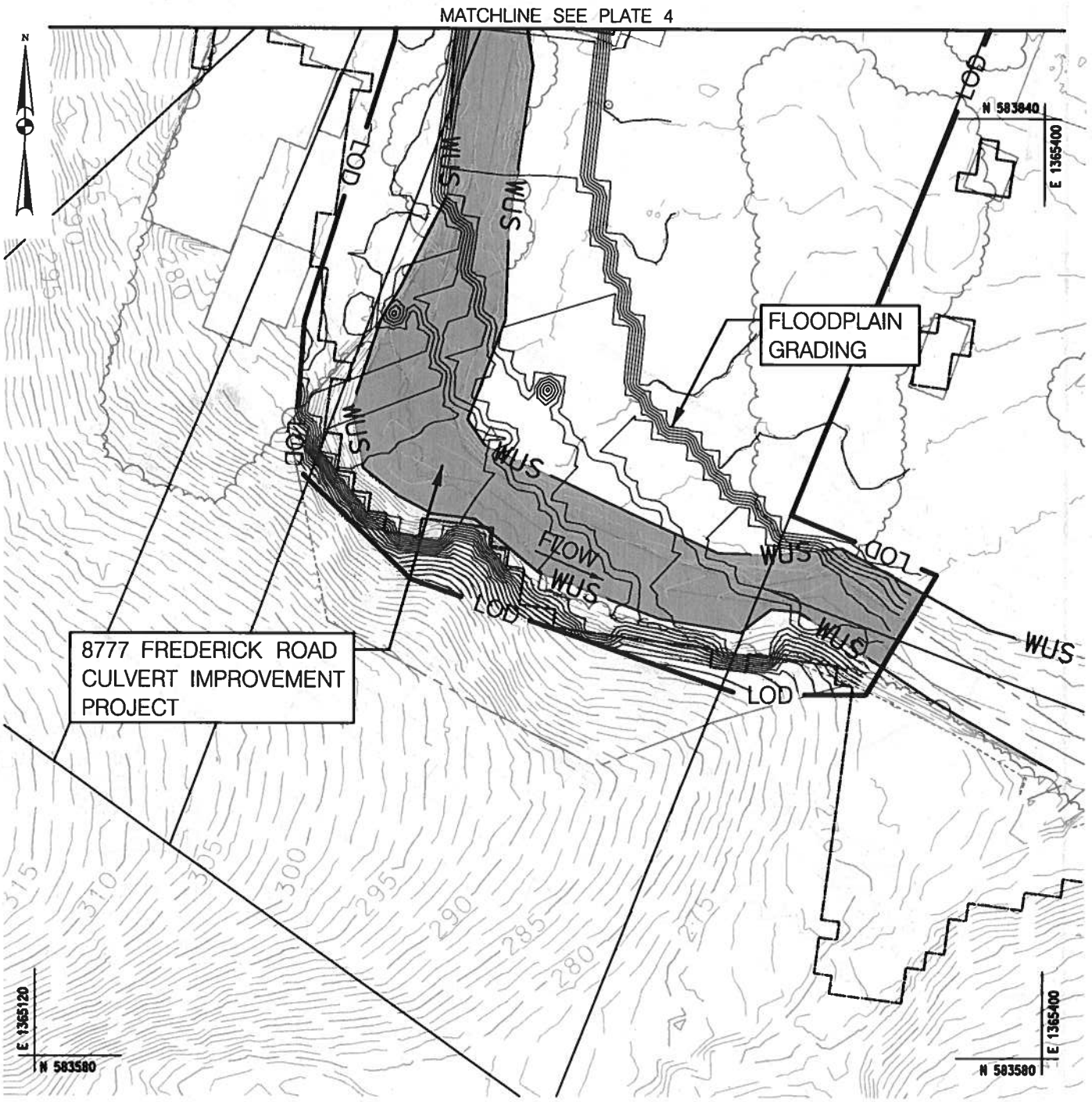

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	266	0	6,340

FLOODPLAIN IMPACTS
PERM. (SF)
17,995

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40'	DATE: SEPTEMBER, 2019	PLATE 5 of 16

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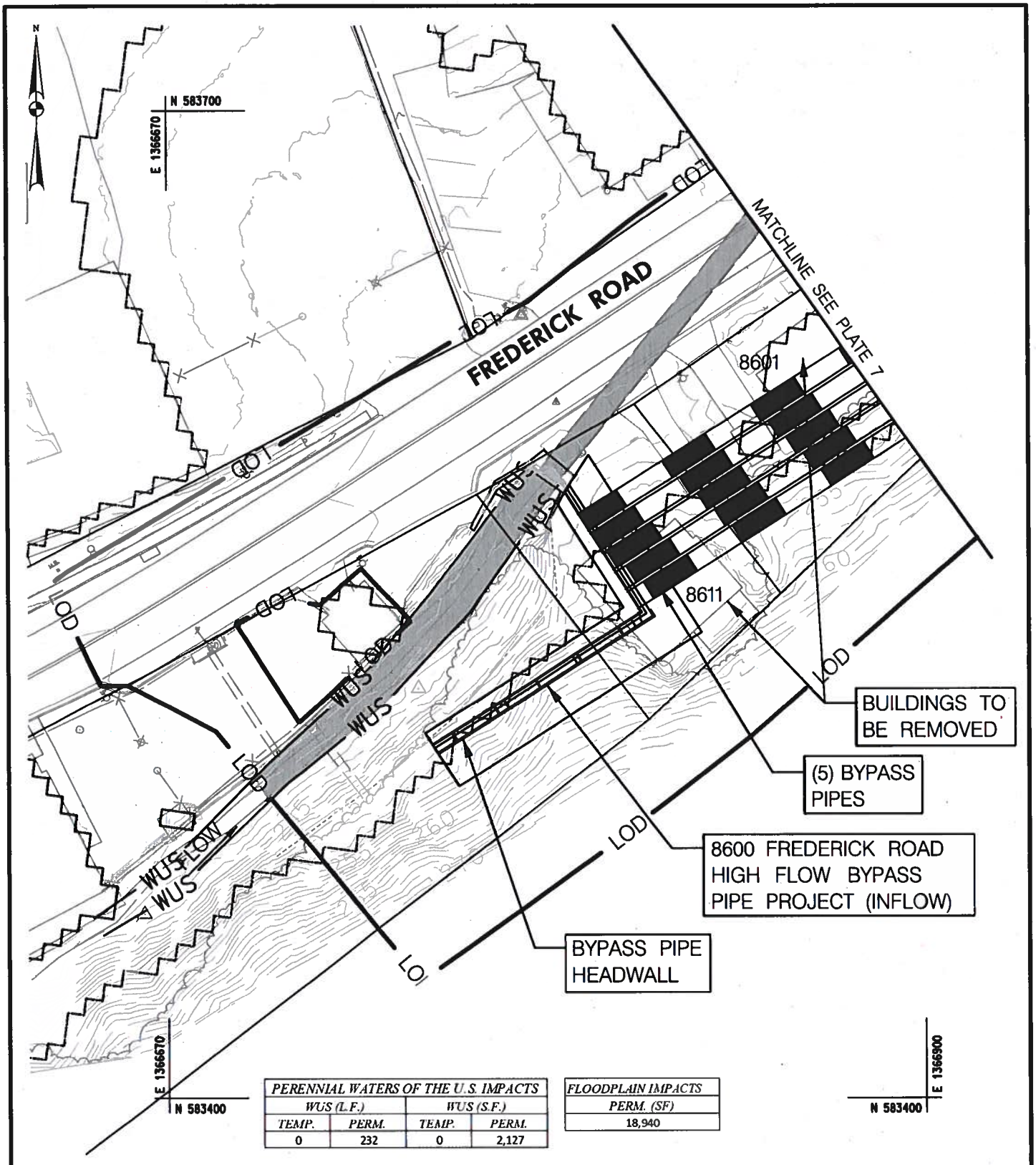

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	232	0	2,127

FLOODPLAIN IMPACTS
PERM. (SF)
18,940

Howard County
MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY
SAFE AND SOUND PLAN
FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40'	DATE: SEPTEMBER, 2019	PLATE 6 of 16

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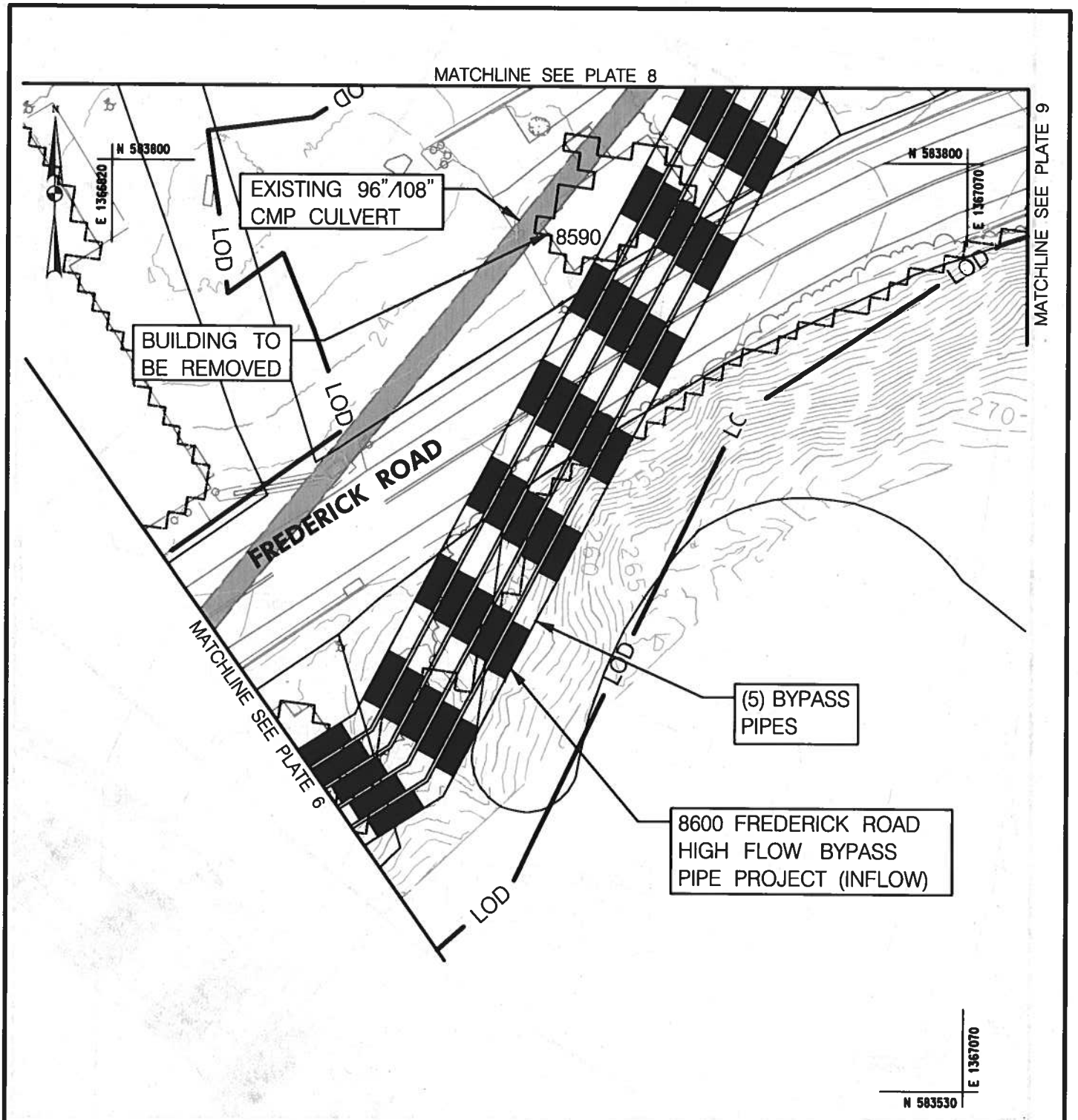

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	202	0	1,406

FLOODPLAIN IMPACTS
PERM. (SF)
24,299

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: SEPTEMBER, 2019 | PLATE 7 of 16

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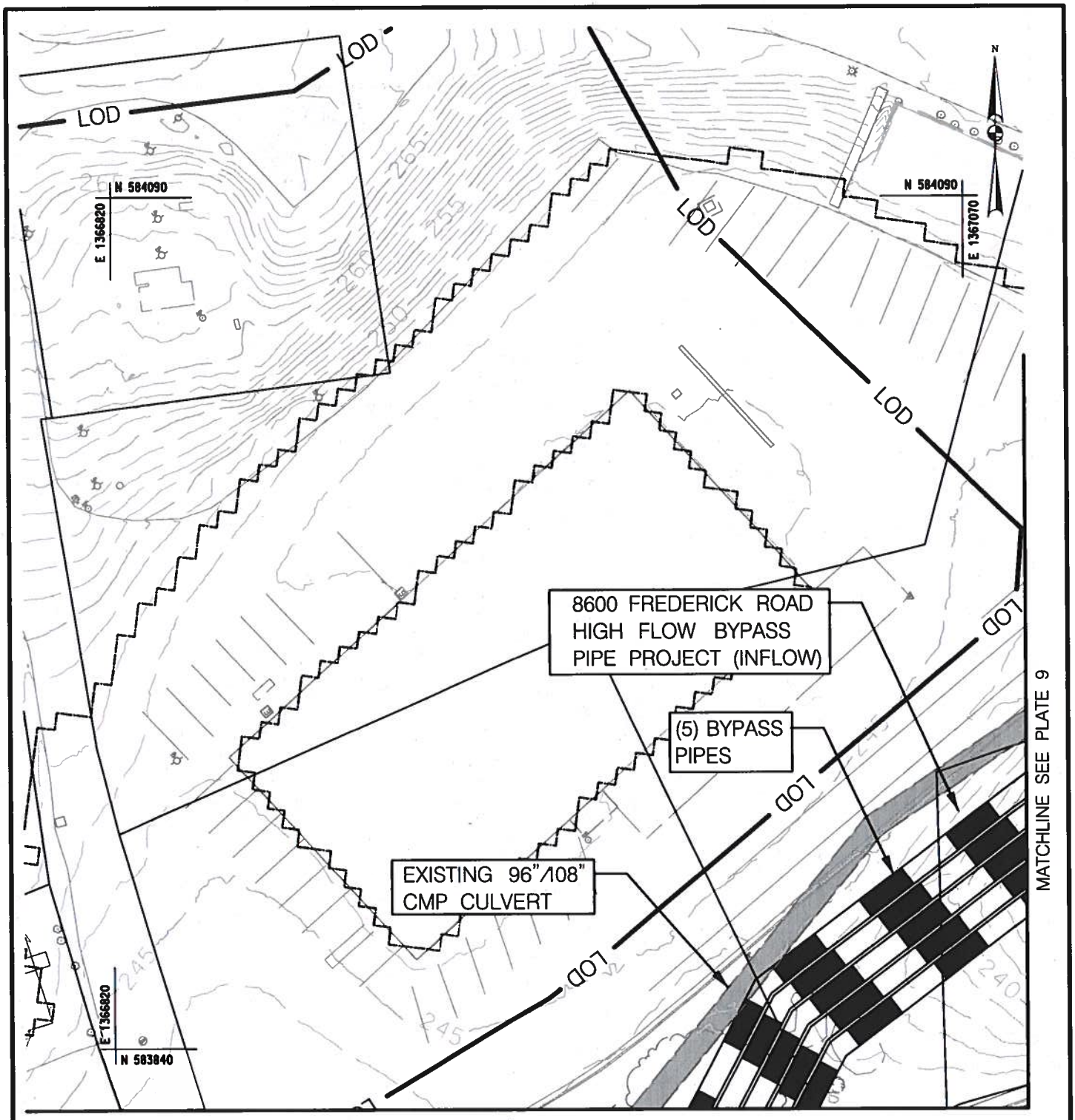

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	162	0	1,127

FLOODPLAIN IMPACTS
PERM. (SF)
17,407

Howard County
MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: SEPTEMBER, 2019 | PLATE 8 of 16

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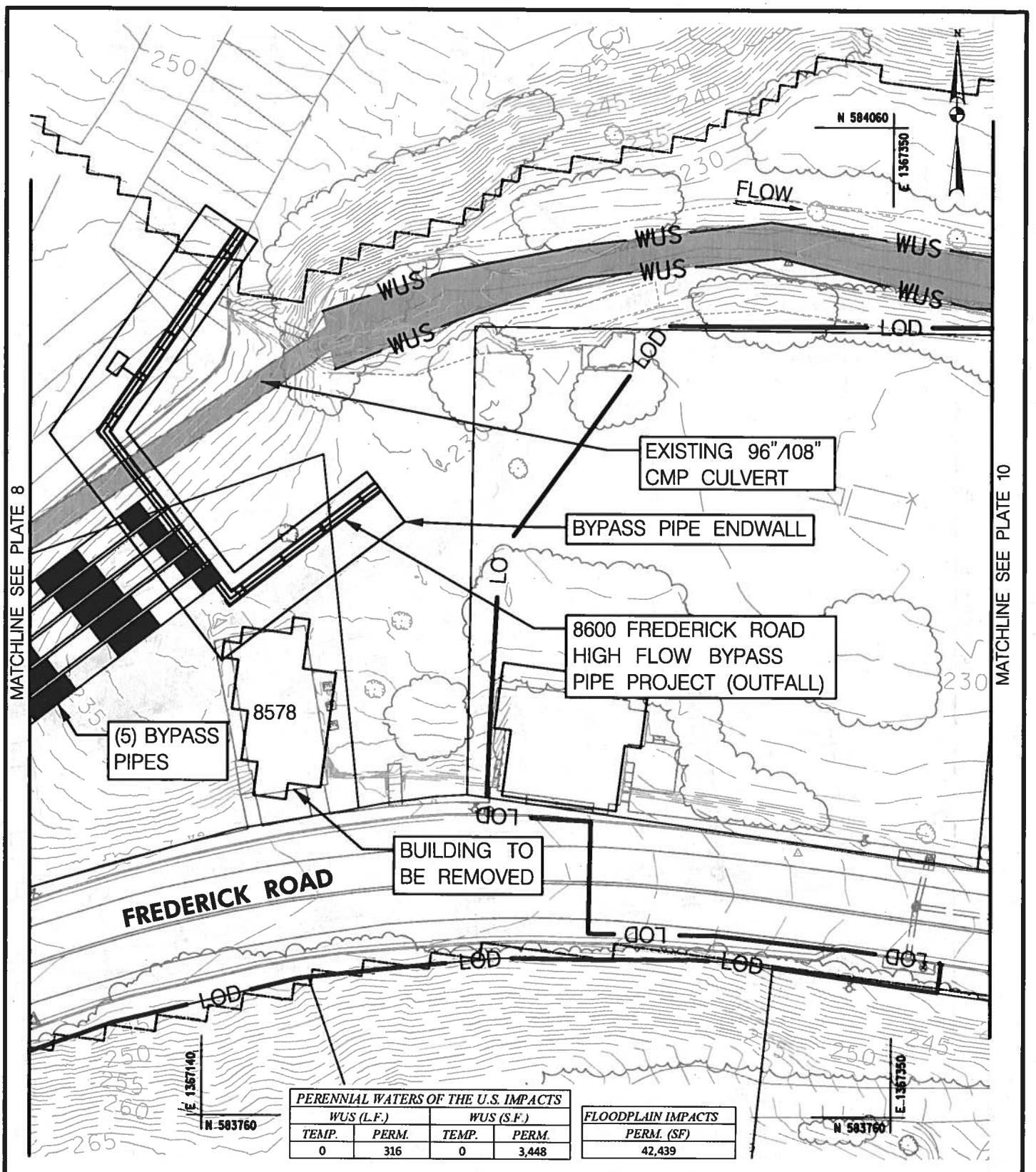

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	316	0	3,448

FLOODPLAIN IMPACTS
PERM. (SF)
42,439

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY
SAFE AND SOUND PLAN
FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40'	DATE: SEPTEMBER, 2019	PLATE 9 of 16

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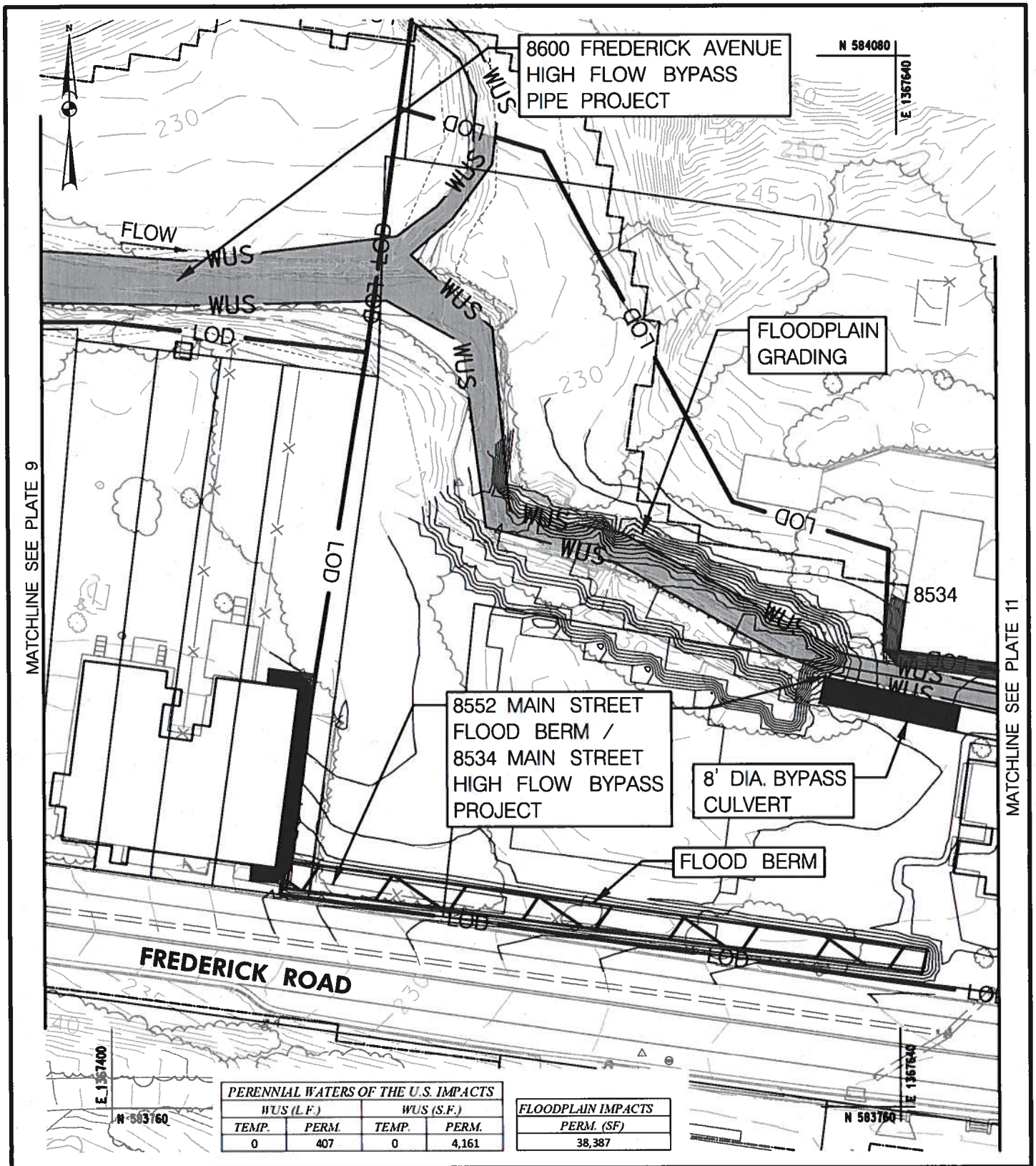

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	407	0	4,161

FLOODPLAIN IMPACTS
PERM. (SF)
38,387

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY
SAFE AND SOUND PLAN
FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40'	DATE: SEPTEMBER, 2019	PLATE 10 of 16

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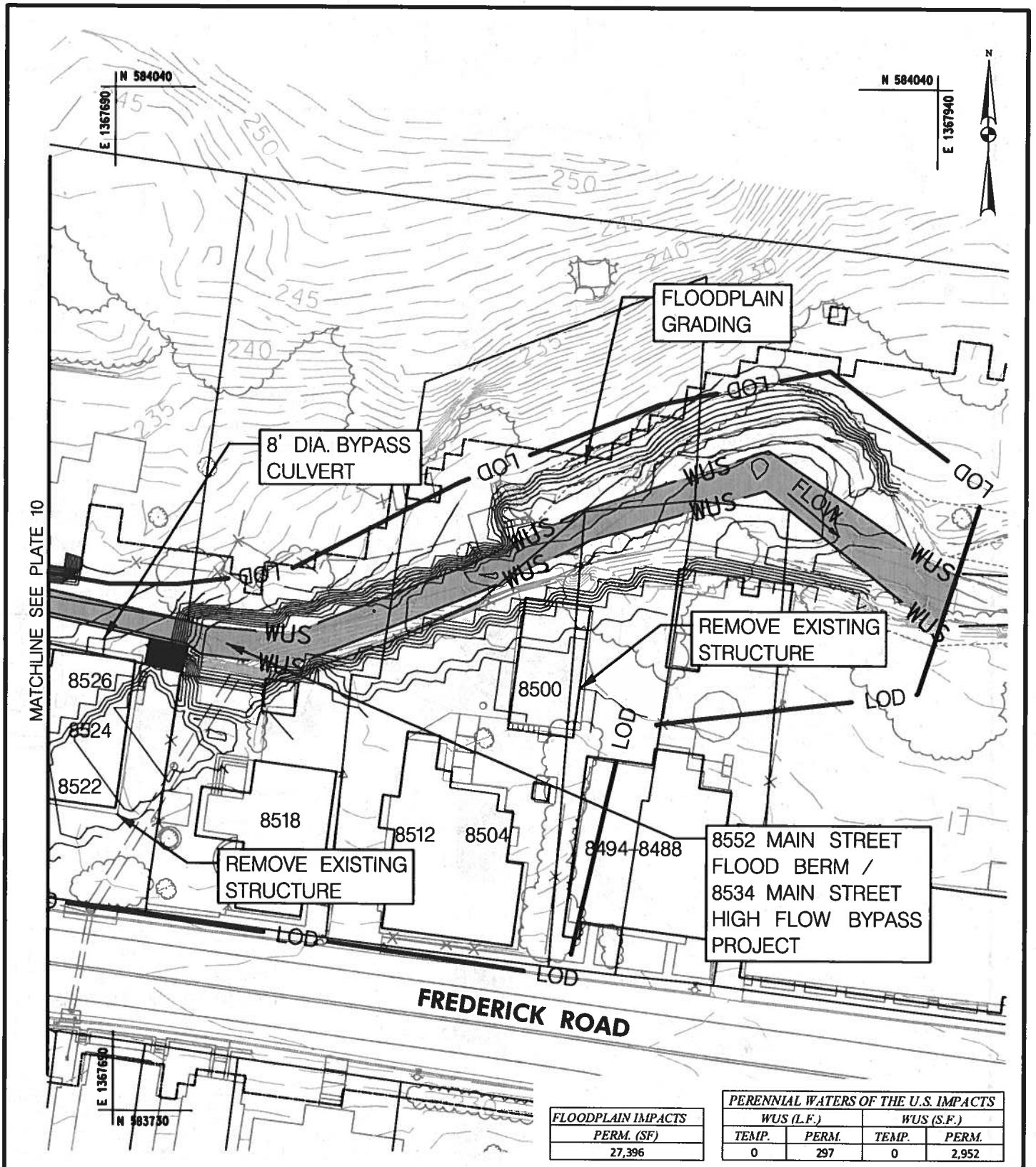

FLOODPLAIN IMPACTS	
PERM. (SF)	
27,396	

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	297	0	2,952

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40' | DATE: SEPTEMBER, 2019 | PLATE 11 of 16

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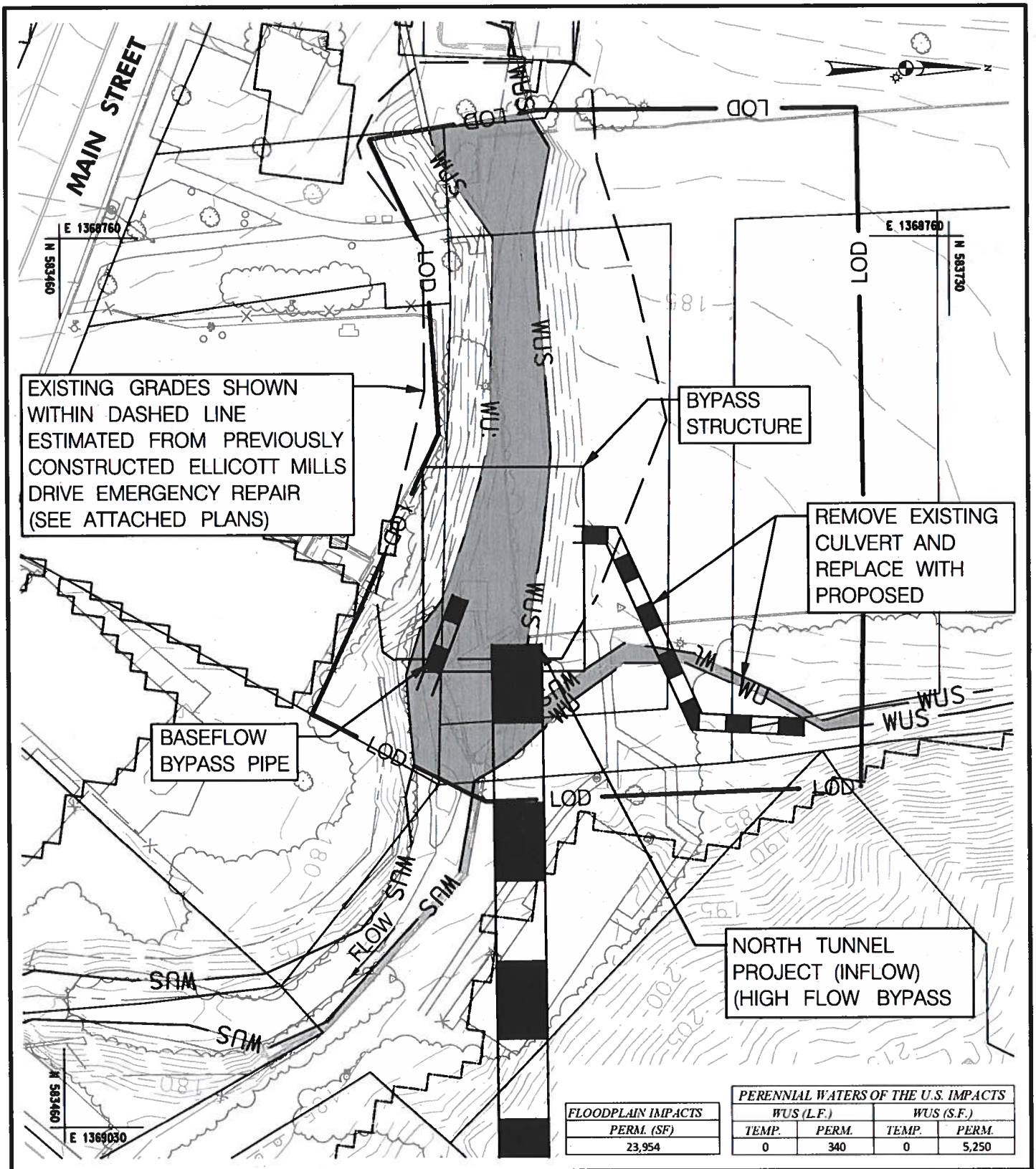

FLOODPLAIN IMPACTS	PERENNIAL WATERS OF THE U.S. IMPACTS			
	WUS (L.F.)		WUS (S.F.)	
PERM. (SF)	TEMP.	PERM.	TEMP.	PERM.
23,954	0	340	0	5,250

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40'	DATE: SEPTEMBER, 2019	PLATE 12 of 16

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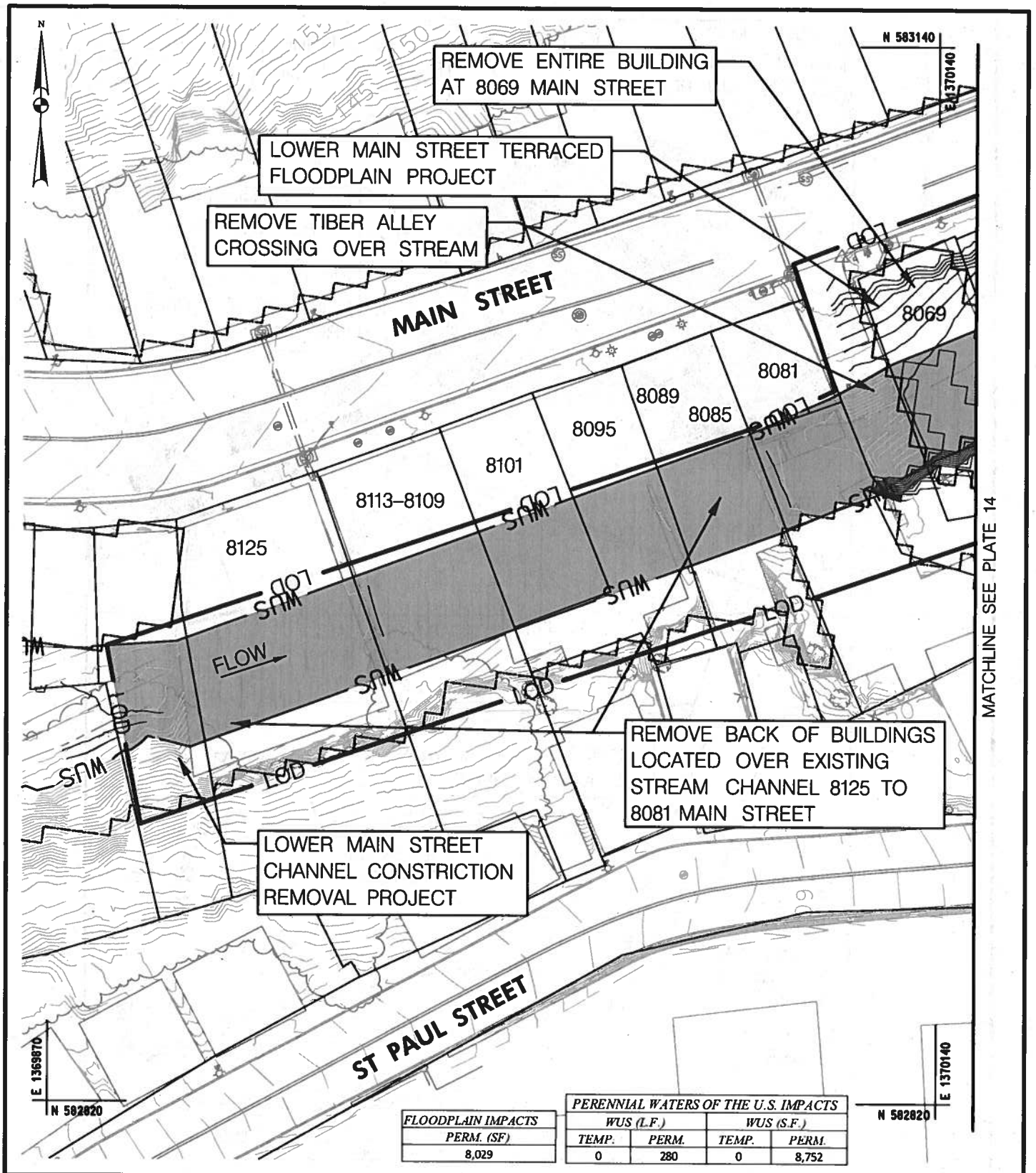

FLOODPLAIN IMPACTS	PERENNIAL WATERS OF THE U.S. IMPACTS			
	WUS (L.F.)		WUS (S.F.)	
PERM. (SF)	TEMP.	PERM.	TEMP.	PERM.
8,029	0	280	0	8,752

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40'	DATE: SEPTEMBER, 2019	PLATE 13 of 16

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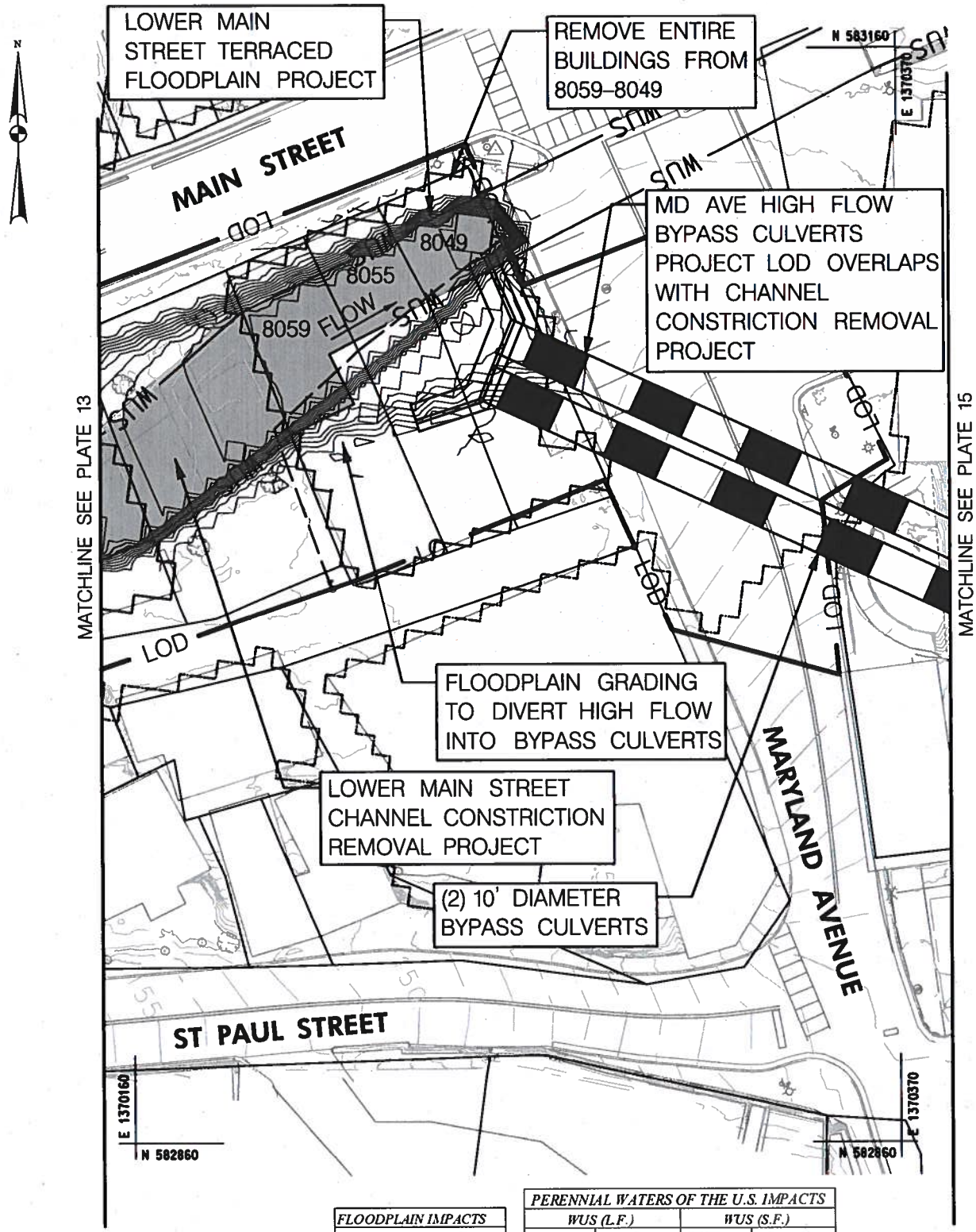

FLOODPLAIN IMPACTS	
PERM. (SF)	
15,736	

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	136	0	3,671

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40'	DATE: SEPTEMBER, 2019	PLATE 14 of 16

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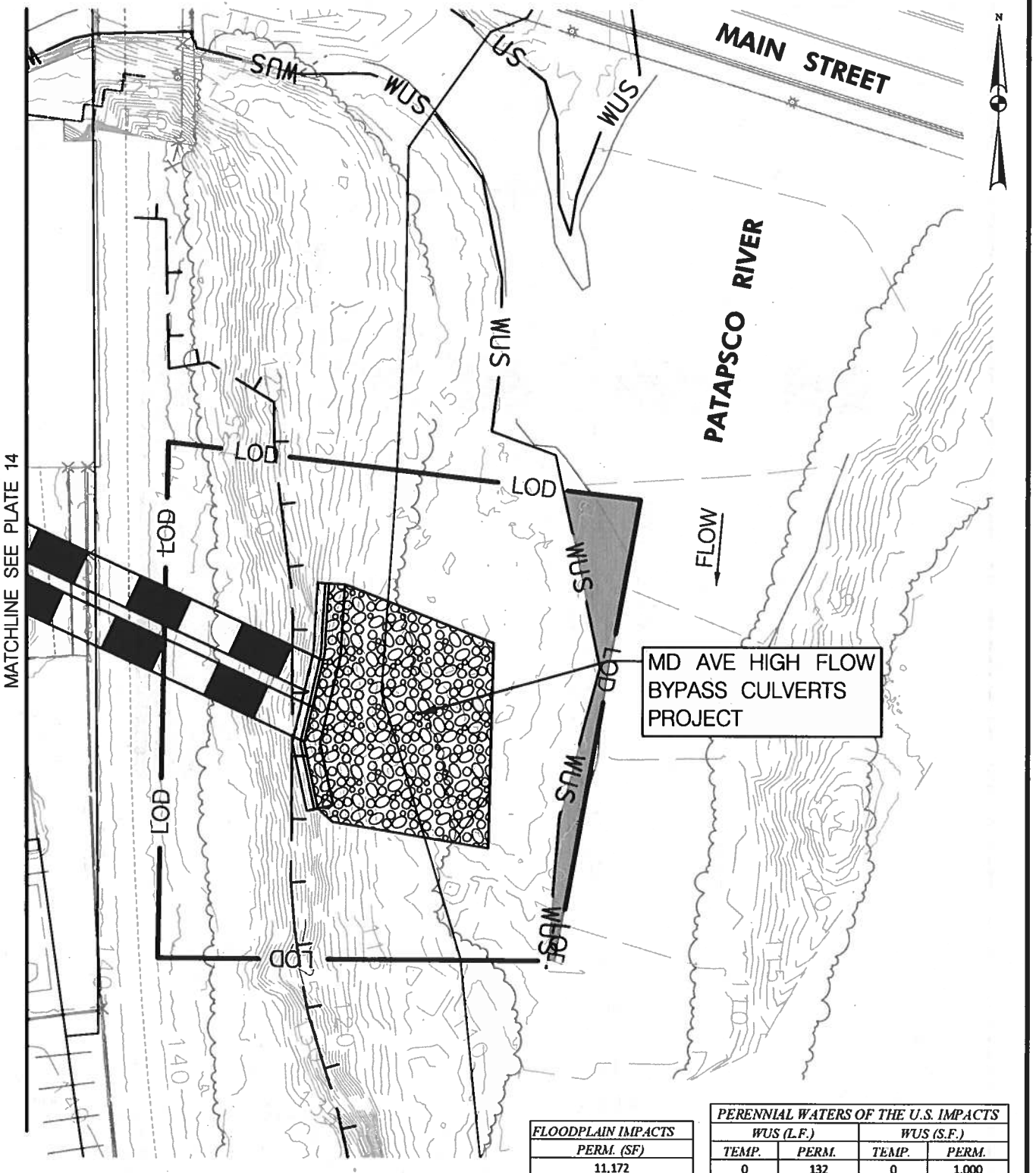

FLOODPLAIN IMPACTS	
PERM. (SF)	
11,172	

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	132	0	1,000

Howard County
MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: SEPTEMBER, 2019 | PLATE 15 of 16

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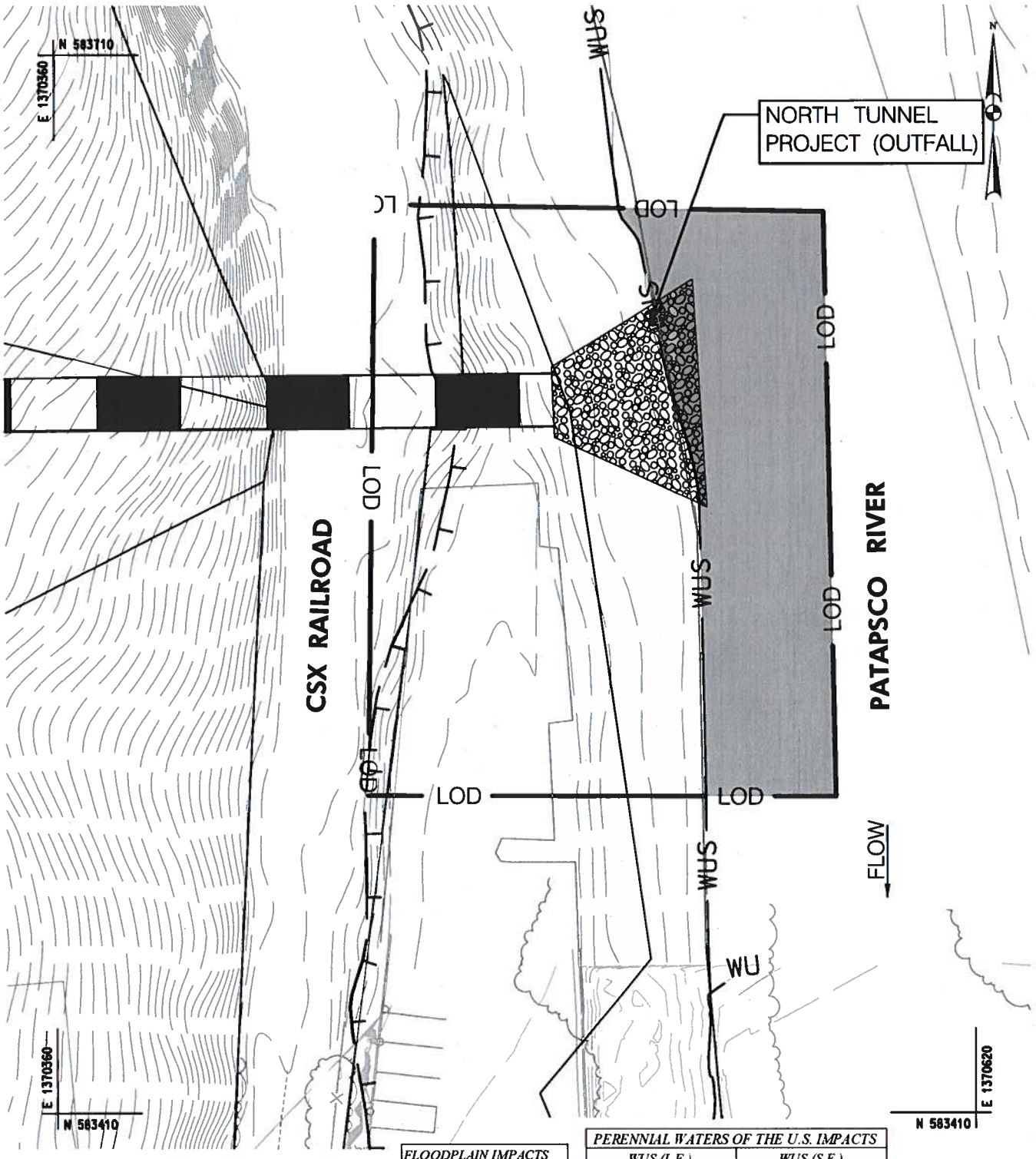

FLOODPLAIN IMPACTS
PERM. (SF)
12,620

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	165	0	6,863

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: SEPTEMBER, 2019 | PLATE 16 of 16

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Attachment B

Wetland Delineation/Natural Resources Inventory Reports

- **Ellicott City Overall Mitigation Project Wetland Delineation Report**
  - 8777 Frederick Road Culvert Improvement Project
  - 8552 Main Street Flood Berm/8534 Main Street High Flow Bypass Pipe Project
  - North Tunnel Project
  - Lower Main Street Channel Constriction Removal Project
  - Maryland Avenue High Flow Bypass Culverts Project
  - Lower Main Street Terraced Floodplain Project
- **8600 Main Street Culvert and Drainage Enhancement Project Natural Resources Inventory**
  - 8600 Frederick Road High Flow Bypass Pipe Project

Ellicott City- Overall Mitigation Project
Wetland Delineation Report

Howard County
MARYLAND

Howard County Government
Storm Water Management Division
Bureau of Environmental Services
6741 Columbia Gateway Drive, Suite 514
Columbia, Maryland 21046

Prepared by:

McCORMICK TAYLOR

509 South Exeter Street, 4th Floor
Baltimore, Maryland 21202
(410) 662-7400

September 2019

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2.0 BACKGROUND AND EXISTING CONDITIONS 1
2.1 TOPOGRAPHY, GEOLOGY, AND SOILS 2
2.2 HYDROLOGY 2
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3.0 FIELD INVESTIGATION 3
3.1 METHODS 3
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Tables

TABLE 1: SOILS WITHIN THE STUDY AREA 2

Appendices

Appendix A - Figures
Figure 1: Project Location Map
Figure 2: FEMA Flood Insurance Rate Map (FIRM)
Appendix B - Wetland Delineation Map
Appendix C - Data Sheets

1.0 INTRODUCTION

The Howard County Government's Storm Water Management Division is proposing seven projects for improving conveyance for large storm events and reducing flooding along Lower Main Street, in downtown Ellicott City, MD (***Appendix A, Figure 1***). The proposed work includes floodplain grading, construction of enlarged conveyance structures and additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity.

As part of these design efforts, McCormick Taylor, Inc. (MT) conducted a wetland delineation investigation, within several study areas, to cover all project locations (***Figure 1***). The wetland delineation was completed in compliance with Section 404 of the Clean Water Act, the Nontidal Wetlands Protection Act, the methods recommended in the *U.S. Army Corps of Engineers Wetlands Delineation Manual, Y-87-1* (USACE 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE 2012). The proposed watercourse boundaries shown on the Wetland Delineation Map (***Appendix B***) are not to be considered final unless a jurisdictional determination has been confirmed by the U.S. Army Corps of Engineers (USACE) and the Maryland Department of the Environment (MDE).

Regulatory guidance requires that impacts to jurisdictional streams and wetlands be avoided or minimized to the greatest extent possible, and that any development activity that will affect said streams and/or wetlands will require permitting from the USACE under Sections 401 and 404 of the Clean Water Act and from the MDE under COMAR 26.23 (Nontidal wetlands) and 26.17 (Water Management).

2.0 BACKGROUND AND EXISTING CONDITIONS

The study area falls within the Northern Piedmont Major Land Resource Area (MLRA 148) of the Land Resource Region (LRR) S, as recognized by the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS). Land use within the vicinity of the study area is residential and commercial, with interspersed forested upland/riparian areas.

Prior to field reconnaissance, research was conducted on existing environmental conditions within the study area. Documents reviewed included the USGS 7.5 minute topographic map for the Ellicott City Quadrangle, the soil map from the NRCS National Cooperative Soil Survey of Howard County (***Appendix B***), the U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory and Maryland Department of Natural Resources (NWI/MDNR) wetland maps (***Appendix B***), and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Mapping (***Appendix A, Figure 2***).

2.1 TOPOGRAPHY, GEOLOGY, AND SOILS

Topography and Geology

The study area is located in the Hampstead Upland district of the Upper Patapsco River Gorge Region in the Piedmont Plateau Physiographic Province. The Hampstead Upland district is characterized by rolling to hilly uplands interrupted by steep-walled gorges (Maryland Geological Survey, 2008). Elevations in the study area range from approximately 110 to 280 feet (***Appendix B***).

Soils

Two soil types occur within the study area, one of which is described as being predominantly non-hydric. The soils/series types identified within the study area are displayed on the mapping in ***Figure 2***. **Table 1** lists the soil mapping units, their hydric rating, and a detailed description of each soil series.

TABLE 1: SOILS WITHIN THE STUDY AREA
(Web Soil Survey, Howard County, Maryland)

SOIL SERIES (SYMBOL)	SLOPE	DESCRIPTION	HYDRIC RATING
Codorus and Hatboro silt loams (Co)	0-3%	Codorus and Hatboro silt loams are poorly drained soils typically associated with drainageways or swales. The depth to the water table is about 0 to 10 inches and hydraulic conductivity ranges from 0.06 to 0.20 in/hr. Available water storage in the profile is approximately 10.4 inches and it has a low runoff class. This soil is frequently flooded and is not ponded.	Predominantly Non-Hydric (35%)
Manor-Bannertown sandy loams (MgF)	25-65%	Manor-Bannertown sandy loams are moderately sloped, well-drained soils typically located on hillslopes and ridges. The depth to the water table is more than 80 inches and the hydraulic conductivity ranges from 0.57 to 1.98 in/hr. Available water storage in the profile is approximately 8.8 inches and it has a high runoff class. This soil is not flooded or ponded.	Not Hydric (0%)

2.2 HYDROLOGY

The study area is within the Maryland 8-Digit Patapsco River Lower North Branch (02130906), which is part of the Upper Chesapeake Basin (HUC 020600). Unnamed tributaries to the Patapsco River are considered Use I streams (Water Contact Recreation, and Protection of Aquatic Life). Instream work is not permitted within the unnamed tributaries to the Patapsco River during the period of March 1 through June 15, inclusive, during any year.

2.3 NWI WETLANDS AND FLOODPLAINS

The NWI/MDNR mapping identified two potential streams within the study areas (***Appendix B***). NWI wetland identification is typically based on stereoscopic analysis of black and white high-altitude aerial photographs (1:80,000) and mapped at a scale of 1"=2000'. This high altitude identification requires field verification of wetland locations and extents.

A review of the FEMA floodplain map (FIRM No. 24027C0095D, effective November 6, 2013) indicates that the study areas are within the 100-year floodplain (***Appendix A, Figure 2***).

3.0 FIELD INVESTIGATION

MT conducted a wetland delineation investigation of the study areas on September 13, 2018, August 14, 2019 and August 22, 2019; the results of which follow.

3.1 METHODS

A team of environmental scientists delineated all potentially jurisdictional features in the study area. The applicable data form (Routine Wetland Determination Data Form or a Waters of the US [WUS] Data Sheet) was completed for each delineated feature (***Appendix B***). Survey was then used to establish the left and right banks of watercourse features. All identified wetlands and watercourses were classified using the Cowardin Classification System according to *A Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Watercourses were also classified in accordance with the June 5, 2007 joint guidance issued by the U.S. Environmental Protection Agency and USACE following the U.S. Supreme Court's decision in the consolidated cases *Rapanos v. United States* and *Carabell v. United States* (Rapanos).

The wetland delineation was completed in accordance with the *U.S. Army Corps of Engineers Wetlands Delineation Manual, Y-87-I* (USACE 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE 2012). This approach is based on three parameters including hydrophytic vegetation, hydric soils, and wetland hydrology. Vegetation was identified to species and indicator status was determined using the associations given in *The National Wetland Plant List* (Lichvar et al. 2016). Soil color descriptions were made using a *Munsell Soil Color Chart* (Munsell ® Color 2009).

No wetlands were found within the study area; therefore no wetland functions/values were assessed for the project.

3.2 RESULTS

MT identified a total of four watercourses and no nontidal wetlands within study area (***Appendix B***). All of the watercourses identified are perennial. Data sheets for each watercourse as well as upland test plots can be found in ***Appendix C***.

WC1 is a perennial, relatively permanent waterway flowing year round (RPW), which enters the study area from the north and flows south continuing outside the study area. WC1 is the mainstem of the Patapsco River. The stream is described as a riverine, upper perennial, unconsolidated bottom, with a cobble gravel and sand streambed (R3UB1/2). WC1 has an average width of 100 feet and a depth of five feet. The banks are fairly stable with WC2 entering WC1 on the right bank.

Photo 1: WC1, mainstem of Patapsco River, facing downstream from Main Street

WC2 is a perennial, RPW, and is the mainstem of the Tiber-Hudson Branch. The watercourse enters the study areas from the north, approximately 900 feet west of the intersection of MD 144 (Frederick Road) and Rogers Avenue, and flows east outside of the study area to the Patapsco River. The stream is described as a riverine, upper perennial, unconsolidated bottom, with a cobble gravel and sand streambed (R3UB1/2). WC2 has an average width of 15 feet and an average depth of four feet. Average water depth during the investigation was up to one foot. The banks are moderately stable due to the presence of riprap and stone/concrete walls from past stabilization.

Photo 2: WC2, mainstem of the Tiber-Hudson Branch, facing downstream

Photo 3: WC2, mainstem of the Tiber-Hudson Branch facing downstream towards Court Avenue

WC3 is a perennial, RPW, which enters the study area from the north before entering a culvert and flowing into the Tiber-Hudson Branch (WC2). The confluence of WC3 and WC2 is located approximately 300 feet east of the intersection of MD 144 (Frederick Road) and Ellicott Mills Drive. The stream is described as a riverine, upper perennial, unconsolidated bottom, with a cobble gravel and sand streambed (R3UB1). WC3 has an average width of four feet and average water depth of three inches. Within the study area, the banks are fairly stable.

Photo 4: WC3, facing upstream at culvert and confluence of WC3 with WC2

WC4 is a perennial, relatively permanent waterway flowing year round, which enters the study area from the north before entering WC2. The watercourse is located approximately 1,100 feet west of the intersection of MD 144 (Frederick Road) and Ellicott Mills Drive. The stream is described as a riverine, upper perennial, unconsolidated bottom, with a cobble gravel and sand streambed (R3UB1/2). WC4 has an average width ranging from two to five feet and average water depth ranging from one to three inches. Within the study area, the banks are moderately stable with minor erosion upstream.

Photo 5: WC4, perennial facing upstream from confluence with WC2.

4.0 CONCLUSION

The field investigation for the Ellicott City – Overall Mitigation Project identified four perennial watercourses. As a result of the fieldwork and research conducted for this wetland and watercourse investigation, MT recommends the submittal of a Joint Permit Application for impacts to resources associated with the proposed work. All watercourse and wetland determinations are not considered final unless a jurisdictional determination has been conducted by the USACE and MDE.

5.0 REFERENCES

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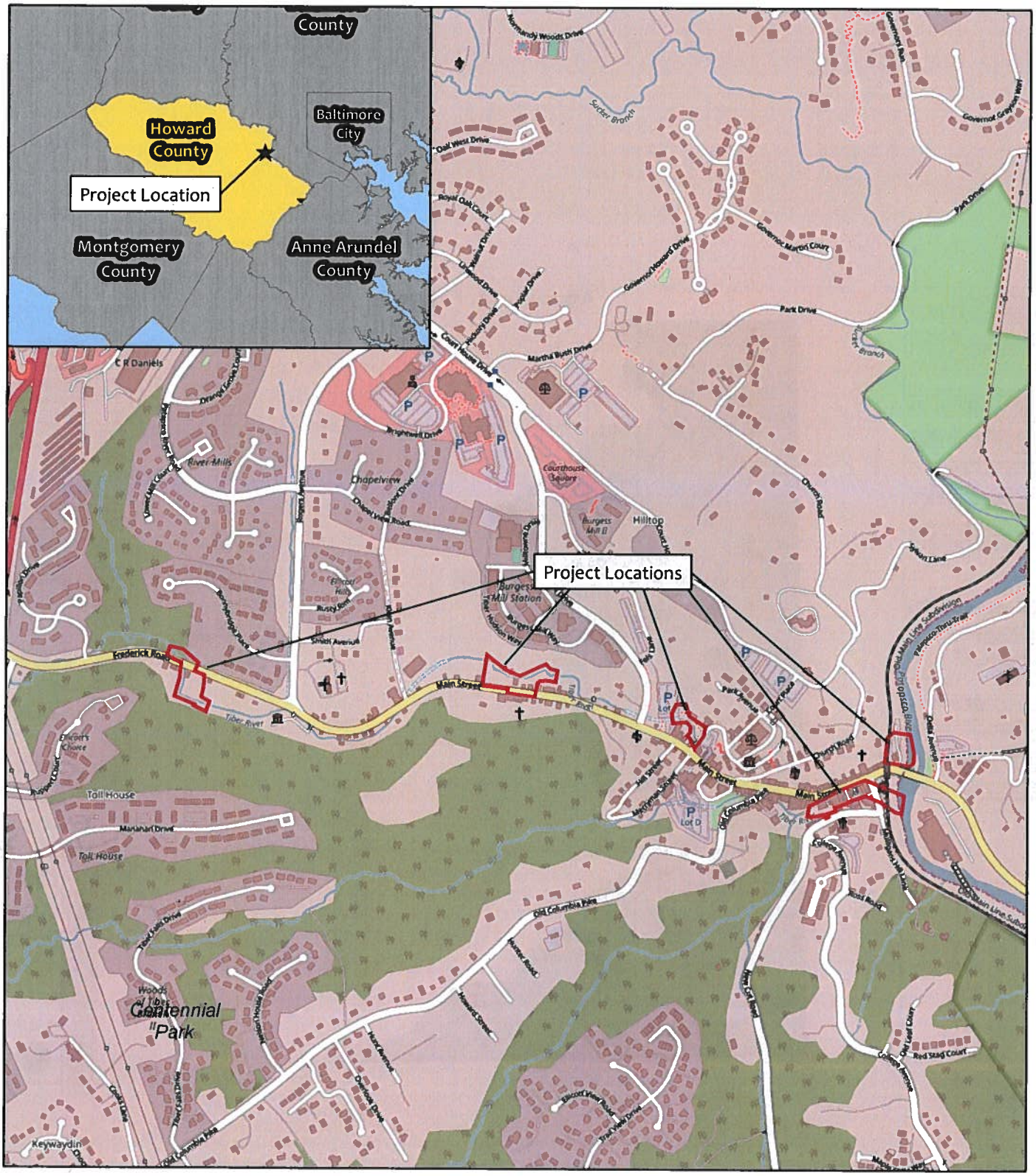
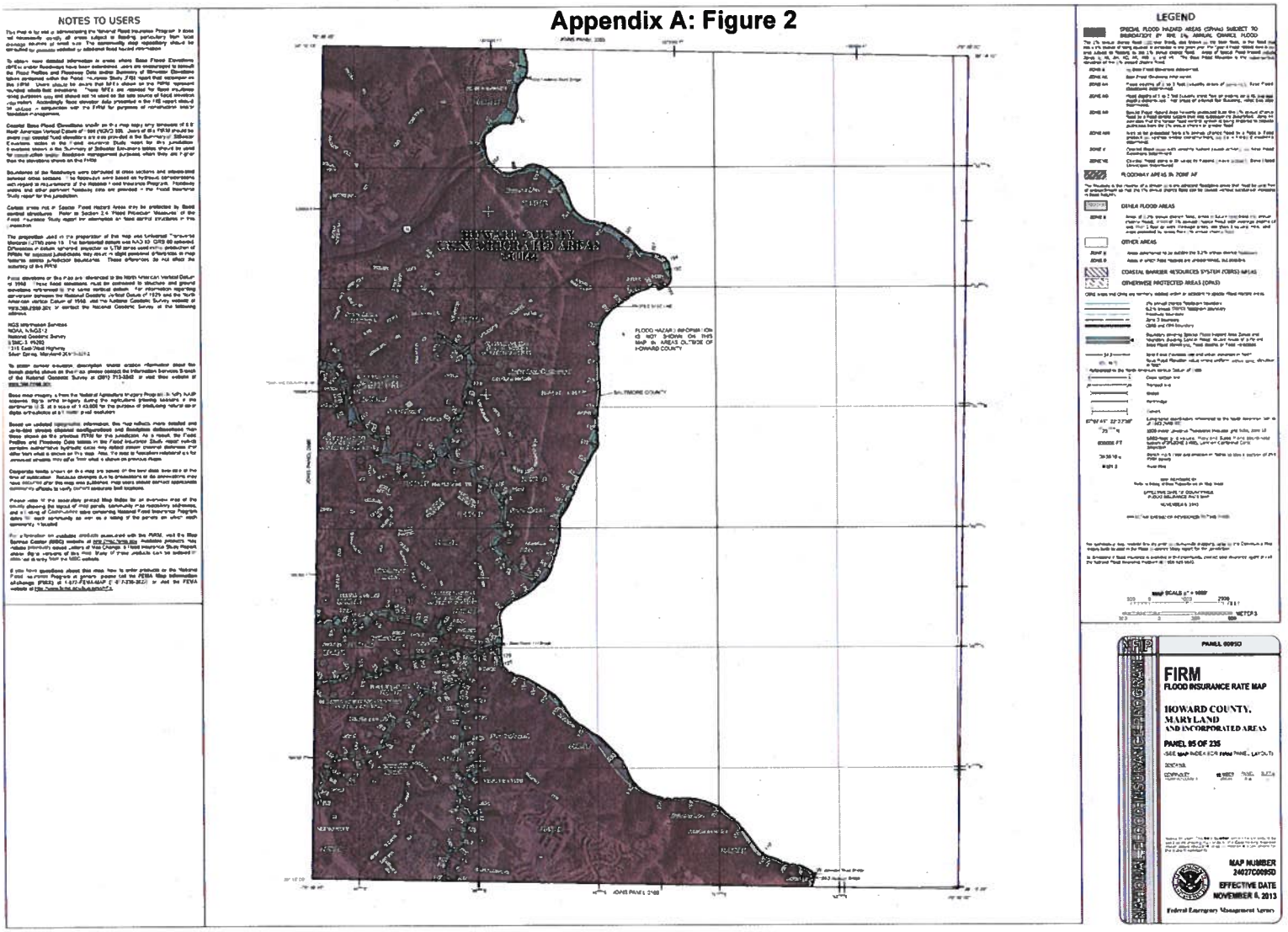
Available online at: http://www.fws.gov/wetlands/Data/Mapper.html



McCORMICK TAYLOR

Ellicott City Overall Mitigation
Appendix A
Figure 1: Project Location Map
Howard County, Maryland

Appendix A: Figure 2



NOTES TO USERS

LEGEND

FIRM
FLOOD INSURANCE RATE MAP

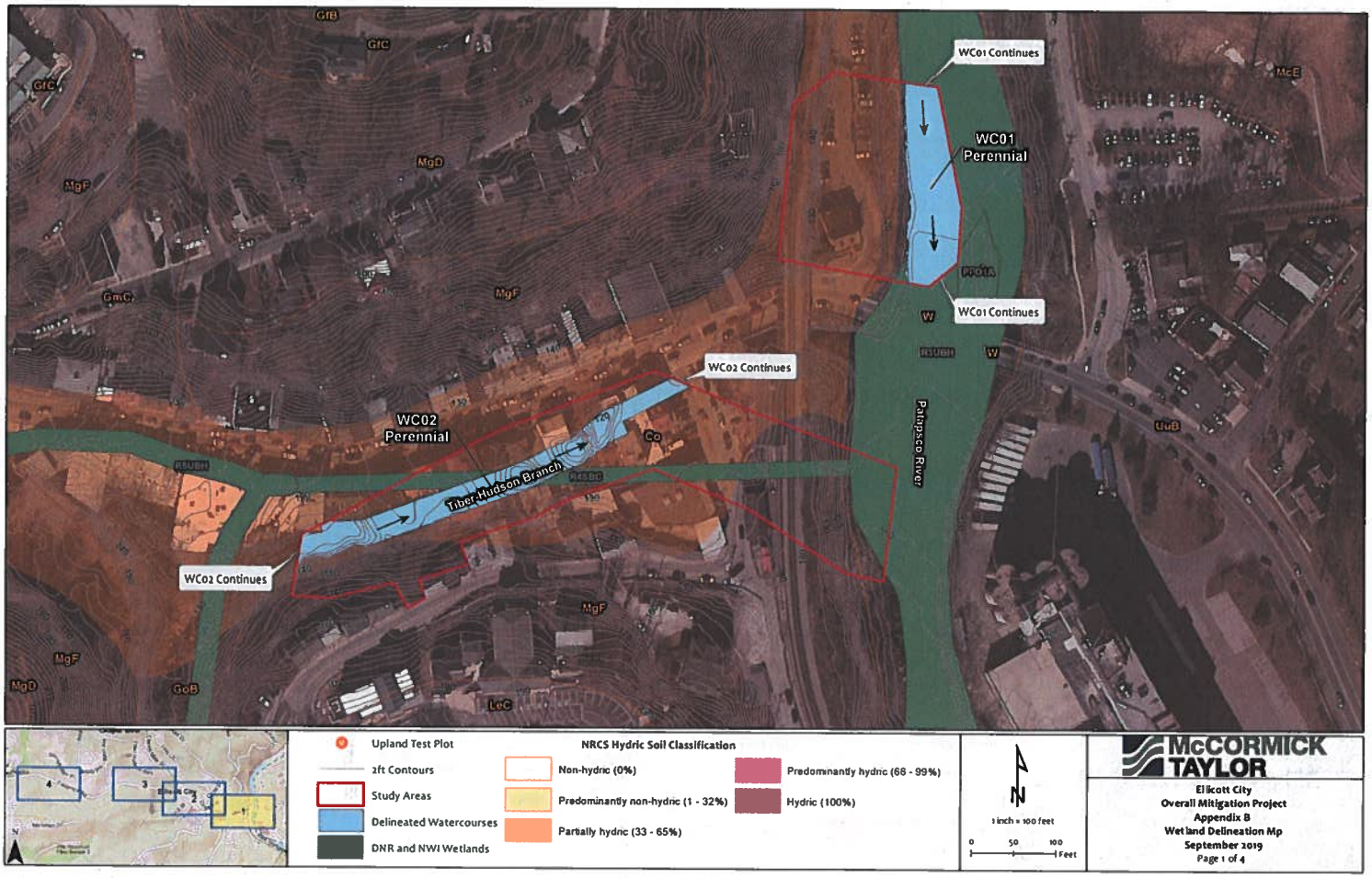
HOWARD COUNTY, MARYLAND AND INCORPORATED AREAS

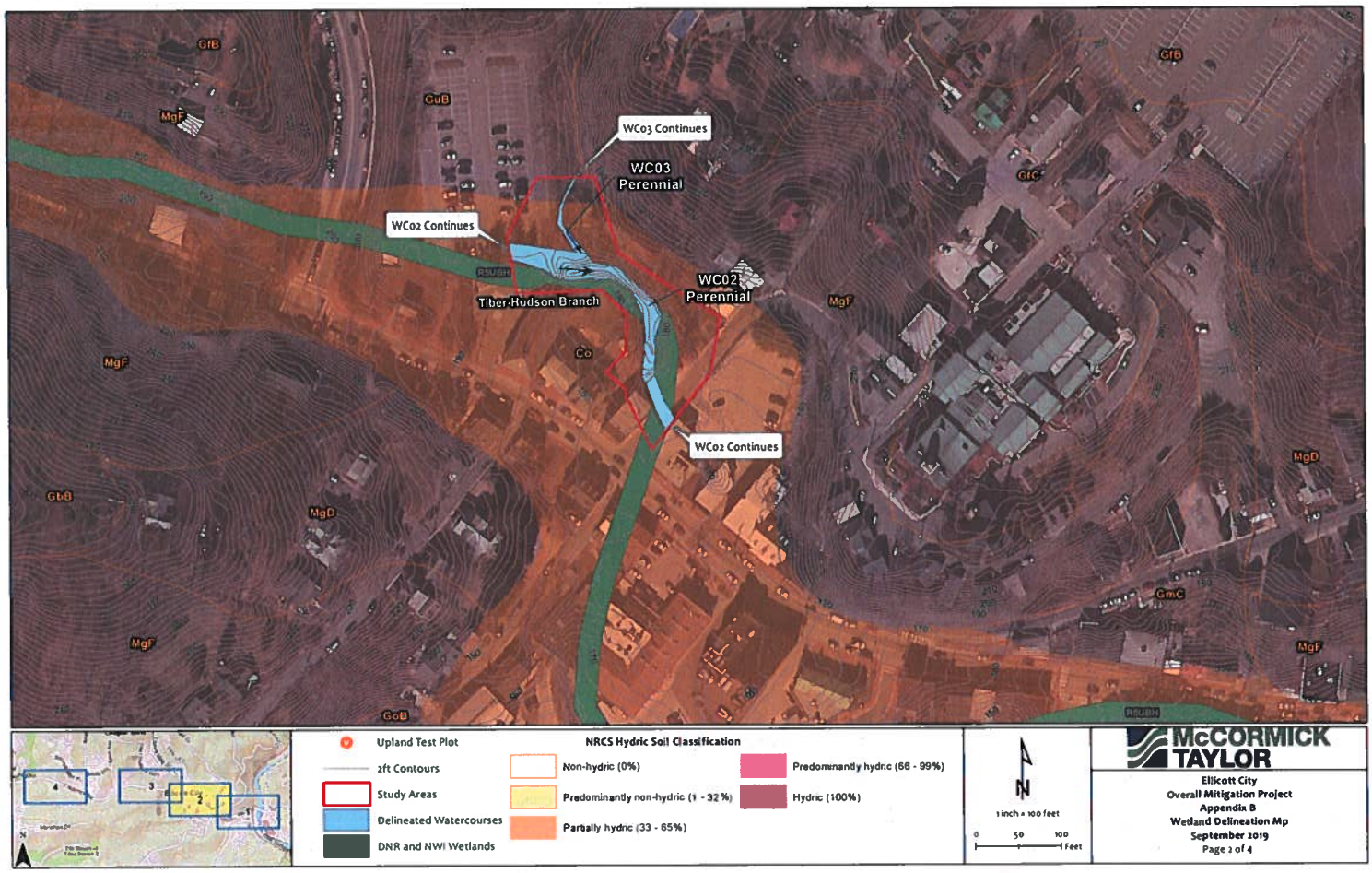
PANEL 95 OF 235

MAP NUMBER 24027C0095D

EFFECTIVE DATE NOVEMBER 6, 2013

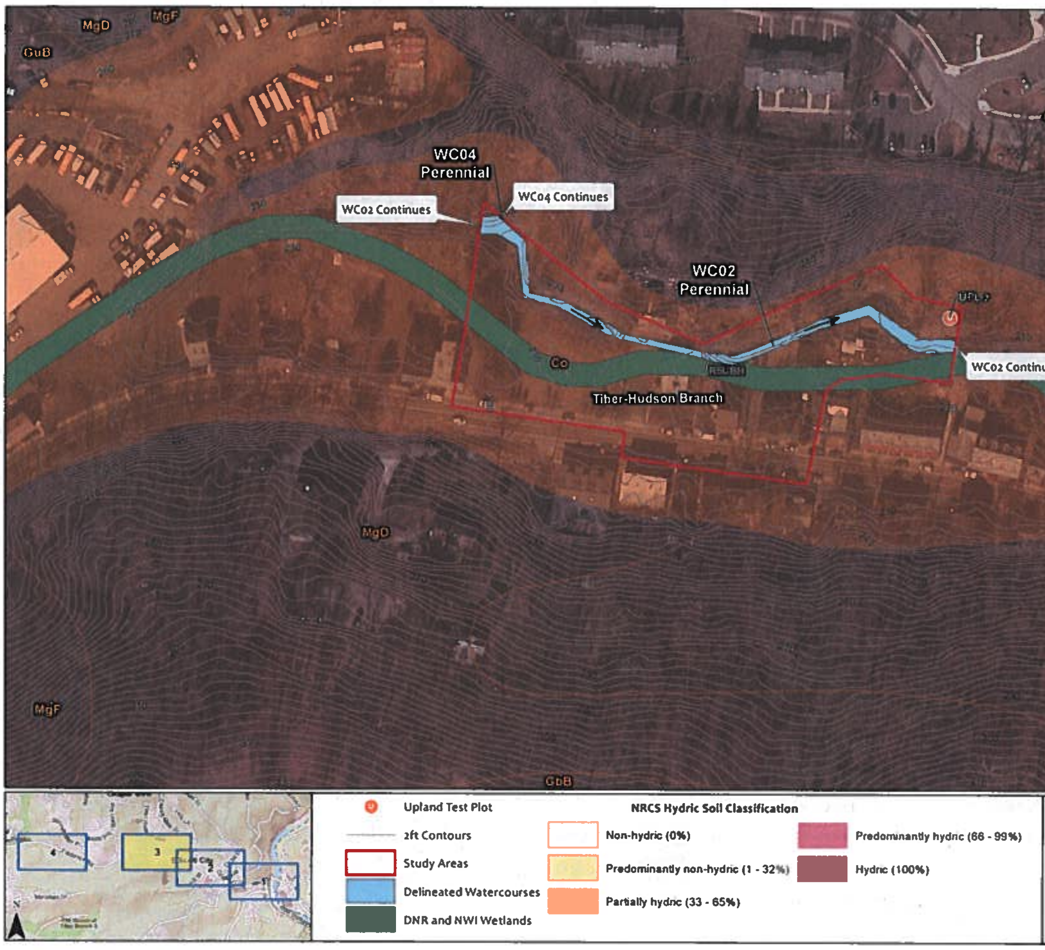
Federal Emergency Management Agency


WC01 Continues
WC01
Perennial
WC01 Continues
WC02 Continues
WC02
Perennial
Tiber-Hudson Branch
WC02 Continues
Patapsco River
GfB
GfC
MgD
MgF
GmC
Co
LuB
McE
LeC
GoB
Upland Test Plot
2ft Contours
Study Areas
Delineated Watercourses
DNR and NWI Wetlands
NRCS Hydric Soil Classification
Non-hydric (0%)
Predominantly non-hydric (1 - 32%)
Partially hydric (33 - 65%)
Predominantly hydric (66 - 99%)
Hydric (100%)
1 inch = 100 feet
0 50 100 Feet
McCORMICK TAYLOR
Ellicott City
Overall Mitigation Project
Appendix B
Wetland Delineation Mp
September 2019
Page 1 of 4

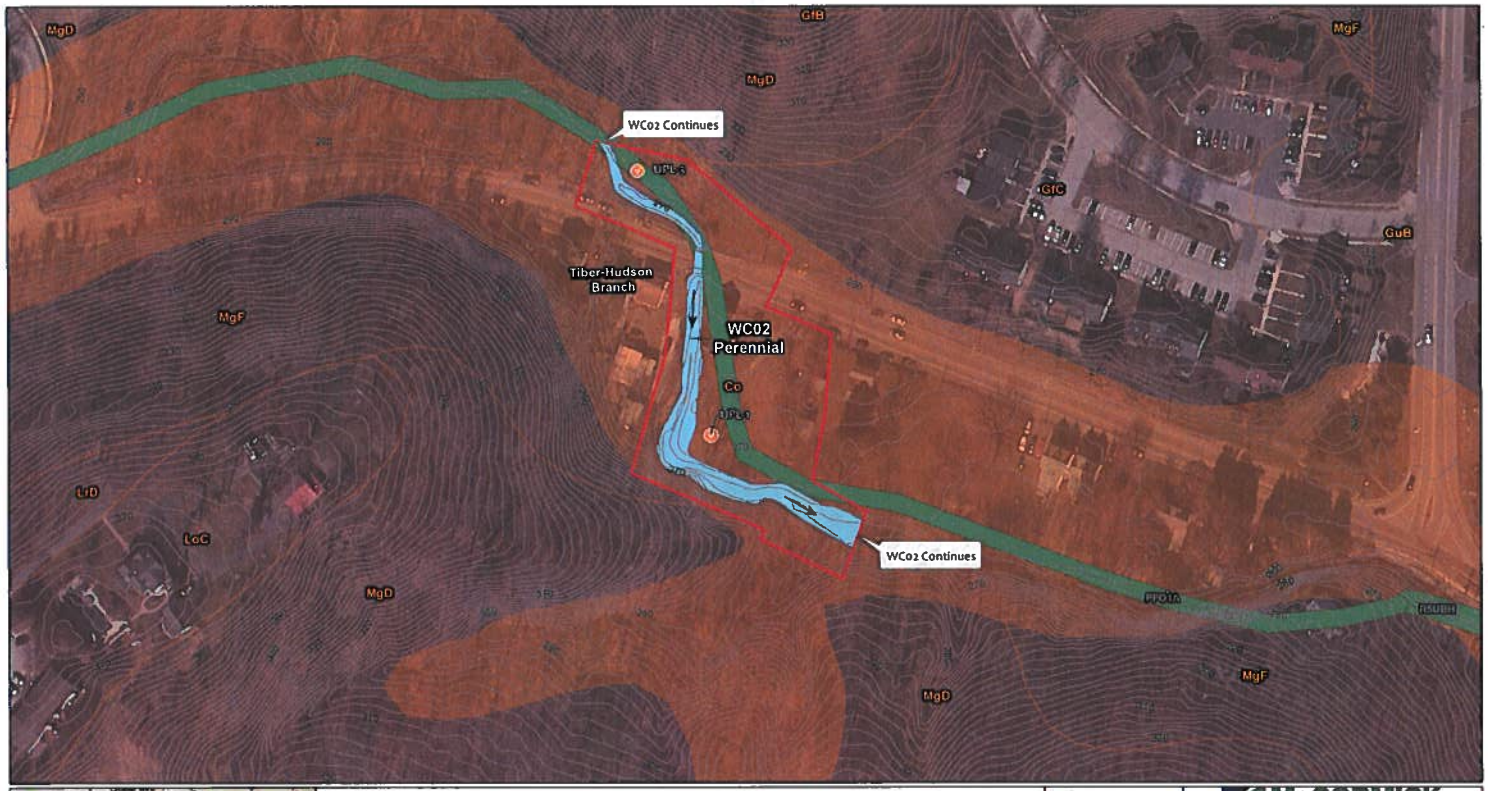


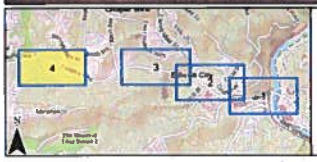
McCORMICK TAYLOR

Ellicott City
Overall Mitigation Project
Appendix B
Wetland Delineation Mp
September 2019
Page 2 of 4



Ellicott City
Overall Mitigation Project
Appendix B
Wetland Delineation Mp
September 2019
Page 3 of 4





Upland Test Plot
2ft Contours
Study Areas
Delineated Watercourses
DNR and NWI Wetlands

NRCS Hydric Soil Classification

Non-hydric (0%)
Predominantly non-hydric (1 - 32%)
Partially hydric (33 - 65%)
Predominantly hydric (66 - 99%)
Hydric (100%)

N

1 inch = 100 feet

0 50 100 Feet

McCORMICK TAYLOR

Ellicott City
Overall Mitigation Project
Appendix B
Wetland Delineation Mp
September 2019

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Ellicott City Overall Mitigation Proj City/County: Ho Co Sampling Date: 8/14/19

Applicant/Owner: Ho Co State: MD Sampling Point: UPL-1

Investigator(s): RH/AT Section, Township, Range: Old Ellicott City

Landform (hillslope, terrace, etc.): FP bench Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR S Lat: 39.269679° Long: -76.813121° Datum: Nad 83

Soil Map Unit Name: Co-Codorus and Hatboro silt loams NWI classification: U

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation Yes, Soil No, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland?	Yes ____	No ✓
Hydric Soil Present?	Yes ____	No ✓			
Wetland Hydrology Present?	Yes ✓	No ____	If yes, optional wetland site ID:		

Remarks:
In an area along bank that appears to have slumped in. Mostly a rip rap/ vegetated bench that receives storm flow and connected by water table

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): <1"	
Water Table Present?	Yes ✓	No ____	Depth (inches): ____	
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____	Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: 10% of plot has <1". watertable high - associated w/ adjacent stream

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: UPL-1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0	= Total Cover	

Herb Stratum (Plot size: 5')			
1. Muhlenbergia vimineum	15	Yes	FAC
2. Fescia arundinacea	25	Yes	OBL
3. Persicaria hydropiperoides	10	Yes	OBL
4. Arthraxon hispidus	7	No	FAC
5. Echinochloa crus-galli	5	No	FAC
6. Persicaria perfoliata	5	No	FAC
7. Setaria faberi	5	No	UPL
8. Persicaria orientalis	5	No	FACU
9. Cyperus strigosus	5	No	FACW
10. Asiatic dayflily - Commelina communis	3	No	FAC
11.			
12.			
	085	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	5	x 2 =	10
FAC species	35	x 3 =	105
FACU species	5	x 4 =	20
UPL species	5	x 5 =	25
Column Totals:	085 (A)		0195 (B)

Prevalence Index = B/A = 0229

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: UPL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/2	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Rejected at 2" at Rip Rap/ Rubble - No soil, just sediment/sand deposited.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Ellicott City Overall Mitigation Proj. City/County: Ellicott / Howard Sampling Date: 8/22/19

Applicant/Owner: Howard Co State: MD Sampling Point: UPL2

Investigator(s): EYC, AWS Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope adj. stream Local relief (concave, convex, none): None Slope (%): 25

Subregion (LRR or MLRA): LRR S Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: _____ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	Is the Sampled Area within a Wetland?	Yes _____ No X
Hydric Soil Present?	Yes _____ No X	If yes, optional wetland site ID:	N/A
Wetland Hydrology Present?	Yes _____ No X		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: UPL-2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Platanus occidentalis	40	Y	FACW
2. Juglans nigra	15	Y	FACU
3. Robinia pseudoacacia	5		FACU
4. Acer negundo	5		FAC
5.			
6.			
7.			
8.			
	40 = Total Cover		

Sapling/Shrub Stratum (Plot size:) 50% 20 20% 8			
1. Lindera benzoin	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	10 = Total Cover		

Herb Stratum (Plot size:) 50% 5 20% 2			
1. Microstegium vimineum	60	Y	FAC
2. Dicanthelium clandestinum	5		FAC
3. Persicaria pensylvanica	5		FACW
4. Persicaria punctata	2		OBL
5. Glecoma hederacea	15		FACU
6. Viola pumila	2		FACW
7. Urtica dioica	5		FACW
8.			
9.			
10.			
11.			
12.			
	89 = Total Cover		

Woody Vine Stratum (Plot size:) 50% 44.5 20% 17.8			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: 0 (A)		0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: UPL-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10 YR 3/3	100					SiL	Refusal @ 8 inches very dry

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Ellicott City Overall Mitigation Proj. City/County: Ellicott City | Howard Sampling Date: 8/22/19

Applicant/Owner: Howard Co. State: MD Sampling Point: UPL3

Investigator(s): GVC, AWS Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope, flood bench Local relief (concave, convex, none): none Slope (%): 25

Subregion (LRR or MLRA): LRR S Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: _____ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	Is the Sampled Area within a Wetland?	Yes _____ No X
Hydric Soil Present?	Yes _____ No X	If yes, optional wetland site ID:	N/A
Wetland Hydrology Present?	Yes _____ No X		

Remarks:

Small bench along perennial channel where sedimentation between boulders has allowed for veg to grow through.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (Includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: UPL3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. N/A			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0	= Total Cover	

Herb Stratum (Plot size: ≈ 5*)			
1. Persicaria perfoliata	10		FAC
2. Setaria faberi	5		UPL
3. Arthraxon hispidus	10		FAC
4. Persicaria punctata	25	Y	OBL
5. Persicaria pensylvanica	15		FACW
6. Pilea pumila	5		FACW
7. Humulus japonicus	10		FACU
8. Microstegium vimineum	40	Y	FAC
9.			
10.			
11.			
12.			
	X 120	= Total Cover	

Woody Vine Stratum (Plot size: 36) 50% 60 20% 24			
1. N/A			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 In. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

* Plot approximated to size of upland area being sampled

SOIL

Sampling Point: VP13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9"	10YR 4/4	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

Auger refusal at 9" due to large boulders.

WATERS OF THE U.S. DATA SHEET

Project: Ellicott City Overall Mittagation project		Feature ID: WC 1	Stream Order:
Date: 9-13-2018	State: MD	Photos: Multiple on tablet	
Crew: AT, GR	County: Howard	Last Flag Number: N/A Surveyed Channel	

Feature Hydrologic Class (check one):

Tidal	Perennial	Intermittent (SNE)	Ephemeral (SNE)
☐ TNW (Subject to ebb and flow)	☐ TNW – Perennial (Flowing year round)	☒ RPW – Seasonal (must flow at least 3 months a year)	☐ Non-RPW draining uplands (*not jurisdictional*)
	☒ RPW – Perennial (Flowing year round)		☐ Non-RPW erosional feature (*not jurisdictional*)
			☐ Non-RPW with abutting wetland
			☐ Non-RPW with adjacent wetland
Describe rational for hydrologic class (and nearest stream): Patapsco River			☐ Non-RPW wetland adjacent or abutting upstream (outside of study area)

Feature Description (check all that apply):

Shape (with respect to top of bank)			Substrate						Vegetation
☒	Natural Channel Shape	Channel Width and Depth: 100ft x 5 ft	☒	Silts	☒	Sands	☒	Other:	RB (& width): Soft veg ran rail road tracks
☐	Artificial (man-made)	Water Depth: 3 ft	☒	Cobbles	☐	Gravel		Riprap	LB (& width): 3ft veg riprap factory
☒	Manipulated (man-altered)	Bank Erosion/stability: moderately stable	☐	Bedrock	☐	Muck			
Notes: riprap along ~~right~~ left bank adjacent to mill/factory.									

Weather/Precipitation Conditions (check all that apply):

During Field Visit		Recent Rains (w/in one week)		Monthly Drought Condition — National Climate Data Center, Regional Palmer Drought Severity Index												
				Severe Drought			*Moderate Drought*		*Normal*			*Moderately Wet*		*Severely Wet*		
☒	No Rain	☐	0-0.5 inches	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
☐	Light Rain	☐	0.5-1 inches													
☐	Heavy Rain	☒	>1 inch											☒		

Non-tidal tributary has (check all that apply):

Bed and Banks			
☒	Yes	☐	No
Ordinary High Water Mark			
☒	Clear, natural line impressed on the bank	☒	Sediment deposition
☐	Changes in the character of soil	☐	Water staining
☐	Shelving	☒	Presence of litter and debris
☐	Vegetation matted down, bent, or absent	☐	Destruction of terrestrial veg.
☐	Leaf litter disturbed	☐	Presence of wrack line
☒	Sediment sorting	☐	Scour
☒	Observed/predicted flow events	☐	Abrupt change in plant community
☐	Other:		

Tidal tributary has (check all that apply):

High Tide Line		Mean High Water Mark indicated by:		Chemical Characteristics	
☐	Oil or scum line along shore objects	☐	Survey to available datum	☐	Water is clear
☐	Fine shell or debris deposits (foreshore)	☐	Physical markings	☐	Water is discolored
☐	Physical markings or characteristics	☐	Vegetation lines/changes in types	☐	Oily film
☐	Tidal gauges			☐	Other:
Notes:					

Additional Notes *(Riffle pools, rootwads, woody debris, aquatic life, etc.)*:

WATERS OF THE U.S. DATA SHEET

Project: Ellicott City Overall Mitigation Project		Feature ID: WC2	Stream Order: ≥ 3rd
Date: 9-13-2018	State: MD	Photos: Multiple on tablet	
Crew: AT, GR	County: Howard	Last Flag Number: N/A Surveyed Channel	

Feature Hydrologic Class (check one):

Tidal	Perennial	Intermittent (SNE)	Ephemeral (SNE)
☐ TNW (Subject to ebb and flow)	☐ TNW – Perennial (Flowing year round)	☐ RPW – Seasonal (must flow at least 3 months a year)	☐ Non-RPW draining uplands (*not jurisdictional*)
	☒ RPW – Perennial (Flowing year round)		☐ Non-RPW erosional feature (*not jurisdictional*)
			☐ Non-RPW with abutting wetland
			☐ Non-RPW with adjacent wetland
Describe rational for hydrologic class (and nearest stream): Tiber-Hudson Branch			☐ Non-RPW wetland adjacent or abutting upstream (outside of study area)

Feature Description (check all that apply):

Shape (with respect to top of bank)			Substrate						Vegetation
☐	Natural Channel Shape	Channel Width and Depth: 15 ft x 4 ft	☒	Silts DS	☒	Sands DS	☒	Other: riprap	RB (& width): N/A
☐	Artificial (man-made)	Water Depth: 1 ft	☒	Cobbles DS	☒	Gravel DS			
☒	Manipulated (man-altered)	Bank Erosion/stability: Minor-moderate erosion/ moderately stable	☐	Bedrock	☐	Muck			LB (& width): N/A
Notes: Riprap & Stone/cement walls (banks) throughout									

Weather/Precipitation Conditions (check all that apply):

During Field Visit		Recent Rains (w/in one week)		Monthly Drought Condition — National Climate Data Center, Regional Palmer Drought Severity Index												
				Severe Drought			*Moderate Drought*		*Normal*			*Moderately Wet*		*Severely Wet*		
☒	No Rain	☐	0-0.5 inches	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
☐	Light Rain	☐	0.5-1 inches													
☐	Heavy Rain	☒	>1 inch											☒		

Non-tidal tributary has (check all that apply):

Bed and Banks			
☒	Yes	☐	No
Ordinary High Water Mark			
☒	Clear, natural line impressed on the bank	☒	Sediment deposition
☐	Changes in the character of soil	☐	Water staining
☐	Shelving	☒	Presence of litter and debris
☒	Vegetation matted down, bent, or absent	☒	Destruction of terrestrial veg.
☐	Leaf litter disturbed	☐	Presence of wrack line
☒	Sediment sorting	☒	Scour
☒	Observed/predicted flow events	☐	Abrupt change in plant community
☐	Other:		

Tidal tributary has (check all that apply):

High Tide Line		Mean High Water Mark indicated by:		Chemical Characteristics	
☐	Oil or scum line along shore objects	☐	Survey to available datum	☐	Water is clear
☐	Fine shell or debris deposits (foreshore)	☐	Physical markings	☐	Water is discolored
☐	Physical markings or characteristics	☐	Vegetation lines/changes in types	☐	Oily film
☐	Tidal gauges			☐	Other:
Notes:					

Additional Notes *(Riffle pools, rootwads, woody debris, aquatic life, etc.)*:

WATERS OF THE U.S. DATA SHEET

Project: Ellicott City Overall Mitigation Project		Feature ID: WC2/US of Court Ave	Stream Order: 2
Date: 8/14/19	State: MD	Photos:	
Crew: RB/AT	County: Howard	Last Flag Number:	

Feature Hydrologic Class (check one):

Tidal	Perennial	Intermittent (SNE)	Ephemeral (SNE)
☐ TNW (Subject to ebb and flow)	☐ TNW – Perennial (Flowing year round)	☐ RPW – Seasonal (must flow at least 3 months a year)	☐ Non-RPW draining uplands (*not jurisdictional*)
	☑ RPW – Perennial (Flowing year round)		☐ Non-RPW erosional feature (*not jurisdictional*)
			☐ Non-RPW with abutting wetland
			☐ Non-RPW with adjacent wetland
Describe rational for hydrologic class (and nearest stream): Tiber-Hudson Branch			☐ Non-RPW wetland adjacent or abutting upstream (outside of study area)

Feature Description (check all that apply):

Shape (with respect to top of bank)		Substrate			Vegetation
☐ Natural Channel Shape	Channel Width and Depth: 12' W / 1.5' TDR	☐ Silts	☐ Sands	☐ Other:	RB (& width): 3' grass buffer before Parking Lot
☑ Artificial (man-made)	Water Depth: 6"	☐ Cobbles	☑ Gravel		
☑ Manipulated (man-altered)	Bank Erosion/stability: Stable, under construction w/ RipRap	☐ Bedrock	☐ Muck	RipRap Class I	LB (& width): 10-15' top soil (active work zone) then parking lot
Notes: Site under active construction. Channel and Bank fully lined w/ Class I RipRap. Approx. located at confluence w/ WC3					

Weather/Precipitation Conditions (check all that apply):

During Field Visit	Recent Rains (w/in one week)	Monthly Drought Condition — National Climate Data Center, Regional Palmer Drought Severity Index												
		Severe Drought			*Moderate Drought*		*Normal*			*Moderately Wet*		*Severely Wet*		
☐ No Rain	☐ 0-0.5 inches	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
☑ Light Rain	☑ 0.5-1 inches													
☐ Heavy Rain	☐ >1 inch							☑						

Non-tidal tributary has (check all that apply):

Bed and Banks			
☑ Yes		☐ No	
Ordinary High Water Mark			
☐ Clear, natural line impressed on the bank	☑	Sediment deposition	
☐ Changes in the character of soil	☑	Water staining	
☐ Shelving	☑	Presence of litter and debris	
☐ Vegetation matted down, bent, or absent	☐	Destruction of terrestrial veg.	
☐ Leaf litter disturbed	☐	Presence of wrack line	
☑ Sediment sorting	☐	Scour	
☐ Observed/predicted flow events	☐	Abrupt change in plant community	
☐ Other: Man made fully lined w/ riprap. Recently constructed			

Tidal tributary has (check all that apply):

High Tide Line		Mean High Water Mark indicated by:		Chemical Characteristics	
☐	Oil or scum line along shore objects	☐	Survey to available datum	☐	Water is clear
☐	Fine shell or debris deposits (foreshore)	☐	Physical markings	☐	Water is discolored
☐	Physical markings or characteristics	☐	Vegetation lines/changes in types	☐	Oily film
☐	Tidal gauges			☐	Other:
Notes:					

Additional Notes ***(Riffle pools, rootwads, woody debris, aquatic life, etc.):***

WATERS OF THE U.S. DATA SHEET

Project: Ellicott City Overall Mitigation Project		Feature ID: WC3	Stream Order: 1
Date: 5/14/19	State: MD	Photos:	
Crew: RH / AT	County: Howard	Last Flag Number:	

Feature Hydrologic Class (check one):

Tidal	Perennial	Intermittent (SNE)	Ephemeral (SNE)
☐ TNW (Subject to ebb and flow)	☐ TNW – Perennial (Flowing year round)	☐ RPW – Seasonal (must flow at least 3 months a year)	☐ Non-RPW draining uplands (*not jurisdictional*)
	☑ RPW – Perennial (Flowing year round)		☐ Non-RPW erosional feature (*not jurisdictional*)
			☐ Non-RPW with abutting wetland
			☐ Non-RPW with adjacent wetland
Describe rational for hydrologic class (and nearest stream): Flowing at time of visit, likely wet year round			☐ Non-RPW wetland adjacent or abutting upstream (outside of study area)

Feature Description (check all that apply):

Shape (with respect to top of bank)			Substrate			Vegetation
☑ Natural Channel Shape	Channel Width and Depth: 4' wide 1' TOB		☑ Silts	☑ Sands	☐ Other:	RB (& width): 10' maintained lawn
☑ Artificial (man-made)	Water Depth: 3"		☑ Cobbles	☑ Gravel		
☑ Manipulated (man-altered)	Bank Erosion/stability: DS stable at culvert w/ WC2		☐ Bedrock	☐ Muck		LB (& width): DS end-maintained lawn, US 40' steep forest

Notes: DS end has been stabilized w/ culvert at confluence w/ WC2

Weather/Precipitation Conditions (check all that apply):

During Field Visit		Recent Rains (w/in one week)		Monthly Drought Condition — National Climate Data Center, Regional Palmer Drought Severity Index												
				Severe Drought			*Moderate Drought*		*Normal*			*Moderately Wet*		*Severely Wet*		
☑	No Rain	☐	0-0.5 inches	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
☐	Light Rain	☑	0.5-1 inches													
☐	Heavy Rain	☐	>1 inch							☑						

Non-tidal tributary has (check all that apply):

Bed and Banks			
☑	Yes	☐	No

Ordinary High Water Mark			
☐	Clear, natural line impressed on the bank	☑	Sediment deposition
☐	Changes in the character of soil	☑	Water staining
☐	Shelving	☑	Presence of litter and debris
☑	Vegetation matted down, bent, or absent	☐	Destruction of terrestrial veg.
☐	Leaf litter disturbed	☐	Presence of wrack line
☐	Sediment sorting	☐	Scour
☐	Observed/predicted flow events	☐	Abrupt change in plant community
☐	Other:		

Tidal tributary has (check all that apply):

High Tide Line		Mean High Water Mark indicated by:		Chemical Characteristics	
☐	Oil or scum line along shore objects	☐	Survey to available datum	☐	Water is clear
☐	Fine shell or debris deposits (foreshore)	☐	Physical markings	☐	Water is discolored
☐	Physical markings or characteristics	☐	Vegetation lines/changes in types	☐	Oily film
☐	Tidal gauges			☐	Other:

Notes:

Additional Notes *(Riffle pools, rootwads, woody debris, aquatic life, etc.)*:

WATERS OF THE U.S. DATA SHEET

Project: Ellicott City Overall Mitigation Project		Feature ID: WC4	Stream Order: 2
Date: 8/22/19	State: MD	Photos:	
Crew: GYC + AWS	County: Howard	Last Flag Number:	

Feature Hydrologic Class (check one):

Tidal	Perennial	Intermittent (SNE)	Ephemeral (SNE)
☐ TNW (Subject to ebb and flow)	☐ TNW – Perennial (Flowing year round)	☐ RPW – Seasonal (must flow at least 3 months a year)	☐ Non-RPW draining uplands (*not jurisdictional*)
	☑ RPW – Perennial (Flowing year round)		☐ Non-RPW erosional feature (*not jurisdictional*)
			☐ Non-RPW with abutting wetland
			☐ Non-RPW with adjacent wetland
Describe rational for hydrologic class (and nearest stream): steady flow during site visit, groundwater evidence incised channel			☐ Non-RPW wetland adjacent or abutting upstream (outside of study area)

Feature Description (check all that apply):

Shape (with respect to top of bank)			Substrate						Vegetation
☑ Natural Channel Shape	Channel Width and Depth: 2-5 ft | 1 ft		☑ Silts	☑ Sands	☐ Other:				RB (& width): microstegium, forested UPL >50 ft
☐ Artificial (man-made)	Water Depth: 1-3 in		☑ Cobbles	☐ Gravel					LB (& width): microstegium forested UPL >50 ft
☐ Manipulated (man-altered)	Bank Erosion/stability: vegetated banks, steep banks/incised		☐ Bedrock	☐ Muck					
Notes:									

Weather/Precipitation Conditions (check all that apply):

During Field Visit		Recent Rains (w/in one week)		Monthly Drought Condition — National Climate Data Center, Regional Palmer Drought Severity Index												
				Severe Drought			*Moderate Drought*		*Normal*			*Moderately Wet*		*Severely Wet*		
☑	No Rain	☐	0-0.5 inches	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
☐	Light Rain	☒	0.5-1 inches													
☐	Heavy Rain	☐	>1 inch								X					

Non-tidal tributary has (check all that apply):

Bed and Banks			
☑	Yes	☐	No

Ordinary High Water Mark			
☑	Clear, natural line impressed on the bank	☐	Sediment deposition
☐	Changes in the character of soil	☐	Water staining
☐	Shelving	☑	Presence of litter and debris
☑	Vegetation matted down, bent, or absent	☐	Destruction of terrestrial veg.
☑	Leaf litter disturbed	☐	Presence of wrack line
☐	Sediment sorting	☑	Scour
☑	Observed/predicted flow events	☐	Abrupt change in plant community
☐	Other:		

Tidal tributary has (check all that apply):

High Tide Line		Mean High Water Mark indicated by:		Chemical Characteristics	
☐	Oil or scum line along shore objects	☐	Survey to available datum	☐	Water is clear
☐	Fine shell or debris deposits (foreshore)	☐	Physical markings	☐	Water is discolored
☐	Physical markings or characteristics	☐	Vegetation lines/changes in types	☐	Oily film
☐	Tidal gauges			☐	Other:
Notes:					

Additional Notes ***(Riffle pools, rootwads, woody debris, aquatic life, etc.):***

8600 Main Street Culvert and Drainage Enhancement Project

Natural Resources Inventory

Prepared for
Howard County, Maryland

Howard County Department of Public Works
Storm Water Management Division
Capital Project D-1165
Consulting Services Agreement CA 23-2013

KCI Technologies, Inc.
July 2019
KCI Project No. 171705999.056

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1 INTRODUCTION

1.1 Project Description

The Howard County Department of Public Works (HODPW) is proposing culvert and drainage improvements along Frederick Road (MD 144) in Ellicott City, Howard County, Maryland. As part of this effort, KCI Technologies, Inc. (KCI) developed this Natural Resources Inventory (NRI), including a forest stand delineation (FSD) and wetland delineation, to identify and characterize environmental resources that could potentially be impacted within the study area. KCI conducted a wetland investigation to determine the presence of wetlands and other "waters of the United States" (WUS) systems within the study area in accordance with the methodologies outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (Environmental Laboratory, 2012), and other relevant guidance documents. Additionally, KCI conducted an FSD to summarize forest species composition, apparent seral stage, degree of structural complexity, environmental condition, and ecosystem function of forest stands that could potentially be impacted within the study area. Forest stands throughout the study area were identified and delineated in accordance with the methodologies outlined in the *State Forest Conservation Technical Manual, Third Edition* (MDNR, 1997) and the *Howard County Forest Conservation Manual* (Howard County, 1999).

1.2 Study Area Description

The project study area consists of a 5.32-acre site along Frederick Road (MD 144), between Belfont Drive and Ellicott Mills Drive. The study area extends approximately 1,000 feet in length along the southern edge, paralleling Frederick Road. The study area follows the culverted and open water segments of Hudson Branch, a tributary to the Patapsco River. This tributary flows generally east through the study area and continues outside of the study area to its eventual confluence with the Patapsco River. The corridor is primarily forested, but is adjoined by residential and commercial properties.

A Site Location Map depicting the study area is enclosed as Attachment 1 to this report.

2 METHODOLOGY

2.1 Review of Existing Data / Literature Review

Prior to conducting field activities, KCI reviewed readily available primary source materials including USGS maps, National Wetland Inventory (NWI) maps, Federal Emergency Management Agency (FEMA) floodplain data, and the city/county soil survey to determine the presence or absence of regulated natural resources (wetlands and streams) within the study area.

2.2 Wetland Delineation Methodology

KCI performed a field reconnaissance for the entire study area to determine the presence or absence of wetland areas during November 2017. Based upon this review, KCI determined that normal conditions were present on the site and that the "Routine Determination" method would be appropriate in order to identify wetland boundaries within the study area. In the field, wetland delineations were conducted using the criteria outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (Environmental Laboratory, 2012).

During the course of the field investigation, dominant plant species within suspected wetland areas were identified and recorded for each stratum present. The United States Army Corps of Engineers (USACE) *2016 National Wetland Plant List* (*Lichvar, 2016)* was used to determine the indicator status of the vegetation found within each community. KCI then characterized the plant community as hydrophytic or upland based upon the results of the Dominance Test and the Prevalence Index worksheets within the *Wetland Determination Data Form – Eastern Mountains and Piedmont Region.*

KCI assessed wetland hydrology within the study area based on the presence of one primary or two or more secondary hydrology indicators. Surface water inundation, depth to soil saturation, drift lines, water marks, and sediment deposits are some of the primary indicators listed in the *Wetland Determination Data Form – Eastern Mountains and Piedmont Region.* Secondary indicators include surface soil cracks, a sparsely vegetated concave surface, drainage patterns, and moss trim lines, as well as other less commonly found indicators.

Soil pits were typically excavated to a depth of approximately 18-24 inches, barring refusal, or immediately below the A-horizon. KCI recorded soil texture and the color of the matrix and any concretions or soft masses within a representative soil sample were assigned hue, value, and chroma utilizing the *Munsell Soil Color Charts* (Munsell, 2000). All soil samples were thoroughly investigated for the presence of redoximorphic features and/or hydric soil indicators included in *Field Indicators of Hydric Soils* (NRCS, 2016) and the *Wetland Determination Data Form – Eastern Mountains and Piedmont Region.* KCI then classified soils as hydric or non-hydric based upon the presence or absence of hydric soil characteristics and indicators.

KCI determined areas to be wetlands once all three wetland parameters (vegetation, hydrology, and soils), as described above, were identified (Environmental Laboratory, 1987 and 2012). When wetlands and streams were identified in the field, their boundaries were flagged along the wetland/upland interface or along the ordinary high water mark, respectively. Closed wetland systems were identified with a "WP" in the system name, while open or linear systems that extended outside of the study area were identified with a "WL" in the system name. Boundaries were marked in the field using consecutively numbered flagging tape, and flag locations were subsequently field located utilizing a total station survey apparatus. A map showing delineated wetlands and waterways is included as Appendix A to this report.

Vegetation, hydrologic, and soils data collected in the field, as well as information derived from the pre-fieldwork data review, were transferred to *Wetland Determination Data Forms - Eastern Mountains and Piedmont Region* in accordance with USACE protocols (1987 and 2012). Appendix B includes the Wetland Determination Data Forms for the upland and wetland sample plot locations and Stream Features Datasheets for WUS systems throughout the study area.

Representative photographs were taken throughout the study area and specifically of wetlands and stream systems in order to document field conditions at the time of the delineation. These photos have been included as Appendix D to this report.

2.3 Forest Stand Delineation Methodology

KCI identified and delineated forest stands throughout the study area in accordance with the methodologies outlined in the *State Forest Conservation Technical Manual, Third Edition* (MDNR, 1997) and the *Howard County Forest Conservation Manual* (HODP&Z, 1999).

Preliminary field maps were generated in house for the entire subject property. These maps (Environmental Features and Forest Survey Maps) were prepared showing approximate boundaries of the forest stands delineated from aerial photographs, topography (steep slopes between 15 and 25% and greater than 25% are indicated), streams (intermittent and perennial), and wetlands and their buffers. The Environmental Features map marked with soils, steep slopes, forest buffers, land uses, critical habitat areas, and 100-year floodplains was used to assess any major forest stands present. Sample plot locations, individual specimen trees (trees with a diameter at breast height (DBH) over 30", or having 75% of the DBH of current State champion of that species), champion trees, and forest structure data were marked on the Forest Survey Map with critical habitats, historic areas, net tract area, and forest circumference line. These field maps were used for later development of the FSD map.

KCI assessed the entire forested section of the project corridor to confirm the boundaries of the forest stands and to document stand condition. Forest stands under one acre in size were included in larger adjacent stands unless it was apparent that some unique characteristic (such as rare, threatened, or endangered species present) would make it critical to evaluate the stand as a separate entity.

A 1/10-acre fixed-plot method was used to document stand condition. The sample plots were determined based on size, topography, contiguity, and forest community features. Sample plots within stands were delineated by tying white and orange flagging to trees. After plots were delineated, the number and species of dominant and co-dominant trees, the percent canopy cover, the percent of understory cover, percent herbaceous ground cover, presence of exotic or invasive species, basal area, size of specimen trees, condition and health of stand, and understory species composition were recorded on the Forest Sampling Data Forms. A map showing delineated forest stands is included as Appendix B. Completed Forest Sampling Data Forms are included in Appendix C.

Priority retention areas were identified and labeled on the FSD map. Priority areas for retention include:

- 100-year floodplain and stream buffer areas,
- Wetlands and wetland buffers,
- Trees and other vegetation identified as rare, threatened, or endangered (RTE) or areas designated as critical habitats,
- Forest contiguous with the sensitive areas listed above,
- Property line and right-of-way plantings,
- State champion or specimen trees,
- Trees and forest resources associated with a historic site, and
- Isolated forest stands of less than 10,000 SF that will be enlarged to meet the minimum standards for forest.

Specimen trees within stands throughout the entire study corridor were identified in the field with white and orange flagging. Specimen trees and sample plot locations were documented using Global Positional System (GPS) with submeter accuracy. Specimen tree health was characterized using the following criteria:

Health	Characteristics
Excellent	Tree form normal for the species Full crown/no vines in crown No major branches dead Leaves normal size and color for the species, with no spotting or insect infestation No cracks in bark that expose the inner layers No weak branch union, cankers, decay No root severing, exposed roots, roots compacted from foot traffic, decay, dieback No invasive vines on tree (bittersweet, wild grape, poison ivy, English ivy)
Good	Competition from adjacent tree species but otherwise normal tree form for the species 80-90% full crown/no vines in crown, <10% smaller branches dead >80% Leaves normal size and color for the species, <10% spotting, less than 5% insect infestation

Health	Characteristics
	> 10% of tree has cracks in bark that are 4" in diameter No weak branch union, cankers, decay No root severing, exposed roots, roots compacted from foot traffic, decay, dieback No invasive vines on tree (bittersweet, wild grape, poison ivy, English ivy)
Fair	Tree has lost a major limb or is leaning to one side <75% full crown/vines may be present in crown <30% of branches may have dead wood >60% Leaves normal size and color for the species, >20% spotting on leaves >30% of tree has cracks in bark that are 4" or greater in diameter Weak branch union is present, cankers present, decay, present One or more root problem is present but does not appear to be causing tree dieback One or more invasive vines (bittersweet, wild grape, poison ivy, English ivy) are present and competing with crown growth Presence of Insect infestation appears to be causing tree dieback
Poor	Tree has lost major limbs and is leaning to one side <50% full crown/vines are dominant in crown >50% of branches may have dead wood <50% Leaves normal size and color for the species, >40% spotting on leaves >50% of tree has cracks in bark that are 4" or greater in diameter Weak branch union is present, cankers present, decay, present One or more root problems are present and appears to be causing tree dieback Invasive vines on tree (bittersweet, wild grape, poison ivy, English ivy) are present and are dominating over crown growth Presence of Insect infestation appears to be causing tree dieback

Note: Trees may have one or more of the characteristics listed under each category.

Representative site photographs were taken throughout the study area and of each sample plot within the forest stands. These photos have been included as Appendix E to this report.

KCI submitted inquiries requesting information regarding the possibility of rare, threatened, and endangered species within or adjacent to the study area to the United States Fish and Wildlife Service (USFWS) and Maryland Department of Natural Resources (MDNR) in September 2017. An inquiry letter was also sent to the Maryland Historical Trust (MHT) in regards to possible historical areas within the limits of the study area and adjacent land. MHT responded that historic resources were present within the original study area. MDNR and USFWS did not identify RTE species within the project area. MHT was contacted on June 16, 2019, in reference to the updated smaller project area and whether or not the previously historical grist mill and wagon works remain a concern. A response is currently pending from MHT. Copies of the correspondence with MHT, MDNR, and USFWS are included as Appendix F.

3 RESULTS

3.1 Literature Review Results

3.1.1 Watershed and Land Use

The study area is located within the Patapsco River Lower North Branch (02130906) watershed. The Patapsco River is the nearest named waterway to the study area. The Maryland Surface Water Use Designation for the Patapsco River and all its tributaries in this area is "Use 1", pursuant to which they are protected for "water contact recreation and protection of aquatic life" (COMAR 26.08.02.08). Due to this designation, in-stream work may not be conducted during the period of March 1 through June 15, inclusive, during any year (COMAR 26.08.02.11). Additionally, KCI reviewed Maryland's High Quality Waters (Tier II) list to identify any Tier II waters within the study area. No Tier II waters were identified in the study area (MDE, 2010). According to the Maryland 303(d) list of impaired waterways, the Patapsco River Lower North Branch is listed as Category 5 – impaired for sulfates and chlorides and Category 4a – impaired with a TMDL for total suspended solids and Escherichia coli.

The Maryland Department of Planning, Land Use/Land Cover geographic information systems (GIS, 2017) indicated the majority of the study area, and its immediate surroundings, is classified as "High Density Residential" (Code 13), "Low Density Residential" (Code 11), "Commercial" (Code 14), and "Forest" (Code 41).

3.1.2 Topography

The study area is located within the Piedmont Physiographic Province. According to a review of the *Ellicott City, Maryland 7.5' Topographic Quadrangle* (United States Geological Survey, 2016) and other sources, the topography within the study area is primarily flat floodplain, with steep slopes south of Frederick Road. Elevations range from approximately 280 feet above mean sea level (MSL) in the southern extents of the study area to 240 feet above MSL in the northern extents of the study area. A copy of the relevant USGS quadrangle map for the study area is included as Attachment 2 to this report.

3.1.3 Soils

According to the *Soil Survey of Howard County, Maryland* (United States Department of Agriculture-Natural Resources Conservation Service [USDA-NRCS], 2008) and more recently available digital NRCS Soil Survey Geographic Database (SSURGO) soils data for the county (NRCS Web Soil Survey, 2018), the predominant soil association found within the vicinity of the study area is the Codorus-Hatboro Association. Soils in this association are described as nearly level, very deep, moderately well drained to poorly drained soils. Within this association, four distinct soil units are present within the study area:

- Codorus and Hatboro silt loams, 0-3% slopes (Co)
- Glenville-Urban land-Udorthents, 0-8% slopes (GuB)

- Manor-Bannertown sandy loams, 15-25% slopes, rocky (MgD)
- Manor-Bannertown sandy loams, 25-65% slopes, rocky (MgF)

Mapped soil units are classified hydric based upon their listing on the National Hydric Soils List by State (USDA-NRCS, 2015) and the State and county lists in the web soil survey (NRCS Web Soil Survey, 2017). Hydric soils are defined as those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile. The table below summarizes hydric components of soils within the study area as listed in either the National Hydric Soils List by State or the web soil survey.

Soil Series	Hydric (Y/N)	Hydric Component	Percent of map unit
Codorus and Hatboro silt loams, 0-3% slopes (Co)	No	Hatboro	35%
Glenville-Urban land-Udorthents, 0-8% slopes (GuB)	No	N/A	N/A
Manor-Bannertown sandy loams, 15-25% slopes (MgD)	No	N/A	N/A
Manor-Bannertown sandy loams, 25-65% slopes (MgF)	No	N/A	N/A

A copy of the soil survey map for the study area is included as Attachment 3 to this report.

3.14 National Wetlands Inventory

The *National Wetlands Inventory (NWI) Map for Ellicott City, Maryland* (U.S. Fish and Wildlife Service [USFWS], 1981-2016) identifies Hudson Branch as a riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH) system within the study area. Attachment 4 shows the locations of NWI-classified wetlands in the vicinity of the study area.

3.1.5 FEMA-Designated Floodplains

According to a review of Federal Emergency Management Agency (FEMA) Q3 Flood Data, a portion of the study area is within the 100-year floodplain associated with Hudson Branch (*FEMA Panel No. 24027C0095D*). Attachment 5 shows the locations of FEMA-designated floodplains in the vicinity of the study area.

3.2 Wetland and Waters of the U.S. Field Investigation Results

The field investigation performed during November 2017 and confirmed in 2019 located one perennial stream and one intermittent stream, classified as "waters of the U.S." Information concerning these streams is outlined below and included in the appendices to this report.

WUS WL001 (Perennial)

WUS WL001 (Flags WL001-001 to WL001-017a/b) is a nontidal, perennial stream, known as Hudson Branch, in the northern extents of the study area, north of Frederick Road, east of Belfont Drive, and west of Ellicott Mills Drive. WUS WL001 is culverted in the western extents of the study area, daylights, and flows east through the study area to a culvert beneath Ellicott Mills Drive. The stream continues to its eventual confluence with the Patapsco River. Approximately 444 linear feet (LF) of natural channel and 568 LF of culverted channel is within the study area. WUS WL001 had an approximate bankfull width of 3 feet with an average bankfull depth of 6 inches and an observed water depth of 1 inch at the time of the site investigation. WUS WL001 is identified on the *National Wetland Inventory Map for Ellicott City, Maryland* (USFWS, 1981-2016) as a riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH) system. Based on the field investigation, the Cowardin Classification for this system is riverine, lower perennial, unconsolidated bottom, cobble-gravel/sand (R2UB1/2).

More information regarding WUS WL001 can be found in the appendices of this report.

WUS WL002 (Intermittent)

WUS WL002 (Flags WL002-001 to WL002-10a/b) is a nontidal, intermittent stream located just outside the northeastern extents of the study area, north of WUS WL001 and south of Burgess Mill Way. WUS WL002 originates at a stormwater outfall outside of the study area and flows south to its confluence with WUS WL001. This intermittent stream had an approximate bankfull width of 3 feet with an average bankfull depth of 6 inches and an observed water depth of 1 inch at the time of the site investigation. WUS WL002 was not identified on the *National Wetland Inventory Map for Ellicott City, Maryland* (USFWS, 1981-2016). Based on the field investigation, the Cowardin Classification for this system is riverine, streambed, cobble-gravel/sand (R4SB3/4).

More information regarding WUS WL002 can be found in the appendices of this report.

Upland Sample Plots

No wetlands were located within the project area. One sample plot was taken within the study area in order to describe the surrounding upland.

UPL-1

Upland sample plot UPL-1 was taken in the WUS WL001 floodplain within the study area. Vegetation at UPL-1 is dominated by green ash (*Fraxinus pennsylvanica*), black gum (*Nyssa sylvatica*), Japanese honeysuckle (*Lonicera japonica*), multiflora rose (*Rosa multiflora*), English ivy (*Hedera helix*), Japanese stiltgrass (*Microstegium vimineum*), small carpetgrass (*Arthraxon hispidus*), grass species (*Festuca* species), fox grape (*Vitis labrusca*), and oriental bittersweet

(*Celastrus orbiculatus*). Meadow garlic (*Allium canadense*) was also identified within the sample plot. Sample plot UPL-1 does not satisfy the hydrophytic vegetation criterion.

Soil characteristics at UPL-1 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-14	Silt loam	10YR 3/2	N/A
14-20	Silt loam	10YR 3/3	N/A

Hydric soil indicators were not identified within the soil profile; therefore, sample plot UPL-1 does not satisfy the hydric soils criterion. No wetland hydrologic indicators were present in close proximity to upland sample plot UPL-1. Sample plot UPL-1 does not satisfy any of the three mandatory wetland criteria; therefore, this area was classified as upland.

More information regarding the soils and vegetation found within upland sample plot UPL-1 can be found in the appendices to this report.

3.3 Forest Stand Delineation Results

The field investigation performed on November 16 and 17, 2017 and verified in 2019, generally confirmed the information gathered from the literature review performed prior to commencement of fieldwork activities. Specifically, existing land uses, topography, soils, and floodplain locations were generally similar to what is recorded on existing, readily available information for the study area. Additional information concerning the forest stands and natural resources is outlined below and in the appendices to this report.

Forest Stands

Two forest stands were identified onsite. A 1/10 acre fixed plot sampling technique was used to sample forest stand conditions at two points onsite (see Forest Sampling Data Forms in Appendix D). Sample points were chosen randomly within the two identified stands.

Overall, the health of the forest stands was determined to be fair with no significant sign of disease or widespread colonization of exotic plant species observed. No rare, threatened, or endangered species were observed.

Forest Stand A

Stand A (Box Elder-Sugar Maple Forest) occupies approximately 0.35 acres within the floodplain of WUS WL001. This early successional stand is bounded by Burgess Mill Way to the north, residential property to the south, commercial property to the west, and Ellicott Mills Drive to the east.

Stand A is dominated by box elder and sugar maple (*Acer saccharum*) in the 12 to 19.9-inch size class. Box elder, red maple (*Acer rubrum*), oriental bittersweet, English ivy, Japanese honeysuckle, Bradford pear (*Pyrus calleryana*), and fox grape are the dominant understory and shrub species. The herbaceous layer is dominated by small carpetgrass, lesser celandine (*Ficaria verna*), Japanese stiltgrass, beefsteak plant (*Perilla frutescens*), white oak, multiflora rose, raspberry species, and vinca species (*Vinca* species).

Four specimen trees were found during the field survey and are listed in the table below. Each tree was assessed and the health of the trees is listed in the table below.

Specimen Trees			
ID	**Species**	**Size**	**Condition**
SP-2	*Acer saccharum*	32.0	Fair
SP-3	*Liriodendron tulipifera*	61.0	Fair
SP-4	*Acer saccharinum*	37.0	Fair
SP-5	*Acer rubrum*	32.0	Poor

Canopy closure within the stand was estimated at approximately 50% and basal area was determined to be 82.5 square feet per acre. There was downed woody debris present and one standing dead tree greater than 6 inches DBH. Litter depth was less than a half inch.

The topography in the stand is gently to moderately sloping towards WUS WL001. Forest Stand A is a high priority retention forest because of its proximity to floodplains and streams, and the presence of specimen trees. This is an early successional stand with a high amount of invasive species coverage.

Forest Stand B

Stand B (Mixed Maple Forest) occupies approximately 0.51 acres within the study area and is south of Frederick Road. This early-mid successional deciduous stand is bounded by Frederick Road and residential development to the north, and residential property to the south, east, and west. The stand continues south outside of the project area.

Stand B is dominated by box elder, red maple, silver maple, sugar maple, and green ash in the 12 to 30+-inch size classes. Box elder, sugar maple, Japanese honeysuckle, multiflora rose, raspberry species, common greenbrier (*Smilax rotundifolia*), poison ivy, and lowbush blueberry are the dominant understory and shrub species. The herbaceous layer is dominated by meadow garlic, small carpetgrass, Japanese honeysuckle, Japanese stiltgrass, and multiflora rose.

Four specimen trees were found during the field survey and are listed in the table below. Each tree was assessed and the health of the trees is listed in the table below.

Specimen Trees			
ID	**Species**	**Size**	**Condition**
SP-11	*Acer rubrum*	32.0	Fair

Specimen Trees			
ID	**Species**	**Size**	**Condition**
SP-12	*Fraxinus pennsylvanica*	30.0	Fair
SP-13	*Fraxinus pennsylvanica*	30.0	Fair
SP-15	*Quercus montana*	30.0	Fair

Canopy closure within the stand was estimated at approximately 76.5% and basal area was determined to be 120 square feet per acre. There was a moderate amount of downed woody debris and one standing dead tree greater than 6 inches DBH. Litter depth was less than a half inch.

The topography in the stand ranges from moderately to steeply sloping to the south. Forest Stand B is a high priority retention forest because of the presence of specimen trees and steep slopes. This is an early-mid successional stand with a low amount of invasive species coverage.

4 CONCLUSIONS

4.1 Wetlands and Waters of the U.S.

Two WUS systems were identified during the field investigation. Information regarding these waterways is summarized below, in tabular form. Refer to Appendix B: Natural Resources Inventory/Forest Stand Delineation Map for the locations of natural resources within the study area.

WUS System	Cowardin Classification*	Approximate Length within Study Area (LF)
WUS WL001	R2UB1/2	1,012
WUS WL002	R4SB3/4	N/A

** Based on National Wetland Inventory Classification System (Cowardin, et al. 1979).*

This investigation represents a study of the wetland and waterway resources as observed within the study area. Investigations of this type reflect the current state of temporal and variable conditions and require individual professional judgment. This is, therefore, a professional estimate of the wetlands and "waters of the U.S." located in the study area based on the delineation methodology utilized and the most recent and best-available information for the above mentioned sites. Wetland boundaries, as currently defined for regulatory purposes, can only be verified through a review by the U.S. Army Corps of Engineers and/or the Maryland Department of the Environment in consultation with the U.S. Environmental Protection Agency and U.S. Fish and Wildlife Service.

4.2 Forests

The study area contains two distinct forest stands. Stand A is a high priority retention stand because of its proximity to floodplains, streams, and the presence of specimen trees. Stand B is a high priority retention stand because of the presence of specimen trees and steep slopes.

This investigation represents a study of the forested areas within the study area as observed during November 2017 and verified in 2019. Forest Stand Delineations of this type reflect the current state and require individual professional judgment. This is, therefore, a professional estimate of the forests located in the study area based on the delineation methodology utilized and the most recent and best-available information for the above mentioned site.

4.3 Discussion

HODPW is proposing drainage improvements along MD 144, Frederick Road, between Belfont Drive and Ellicott Mills Drive. Impacts to wetlands or waterways within the proposed project area will require a *Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal, or Nontidal Wetland in Maryland.* Additionally, forest disturbance will require a forest conservation plan (FCP). Clearing above the established threshold will require forest mitigation in the form of reforestation onsite or off-site or through a fee-in-lieu.

Qualifications of Preparer

Ms. Jennifer Bird, Senior Project Manager with KCI's Natural Resources Management Practice, prepared the Forest Stand Delineation included in this Natural Resources Inventory. Enclosed in Appendix G is a copy of Ms. Bird's confirmation letter from MDNR stating she is a Qualified Professional under Maryland State Forest Conservation regulations, to conduct forest stand delineations and develop forest conservation plans.

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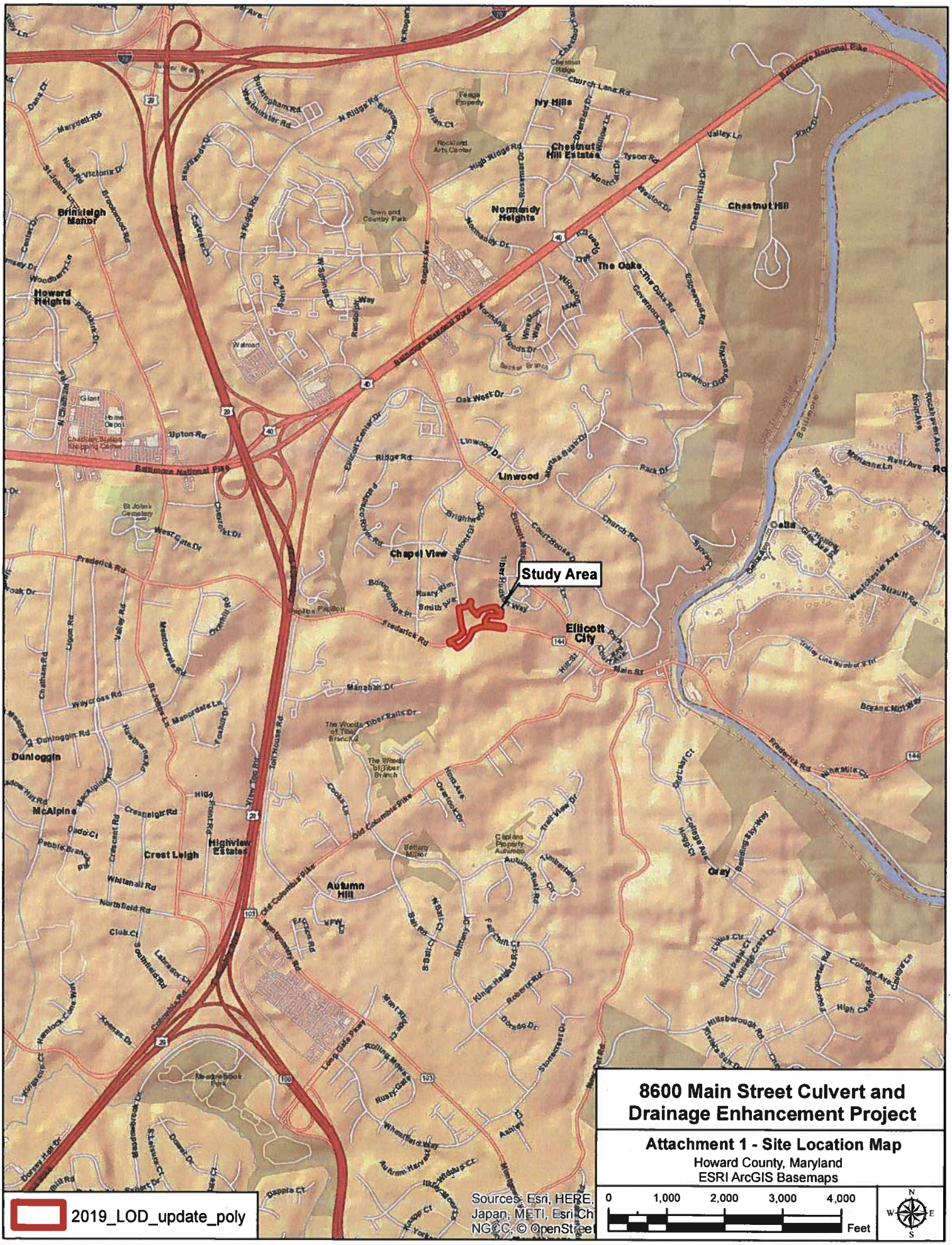
ATTACHMENT 1

Site Location Map



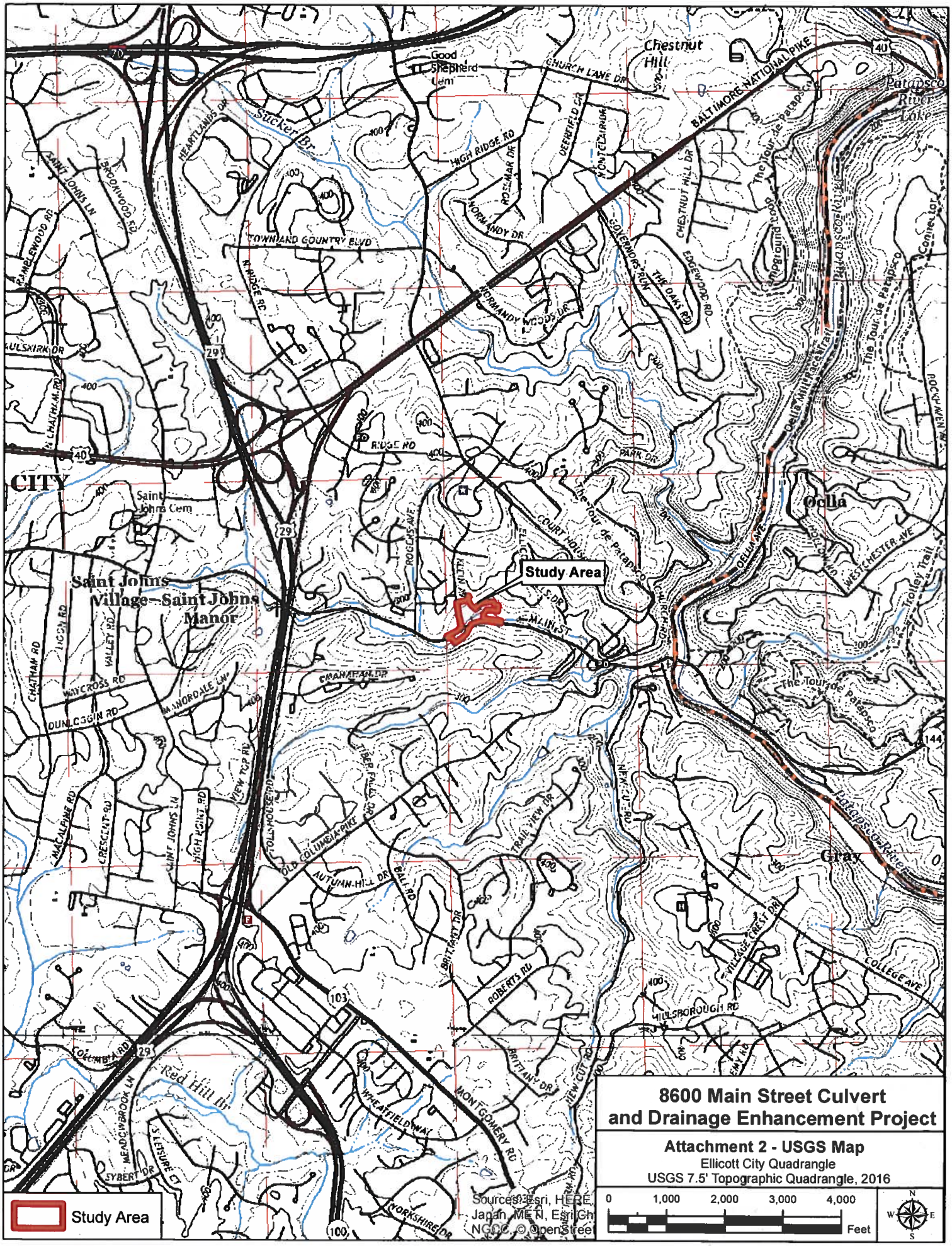
8600 Main Street Culvert and Drainage Enhancement Project

Attachment 1 - Site Location Map

Howard County, Maryland
ESRI ArcGIS Basemaps

ATTACHMENT 2

USGS 7.5' Topographic Map



8600 Main Street Culvert and Drainage Enhancement Project

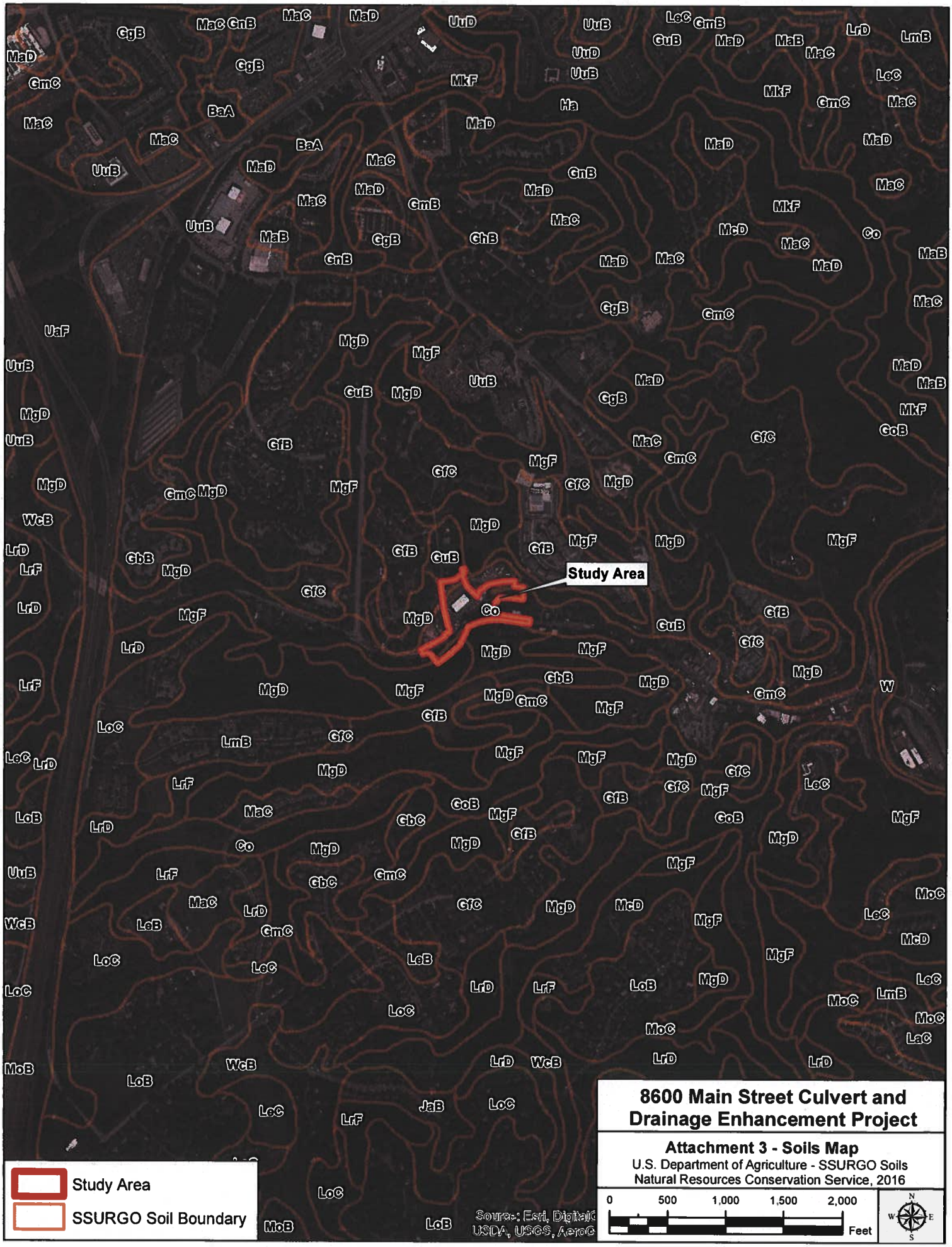
Attachment 2 - USGS Map

Ellicott City Quadrangle

USGS 7.5' Topographic Quadrangle, 2016

ATTACHMENT 3

Soils Map



Study Area

SSURGO Soil Boundary

Source: Esri, DigitalG
USDA, USGS, AeroG

8600 Main Street Culvert and Drainage Enhancement Project

Attachment 3 - Soils Map

U.S. Department of Agriculture - SSURGO Soils
Natural Resources Conservation Service, 2016

ATTACHMENT 4

National Wetlands Inventory (NWI) Map

8600 Main Street Culvert and Drainage Enhnacement Project

Attachment 4 - NWI Map

U.S. Fish & Wildlife Service
National Wetlands Inventory, 1981-2016

ATTACHMENT 5

Q3 Flood Map

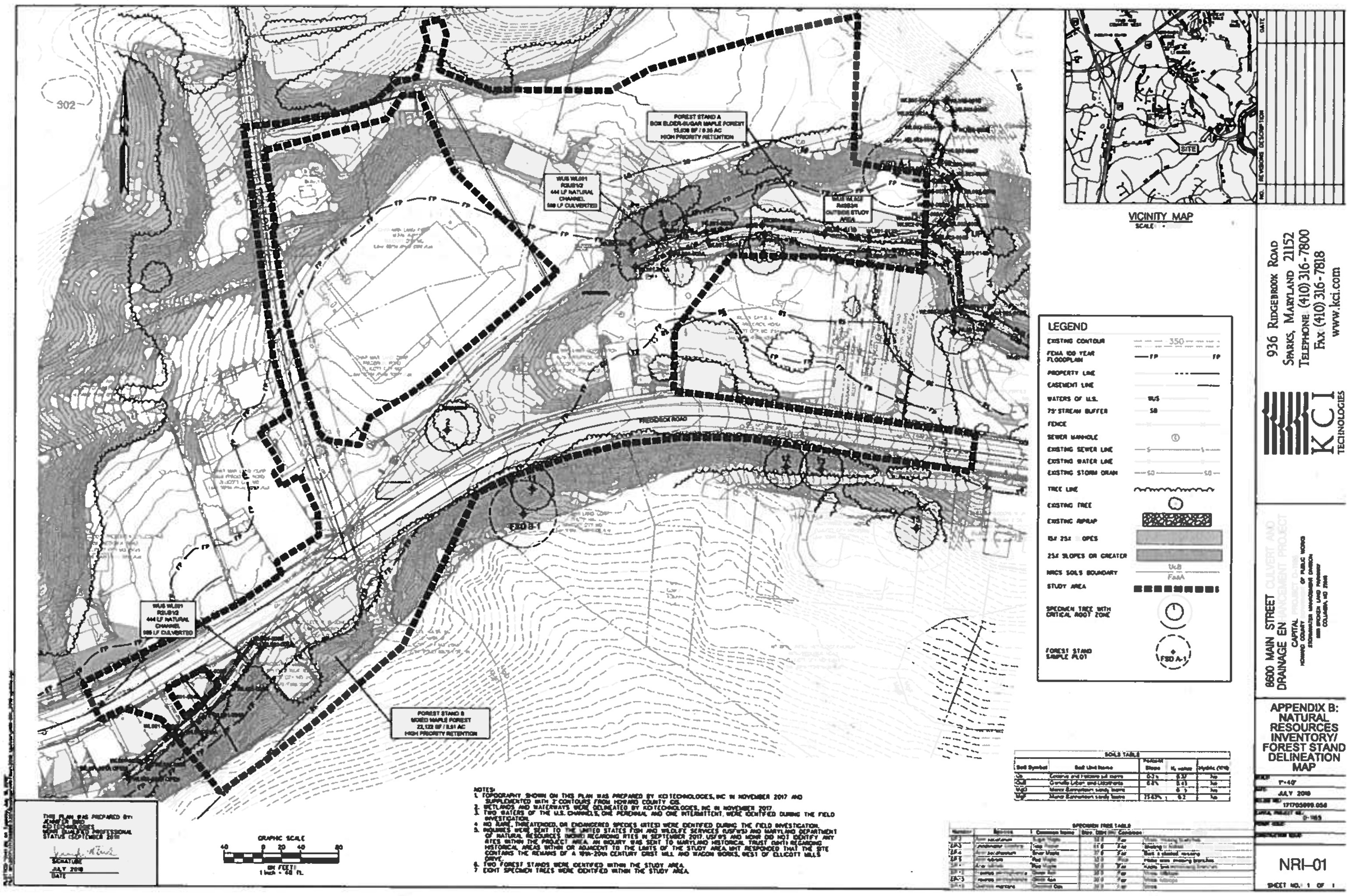
8600 Main Street Culvert and Drainage Enhancement Project

Attachment 5 - Q3 Flood Map

Federal Emergency Management Agency
Q3 Flood Data for Howard County, Maryland

APPENDIX A

Natural Resources Inventory/Forest Stand Delineation Map



VICINITY MAP
SITE
LEGEND
EXISTING CONTOUR
FEMA 100 YEAR FLOODPLAIN
PROPERTY LINE
EASEMENT LINE
WATERS OF U.S.
75' STREAM BUFFER
FENCE
SEWER MANHOLE
EXISTING SEWER LINE
EXISTING WATER LINE
EXISTING STORM DRAIN
TREE LINE
EXISTING TREE
EXISTING RIPRAP
25% SLOPES OR GREATER
NRCS SOILS BOUNDARY
STUDY AREA
SPECIMEN TREE WITH CRITICAL ROOT ZONE
FOREST STAND SAMPLE PLOT
FOREST STAND A
FOREST STAND B
SOILS TABLE
SPECIMEN TREE TABLE
GRAPHIC SCALE
NOTES:
936 Ridgebrook Road
Sparks, Maryland 21152
Telephone (410) 316-7800
Fax (410) 316-7818
www.kci.com
KCI TECHNOLOGIES
8600 MAIN STREET
APPENDIX B: NATURAL RESOURCES INVENTORY/ FOREST STAND DELINEATION MAP
JULY 2018
NRI-01

APPENDIX B

Data Point Forms: Wetland Determination and Stream Features

Stream Features
Field Sheet

Date: 11/16/17 **Project Site:** Ellicott City **Stream #** WL001
Observers: KM, AK

Stream Flow: X Perennial ____ Intermittent ____ Ephemeral
Gradient: 5%

Morphology:

Average Bankful Width 8' Average Bankfull Depth 1' Average Water Depth: 4"

Has stream morphometry been altered? Describe type and degree: Yes,the channel is bridged, and culverted in multiple locations. Gabion baskets are present as substrate and bank reinforecemet

Habitat and Pollutants:

Substrate:

X Bedrock X Gravel/Sand ____ Silt

X Sand X Cobble/Gravel ____ Clay

Habitat Complexity:

X Riffle/Pools ____ Undercut banks

____ Tree Roots X Woody Debris

Bank Erosion: ____ Severe ____ Moderate X Minor

Describe: Reinfored with bedrock, rip rap, and retaining walls throughout the channel.

Silt Deposition: ____ Severe ____ Moderate X Minor

Riparian Zone:

Right Bank: ____ Forested X Vegetated X Developed X Maintained

Notes: Adjacent to residential property.

Slope: 1%

Left Bank. ____ Forested X Vegetated X Developed X Maintained

Notes: Adjacent to upland riparian forest and residential property.

Slope: 3%

Cowardin (1979) Stream Classification: R2UB1/2

Stream Features
Field Sheet

Date: 11/16/17 **Project Site:** Ellicott City **Stream #** WL002
Observers: KM, AK

Stream Flow: ____ Perennial __X__ Intermittent ____ Ephemeral
Gradient: 6%

Morphology:

Average Bankful Width 3' Average Bankfull Depth 6" Average Water Depth: 1"

Has stream morphometry been altered? Describe type and degree: Yes, originates at a stormwater outfall. Rip rap is present at the updatream end. Iron flocculent is present within the channel.

Habitat and Pollutants:

Substrate:

____ Bedrock __X__ Gravel/Sand ____ Silt

__X__ Sand __X__ Cobble/Gravel ____ Clay

Habitat Complexity:

__X__ Riffle/Pools __X__ Undercut banks

__X__ Tree Roots __X__ Woody Debris

Bank Erosion: ____ Severe __X__ Moderate ____ Minor

Describe: Some undercutting of the banks at the downstream end of the channel.

Silt Deposition: ____ Severe ____ Moderate __X__ Minor

Riparian Zone:

Right Bank: __X__ Forested __X__ Vegetated ____ Developed ____ Maintained

Notes: Adjacent to upland riparian forest

Slope: 2%

Left Bank. __X__ Forested __X__ Vegetated ____ Developed ____ Maintained

Notes: Adjacent to upland riparian forest, and remnants of an old building.

Slope: 2%

Cowardin (1979) Stream Classification: R4SB3/4

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Ellicott City Drainage Improvements City/County: Howard County Sampling Date: 11/16/17
Applicant/Owner: Howard County Department of Public Works State: MD Sampling Point: UPL-1
Investigator(s): KM, AK Section, Township, Range: Ellicott City
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <2
Subregion (LRR or MLRA): MLRA 147 Lat: 39.270061 Long: -76.805215 Datum: NAD 83
Soil Map Unit Name: Codorus and Hatboro silt loams, 0-3% slopes (Co) NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks.)
Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes [✓] No [ ]
Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes [ ]	No [✓]	**Is the Sampled Area within a Wetland?** Yes [ ] No [✓]
Hydric Soil Present?	Yes [ ]	No [✓]	
Wetland Hydrology Present?	Yes [ ]	No [✓]	

Remarks:
The sample plot does not satisfy the three mandatory wetland criteria; therefore, this area is classified as upland. The sample plot is adjacent to WUS WL001 and WL002. Rain has occurred within the past 24 hours. Downed woody debris and bamboo debris is present within the plot.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] True Aquatic Plants (B14)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes [ ] No [✓] Depth (inches): _____
Water Table Present? Yes [ ] No [✓] Depth (inches): _____
Saturation Present? (includes capillary fringe) Yes [ ] No [✓] Depth (inches): _____

Wetland Hydrology Present? Yes [ ] No [✓]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The sample plot does not satisfy the wetland hydrology criterion.

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: UPL-1

Tree Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	30	Y	FACW
2. Nyssa sylvatica	10	Y	FAC
3.			
4.			
5.			
6.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		

Sapling Stratum (Plot size: 15ft radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Shrub Stratum (Plot size: 15ft radius)			
1. Lonicera japonica	15	Y	FACU
2. Rosa multiflora	5	Y	FACU
3. Hedera helix	5	Y	FACU
4.			
5.			
6.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		

Herb Stratum (Plot size: 5ft radius)			
1. Allium canadense	5	N	FACU
2. Festuca species	30	Y	NI
3. Microstegium vimineum	15	Y	FAC
4. Arthraxon hispidus	15	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65 = Total Cover		
50% of total cover: 32.5	20% of total cover: 13		

Woody Vine Stratum (Plot size: 30ft radius)			
1. Vitis labrusca	15	Y	FACU
2. Celastrus orbiculatus	5	Y	FACU
3.			
4.			
5.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 44% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 0	x 1 = 0
FACW species 30	x 2 = 60
FAC species 40	x 3 = 120
FACU species 50	x 4 = 200
UPL species 0	x 5 = 0
Column Totals: 120 (A)	380 (B)

Prevalence Index = B/A = 3.17

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks: (Include photo numbers here or on a separate sheet.)

The sample plot does not satisfy the hydrophytic vegetation criterion.

SOIL

Sampling Point: UPL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/2	100	--	--	--	--	sil	
14-20	10YR 3/3	100	--	--	--	--	sil	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) **(LRR N)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ☐ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13) **(MLRA 136, 122)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ☐ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(MLRA 147)**
- ☐ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The sample plot does not satisfy the hydric soils criterion.

APPENDIX C

Forest Sampling Data Sheets and Forest Summary Datasheets

Property: Ellicott City **Prepared By:** AK, KM

Stand #: A **Plot #:** 1 **Plot Size:** 1/10 Acre **Date:** 11/16/2017

Basal Area in sf/acre: 95	**Size Class of trees >20' height within sample plot**															
Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9" dbh			# of Trees > 30" dbh			
Crown Position	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Total**
Nyssa sylvatica			2		2											4
Prunus serotina			1			1		1								3
Acer rubrum			1		1	1										3
Acer negundo							3			6						9
Fagus grandifolia			1													1
																0
																0
																0
																0
																0
																0
																0
Total Number of Trees per Size Class	5			5			4			6			0			20
Number & Size of Standing Dead Trees																0

List of Common Understory Species 3' - 20':
Acer rubrum, Celastrus orbiculatus, Hedera helix

% of Canopy Closure					
C	*N*	*E*	*S*	*W*	*Total*
40	40	50	30	60	44

% Understory Cover 3' - 20'					
C	*N*	*E*	*S*	*W*	*Total*
10	0	2	10	20	8.4

Percent of Invasive Cover per Plot (All Layers): 60%

Plot Successional Stage: Early

List of Herbaceous Species 0' - 3':
Arthraxon hispidus, Ficaria verna, Lonicera japonica, Perilla frutescens, Rosa multiflora, Rubus species, *Vitis labrusca*

% of Herbaceous Cover 0' - 3'					
C	*N*	*E*	*S*	*W*	*Total*
60	60	10	60	60	50

Comments
Rain has occurred within the past 24 hours. The sample plot is dominated by vines and is located at the toe of slope, adjacent to WUS WL001 and WUS WL002. Downed woody debris is present within the sample plot.

Property: Ellicott City **Prepared By:** AK, KM

Stand #: A **Plot #:** 2 **Plot Size:** 1/10 Acre **Date:** 11/16/2017

Basal Area in sf/acre: 70	**Size Class of trees >20' height within sample plot**															
Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9" dbh			# of Trees > 30" dbh			
Crown Position	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Total**
Nyssa sylvatica			1													1
Prunus serotina					1	1										2
Acer negundo					2		3									5
Quercus alba					1											1
Acer saccharum			1				1									2
																0
																0
																0
																0
																0
																0
																0
																0
Total Number of Trees per Size Class	2			5			4			0			0			11
Number & Size of Standing Dead Trees				1												1

List of Common Understory Species 3' - 20':
Acer negundo, Lonicera japonica, Pyrus calleryana, Rosa multiflora, Smilax rotundifolia

% of Canopy Closure					
C	*N*	*E*	*S*	*W*	*Total*
80	30	60	50	60	56
% Understory Cover 3' - 20'					
C	*N*	*E*	*S*	*W*	*Total*
40	30	20	40	50	36

Percent of Invasive Cover per Plot (All Layers): 80%, herbaceous

Plot Successional Stage: Early

List of Herbaceous Species 0' - 3':
Quercus alba, Vinca species

% of Herbaceous Cover 0' - 3'					
C	*N*	*E*	*S*	*W*	*Total*
100	10	100	20	10	48

Comments
Plot A-2 is outside of the study area. Rain has occurred within the past 24 hours. The sample plot is located on a hillslope adjacent to WUS WL001 and Ellicott Mills Drive. Vinca vine species is the dominant ground cover.

Property Name: Ellicott City Drainage Improvements	
Location: Ellicott City, Howard County, Maryland	
Prepared By: AK, KM	**Date: 11/16/2017**

Stand Variable	**Stand A**
1. Dominant/Codominant species	**Dominant:** *Acer negundo, Acer saccharum* **Codominant:** *Acer rubrum, Nyssa sylvatica, Prunus serotina, Quercus alba*
2. Successional stage	Early
3. Basal area in square feet per acre	82.5
4. Size class of dominant species	12-19.9," 20-29.9"
5. Percent of canopy closure	50%
6. Number of tree species per acre	7
7. Common understory species per acre	*Acer negundo, Acer rubrum, Celastrus orbiculatus, Hedera helix, Lonicera japonica, Pyrus calleryana, Vitis labrusca*
8. Percent of understory cover 3' to 10' tall	22.2%
9. Number of woody plants species 3' to 20' tall	7
10. Common herbaceous species 0' to 3' tall	*Arthraxon hispicus, Ficaria verna, Lonicera japonica, Microstegium vimineum, Perilla frutescens, Quercus alba, Rosa multiflora, Rubus* species, *Vinca* species
11. Percent of herbaceous and woody plant cover 0' to 3' tall	49%
12. List of major invasive plant species and percent cover	*Arthraxon hispidus, Celastrus orbiculatus, Lonicera japonica, Microstegium vimineum, Pyrus calleryana, Rosa multiflora* – 70% herbaceous
13. Number of standing dead trees 6" dbh or greater	1
14. Comments	Rain has occurred within the past 24 hours. The forest stand is located north of WUS WL001, along utility option #1. There is a moderate amount of understory, and herbaceous coverage.

Property: Ellicott City **Prepared By:** AK, KM

Stand #: B **Plot #:** 1 **Plot Size:** 1/10 Acre **Date:** 11/17/2017

Basal Area in sf/acre: 140	**Size Class of trees >20' height within sample plot**															
Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9" dbh			# of Trees > 30" dbh			
Crown Position	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Total**
Acer saccharum			18	3	3	4	4		1							33
Fraxinus pennsylvanica				1			3			2						6
Acer negundo			1		2	1	1	1								6
Acer rubrum					1								1			2
																0
																0
																0
																0
																0
																0
																0
																0
Total Number of Trees per Size Class	19			15			10			2			1			47
Number & Size of Standing Dead Trees				1												1

List of Common Understory Species 3' - 20':
Acer saccharum, Lonicera japonica, Smilax rotundifolia, Toxicodendron radicans

% of Canopy Closure

C	*N*	*E*	*S*	*W*	*Total*
75	80	70	70	90	77

% Understory Cover 3' - 20'

C	*N*	*E*	*S*	*W*	*Total*
0	0	30	0	10	8

Percent of Invasive Cover per Plot (All Layers): 5%

Plot Successional Stage: Early-mid

List of Herbaceous Species 0' - 3':
Lonicera japonica, Toxicodendron radicans

% of Herbaceous Cover 0' - 3'

C	*N*	*E*	*S*	*W*	*Total*
0	10	10	10	10	8

Comments
The sample plot is located on a hillslope between an access road and Mainstreet (Frederick Road). Downed woody debris is present within the sample plot. There is minimal herbaceous coverage within the sample plot.

Property: Ellicott City **Prepared By:** AK, KM

Stand #: B **Plot #:** 2 **Plot Size:** 1/10 Acre **Date:** 11/17/2017

Basal Area in sf/acre: 100	**Size Class of trees >20' height within sample plot**															
Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9" dbh			# of Trees > 30" dbh			
Crown Position	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Dom**	**CoD**	**Other**	**Total**
Acer negundo							1	1								2
Acer saccharum		1	2			3	1									7
Acer saccharinum										1						1
																0
																0
																0
																0
																0
																0
																0
																0
																0
Total Number of Trees per Size Class	3			3			3			1			0			10
Number & Size of Standing Dead Trees																0

List of Common Understory Species 3' - 20':
Acer negundo, Acer saccharum, Lonicera japonica, Rosa multiflora, Rubus species, Toxicodendron radicans, Vaccinium angustifolium

% of Canopy Closure

C	*N*	*E*	*S*	*W*	*Total*
70	80	70	70	90	76

% Understory Cover 3' - 20'

C	*N*	*E*	*S*	*W*	*Total*
10	20	10	20	5	13

Percent of Invasive Cover per Plot (All Layers):
30%, herbaceous

Plot Successional Stage:
Early-mid

List of Herbaceous Species 0' - 3':
Alliaria petiolata, Arthraxon hispidus, Lonicera japonica, Microstegium vimineum, Rubus species

% of Herbaceous Cover 0' - 3'

C	*N*	*E*	*S*	*W*	*Total*
40	40	15	45	5	29

Comments
Plot B-2 is outside the study area.

Property Name: Ellicott City Drainage Improvements	
Location: Ellicott City, Howard Count, Maryland	
Prepared By: AK, KM	**Date: 11/17/2017**

Stand Variable	**Stand B**
1. Dominant/Codominant species	**Dominant:** *Acer negundo, Acer rubrum, Acer saccharinum, Acer saccharum, Fraxinus pennsylvanica*
2. Successional stage	Early-mid
3. Basal area in square feet per acre	120
4. Size class of dominant species	6-11.9," 12-19.9," 20-29.9," 30+"
5. Percent of canopy closure	76.5%
6. Number of tree species per acre	5
7. Common understory species per acre	*Acer negundo, Acer saccharum, Lonicera japonica, Rosa multiflora, Rubus* species, *Smilax rotundifolia, Toxicodendron radicans, Vaccinium angustifolium*
8. Percent of understory cover 3' to 10' tall	10.5%
9. Number of woody plants species 3' to 20' tall	6
10. Common herbaceous species 0' to 3' tall	*Alliaria petiolata, Arthraxon hispidus, Lonicera japonica, Microstegium vimineum, Rubus* species, *Toxicodendron radicans*
11. Percent of herbaceous and woody plant cover 0' to 3' tall	18.5%
12. List of major invasive plant species and percent cover	*Alliaria petiolata, Arthraxon hispidus, Lonicera japonica, Microstegium vimineum, Rosa multiflora* – 17.5%
13. Number of standing dead trees 6" dbh or greater	1
14. Comments	The forest stand is located along utility line option #3. There is a moderate amount of invasive species. Understory cover and herbaceous coverage is low to moderate.

APPENDIX D

Representative Site Photographs

Photographic Record

KCI Technologies, Inc.

Agency: Howard County Department of Public Works
Project: 8600 Main Street Culvert and Drainage Enhancement Project
Project No. – 171705999.056

Photographer: K. Myers
Date: 11/16/17
Frame No. 1
Direction: Southwest
Comments: View of WUS WL001 facing upstream from flag WL001-001.

Photographer: K. Myers
Date: 11/16/17
Frame No. 2
Direction: Northeast
Comments: View of WUS WL001 facing downstream from flag WL001-001.

Photographic Record

KCI Technologies, Inc.

Agency: Howard County Department of Public Works
Project: 8600 Main Street Culvert and Drainage Enhancement Project
Project No. – 171705999.056

Photographer: K. Myers
Date: 11/16/17
Frame No. 3
Direction: Southwest
Comments: View of WUS WL001 facing upstream from flag WL001-005

Photographer: K. Myers
Date: 11/16/17
Frame No. 4
Direction: Northeast
Comments: View of WUS WL001 facing downstream from flag WL001-005

Photographic Record

KCI Technologies, Inc.
Agency: Howard County Department of Public Works
Project: 8600 Main Street Culver and Drainage Enhancement Project
Project No. – 17170599.056

Photographer: K. Myers
Date: 11/16/17
Frame No. 5
Direction: West
Comments: View of WUS WL001 facing upstream from flag WL001-008

Photographer: K. Myers
Date: 11/16/17
Frame No. 6
Direction: East
Comments: View of WUS WL001 facing downstream from flag WL001-012

Photographic Record

KCI Technologies, Inc.
Agency: Howard County Department of Public Works
Project: 8600 Main Street Culvert and Drainage Enhancement Project
Project No. – 17170599.056

Photographer: K. Myers
Date: 11/16/17
Frame No. 7
Direction: South
Comments: View of WUS WL002 facing downstream from flag WL002-001

Photographer: K. Myers
Date: 11/16/17
Frame No. 8
Direction: North
Comments: View of WUS WL002 facing upstream from flag WL002-009

Photographic Record

KCI Technologies, Inc.
Agency: Howard County Department of Public Works
Project: 8600 Main Street Culvert and Drainage Enhancement Project
Project No. – 171705999.056

Photographer: K. Myers
Date: 11/16/17
Frame No. 9
Direction: North
Comments: View of Upland Sample Plot UPL-1.

Photographer: K. Myers
Date: 11/16/17
Frame No. 10
Direction: N/A
Comments: View of Upland Sample Plot UPL-1 soils.

Photographic Record

KCI Technologies, Inc.
Agency: Howard County Department of Public Works
Project: 8600 Main Street Culvert and Drainage and Enhancement Project
Project No. – 171705999.056

Photographer: K. Myers
Date: 11/16/17
Frame No. 11
Direction: South
Comments: View of Forest Stand Delineation Sample Plot FSD A-1 from center

Photographer: K. Myers
Date: 11/16/17
Frame No. 12
Direction: West
Comments: View Forest Stand Delineation Sample Plot FSD A-2 from center

Photographic Record

KCI Technologies, Inc.
Agency: Howard County Department of Public Works
Project: 8600 Main Street Culvert Drainage and Enhancement Project
Project No. – 171705999.056

Photographer: K. Myers
Date: 11/17/17
Frame No. 13
Direction: South
Comments: View of Forest Stand Delineation Sample Plot FSD B-1 from center

Photographer: K. Myers
Date: 11/17/17
Frame No. 14
Direction: West
Comments: View of Upland Sample Plot UPL-2/Forest Stand Delineation Sample Plot FSD B-2 from center.

Photographic Record

KCI Technologies, Inc.
Agency: Howard County Department of Public Works
Project: 8600 Main Street Culvert Drainage and Enhancement Project
Project No. – 171705999.056

Photographer: K. Myers
Date: 11/17/17
Frame No. 12
Direction: N/A
Comments: View of Upland Sample Plot UPL-2 soils

APPENDIX E

Natural Resource, Historic and Cultural Review Correspondence

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

18-MIS-043

September 29th, 2017

Amanda Wagoner
KCI Technologies, INC.
936 Ridgebrook Road
Sparks, MD 21152

Subject: Fisheries Information for the Ellicott City Drainage Improvements, Ellicott City, Howard County, MD.

Dear Ms. Wagoner;

The above referenced project has been reviewed to determine fisheries species near the proposed project. The proposed activities include drainage improvements in Ellicott City Maryland.

The project impacts an unnamed tributary to the Patapsco River which is classified as a Use I stream. Generally no in-stream work is allowed in a Use I streams between March 1st and June 15th of any given year to protect spawning fish. The applicant is encouraged to strictly adhere to the approved sediment and erosion control plan in order to prevent runoff into the affected stream

DNR has documented many resident fish species from the Patapsco River and its nearby tributaries by our Maryland Biological Stream Survey. MBSS data can be accessed via the MDDNR web page at http://streamhealth.maryland.gov, allowing access to resource surveys.

If you have any further questions, please feel free to contact me at 410 260-8736.

Sincerely;

Christopher Aadland

Christopher Aadland
Environmental Review Program

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor
Mark Belton, Secretary
Joanne Throwe, Deputy Secretary

September 29, 2017

Ms. Katherine E. Myers
KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, Maryland 21152

RE: Environmental Review for Ellicott City Drainage Improvements, Ellicott City, Howard County, Maryland.

Dear Ms. Myers:

The Wildlife and Heritage Service has determined that there are no official State or Federal records for listed plant or animal species within the delineated area shown on the map provided. As a result, we have no specific concerns regarding potential impacts or recommendations for protection measures at this time. Please let us know however if the limits of proposed disturbance or overall site boundaries change and we will provide you with an updated evaluation.

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# 2017.1433.ho

United States Department of the Interior
U.S. Fish & Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
410/573 4575

Online Certification Letter

Today's date: 9/6/2017

Project: Ellicott City Drainage Improvements

Dear Applicant for online certification:

Thank you for using the U.S. Fish and Wildlife Service (Service) Chesapeake Bay Field Office online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA).This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

Based on this information and in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), we certify that except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project area. Therefore, no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service is required. 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. For additional information on threatened or endangered species in Maryland, you should contact the Maryland Wildlife and Heritage Division at (410) 260-8573. For information in Delaware you should contact the Delaware Division of Fish and Wildlife, Wildlife Species Conservation and Research Program at (302) 735-8658. For information in the District of Columbia, you should contact the National Park Service at (202) 339-8309.

The U.S. Fish and Wildlife Service also works with other Federal agencies and states to minimize loss of wetlands, reduce impacts to fish and migratory birds, including bald eagles, and restore habitat for wildlife. Information on these conservation issues and how

development projects can avoid affecting these resources can be found on our website (www.fws.gov/chesapeakebay)

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 Chesapeake Bay Field Office Threatened and Endangered Species program at (410) 573-4527.

Sincerely,

Genevieve LaRouche
Field Supervisor

APPENDIX F

Qualification of Preparer

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John R. Griffin, Secretary
Joseph P. Gill, Deputy Secretary

September 6, 2011

Jennifer Bird
1717 Dogwood Dr.
Frederick, MD 21701

Dear Ms. Bird:

The Maryland Department of Natural Resources has reviewed your application for qualified professional status for the purpose of developing Forest Stand Delineations and Forest Conservation Plans. We are happy to inform you that you meet the requirements of COMAR 08.19.06.01 for qualified professional status.

Your name will be included on a list of qualified professionals to be sent to the jurisdictions with authority to review Forest Stand Delineations and Forest Conservation Plans.

Participation by professionals like you is key to successful implementation of the Forest Conservation Act. Thank you for submitting your application.

Sincerely,

Steven W. Koehn

Steven W. Koehn
Director/State Forester

Attachment C

Agency Coordination

- **Agency/Section 106 Coordination Meeting Minutes, June 7, 2019**
- **Agency/Section 106 Coordination Meeting Minutes, August 7, 2019**
- **USFWS Species List generated June 13, 2019, for 8600 Frederick Road High Flow Bypass Pipe Project**
- **Maryland DNR Environmental Review trilogy letter (Overall Mitigation Project), September 10, 2019**
- **Maryland DNR Wildlife and Heritage Service trilogy letter (Overall Mitigation Project), September 10, 2019**
- **Maryland Historic Trust trilogy letter (Overall Mitigation Project), September 10, 2019**
- **See also Attachment B – *8600 Main Street Culvert and Drainage Enhancement Project Natural Resources Inventory* (Appendix E) for additional agency correspondence related to the 8600 Frederick Road High Flow Bypass Pipe Project**

McCORMICK TAYLOR

Ellicott City Safe and Sound Project
Howard County
Agency/Section 106 Coordination Meeting

Date: June 7, 2019
Location: Roger Carter Community Center, Rockwell Room
Time: 10:00 AM

Attendees:

Shaina Hernandez, Howard County, COEX
Peter Conrad, Howard County, DPZ
Beth Burgess, Howard County, DPZ
Sharon Walsh, Howard County, DPW
Zack Hollenbeck, Howard County, DPW
Mark DeLuca, Howard County, DPW
Mark Richmond, Howard County, DPW
Joseph DaVia, United States Army Corps of Engineers
Don Bole, United States Army Corps of Engineers
Scott Watson, United States Army Corps of Engineers
Collin Ingraham, Maryland Historical Trust
Beth Cole, Maryland Historical Trust
Dixie Henry, Maryland Historical Trust
Natalie Loukianoff, Maryland Historical Trust
Duane Felix, Department of Housing and Community Development
Melissa Archer, Department of Housing and Community Development
Debra Correia, Maryland Department of Environment
Amy Hribar, McCormick Taylor, Inc.
Andy McLean, McCormick Taylor, Inc.
Charles Richmond, McCormick Taylor, Inc.
Allison Brewer, McCormick Taylor, Inc.

1. Welcome and Introductions. Beth Burgess (Howard County) opened the meeting and led the introduction of attendees.

2. Project History. Mark DeLuca (Howard County) provided a history of the project. He discussed previous flooding events in 2011, 2016 and 2018 and the efforts of the County to address future flooding. McCormick Taylor, Inc. was directed to develop plans to attempt to reduce floodwaters (velocity and elevation) on Ellicott City's lower Main Street by making improvements on public property only. After the 2018 flood, McCormick Taylor was asked to conduct a re-evaluation to address and look at all possible improvements, expanding beyond the use of public property only. Eighteen (18) potential projects were investigated as part of the study. Based on the results of this study, the previous Howard County administration proposed an action plan which included the acquisition and demolition of ten properties located along lower Main Street. However, following elections in November 2018, the new administration selected to place the project on hold in order to determine whether more historic buildings could be retained while keeping everyone safe and also reducing floodplain impacts. The lower Main Street channel improvements were re-examined and modified to require only four full takes instead of the previous plan for ten demolitions. It was determined that all buildings that straddle the stream were considered obstructions and needed to be modified or removed. Additional plans were developed for the "West End," which are intended to retain or divert as much water as possible. Other projects have been proposed to improve the conveyance system, including culvert and drain improvements.

3. Project Descriptions. Mark Richmond (Howard County) provided descriptions of each of the proposed projects.

Maryland Avenue Culverts: The Maryland Avenue Culverts project will involve the construction of two culverts from Maryland Avenue to Patapsco River, passing beneath the CSX railroad and Ellicott City Station,

Baltimore & Ohio Railway (designated a National Historic Landmark, NHL). The pipe alignment will be set to avoid/minimize impacts to the two existing buildings. The need for an outlet to the river, under the CSX railroad, will result in the necessity of the removal of four buildings at lower Main Street (within the Ellicott City Historic District). Mark Richmond noted that the construction will include boring under the railroad and may require an open cut under Maryland Avenue. The need for temporary road closure in this area may be necessary but has not yet been determined.

Terraced Floodplain: The Terraced Floodplain project will necessitate removing the rear portion of six buildings located along the south side of Main Street (within the Ellicott City Historic District) in order to allow for conveyance of high storm flows. This project will remove the rear of buildings that were constructed over the stream. Zach Hollenbeck (Howard County) noted that all the buildings in this area will retain their full facades. The remaining portions of the six buildings will still be usable space. It has been determined technically feasible to remove the first floor of the Shoemaker Building (8095 Main Street) and retain the functionality of the upper stories as useable space.

North Tunnel: The North Tunnel is intended to capture the flow beginning near Court Avenue and connect to the Patapsco River upstream of the Main Street bridge. The construction of the tunnel would require boring under the CSX railroad. The tunnel is approximately 1600 feet in length, but the exact alignment and sizing have not been determined. The tunnel would be approximately 12-15 feet in diameter. Mark DeLuca expects that the tunnel would have a concrete liner, but this is still to be determined. Mark Richmond said the entrance to the tunnel would likely have a 35-foot vertical drop and the tunnel itself may extend to a depth of 100 feet below ground surface in places. Baseflow will be maintained in the natural channel by the utilization of a gate; the gate will remain closed except in the event of overflows. The tunnel is considered an overflow tunnel for higher storms and the exact approach for the gate feature has not yet been determined.

Joseph, Scott, and Don (Corps) asked questions concerning the design, construction, and anticipated functionality/purpose of the tunnel, including issues related to safety and gating. Beth Cole (MHT) also requested clarification about gating at the exit, overall length of the tunnel, the need for any ventilation points along the tunnel length, and the need for designated spoils locations. Mark DeLuca noted that vertical shafts may be required for maintenance, emergency access, or ventilation; however, the exact locations of these shafts and their interval along the tunnel have yet to be determined. All safety concerns related to the tunnel will be addressed as plans progress. The specifications for associated gating, debris catchments, and public safety protection measures will be determined as part of final design.

Mark DeLuca noted that boring and rock sampling need to be completed before the conceptual plans can be finalized. The goal is to allow high flow, but prevent debris from blocking the structure opening.

Don Bole (Corps) asked about the use/reuse of any extra materials/spoil material. Mark DeLuca is hoping to have an innovative plan for the spoils, but no plan has been developed at this time. Don also asked about downstream impacts. Andy McLean (McCormick Taylor, Inc.) noted that energy dissipation efforts, which could include riprap, would likely be needed for the Maryland Ave Culverts and North Tunnel projects. Joseph DaVia asked if the tunnel would be developed considering 2 year, 5 year, and 10 year storm events. Andy said they are being considered. It was clarified that the tunnel is not intended or being designed for use as a storage facility. The plan for design and construction of these projects could be through a design build process or a traditional design bid build process. The overall design and construction specifications will be coordinated as part of /with the Master Plan, which is being coordinated through Department of Planning and Zoning.

Beth Cole (MHT) asked if any blasting would be required as part of the tunnel construction. Mark DeLuca indicated that they wanted to minimize any additional vibration. He noted that there will be condition surveys on all adjacent structures. At this time it is not anticipated that blasting would be conducted as part of the tunnel construction; however, a final determination will be made as part of the design process. It is anticipated that vibration monitoring will be conducted as part of this and other applicable projects.

Joseph DaVia stated that CSX should be contacted as a potential consulting party (as part of the Section 106 process) as permitting and access approval from CSX will likely be necessary. Mark Richmond noted that the County has already contacted CSX to discuss the projects that will cross the CSX property.

Don Bole requested clarification that both the Maryland Ave Culverts and North Tunnel were both necessary projects. Andy McLean and Mark Richmond indicated that both individual projects were necessary and that extensive modeling had been completed to determine what projects would be necessary to ensure that the goals of reduced flow velocity, flood elevation, water conveyance, etc. would be met.

West End: 8534 and 8552 Main Street: The project is intended to improve the capacity for water conveyance; the project will consist of adding a second pipe to the existing culvert, the construction of an earthen berm, and the potential removal of several buildings. Mark DeLuca stated that the existing rear asphalt driveway of these parcels form the wall of the existing stream. Though the full impacts of this project are not yet known, the adjacent properties have received repetitive damages from flooding. He also noted that conveyance in this area is limited by the 9' diameter of the current pipe; the amount of water able to enter the pipe is limited and the force of the outflow is causing damage to the adjacent buildings and properties. The project will also include the construction of a berm along Main Street to keep water off the roadway. An existing berm is present, but is constructed on a diagonal and actually pushes water out into the road. The proposed earthen berm would be approximately 3 to 4 feet in height but the exact will be determined in final design. The project will likely result in impacts to properties at this location, including the possible removal of four buildings that currently contribute to the obstruction of water flow. The buildings are located within the Ellicott City Historic District.

Melissa Archer (Department of Housing and Community Development, DHCD) asked if any of the buildings were vacant. Mark DeLuca noted that only one building was vacant (owned by the County). Two others are occupied and one is a garage. Mr. Bole asked if it would be reasonable to relocate the stream to the north in order to avoid impacts to the four structures along Main Street. Mark indicated that this had been considered, but would result in a direct impact to the house on the north side of the stream (Wendy's). To date, this property has not been subject to flood damage. Mr. Bole asked if the utilization of a bridge and an expanded channel was considered. Mark indicated that no landing point is present for that option. Mark expressed that the current plan is considered the best option. All the buildings adjacent to the project location are located within the Ellicott City Historic District. It is assumed that these buildings may be contributing to the historic district (contributing and non-contributing status of buildings in the study area has not yet been confirmed). It was noted that the berm is in the 100-year floodplain.

West End: 8600 Frederick Road: The existing culvert is undersized for its current needs. The project will involve adding complimentary culverts to improve conveyance under the road, which is subject to frequent flooding, the removal of residences that have received significant damage, and streambank stabilization. The project is located within the Ellicott City Historic District. The historical significance of the buildings to be removed have not yet been determined. It is likely that a temporary but limited road closure could be utilized in order to quicken construction.

West End: Rogers Avenue Storm Drain: Currently there is insufficient drainage/capacity at this location which is contributing to the downstream flooding. The project is considered a maintenance project and will include the addition of various inlets to improve capacity. Dixie Henry (MHT) noted that the Maryland Historical Trust has an easement on the Colored School, located along the south side of Main Street at this location. Any planning should take into consideration the MHT easement.

West End: 8777 Main Street: The purpose of the project is to improve water conveyance in this area. Mark DeLuca indicated that water is forced onto the street because the existing culvert cannot handle the current flow. He noted that there are several technical challenges to be overcome, but that the project is critical to public safety. The existing channel is fixed and narrow, as the stream has been channelized via stone wall construction. In addition, an historic residence was subsequently constructed on the channel walls. The house (previously a tavern and lodge), which lies immediately southeast of the culvert, has recently been determined eligible for the National Register of Historic Places; it was also recently purchased by Howard County. The County still needs to look at capacity and size at this location before determining options; considered options will need to avoid causing flooding where it did not occur previously. Potential methods of construction will also need to be a consideration. This project is critical due to high water in the road. This project is outside the Ellicott City Historic District.

Multiple Dry Flood Mitigation Storage Facilities: Mark Richmond provided a description of the dry flood storage facilities. These sites are located outside the Ellicott City Historic District. The facilities will be located along existing stream channels and are intended to mitigate larger storm events. High flow waters will be detained at these facilities and slow-released down stream. Baseflow and smaller stormflows will pass through the facilities unimpeded.

The H-7 and Quaker Mill facilities are already in for permitting. Don Bole asked if NC-3, T-1, and H-4 are new storage facilities. Mark Richmond confirmed that these facilities are new dry storage facilities with baseflow coming through. Mr. Bole asked if the culvert at Quaker Mill would utilize an existing pond. Mark Richmond said it would. H-7 will utilize the inner loop of US40 and US29.

Beth Cole (MHT) requested clarification regarding the status of the Church and Emory Streets Storm Drain Improvements project and their association with the overall Safe and Sound Project. Ms. Cole indicated that MHT had recently received information regarding a grant request for this project. MHT received this project as a bond bill and wanted to know if it was being considered as part of these projects. Mark DeLuca indicated that the projects consists of the placement of storm drains as a maintenance activity and not as a storm water mitigation activity. These activities will be limited to within the roadway and serve to enhance the current system. Mark Richmond reiterated that the project was similar to Rogers Avenue and dealt with storm drain improvements. As the project will be contained within the roadway, the project is not expected to impact any structures. Mark Richmond indicated that the County has applied to FEMA to help with the funding of the project. Don Bole and Joe DaVia questioned the plan for filing the project. Mark Richmond indicated that the project does not impact streams or Waters of the US.

4. Emergency Project – Caplan's Department Store

Zack Hollenbeck (Howard County) provided a description of the partial demolition of Caplan's Department Store. The demolition project is to be County funded. Mr. Hollenbeck reported that Howard County's Historic Preservation Committee (HPC) has approved the removal of the back of Caplan's Department Store due to traumatic structural failure and collapse. He noted that the project was being undertaken as an emergency due to safety concerns. No discharge into the stream is expected. It is understood that any stream diversion or allowance

of debris to enter the stream would require a permit (State and/or Federal). A netting catchment system will be installed over the stream and no fill material will be allowed to enter the stream. Mr. Hollenbeck also indicated that the back brick wall of Caplan's will also be repaired. He indicated that additional structural and flood debris would be removed in order to determine the presence and stability of any remaining structural elements and assist in developing/formalizing a plan for stabilization. Joseph DaVia reiterated that any discharge in the stream would require federal permit. He stressed that the County should make sure that a project description is prepared and includes all known activities. Debra Correia (MDE) said no permitting is required if the project only involves repairs to the existing wall and there are no activities planned within the stream. Joseph DaVia suggested that Howard County think about an outreach plan as the Corps anticipates receiving calls from the public/interested parties pertaining to the demolition and its prior approval/permitting.

Beth Cole (MHT) expressed concerns that this could appear as an anticipatory demolition in advance of the Corps' permit and to avoid Section 106. She questioned whether the demolition would need to be required as part of the overall group of projects being considered to address flood mitigation effects. Zach Hollenbeck stated that this would be undertaken regardless of other projects due to the concern for public safety. Shania Hernandez noted that the public safety aspect of the demolition has been extensively advertised to the public and the County has been transparent about the need; to date, no public opposition to the demolition has been expressed. Mr. Hollenbeck also noted that the project will result in the preservation of the building north of the channel, with only the rear section (over the channel) being removed; the building façade will be stabilized and reconstructed in a future phase.

Duane Felix (DHCD) asked about the cost of the demolition. Zach Hollenbeck stated that the demolition cost is approximate $600,000, which includes stabilization and weatherproofing.

Howard County will provide a project description to the reviewing agencies stating the purpose and need of the project. The letter will define the emergency need for the removal of sections of Caplan's Department Store and the proposed plans. A "no permit required" letter from MDE and the Corps should be requested by the County to document that the County has coordinated with these agencies regarding the potential need for a permit. Zach will submit project information to the Corps and MDE to obtain those letters. The County has proposed a July 1, 2019 start for the Caplan's Department Store demolition. Debra Correia (MDE) indicated that MDE has an expedited process for emergency projects, which the County has used previously in emergency situations.

5. Permitting Process

The attendees discussed the permitting process for the proposed projects. The options of a single permit versus multiple permits was discussed. Mark Richmond suggested a series of individual permits due to the timing of when each project will be ready to go to construction. The opinion of the review agencies was solicited. Beth Cole (MHT) indicated that it would be the Corps decision, if they are the lead Federal agency. Joseph DaVia asked if there was Federal funding for any of the projects. Mark Richmond reported that a FEMA Hazard Mitigation Grant Program (HMGP) was being used for the 8600 Frederick Road Culvert Improvement project. The County has also applied for additional FEMA funding for H-7, Church and Emory Streets Storm Drains Improvements, and Maryland Avenue Culverts through a Pre-Disaster Mitigation (PDM) grant. Mark Richmond is expecting to receive and update from FEMA in May or June with a formal notification in Fall 2019. Beth Cole (MHT) said that if FEMA is funding the projects, then FEMA could become the lead agency for permitting. She noted that MHT (and Preservation Maryland) has a Programmatic Agreement with FEMA for project review. For projects not funded by FEMA and requiring a Joint Permit Application (JPA), the Corps should be the lead agency. Shaina noted that DHCD is providing $700,000 for cleaning up and stabilization of the lower Main Street buildings. She was not aware of any additional Federal funding.

Mark DeLuca questioned how the permitting process would be handled if the projects were not all complete and ready to go at the same time; as a result of various planning/funding constraints the designs for all proposed projects have not yet been advanced. Joseph DaVia indicated that the County should present what is reasonably foreseeable. Mr. DeLuca indicated that a timetable could be provided regarding when projects / phases of construction were anticipated/planned. Don Bole asked if the projects can stand on their own and would not be contingent on the functioning of another project. Mark Richmond said that the projects could be "stand alone," but are intended to work together collectively (have a net impact). Joseph DaVia asked for a clear description of each of the projects and a statement on whether they could stand on their own as projects.

Beth Cole (MHT) asked if the County could determine which projects have potential to impact historic properties. She suggested permitting projects within the Historic District/those with potential historic impacts separately from those unlikely to have historic impacts. Ms. Cole asked that FEMA be involved in discussions with the Corps to determine if they will be the lead Federal agency (for some or all the projects). She indicated that the use of a spreadsheet could be helpful in order to determine permitting.

The potential resolution of adverse effects to historic resources was discussed as a potential factor in determining the most appropriate permitting/review process. Several projects appear to have the potential to result in an adverse effect finding due to the proposed demolition of various structures, many of which are contributing elements of the Ellicott City Historic District. Concerns were expressed over the potential need to develop individual agreement documents for each project. MHT indicated they would prefer to discuss mitigation of adverse effects within a single agreement document versus agreement documents for each project. MHT also expressed concerns regarding their ability to assess/address cumulative effects between individual permits.

Joseph DaVia asked about the justification for and the pros and cons of utilizing one individual permit, rather than permitting each project with their own permits. Don Bole stated that an individual permit is valid for up to 10 years, while a general permit is only valid for up to 2 years. It was asked if it would be beneficial to separate projects that fall outside the Ellicott City Historic District for permitting purposes. It was suggested that a general permit could be prepared for those undertakings not impacting the historic district. Mark Richmond expressed interest in this option as there are concerns that one project / one part of the overall program could potentially hold up other aspects. Mr. DaVia agreed that separating projects regarding those with or without historic concerns is a valid consideration.

Scott Watson (Corps) indicated on behalf of the Corps, that the agency would like to consult with FEMA regarding how to proceed as it is likely not advantageous to split the projects between the two agencies. Beth (MHT) requested that a conference call be scheduled between the Corps, FEMA, and MHT to discuss what permits they have received and their willingness to participate. She indicated that should would be willing to initiate contact with FEMA regarding an agency to agency meeting. It was acknowledged that this larger issue needs to be resolved before additional aspects of the Section 106 process are discussed, including consulting parties. Once the lead agency has been determined, the chain of command and overall review process can be finalized.

Don Bole asked if the County had looked at areas in the floodplain within the stream channel for additional storage areas. Mark Richmond stated that McCormick Taylor was tasked to look at all possible options and determine where opportunities for expanding floodplain storage that would "move the needle." No other significant locations were identified for floodplain storage.

Dixie Henry requested a spreadsheet that would clearly outline the impacts, funding, permits required, and any other relevant information for each project once determined. She stated that eventually MHT will need to be informed of project plans, disposal sites, staging areas, wetland mitigation sites, etc. and other information about potential impacts to historic resources as part of the review process. Information about all of the alternatives considered for the project(s) and how the preferred alternative was selected/arrived upon will also be required.

Scott Watson (Corps) noted that consideration of historic preservation issues has been a factor in the project development to this point. He agreed that the steps taken to reduce or minimize impacts to historic resources needs to be documented. The Federal agencies need to see the process of why this project is the best alternative. Howard County will prepare information to detail the purpose and need(s), how various alternatives were examined and how historic preservation was taken into consideration. Mr. Watson asked if the National Register nomination form for the Ellicott City Historic District recorded all the contributing and non-contributing elements. Natalie Loukianoff (MHT) stated that the nomination form was completed during the 1980s and did not include an itemized list of contributing and non-contributing elements. Ms. Loukianoff indicated that MHT's National Register Administrator had recently reviewed the form and information concerning all of the buildings under consideration for inclusion within the Historic District; it is not anticipated that extensive updates to the form would be necessary as part of this project(s).

The Corps and MHT expressed their appreciation for the meeting and indicated they intended to continue to work closely with the County on the project.

Site Visit: A site visit to lower Main Street was held following the conclusion of the meeting. During the site visit, Zach identified the four buildings that were planned for removal as part of the Maryland Avenue Culverts project and the portions of the six buildings to be removed as part of the Terraced Floodplain project (those overlying/extending over the current stream channel only). MHT expressed its preference that the existing stone walls of the channel be incorporated in the design/retained as part of the channel support. Attendants of the site visit were then given street view access to the interior of Caplan's Department Store. The approximate location and trajectory of the Maryland Avenue Culverts between the two extant Ellicott Station buildings was then field viewed and the conceptual plans/construction methods were discussed. Beth Cole (MHT) noted that the Maryland Historical Trust has an easement associated with the Ellicott Station and reiterated to the group that it is a NHL. Following the lower Main Street site visit, the attendants were encouraged to visit/windshield view any remaining project locations of interest as available.

During the site visit, Scott Watson (Corps), Dixie Henry (MHT), and Allison Brewer (MT) discussed the observed disturbance within the lower Main Street project area. Based on the topography, observed disturbance from repeated flooding/scouring, and the limitations of the proposed demolition (confined to structures overlying the active stream channel), it was agreed that the archaeological potential and/or archaeological integrity of the project area was low. All parties agreed that a memo outlining the existing conditions and assessment would be sufficient documentation. It was also agreed that once the plans/permit areas for the remaining projects were more formalized, additional discussions would be had regarding the potential need for associated archaeological survey.

McCORMICK TAYLOR

Action Items:

Action Item	Responsible Party	Status
Spreadsheet of Project Activities	Howard County	Complete
Determine Lead Agency	Corps, Maryland Historical Trust	Complete
Confirm FEMA Funding	Howard County	Complete
Include CSX as potential Consulting Party	Howard County	Complete
Provide project description for Caplan's Department Store for "No Permit Required" Letter	Howard County	Complete
Prepare "No Permit Required" Letter for Caplan's Department Store	MDE, Corps	Complete (Corps)

The meeting minutes have been prepared in an effort to accurately record the proceedings. If you have any revisions or corrections to the minutes, please provide that information to Charles Richmond at 717-540-6040 or carichmond@mccormicktaylor.com within 14 days.

McCORMICK TAYLOR

Ellicott City Safe and Sound Project
Howard County
Agency/Section 106 Coordination Meeting

Date: August 7, 2019
Location: 9801 Broken Land Parkway, Columbia, MD
Time: 2:00 PM

Attendees:
Shaina Hernandez, Howard County, COEX
Beth Burgess, Howard County, DPZ
Sharon Walsh, Howard County, DPW
Zack Hollenbeck, Howard County, DPW
Mark Richmond, Howard County, DPW
Joseph DaVia, United States Army Corps of Engineers (USACE)
Don Bole, United States Army Corps of Engineers (USACE)
Beth Cole, Maryland Historical Trust (MHT)
Natalie Loukianoff, Maryland Historical Trust (MHT)
Bill Sieger, Maryland Department of Environment (MDE)
Charles Richmond, McCormick Taylor, Inc.

Mark Richmond opened the meeting and led the introduction of the attendees. He noted that the meeting is intended to discuss the permit application process as related to the Section 106 review process and resolve whether a single permit/106 process is appropriate or whether there is a need to break up the projects into individual permits/processes. The Corps has been established as the lead agency.

Sharon Walsh stated that clean-out work had begun on Caplan's Department Store, which received a No Permit Required letter from the Corps. She indicated that no discharge into the Tiber River is anticipated for the stabilization projects. Additional stabilization projects along Main Street are pending. These have been submitted for review by the Department of Housing and Community Development (DHCD) and Maryland Historical Trust (MHT), as the efforts are being funded by a mix of DHCD Grant and County funds. The County has submitted these projects to USACE and requested a No Permit required declaration.

Mark Richmond reported that there are five projects outside the Ellicott City Historic District and that those projects would each have their own separate JPA and would not be included with the JPA for the project activities within the historic district. These projects consist of flood mitigation storage sites and several have already begun the permitting process.

Natalie Loukianoff indicated that the 8777 Frederick Rd Culvert Improvement Project is outside the Ellicott City Historic District, but is located within the Frederick Road Survey District, which MHT considers to be part of the historic district. She also noted that the Shoemaker Building, 8095 Main Street, is recorded as a contributing element of the Ellicott City Historic District, even though it was rebuilt in 2001.

Beth Cole stated that the applicant and review agencies need to start looking at the projects as a whole, unified undertaking, rather than piecemeal projects.

Mark Richmond expressed concerns about the timing of project activities, indicating that some project designs could be completed and ready to advance before others. Beth Cole stated that there are benefits to addressing all the projects together, including the ability to address the cumulative impacts of the projects. Joe DaVia reported

that it may be possible to develop a Programmatic Agreement specific to this undertaking. He listed the projects that had the greatest potential to have impacts, which included the Terraced Floodplain (which was the original project from the 2018 JPA, but is no longer an accurate descriptor of the project) and Maryland Avenue Culverts. The group discussed the possibility of lumping projects together based on their level of impacts.

Mark Richmond said that the Corps is currently performing a peer review of the County's overall approach to addressing flood mitigation in downtown Ellicott City.

The 8777 Frederick Road Culvert Improvement Project was discussed. The project will require MDE and Corps review due to the activities involving the stream. The Erlougher's Tavern, HO-364, at that location, has been determined to be eligible for the National Register of Historic Places (NRHP). Sharon Walsh noted that the possibility of relocating the house was considered. Natalie Loukianoff stated that 8777 Frederick Road is within the Frederick Road Survey District and that the district is considered to be an extension of the Ellicott City Historic District.

Mark Richmond noted that the county has a 5-year plan to implement the proposed undertakings. It is not feasible to design and construct all the projects at the same time, so it is anticipated that there will be a staggered schedule to complete projects. Mark discussed the project activities that were part of the Terraced Floodplain work. This originally called for the removal of ten buildings and landscaping activities, but has been revised to include the removal of four buildings and partial removals of six additional buildings. The buildings with partial removals will remain and will continue to be utilized.

Howard County has proposed work at four properties (8125, 8085, 8081, and 8109-8111-8113 Main Street) and has requested a determination from MDE and USACE if a permit is required for the work. At the time of the meeting Howard County had previously received a 'no permit required' letter from USACE for 8125 Main Street. The remaining three properties were discussed and the USACE noted that they would issue a 'no permit required' letter for those properties. (Howard County has subsequently received said letter). This confirms that the work proposed is not subject to USACE review. MDE asked if Howard County had received any documentation from them. Zach noted that they had not, but that Mark Richmond had discussed the ongoing efforts with MDE. (The county has subsequently received documentation from MDE with regards to 8085, 8081, and 8109-8111-8113Main Street). The group also discussed the removal of the rear of 8125 Main Street as an emergency undertaking due to its condition.

These efforts are utilizing State (DHCD) and County funding. The stabilization efforts do not include the removal or demolition of any part of the structures and should be considered separate from the rear removal. The stabilization activities are not expected to discharge any materials into the Tiber River.

Natalie Loukianoff questioned if the six partial removals required MDE approval. Sharon said that the rear removals were not part of any submissions that have been made to the Corps/MDE. The removals will need to be addressed as part of the Section 106 review. If MDE approval is required, it should be incorporated into the Section 106 review to minimize any potential agreement documents.

Don Bole asked about other priority projects. These include Quaker Mill Pond and Hudson 7 Pond (H-7). These projects will be reviewed by separate permits and will not require Section 106 review. Mark Richmond indicated that some of these projects have begun the permitting process.

Mark Richmond stated that the current permit for the Lower Main Street project, which included the Terraced Floodplain, is on hold. It is the county's perspective that a single, new JPA should be proposed. The new JPA

would include the Terraced Floodplain, Maryland Avenue Culverts, North Tunnel, and other conveyance projects located within the Ellicott City Historic District.

Joe DaVia indicated that the Corps would want a new JPA to address the proposed undertakings. The previous JPA should be withdrawn. The new JPA should include the Maryland Avenue Culverts, Terraced Floodplain (which now includes the removal of four buildings and partial removal of six buildings), North Tunnel, 8534 Frederick Road High Flow Bypass Pipe, 8552 Frederick Road Flood Berm, 8600 Frederick Road culvert project, and 8777 Frederick Road projects. Howard County will contact KCI regarding the status of 8600 Frederick Road. It was suggested that the timeframe for the completion of the Section 106 review process could require between 6 to 12 months. Mark Richmond will update the summary table of projects to break out and rename the old Terraced Floodplain item to reflect one item for the complete removal of four buildings and another item for the partial removal of six buildings. (The revised table is attached to these meeting minutes.)

The subject of salvaging materials from any of the partial or full demolitions was discussed. The salvaging of historic building elements should be considered as a potential mitigation measure as part of the Section 106 review process.

Shaina Hernandez asked about what efforts could be made to expedite the Section 106 process. She noted the county will do all that it can to ensure the process proceeds in a timely and efficient manner. She also noted that the public is very aware of the project and appreciates updates/notifications of the project's progress.

Beth Cole suggested that the county could incorporate information on the Section 106 process on its website. Shaina Hernandez noted that information for the project website was being drafted at this time. She also stated that it would be useful to provide updates to the public on the progress of the process through social media, including the EC Safe and Sound Facebook page. Shaina requested the USACE and all parties to feed project updates to the County in order to provide information to the public.

Charles Richmond stated that there were currently fifty-one potential consulting parties that are expected to be invited to participate in the Section 106 process, including organizations and property owners. The list of potential consulting parties will be finalized after the permit areas for each project is complete. The list will be provided to the Corps for review.

McCormick Taylor, Inc. will be responsible to draft a new JPA. Mark Richmond thought it would be possible to get a new JPA within approximately three weeks. Joe DaVia and Bill Sieger both noted that following the submission of the JPA there will most likely need to be a public hearing due to the potential impacts of the project. The public hearing could be scheduled 30 days from the conclusion of the Corps/MDE JPA review. The County would like to shoot for the public hearing to take place in early November if possible.

Action Items:

- USACE will provide "no permit required" letters for 8085, 8081, and 8109-8111-8113 Main Street
- Prepare Joint Permit Application (McCormick Taylor, Inc.)
- Contact KCI regarding the status of 8600 Frederick Road (Howard County)
- Finalize list of potential consulting parties (McCormick Taylor, Inc.)
- Submit Joint Permit Application to Corps and MDE for review (Howard County)

The meeting minutes have been prepared in an effort to accurately record the proceedings. If you have any revisions or corrections to the minutes, please provide that information to Charles Richmond at 717-540-6040 or carichmond@mccormicktaylor.com within 7 days.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127
http://www.fws.gov/chesapeakebay/
http://www.fws.gov/chesapeakebay/endsppweb/ProjectReview/Index.html

In Reply Refer To: June 13, 2019
Consultation Code: 05E2CB00-2019-SLI-1550
Event Code: 05E2CB00-2019-E-03908
Project Name: Ellicott City West End Culvert and Drainage Improvements

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
(410) 573-4599

Project Summary

Consultation Code: 05E2CB00-2019-SLI-1550

Event Code: 05E2CB00-2019-E-03908

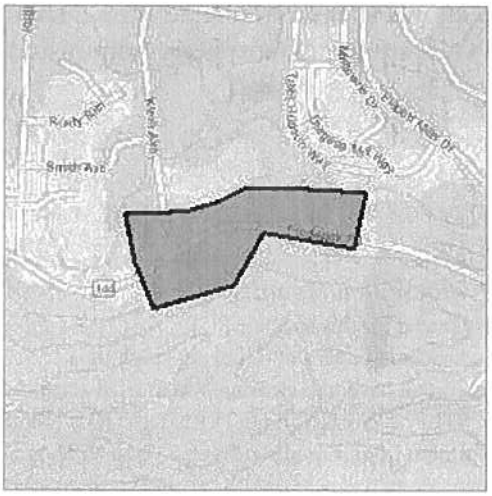
Project Name: Ellicott City West End Culvert and Drainage Improvements

Project Type: WATER SUPPLY / DELIVERY

Project Description: KCI has been contracted by the Howard County Department of Public works to provide design engineering services for the Ellicott City West End Culvert and Drainage Improvements Project.

Project Location:

- Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/39.26926635160791N76.80702486807922W



Counties: Howard, MD

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis*	Threatened

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- Projects with a federal nexus that have tree clearing = to or > 15 acres: 1. REQUEST A SPECIES LIST 2. NEXT STEP: EVALUATE DETERMINATION KEYS 3. SELECT EVALUATE under the Northern Long-Eared Bat (NLEB) Consultation and 4(d) Rule Consistency key

Species profile: https://ecos.fws.gov/ecp/species/9045

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R5UBH

McCORMICK TAYLOR

September 20, 2019

Mr. Tony Redman, Director
Environmental Review Division
Maryland Department of Natural Resources
Fisheries Service
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401

RE: The Howard County Department of Public Works, Storm Water Management Division Bureau of Environmental Service — Ellicott City – Safe and Sound Plan – Flood Mitigation Projects, Howard County, Maryland

Dear Mr. Redman,

As part of the Safe and Sound plan for Ellicott City, the Howard County Department of Public Works. Storm Water Management Division, Bureau of Environmental Services is proposing seven projects along the Main Street corridor to provide improved conveyance for large storm events and reduce the potential of flooding. The seven projects are in various stages of design, and generally include floodplain grading, enlarged conveyance structures, additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity. The westernmost project is located at approximately 8777 Frederick Road and the easternmost project is located along the Patapsco River in downtown Ellicott City. The seven projects included within this package are listed below, along with brief descriptions of each:

- 8777 Frederick Road Culvert Improvement Project– Project includes channel and floodplain grading upstream and downstream of existing crossing below Frederick Road to increase channel conveyance capacity. Existing crossing below Frederick Road will be expanded to approximately 40' wide. The existing structure at 8777 Frederick Road may potentially be displaced from its current location for floodplain grading and installation of the new crossing. The property at 8777 Frederick Road (HO-364) has been determined to be eligible for the National Register of Historic Places.
- 8600 Frederick Road High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream of current entrance to existing 96"/108" CMP cross culvert to expand the channel and increase capacity. A headwall structure at the upstream end will include a weir to direct high flows into five (5) bypass culverts, while maintaining base flow through the existing culvert. The downstream end of the existing culvert will be shifted upstream to a new endwall location, opening up stream that is currently inside the 96"/108" CMP cross culvert. The bypass pipes will discharge at this same outfall location. The bypass pipe installation may potentially displace four existing structures at addresses: 8611 Frederick Road, 8601 Frederick Road, 8590 Main Street, and 8578 Main Street. The project may potentially impact historic resources at addresses 8637-8639 Frederick Road, and 8629 Main Street, which are located within the National Register listed Ellicott City Historic District (HO-78) and National Register eligible Frederick Road Survey District (H)-899).
- 8552 Main Street Flood Berm/8534 Main Street High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream and downstream of a proposed 8' diameter cross culvert that will be placed parallel to the existing 8' CMP culvert. The proposed cross culvert will improve

conveyance of high flows through the area. The flood berm at 8552 Main Street is designed to minimize floodplain flows from entering Frederick Road. Grading at downstream end of culverts may include potential displacement of structures with addresses 8526 – 8522 Main Street, 8518 Main Street, and 8512 Main Street. The flood berm may potentially displace or impact historical resources at addresses 8548-8552 West Main Street and 8556-8560 West Main Street. These properties are located within the Ellicott City Historic District.

- Lower Main Street Channel Constriction Removal Project – Project includes removing constrictions over the existing stream channel to restore conveyance capacity of the channel. The back of 6 buildings located over the existing stream channel will be removed from the 100-year floodplain, for 8081 Main Street (deck only), 8085-8089 Main Street, 8095-8101 Main Street (first floor only), 8109-8111-8113 Main Street, and 8125 Main Street. This includes HO-359, HO-586, HO-360 in MHT records and are located within the Ellicott City Historic District.
- Lower Main Street Terraced Floodplain Project – Project includes removing Tiber Alley, and 4 buildings located over the existing stream channel (8069, 8059, 8055, and 8049 Main Street). This includes HO-330 and HO-669 in MHT records. All of the buildings are located within the Ellicott City Historic District.
- Maryland Avenue High Flow Bypass Culverts Project – Project includes channel grading in Hudson/Tiber to facilitate bypass of high flows into a proposed headwall for two 10' diameter bypass culverts to relieve flooding. Bypass culverts will convey high flows between B&O museum buildings, below CSX railroad to the Patapsco River. MD Ave bypass culverts outfall will be stabilized with riprap and adequate energy dissipation measures. Project may potentially impact the historic Ellicott City Station of the B&O Railway (HO-71), which is located within the Ellicott City Historic District.
- North Tunnel Project – Project includes channel and floodplain grading at upstream end of proposed tunnel location to install entrance structure for the proposed high flow, bypass. High flow bypass will be approximately 15' in diameter and will convey flow beneath Court Avenue approximately 1600' to outfall in the Patapsco River, upstream of the Main Street bridge. The details of the entrance structure have not been defined, but impact plates provide schematic representation of potential design. The tunnel outfall will be stabilized with riprap and adequate energy dissipation measures. The project is set within the Ellicott City Historic District.

We request any information concerning fisheries or additional water quality requirements that may occur in the study area. Please send your response to the attention of Amy Hribar at McCormick Taylor, 509 South Exeter Street, Baltimore, MD 21202 or via email at alhribar@mccormicktaylor.com.

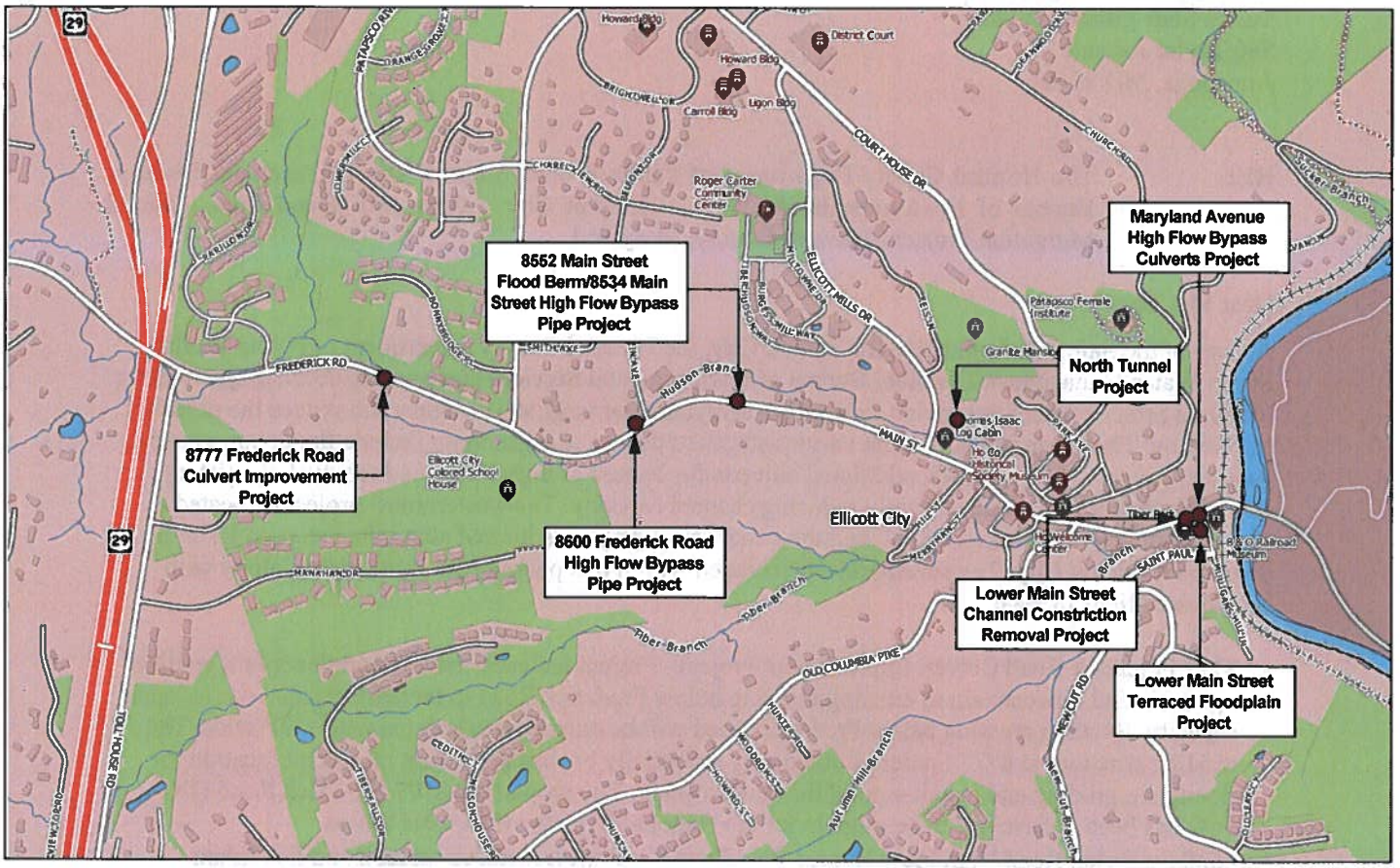
If you have any questions or if you would like additional information, please contact Amy Hribar at (410) 662-7400. Thank you for your consideration regarding these project activities.

Sincerely,

Amy Hribar, PE, CFM
Water Resources Senior Manager
McCormick Taylor, Inc.

Enc.

cc: Mark Richmond, PE, Chief, Howard County Government – Storm Water Management Division
Chris Brooks, PE, McCormick Taylor
Andy McLean, PE, McCormick Taylor



HOWARD COUNTY MARYLAND

McCORMICK TAYLOR

Ellicott City Safe and Sound Plan Flood Mitigation Projects

Ellicott City, Howard County, MD

N W E S

1,000 feet

Source: https://data.howardcountymd.gov/InteractiveMap.html?Workspace=EC_Flood_Mitigation_Projects

McCORMICK TAYLOR

September 20, 2019

Mrs. Lori Byrne, Environmental Review Division
Maryland Department of Natural Resources
Wildlife and Heritage Service
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401

RE: The Howard County Department of Public Works, Storm Water Management Division Bureau of Environmental Service — Ellicott City – Safe and Sound Plan – Flood Mitigation Projects, Howard County, Maryland

Dear Mrs. Byrne,

As part of the Safe and Sound plan for Ellicott City, the Howard County Department of Public Works. Storm Water Management Division, Bureau of Environmental Services is proposing seven projects along the Main Street corridor to provide improved conveyance for large storm events and reduce the potential of flooding. The seven projects are in various stages of design, and generally include floodplain grading, enlarged conveyance structures, additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity. The westernmost project is located at approximately 8777 Frederick Road and the easternmost project is located along the Patapsco River in downtown Ellicott City. The seven projects included within this package are listed below, along with brief descriptions of each:

- 8777 Frederick Road Culvert Improvement Project– Project includes channel and floodplain grading upstream and downstream of existing crossing below Frederick Road to increase channel conveyance capacity. Existing crossing below Frederick Road will be expanded to approximately 40' wide. The existing structure at 8777 Frederick Road may potentially be displaced from its current location for floodplain grading and installation of the new crossing. The property at 8777 Frederick Road (HO-364) has been determined to be eligible for the National Register of Historic Places.
- 8600 Frederick Road High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream of current entrance to existing 96"/108" CMP cross culvert to expand the channel and increase capacity. A headwall structure at the upstream end will include a weir to direct high flows into five (5) bypass culverts, while maintaining base flow through the existing culvert. The downstream end of the existing culvert will be shifted upstream to a new endwall location, opening up stream that is currently inside the 96"/108" CMP cross culvert. The bypass pipes will discharge at this same outfall location. The bypass pipe installation may potentially displace four existing structures at addresses: 8611 Frederick Road, 8601 Frederick Road, 8590 Main Street, and 8578 Main Street. The project may potentially impact historic resources at addresses 8637-8639 Frederick Road, and 8629 Main Street, which are located within the National Register listed Ellicott City Historic District (HO-78) and National Register eligible Frederick Road Survey District (H)-899).
- 8552 Main Street Flood Berm/8534 Main Street High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream and downstream of a proposed 8' diameter cross culvert that will be placed parallel to the existing 8' CMP culvert. The proposed cross culvert will improve conveyance of high flows through the area. The flood berm at 8552 Main Street is designed to

minimize floodplain flows from entering Frederick Road. Grading at downstream end of culverts may include potential displacement of structures with addresses 8526 – 8522 Main Street, 8518 Main Street, and 8512 Main Street. The flood berm may potentially displace or impact historical resources at addresses 8548-8552 West Main Street and 8556-8560 West Main Street. These properties are located within the Ellicott City Historic District.

- Lower Main Street Channel Constriction Removal Project – Project includes removing constrictions over the existing stream channel to restore conveyance capacity of the channel. The back of 6 buildings located over the existing stream channel will be removed from the 100-year floodplain, for 8081 Main Street (deck only), 8085-8089 Main Street, 8095-8101 Main Street (first floor only), 8109-8111-8113 Main Street, and 8125 Main Street. This includes HO-359, HO-586, HO-360 in MHT records and are located within the Ellicott City Historic District.
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We request any information concerning state-listed or endangered plant or animal species and/or any unique habitat that may occur in the study area. Please send your response to the attention of Amy Hribar at McCormick Taylor, 509 South Exeter Street, Baltimore, MD 21202 or via email at alhribar@mccormicktaylor.com.

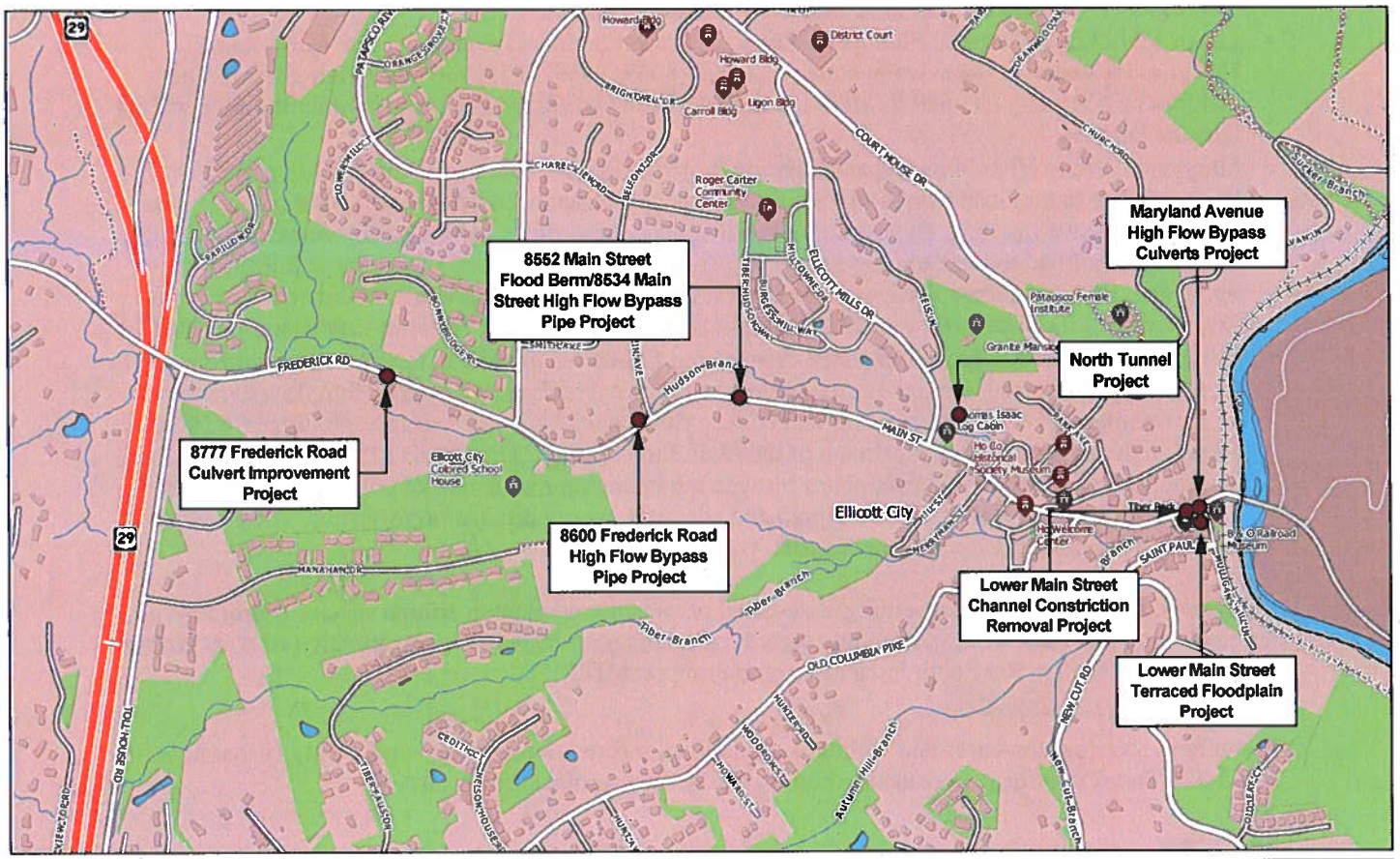
If you have any questions or if you would like additional information, please contact Amy Hribar at (410) 662-7400. Thank you for your consideration regarding these project activities.

Sincerely,

Amy Hribar, PE, CFM
Water Resources Senior Manager
McCormick Taylor, Inc.

Enc.

cc: Mark Richmond, PE, Chief, Howard County Government – Storm Water Management Division
Chris Brooks, PE, McCormick Taylor
Andy McLean, PE, McCormick Taylor



HOWARD COUNTY MARYLAND

McCORMICK TAYLOR

Ellicott City Safe and Sound Plan Flood Mitigation Projects

Ellicott City, Howard County, MD

N W E S

1,000 feet

Source: https://data.howardcountymd.gov/InteractiveMap.html?Workspace=EC_Flood_Mitigation_Projects

McCORMICK TAYLOR

September 20, 2019

Ms. Elizabeth Hughes
State Historic Preservation Officer
Maryland Historic Trust
100 Community Place, 3rd Floor
Crownsville, MD 21032-2023

RE: The Howard County Department of Public Works, Storm Water Management Division Bureau of Environmental Service — Ellicott City – Safe and Sound Plan – Flood Mitigation Projects, Howard County, Maryland

Dear Ms. Hughes,

As part of the Safe and Sound plan for Ellicott City, the Howard County Department of Public Works. Storm Water Management Division, Bureau of Environmental Services is proposing seven projects along the Main Street corridor to provide improved conveyance for large storm events and reduce the potential of flooding. The seven projects are in various stages of design, and generally include floodplain grading, enlarged conveyance structures, additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity. The westernmost project is located at approximately 8777 Frederick Road and the easternmost project is located along the Patapsco River in downtown Ellicott City. The seven projects included within this package are listed below, along with brief descriptions of each:

- 8777 Frederick Road Culvert Improvement Project– Project includes channel and floodplain grading upstream and downstream of existing crossing below Frederick Road to increase channel conveyance capacity. Existing crossing below Frederick Road will be expanded to approximately 40' wide. The existing structure at 8777 Frederick Road may potentially be displaced from its current location for floodplain grading and installation of the new crossing. The property at 8777 Frederick Road (HO-364) has been determined to be eligible for the National Register of Historic Places.
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minimize floodplain flows from entering Frederick Road. Grading at downstream end of culverts may include potential displacement of structures with addresses 8526 – 8522 Main Street, 8518 Main Street, and 8512 Main Street. The flood berm may potentially displace or impact historical resources at addresses 8548-8552 West Main Street and 8556-8560 West Main Street. These properties are located within the Ellicott City Historic District.

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- North Tunnel Project – Project includes channel and floodplain grading at upstream end of proposed tunnel location to install entrance structure for the proposed high flow, bypass. High flow bypass will be approximately 15' in diameter and will convey flow beneath Court Avenue approximately 1600' to outfall in the Patapsco River, upstream of the Main Street bridge. The details of the entrance structure have not been defined, but impact plates provide schematic representation of potential design. The tunnel outfall will be stabilized with riprap and adequate energy dissipation measures. The project is set within the Ellicott City Historic District.

We request any information concerning historic or architectural resources within the area of potential effect. Please send your response to the attention of Amy Hribar at McCormick Taylor, 509 South Exeter Street, Baltimore, MD 21202 or via email at alhribar@mccormicktaylor.com.

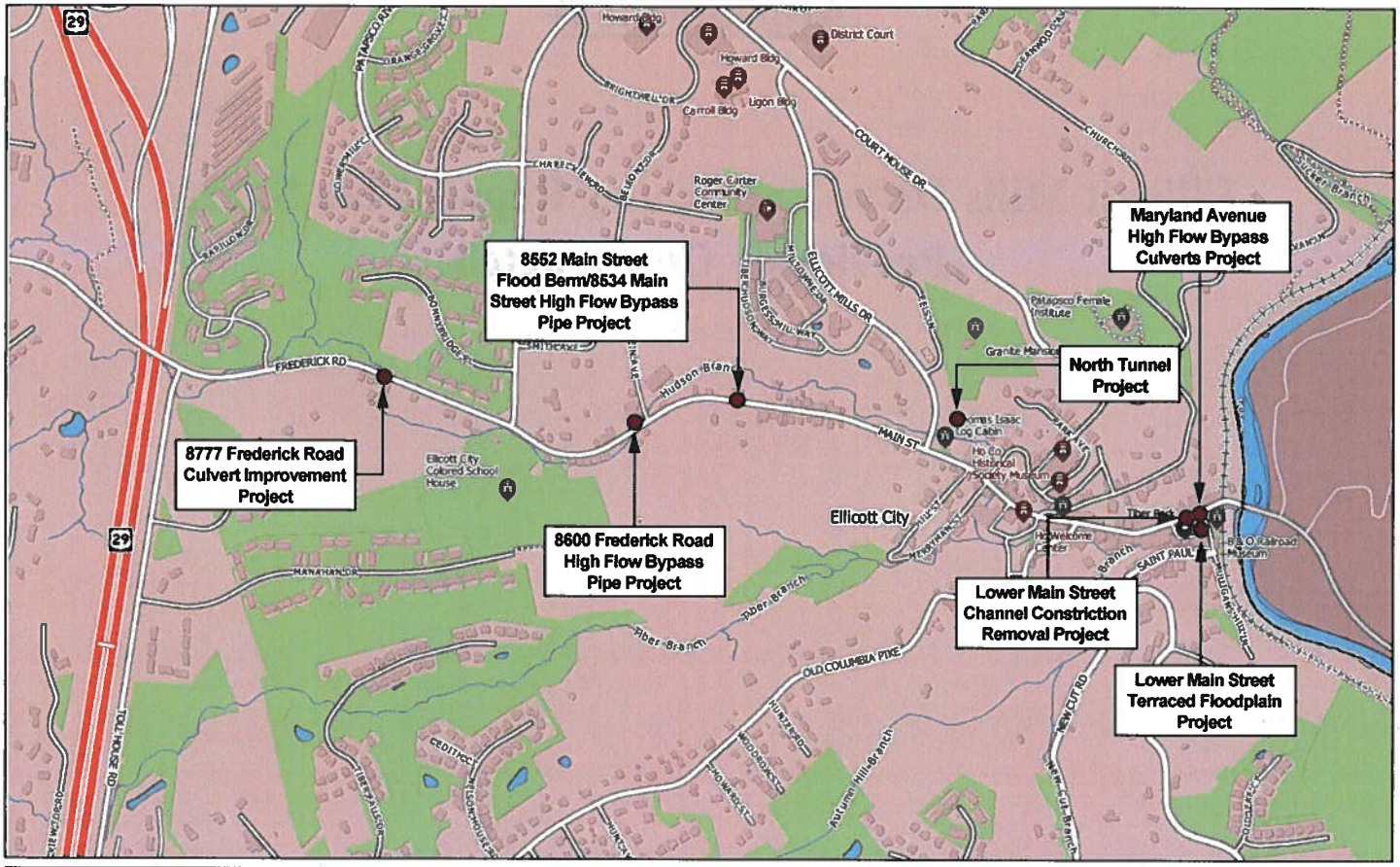
If you have any questions or if you would like additional information, please contact Amy Hribar at (410) 662-7400. Thank you for your consideration regarding these project activities.

Sincerely,

Amy Hribar, PE, CFM
Water Resources Senior Manager
McCormick Taylor, Inc.

Enc.

cc: Mark Richmond, PE, Chief, Howard County Government – Storm Water Management Division
Chris Brooks, PE, McCormick Taylor
Andy McLean, PE, McCormick Taylor



HOWARD COUNTY MARYLAND

McCORMICK TAYLOR

Ellicott City Safe and Sound Plan Flood Mitigation Projects

Ellicott City, Howard County, MD

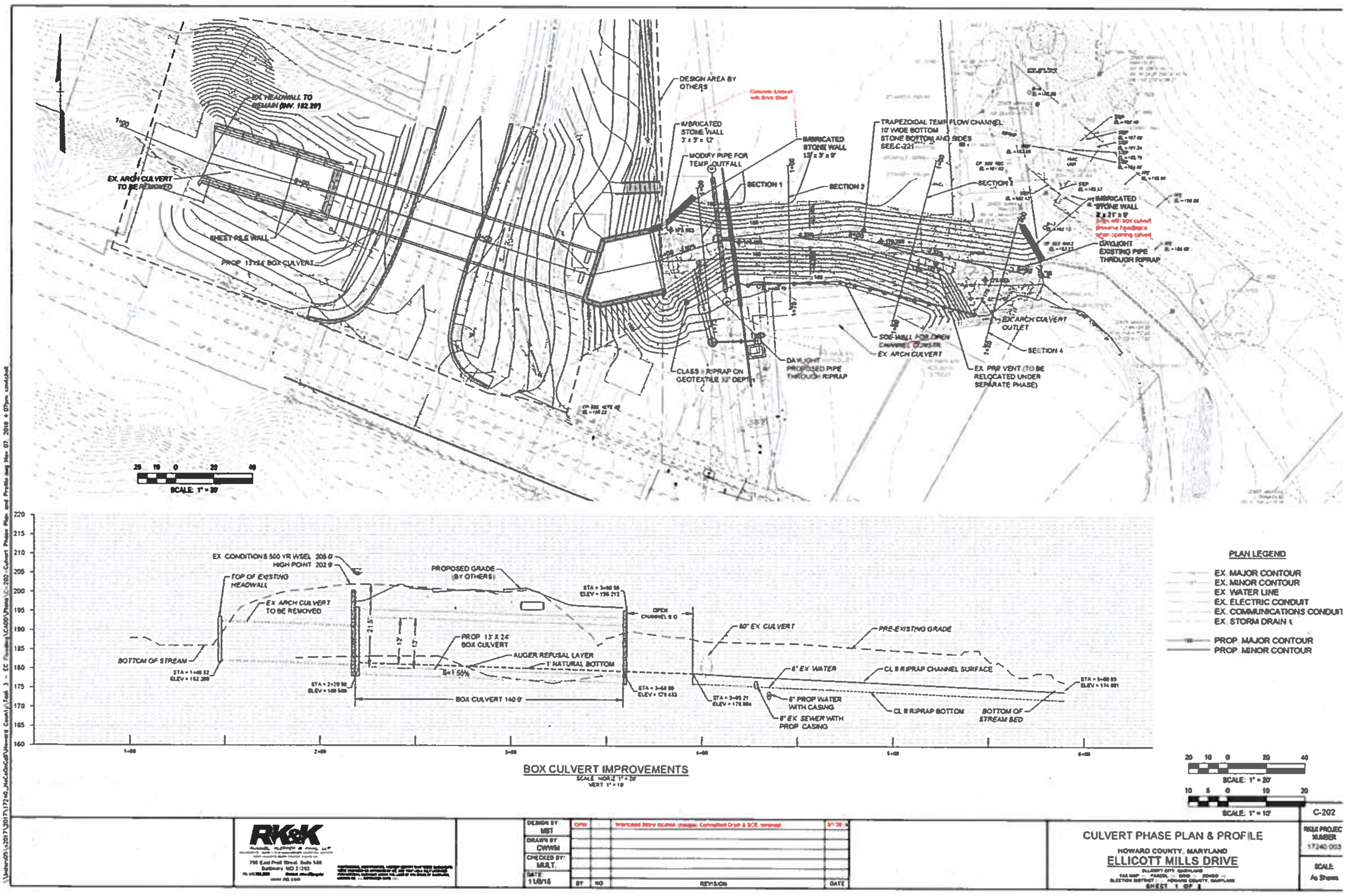
N W E S

1,000 feet

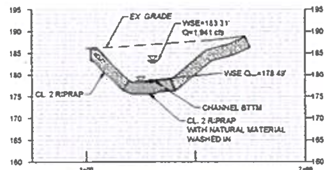
Source: https://data.howardcountymd.gov/InteractiveMap.html?Workspace=EC_Flood_Mitigation_Projects

Attachment D

Ellicott Mills Drive Emergency Repair Plan Sheets (Previously Constructed)

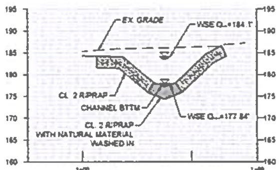


DESIGN AREA BY OTHERS
IMBRICATED STONE WALL
MODIFY PIPE FOR TEMP. OUTFALL
SECTION 1
SECTION 2
SECTION 3
SECTION 4
TRAPEZOIDAL TEMP FLOW CHANNEL 10' WIDE BOTTOM STONE BOTTOM AND SIDES SEE C-221
EX. ARCH CULVERT TO BE REMOVED
SHEET PILE WALL
PROP. 13'x24' BOX CULVERT
CLASS II RIPRAP ON GEOTEXTILE 12" DEPTH
DAYLIGHT PROPOSED PIPE THROUGH RIPRAP
DAYLIGHT EXISTING PIPE THROUGH RIPRAP
EX. ARCH CULVERT
EX. ARCH CULVERT OUTLET
EX. PRP VENT (TO BE RELOCATED UNDER SEPARATE PHASE)
SCALE: 1" = 20'
EX. CONDITIONS 500 YR WSEL 205.0'
HIGH POINT 202.9'
TOP OF EXISTING HEADWALL
EX. ARCH CULVERT TO BE REMOVED
BOTTOM OF STREAM
PROPOSED GRADE (BY OTHERS)
PROP. 13' X 24' BOX CULVERT
AUGER REFUSAL LAYER
1' NATURAL BOTTOM
BOX CULVERT 140.0'
OPEN CHANNEL 5.0
60" EX. CULVERT
PRE-EXISTING GRADE
8" EX. WATER
8" PROP. WATER WITH CASING
8" EX. SEWER WITH PROP. CASING
CL II RIPRAP CHANNEL SURFACE
CL II RIPRAP BOTTOM
BOTTOM OF STREAM BED
BOX CULVERT IMPROVEMENTS
SCALE: HORIZ. 1" = 20'
VERT. 1" = 10'
PLAN LEGEND
EX. MAJOR CONTOUR
EX. MINOR CONTOUR
EX. WATER LINE
EX. ELECTRIC CONDUIT
EX. COMMUNICATIONS CONDUIT
EX. STORM DRAIN
PROP. MAJOR CONTOUR
PROP. MINOR CONTOUR
SCALE: 1" = 20'
SCALE: 1" = 10'
RK&K
DESIGN BY
DRAWN BY
CHECKED BY: MULT.
DATE
REVISION
CULVERT PHASE PLAN & PROFILE
HOWARD COUNTY, MARYLAND
ELLICOTT MILLS DRIVE
C-202
RK&K PROJECT NUMBER
SCALE: As Shown



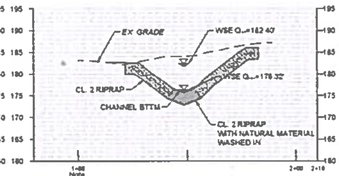
Note
Q = Calculated based on the maximum culvert flow rate (1,941 cfs)
Q = Calculated based on a 7 cfs base flow

SECTION 1
SCALE: HORIZ. 1" = 20'
VERT. 1" = 10'



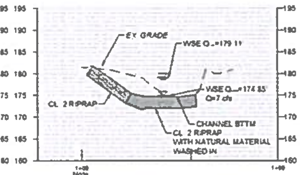
Note
Q = Calculated based on the maximum culvert flow rate (1,941 cfs)
Q = Calculated based on a 7 cfs base flow

SECTION 2
SCALE: HORIZ. 1" = 20'
VERT. 1" = 10'



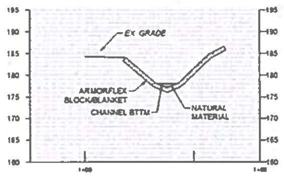
Note
Q = Calculated based on the maximum culvert flow rate (1,941 cfs)
Q = Calculated based on a 7 cfs base flow

SECTION 3
SCALE: HORIZ. 1" = 20'
VERT. 1" = 10'



Note
Q = Calculated based on the maximum culvert flow rate (1,941 cfs)
Q = Calculated based on a 7 cfs base flow

SECTION 4
SCALE: HORIZ. 1" = 20'
VERT. 1" = 10'



ALTERNATE SECTION
SCALE: HORIZ. 1" = 20'
VERT. 1" = 10'

SCALE: 1" = 20'
SCALE: 1" = 10'

RK&K
700 East Pratt Street, Suite 500
Baltimore, MD 21202

DESIGN BY:	MBT
DRAWN BY:	CWWM
CHECKED BY:	MULT.
DATE:	11/8/18

BY	NO	REVISION	DATE

OPEN CHANNEL SECTIONS
HOWARD COUNTY, MARYLAND
ELLICOTT MILLS DRIVE
ELLICOTT CITY, MARYLAND
SHEET 1 OF 2

C-221
RK&K PROJECT NUMBER 17240 003
SCALE: As Shown

Attachment A - Joint Permit Application

-Amendment (1/27/20)

509 S. Exeter Street, 4th Floor | Baltimore, MD 21202 | 410.662.7400
www.mccormicktaylor.com

McCORMICK TAYLOR

January 27th, 2020

Mr. Donald Bole
US Army Corps of Engineers, Baltimore District
2 Hopkins Plaza
Mailstop – 430
Baltimore, Maryland 21201

Ms. Debra Correia
Maryland Department of the Environment
Waterway Construction Division
1800 Washington Boulevard
Baltimore, Maryland 21230

RE: Howard County Department of Public Works, Storm Water Management Division Bureau of Environmental Service – Ellicott City Safe and Sound Plan, Flood Mitigation Projects
Howard County, Maryland
Application No. 201961647/19-NT-3250
Joint Permit Application Amendment

Dear Mr. Bole and Ms. Correia

The Howard County Department of Public Works, Storm Water Management Division, Bureau of Environmental Services respectfully this JPA Amendment for Application Number 201961647/19-NT-3250 for the Ellicott City, Safe and Sound Plan, Flood Mitigation Projects. This JPA Amendment is a follow-up to the application submitted 9/20/19 and subsequent comments provided by MDE and the USACE.

The seven projects included in the attached package are in various stages of design, and generally include floodplain grading, construction of enlarged conveyance structures and additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity. The seven projects included within this package are listed below, along with brief descriptions of each:

- 8777 Frederick Road Culvert Improvement Project– Project includes channel and floodplain grading upstream and downstream of existing crossing below Frederick Road to increase channel conveyance capacity and improve overall channel and floodplain stability. Existing crossing below Frederick Road will be expanded to approximately 40' wide. The existing structure at 8777 Frederick Road may potentially be displaced from its current location for floodplain grading and installation of the new crossing. The property at 8777 Frederick Road (HO-364) has been determined to be eligible for the National Register of Historic Places.
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The items included within this amendment package are:

- Cover Letter
- Point-by-point responses to MDE comments dated 10/11/19
- Point-by-point responses to USACE comments dated 10/09/19
- Updated Impact Plates to reflect updates the LOD in several areas
- Updated Joint Permit Application to indicate Amendment and reflect updated impacts
- Alternatives Analysis Summary as requested through Agency comments
- Supplemental Plan Information – Includes available project plan updates. Most projects do not have updated plans but plans will be provided as project details and design progress.
- Impacted Structures Table

Impact Plate 5a has been added to account for LOD expansion to the southeast of the 8777 Frederick Road Culvert Improvement Project. The 8777 Frederick Road Culvert Improvement project will be combined with another stream restoration project in the area, and therefore the permit application has

been updated to reflect the LOD for the culvert work and the stream restoration work. The current stream restoration plans for this area are provided in this amendment package.

Impact Plate 5b has been added to account for LOD expansion to the southwest at the 8600 Frederick Road High Flow Bypass Project, for removal of two buildings and a shed, and floodplain and channel grading. Proposed grading has also been added to the Impact Plates (Plates 5b – 9) for this project. Updates the LOD and associated impacts on Plate 11 and Plate 16 are also included. A table outlining the structures proposed for removal or modification is included as Attachment E.

Updated proposed impacts include 3,515 linear feet (54,914 square feet) of permanent impacts to the Patapsco River, Tiber Run, and perennial tributaries, and 343,085 square feet of permanent impacts in the 100-year floodplain.

Coordination among agencies is ongoing, and additional information relative to agency and Section 106 coordination, the hydraulic analysis, design and Erosion and Sediment Control plans, property owner notifications, and additional supporting documentation of design plans will be provided at a later date. Please contact me at 410-662-7400 if there are any questions with this application.

Sincerely,

Andy McLean, PE
Project Manager, Water Resources
McCormick Taylor

Enc.

cc: Mark Richmond, PE, Howard County SWM Division Chief
Chris Brooks, PE, McCormick Taylor
Amy Hribar, PE, McCormick Taylor

Attachment 1:
MDE Comment Responses

McCORMICK TAYLOR

January 24, 2020

Ms. Debra Correia
Senior Regulatory & Compliance Engineer
Waterway Construction Division
Maryland Department of the Environment
410-537-3900

Reference: Ellicott City Flood Control Projects 2019-61647 / 19-NT-3250

Subject: Point-by-Point Response to Comments Received 10/11/19

Dear Ms. Correia:

We are pleased to provide you with the following Joint Permit Application Amendment and point-by-point responses to comments received 10/11/19 on the original Joint Permit Application submitted 9/20/19 for the subject projects in Ellicott City, MD. In addition to the comment responses provided below, please see the additional supporting documentation provided in the amendment package.

1. Please show the 100-year floodplain delineation on plans.

Response: The 100yr floodplain is shown on the impact plates, and will be provided on future plan submissions for the individual projects as plans are developed.

2. Please provide E&SC plans for the project. Plans should be full sized or at least 11x17.

Response: E&SC plans have not been generated at this stage in the design process. As individual projects progress, detailed design plans, including E&SC plans, will be provided for MDE review.

3. A detailed vicinity map of the project area, including the project boundary. The map should identify the project site, property boundaries, and adjacent property owners.

Response: The current, conceptual project boundaries are delineated on the impact plates. These plates show the general vicinity of the various projects. A detailed map showing adjacent property owners will be provided as designs progress. Property notifications will also be sent out for the USACE Section 106 process. With this in mind, we would like to coordinate further regarding necessary notifications required by MDE, associated timing of notifications and which properties will require notification, to avoid confusion and conflict with USACE or County notifications.

4. Please submit a design report to include at minimum:

4.a. water surface elevations in feet, associated with the 2-yr, 10-yr & 100-yr frequency flood events for both existing and proposed at each cross-section. A plan showing where cross-sections are taken. Hydrologic calculations shall be based on the ultimate development of the watershed.

Response: H&H design reports including the information requested will be developed for individual projects as project designs progress.

5. Alternate proposal studies/study

Response: Many alternatives to the projects presented within this application have been considered and evaluated. A comprehensive summary is presented in the attached alternatives analysis detailing the background of the alternatives considered, and in-depth analysis of the primary alternatives considered.

6. For all in-stream work a sequence of construction is required and method of stream diversion to be used. Details for stream diversion are to be included on plan-set

Response: Noted. A sequence of construction, diversion methods, and details will be provided at a later date as individual project design plans are developed.

7. Include on plans, any restorative plans where culverts are being removed and not replaced

Response: Noted. Any restorative plans will be provided at a later date as individual project design plans are developed.

8. Restorative/stabilization plans for buildings being removed in the 100-year floodplain

Response: Noted. Any restorative/stabilization plans will be provided at a later date as individual project design plans are developed.

9. Justification for any rip-rap to be placed at culvert/tunnel outfalls based on the anticipated stream velocities

Response: Noted. Riprap/Energy dissipation structure stabilization computations for culverts and outfalls will be provided at a later date as individual project design plans and computations are developed.

If you have any questions or would like additional information, please contact Andy McLean at (410) 662-7400.

Sincerely,

Andy McLean, PE
Project Manager, Water Resources
McCormick Taylor, Inc.

Enc.
cc: Mark Richmond, PE, Howard County SWM Division Chief
Chris Brooks, PE, McCormick Taylor
Amy Hribar, PE, McCormick Taylor

Attachment 2:
USACE Comment Responses

McCORMICK TAYLOR

January 24, 2020

Mr. Donald Bole
U.S. Army Corps of Engineers, Baltimore District
2 Hopkins Plaza
Baltimore, MD 21201
(410) 962-6079

Reference: Ellicott City Flood Control Projects 2019-61647 / 19-NT-3250

Subject: Point-by-Point Response to Comments Received 10/09/19

Dear Mr. Bole:

We are pleased to provide you with the following Joint Permit Application Amendment and point-by-point responses to comments received 10/09/19 on the original Joint Permit Application submitted 9/20/19 for the subject projects in Ellicott City, MD. In addition to the comment responses provided below, please see the additional supporting documentation provided in the amendment package.

1. Please provide a project description for each of the 7 projects. Be sure to include total permanent/temporary stream impacts for each project and describe the nature of each impact (culvert replacement, bank stabilization, floodplain grading). For example, 225 lf of rip-rap bank stabilization, etc. Also, the drawings should correspond to the written description, so be sure to indicate the location, type and magnitude of the stream impact on the drawing. The drawings should also clearly indicate existing conditions and proposed conditions. If a culvert is being replaced, we will need to see cross sections of the existing culvert vs. the proposed culvert.

Response: A project description is provided in the cover letter of the amendment application. Stabilization measures and specific design features for each project are not defined at this design stage, however further descriptions, design plans, and supplemental information for the individual projects will be provided as project designs progress. The current submission includes updated impact plates which show the anticipated project limits, and the primary elements of each project design, ie. proposed conveyance structures, proposed grading. The individual impacts on shown on each impact plate are provided on each respective plate. Individual project impacts are not provided as some projects will overlap in their permanent impacts, particularly for the projects along Lower Main Street. As the project designs progress, and design/construction phasing details are developed, additional information on the specific project resource impacts may be provided as requested.

2. Please provide a single plan view showing where the 8600 Frederick Road high flow pipe, the North Tunnel and the Maryland Avenue Culverts start and end.

Response: A single planview showing the locations of the North Tunnel and MD Avenue Culverts is shown in the revised impact plate 2.

3. Please provide a list and description of what activity will occur at each building. It is my understanding that you are proposing to remove 4 buildings (8069,8059, 8055 and 8049) and manipulate the structure of several others. Also, please provide a map and highlight each building that will be totally removed vs. manipulated.

Response: A table is provided in this submission package, "Structures Proposed for Removal or Modification" identifying which buildings are anticipated to be removed/modified/impacted for each project.

4. Please indicate how you plan to stabilize the floodplain. Are you proposing to use rock? Are you proposing any stream structures for this project?

Response: Floodplain stabilization will be achieved through a variety of design measures, likely to include riprap stabilization among other protection measures. Stream stabilization techniques may include in-stream structures, riffle-grade control, bank stabilization with imbricated stone or concrete structures, and other potential measures will be considered. At this phase of the project designs, specific details on stabilization measures are not available. As project designs progress, updated plans, including stabilization practices, will be provided as supporting documentation on this permit application.

5. We have previously received the Hudson Branch flood mitigation project (2019-60176) which involves the manipulation of a potentially historic structure. Should this project be added to the group of 7 projects? If this project is reviewed as a separate application, we may need to draft a separate MOU to resolve any NHPA concerns.

Response: This project has been added to the amendment package of the subject permit application (2019-61647). The plans for the Hudson Branch project have been included in this submission, and the LOD of this project has been merged with the 8777 Culvert Improvement Project LOD; LOD updates are reflected on the summary impact sheets and specifically on impact plates 4, 5, and 5a, as well as the revised impact quantities in the application.

6. Please provide an alternatives analysis which shows how other alternatives were considered and impacts to historic structures and aquatic resources were avoided or minimized.

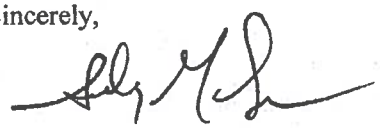
Response: Many alternatives to the projects presented within this application have been considered and evaluated. A comprehensive summary is presented in the attached alternatives analysis detailing the background of the alternatives considered, and in-depth analysis of the primary alternatives considered.

7. We will let you know if any additional information/coordination is required for the consulting parties list.

Response: Acknowledged.

If you have any questions or would like additional information, please contact Andy McLean at (410) 662-7400.

Sincerely,

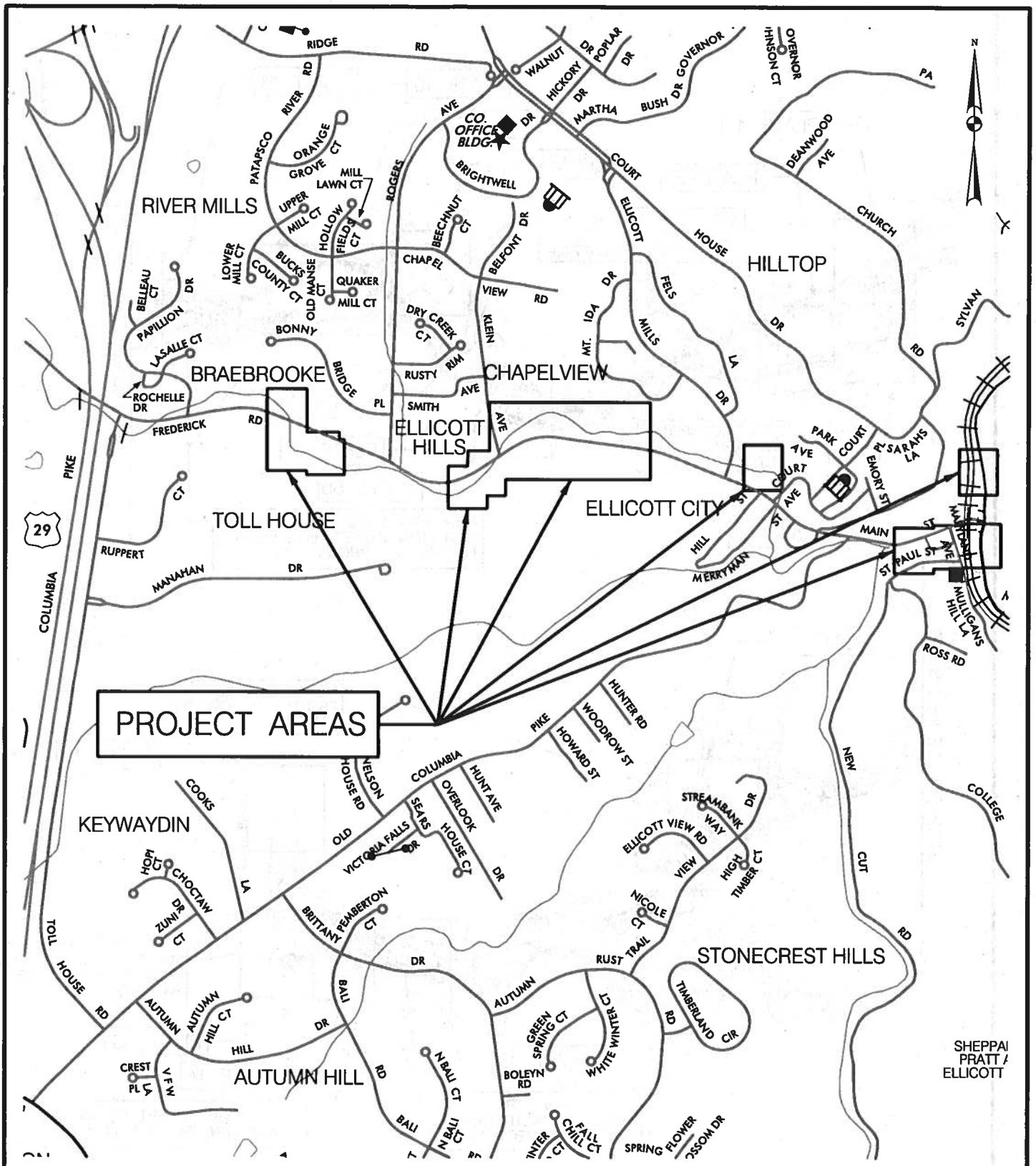


Andy McLean, PE
Project Manager, Water Resources
McCormick Taylor, Inc.

Enc.

cc: Mark Richmond, PE, Howard County SWM Division Chief
Chris Brooks, PE, McCormick Taylor
Amy Hribar, PE, McCormick Taylor

Attachment 3:
Updated, Revised Impact Plates



Howard County MARYLAND	**Revisions**	**Howard County**
McCORMICK TAYLOR		**ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS**
		Location Map
		SCALE: 1" = 1,000' | DATE: JANUARY, 2020 | PLATE 1 of 16

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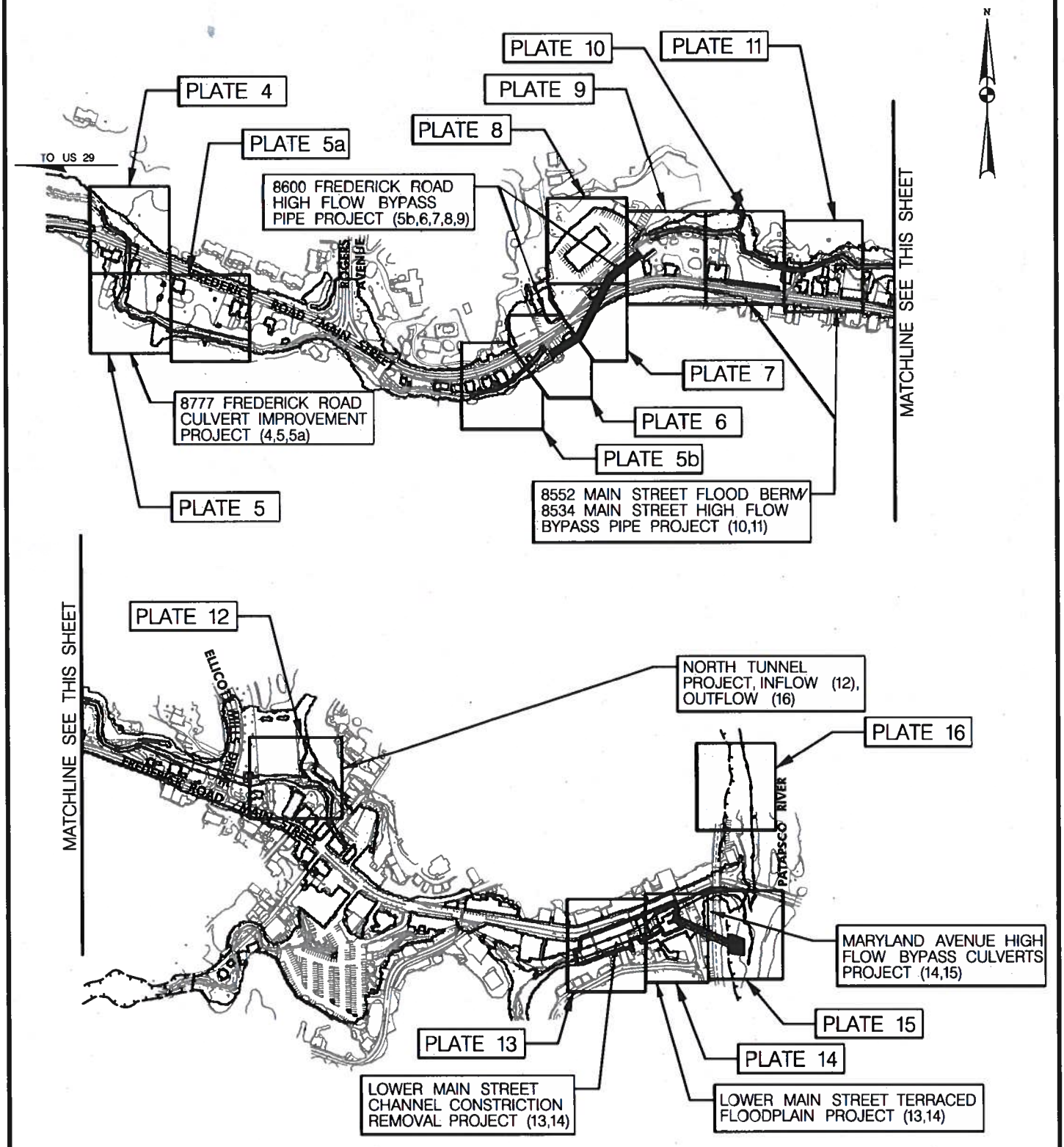

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Overall Site Plan
	SCALE: 1" = 500' | DATE: JANUARY, 2020 | PLATE 2 of 16

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LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- WOODS
- PROPERTY LINE
- SAN — EXISTING SANITARY SEWER
- LOD — LIMIT OF DISTURBANCE
- WUS — WATERS OF THE US
- 100 YEAR MODELED FLOODPLAIN
- 100 YEAR FEMA FLOODPLAIN

IMPACT LEGEND

PERMANENT W.U.S ----------

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		*WUS (S.F.)*	
TEMP.	*PERM.*	*TEMP.*	*PERM.*
0	3,515	0	54,914

FLOODPLAIN IMPACTS
PERM. (SF)
343,085

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY
SAFE AND SOUND PLAN
FLOOD MITIGATION PROJECTS

Legend and Waterway Impacts

SCALE: NTS	DATE: JANUARY, 2020	PLATE 3 of 16

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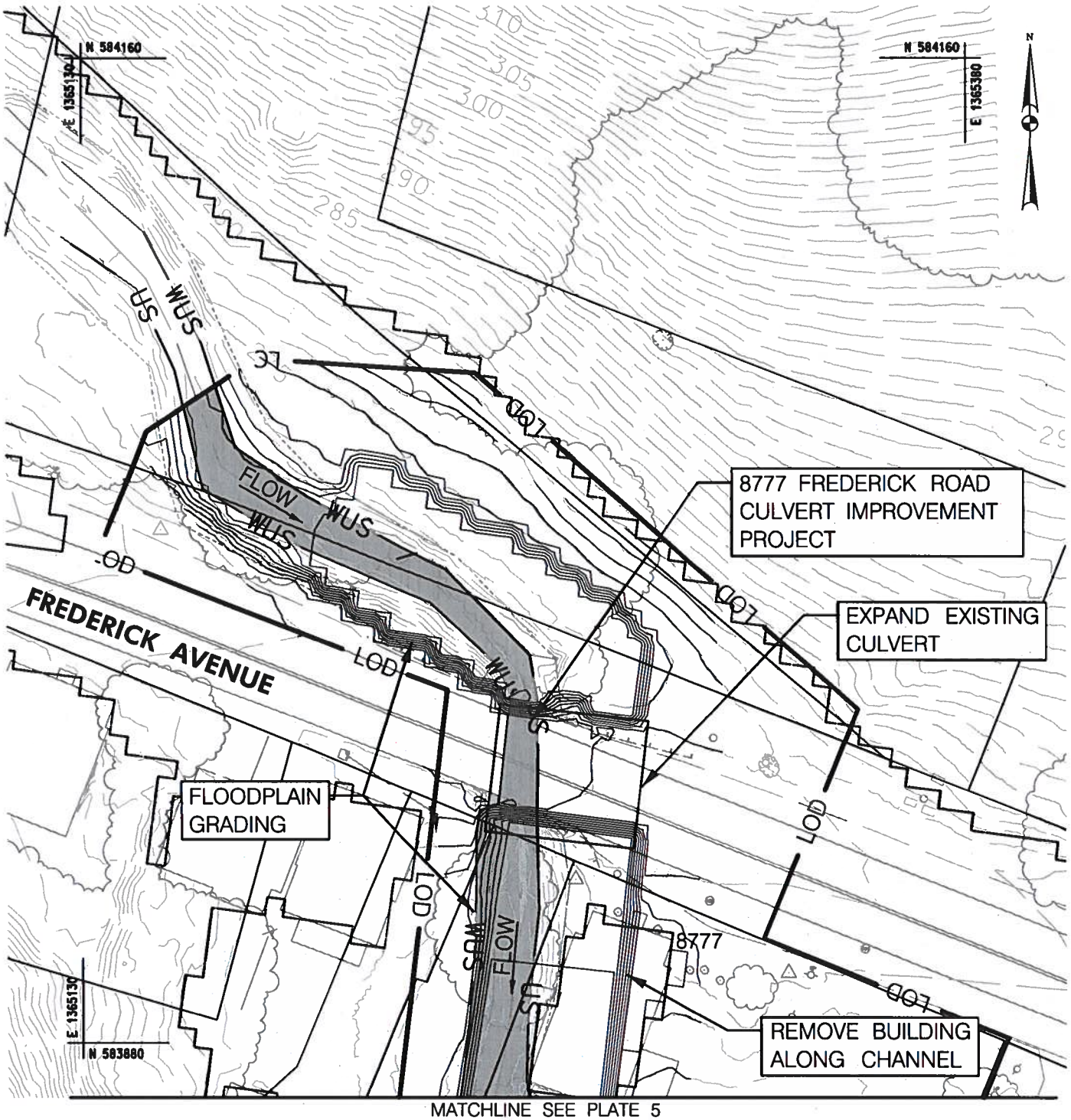

MATCHLINE SEE PLATE 5

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	246	0	3,248

FLOODPLAIN IMPACTS
PERM. (SF)
25,673

Howard County
MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: JANUARY, 2020 | PLATE 4 of 16

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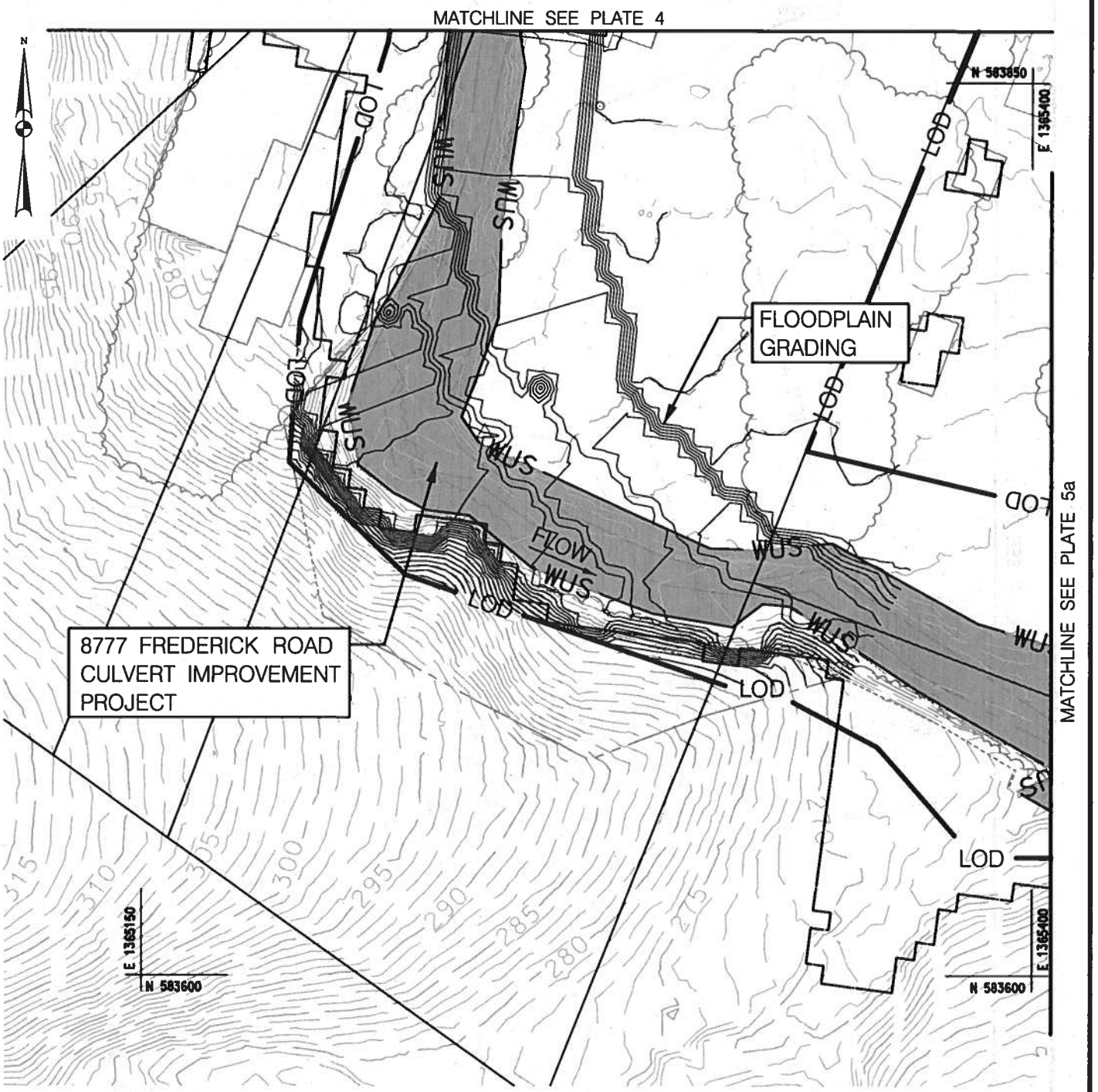

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	313	0	7,697

FLOODPLAIN IMPACTS
PERM. (SF)
29,424

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: JANUARY, 2020 | PLATE 5 of 16

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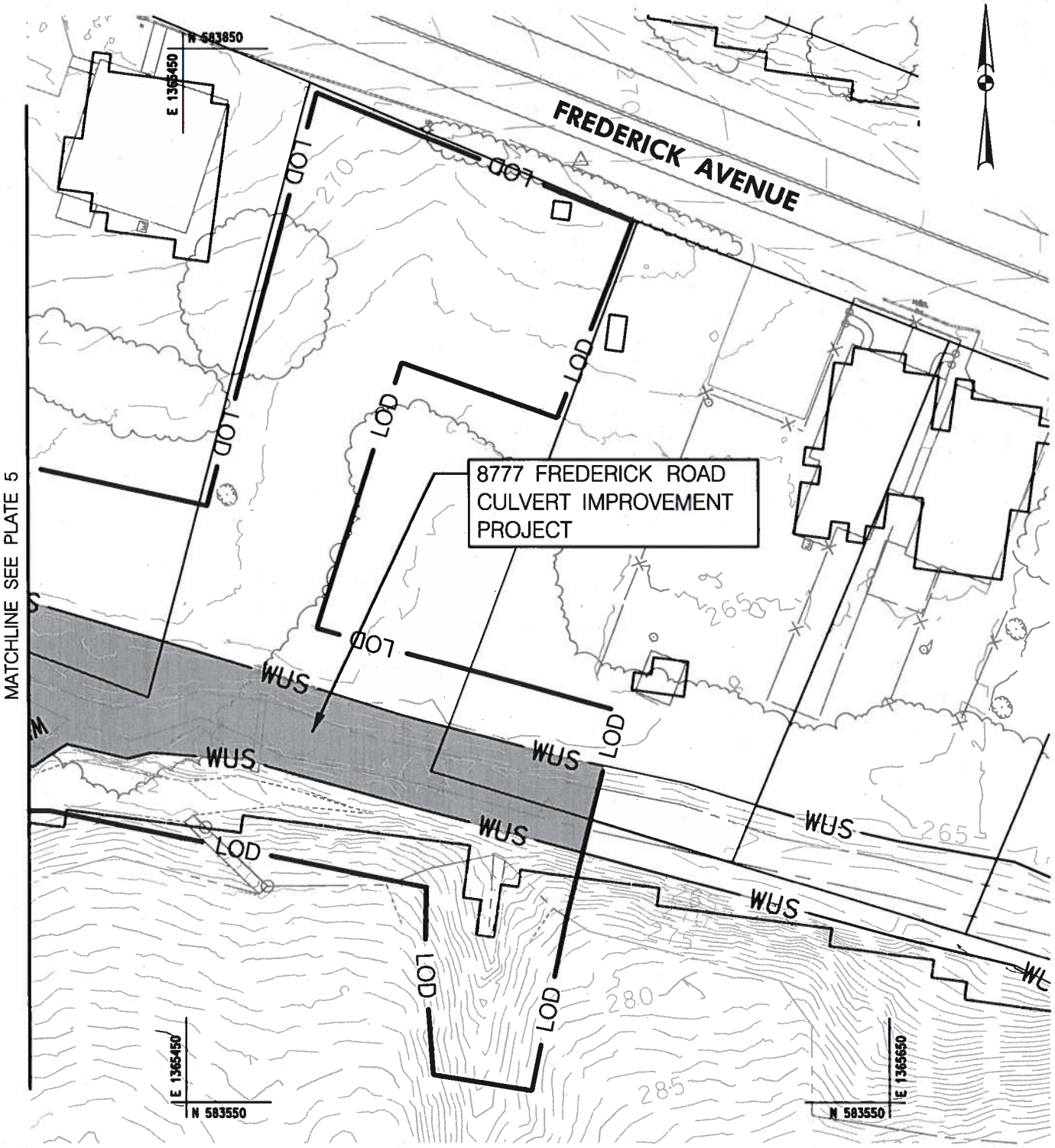

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	166	0	4,691

FLOODPLAIN IMPACTS
PERM. (SF)
20,125

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: JANUARY, 2020 | PLATE 5a of 16

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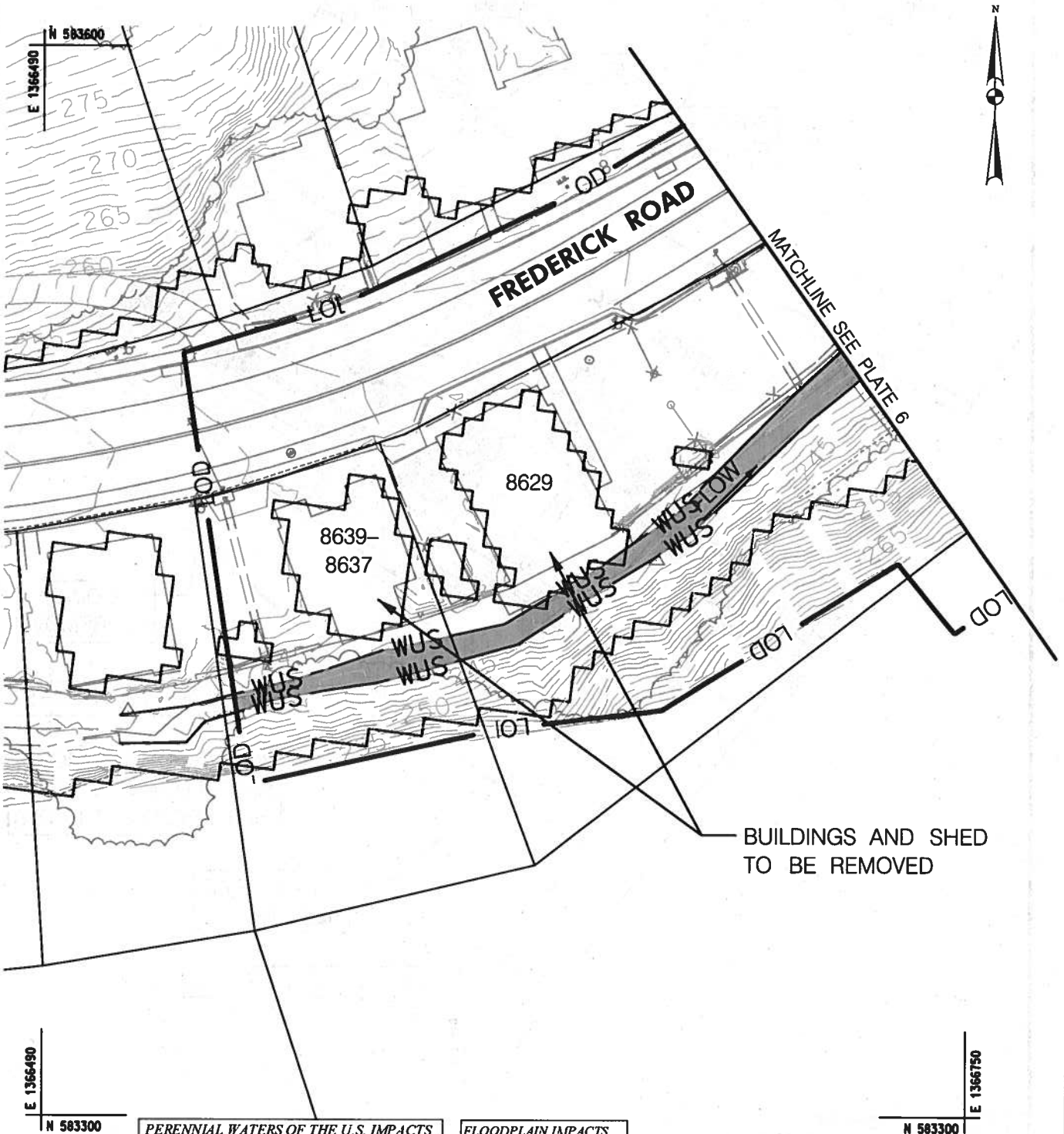

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	203	0	1,432

FLOODPLAIN IMPACTS
PERM. (SF)
21,483

Howard County
MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: JANUARY, 2020 | PLATE 5b of 16

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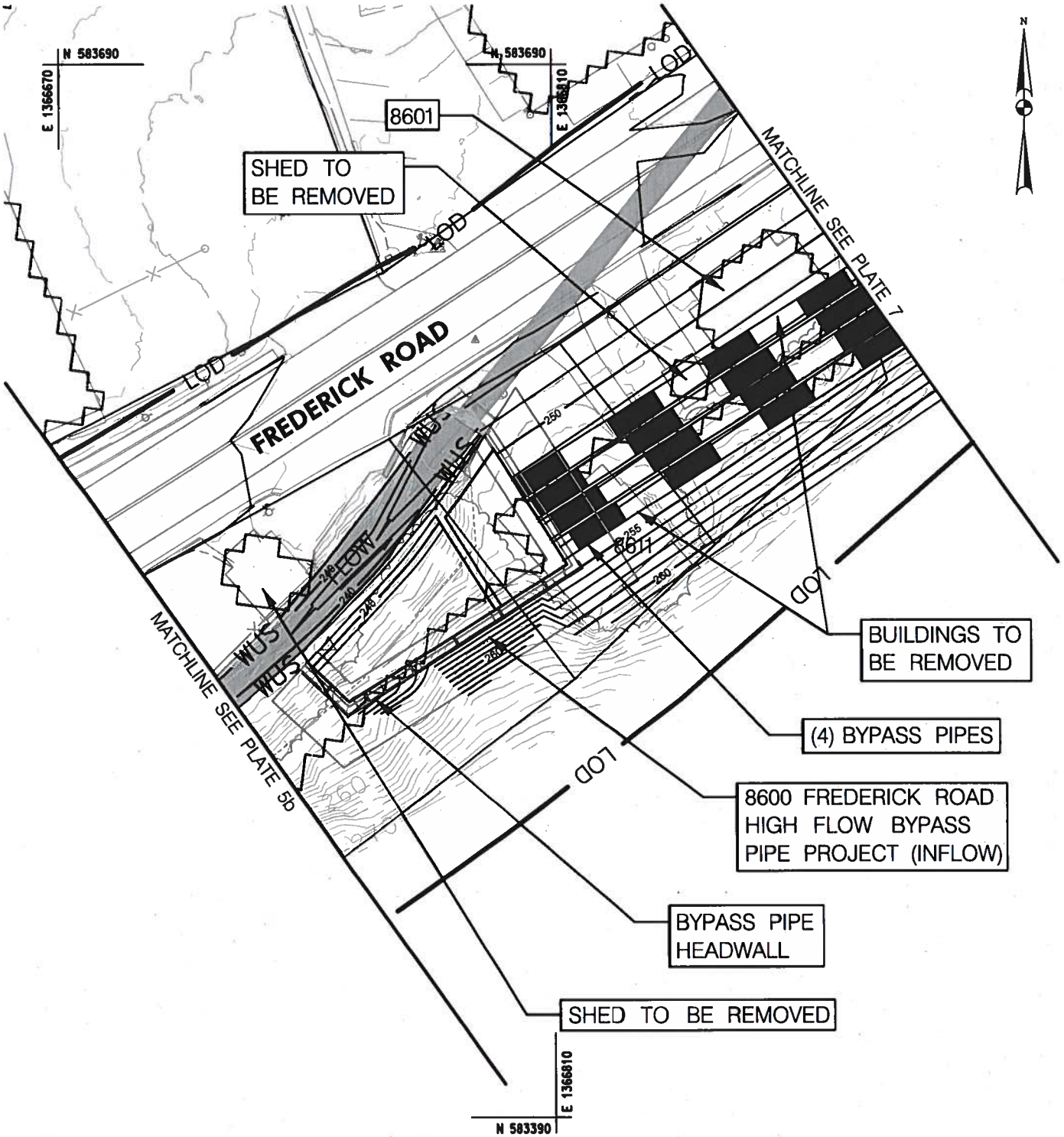

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	223	0	2,036

FLOODPLAIN IMPACTS
PERM. (SF)
20,051

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: JANUARY, 2020 | PLATE 6 of 16

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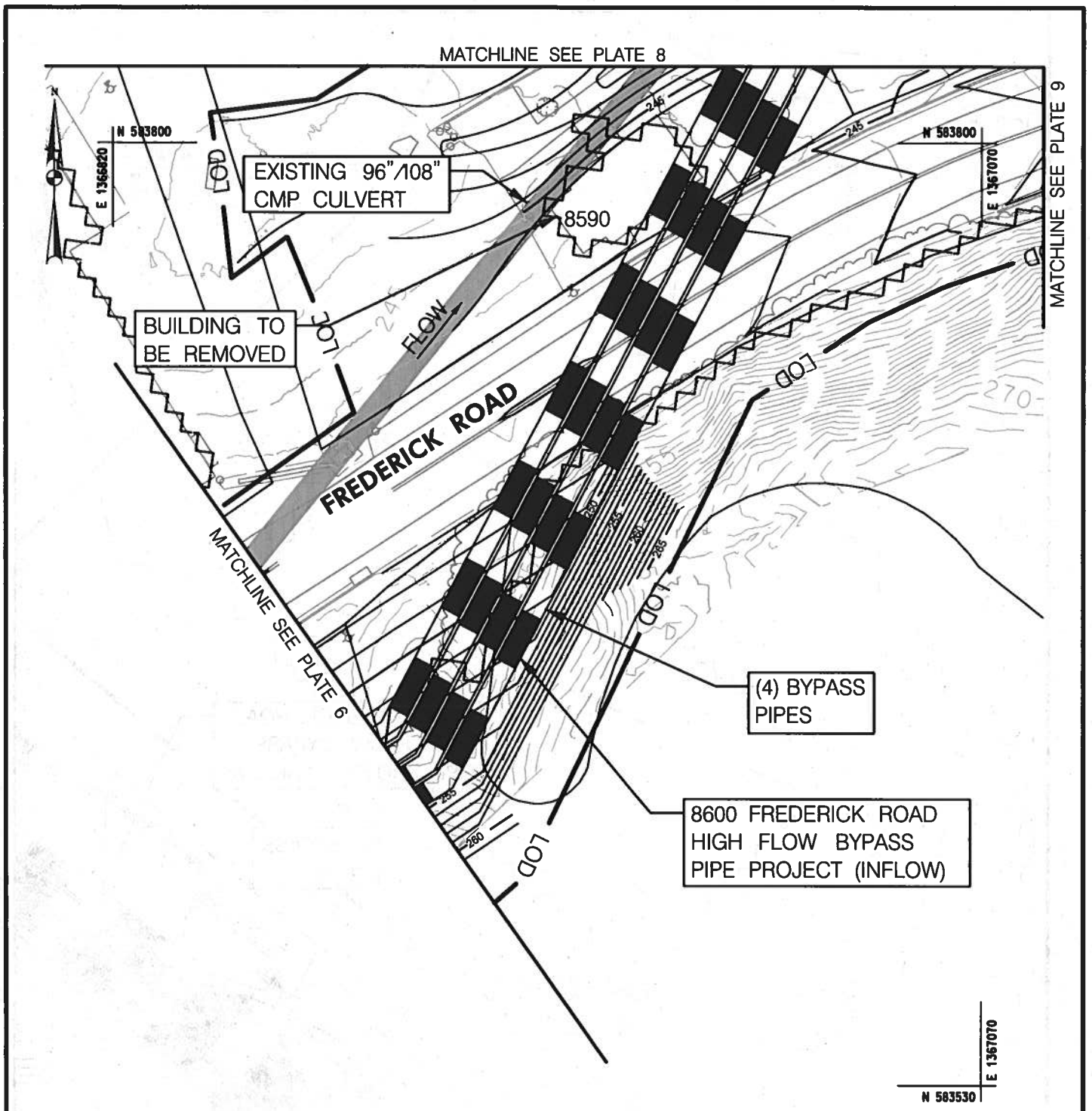

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	184	0	1,275

FLOODPLAIN IMPACTS
PERM. (SF)
23,986

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' · DATE: JANUARY, 2020 · PLATE 7 of 16

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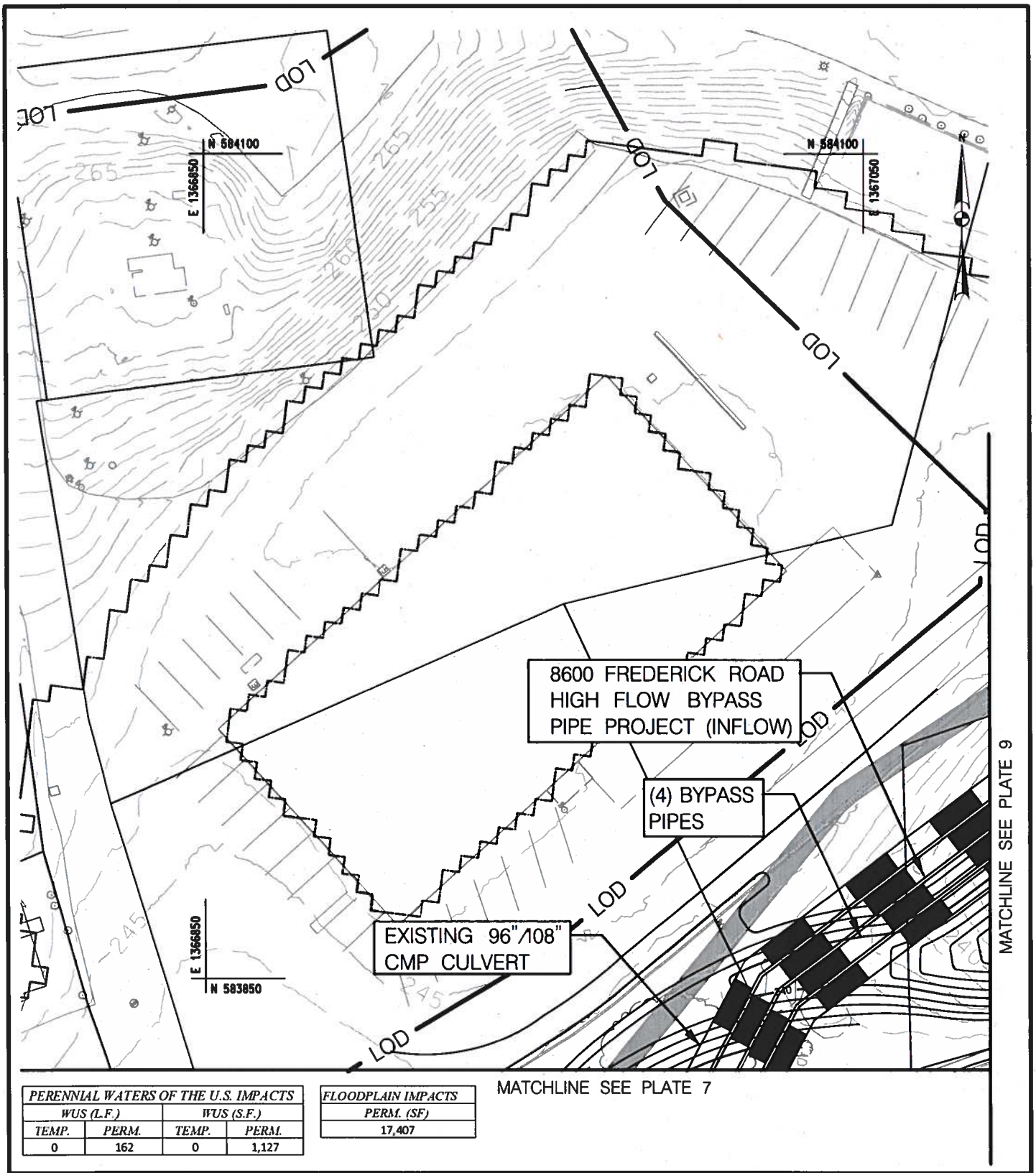

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	162	0	1,127

FLOODPLAIN IMPACTS
PERM. (SF)
17,407

Howard County MARYLAND

McCORMICK TAYLOR

Revisions

Howard County

ELLICOTT CITY
SAFE AND SOUND PLAN
FLOOD MITIGATION PROJECTS

Waterway Impacts

SCALE: 1" = 40'	DATE: JANUARY, 2020	PLATE 8 of 16

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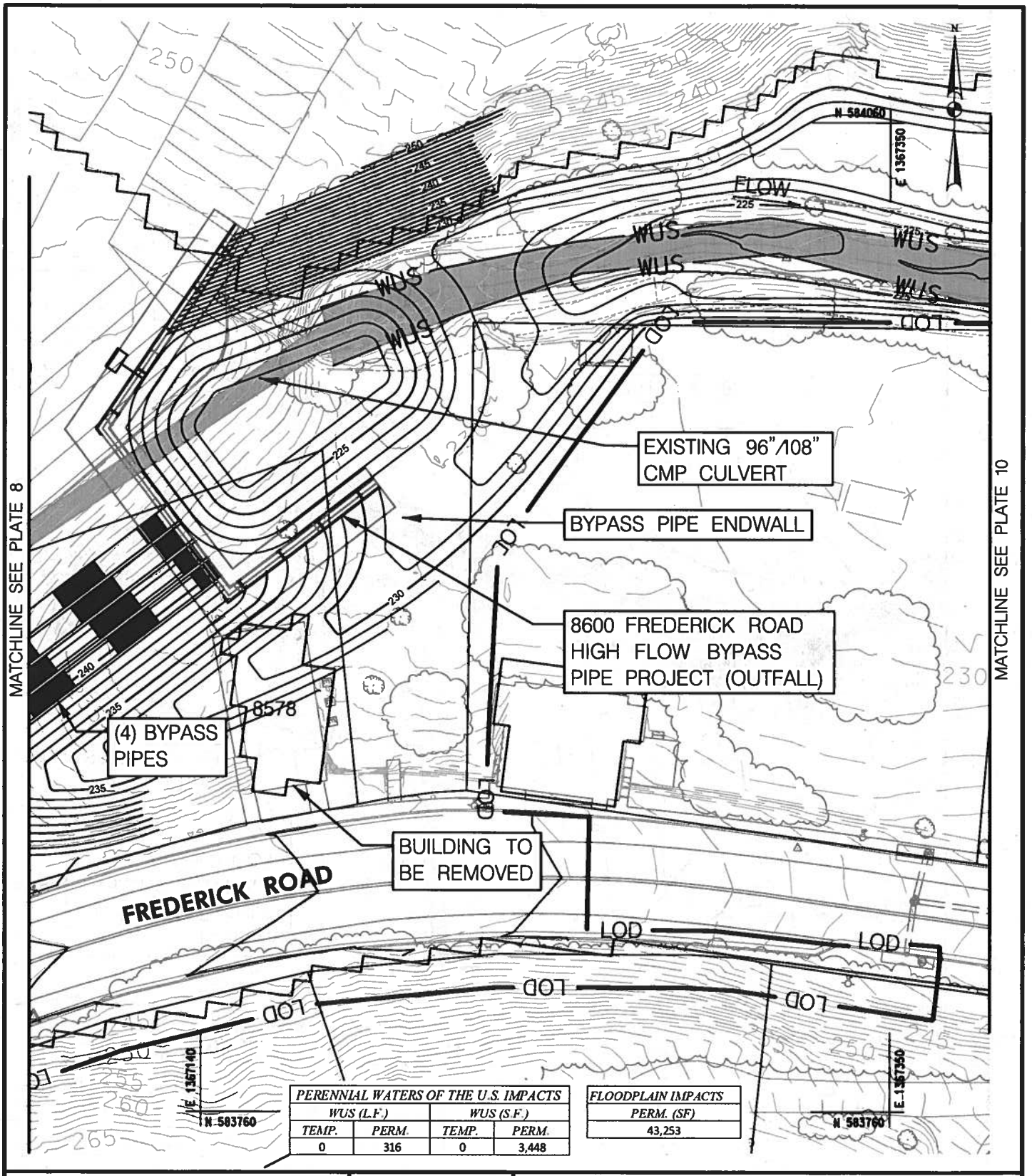

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	316	0	3,448

FLOODPLAIN IMPACTS
PERM. (SF)
43,253

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: JANUARY, 2020 | PLATE 9 of 16

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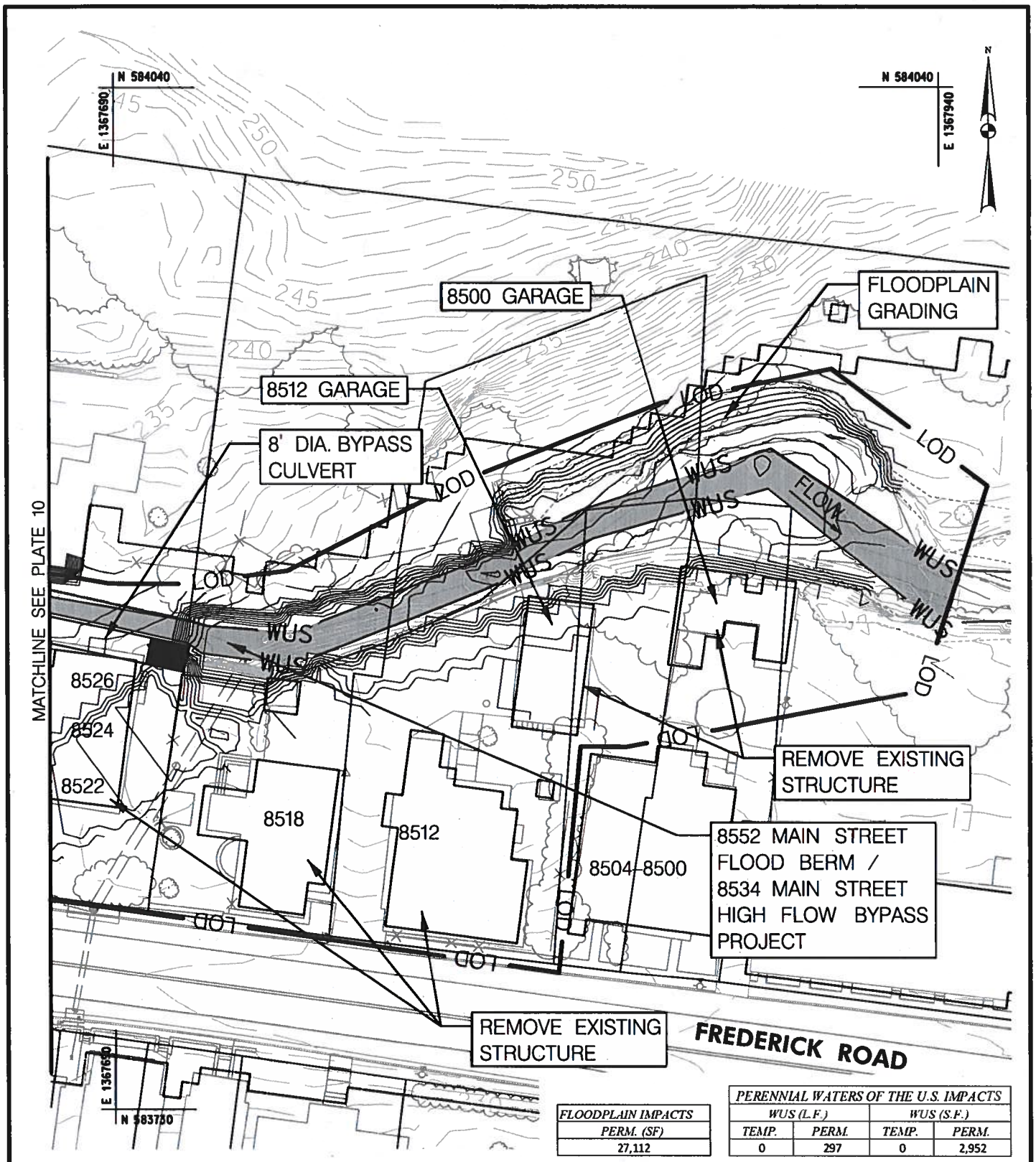

FLOODPLAIN IMPACTS	
PERM. (SF)	
27,112	

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	297	0	2,952

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: JANUARY, 2020 | PLATE 11 of 16

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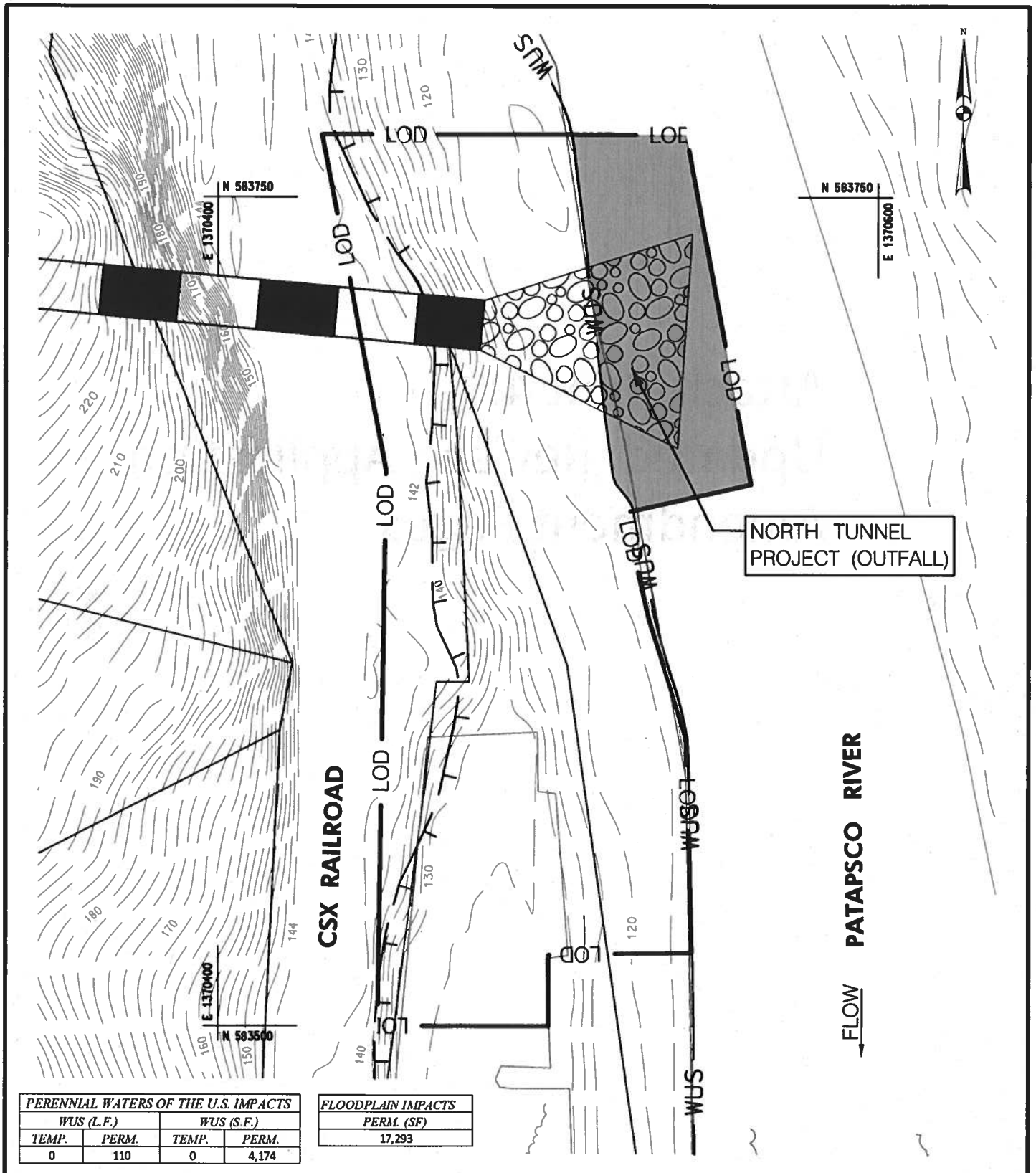

PERENNIAL WATERS OF THE U.S. IMPACTS			
WUS (L.F.)		WUS (S.F.)	
TEMP.	PERM.	TEMP.	PERM.
0	110	0	4,174

FLOODPLAIN IMPACTS
PERM. (SF)
17,293

Howard County MARYLAND

McCORMICK TAYLOR

Revisions	Howard County
	ELLICOTT CITY SAFE AND SOUND PLAN FLOOD MITIGATION PROJECTS
	Waterway Impacts
	SCALE: 1" = 40' | DATE: JANUARY, 2020 | PLATE 16 of 16

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Attachment 4:
Updated, Revised Application Amendment Pages

JOINT FEDERAL/STATE APPLICATION FOR THE ALTERATION OF ANY FLOODPLAIN, WATERWAY, TIDAL OR NONTIDAL WETLAND IN MARYLAND

FOR AGENCY USE ONLY

Application Number _____ **Date Determined Complete** _____
Date Received by State _____ **Date(s) Returned** _____
Date Received by Corps _____ _____
Type of State permit needed _____ **Date of Field Review** _____
Type of Corps permit needed _____ **Agency Performed Field Review** _____

++

- Please submit 1 original and 6 copies of this form, required maps and plans to the Wetlands and Waterways Program as noted on the last page of this form.
- Any application that is not completed in full or is accompanied by poor quality drawings may be considered incomplete and result in a time delay to the applicant.

Please check one of the following:

RESUBMITTAL: _____ APPLICATION AMENDMENT: __X__ MODIFICATION TO AN EXISTING PERMIT: _____
JURISDICTIONAL DETERMINATION ONLY: __ APPLYING FOR AUTHORIZATION ___
PREVIOUSLY ASSIGNED NUMBER (RESUBMITTALS AND AMENDMENTS) _____

DATE January 8th, 2020

APPLICATION DESCRIPTION: Ellicott City Safe and Sound Plan Flood Mitigation Projects

1. APPLICANT INFORMATION:
APPLICANT NAME:

A. Name: Mr. Mark Richmond B. Daytime Telephone: 410-313-6413
C. Company: Howard County Government-SWM Division D. Email Address: msrichmond@howardcountymd.gov
E. Address: 9801 Broken Land Parkway
F. City: Columbia State: MD Zip: 21046

AGENT/ENGINEER INFORMATION:
A. Name: Ms. Amy Hribar B. Daytime Telephone: 410-662-7400
C. Company: McCormick Taylor, Inc. D. Email Address: alhribar@mccormicktaylor.com
E. Address: 509 South Exeter Street, 4th Floor
F. City: Baltimore State: Maryland Zip: 21202

ENVIRONMENTAL CONSULTANT:
A. Name: Mr. Adam Tatone B. Daytime Telephone: 410-662-7400
C. Company: McCormick Taylor, Inc. D. Email Address: adtatone@mccormicktaylor.com
E. Address: 509 South Exeter Street, 4th Floor
F. City: Baltimore State: Maryland Zip: 21202

CONTRACTOR (If known): _____

A. Name: _____ B. Daytime Telephone: _____
C. Company: _____ D. Email Address: _____
E. Address: _____
F. City: _____ State: _____ Zip: _____

PRINCIPAL CONTACT:

A. Name: Ms. Amy Hribar B. Daytime Telephone: 410-662-7400
C. Company: McCormick Taylor, Inc. D. Email Address: alhribar@mccormicktaylor.com
E. Address: 509 South Exeter Street, 4th Floor
F. City: Baltimore State: Maryland Zip: 21202

PCA 13910
OBJ 4142

2. PROJECT DESCRIPTION

a. GIVE WRITTEN DESCRIPTION OF PROJECT:

This project involves seven projects along the Frederick Road/Main Street corridor in Ellicott City to provide improved conveyance of large storm events and reduce potential of flooding. The projects generally include floodplain grading, construction of enlarged conveyance structures and additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity. The westernmost project is located at approximately 8777 Frederick Road and the easternmost project is located along the Patapsco River in downtown Ellicott City.

Has any portion of the project been completed? _____ Yes __X__ No If yes, explain

Is this a residential subdivision or commercial development? _____ Yes __X__ No
If yes, total number of acres on property _____ acres

Will there be temporary or permanent tree clearing occurring on the overall project site (i.e., uplands and wetlands), including but not limited to, tree clearing for site development, road/highways, utilities, mining, stormwater management, restoration, energy production and transmission, etc.)?
__X__ Yes _____ No
If yes, total estimated acres of tree clearing for the overall project site: <1 acres

b. ACTIVITY: Check all activities that are proposed in the wetland, waterway, floodplain, and nontidal wetland buffer as appropriate.

A. _____	Filling	D. _____	flooding or impounding water	F. __X__	Grading
B. _____	Dredging	E. _____	draining	G. __X__	removing or destroying vegetation
C. __X__	Excavating			__X__	building structures

Wetlands

Nontidal Wetlands – *Permanent* _0__ sq. ft
Nontidal Wetlands – *Temporary* __0__ sq. ft
Tidal Wetlands – *Permanent* __0__ sq. ft
Tidal Wetlands – *Temporary* __0__ sq. ft

Wetland Buffers

Nontidal Wetlands Buffer – *Permanent* __0__ sq. ft.
Nontidal Wetlands Buffer –*Temporary* __0__ sq. ft.

Waters of the U.S./Streams

Waters of the U.S./Streams – *Permanent* _3,515_ LF _54,914_ SF
Waters of the U.S./Streams – *Temporary* _0_ LF _0_ SF
Tidal Waters – *Permanent* __0__ LF __0__ sq. ft
Tidal Waters – *Temporary* __0__ LF __0__ sq. ft
Ephemeral Waters of U.S./Streams – *Permanent* _0_ LF __0__ SF
Ephemeral Waters of U.S./Streams – *Temporary* _0_ LF __0__ SF

100-Year Floodplain

Disturbance on Floodplain __343,085__ sq. ft.
Net Volume of Cut in the Floodplain TBD CY

c. TYPE OF PROJECTS: Project Dimensions

For each activity, give overall length and width (in feet), in columns 1 and 2. For multiple activities, give total area of disturbance in square feet in column 3. For activities in tidal waters, give maximum distance channelward (in feet) in column 4. For dam or small ponds, give average depth (in feet) for the completed project in column 5. Give the volume of fill or dredged material in column 6.

		Length (Ft.) 1	Width (Ft.) 2	Area (Sq. Ft.) 3	Maximum/Average Channelward Encroachment 4		Pond Depth 5	Volume of fill/dredge material (cubic yards) below MHW or OHW 6
A. _____	Bulkhead							
B. _____	Revetment							
C. _____	Vegetative Stabilization							
D. _____	Gabions							
E. _____	Groins							
F. _____	Jetties							
G. _____	Boat Ramp							
H. _____	Pier							
I. _____	Breakwater							
J. _____	Repair & Maintenance							
K. _____	Road Crossing							
L. _____	Utility Line							
M. _____	Outfall Construction							
N. _____	Small Pond							
O. _____	Dam							
P. _____	Lot Fill							
Q. _____	Building Structures							
R. _____	Culvert							
S. _____	Bridge							
T. _____	Stream Channelization							

Attachment 5: Alternatives Analysis Summary

Executive Summary

The Howard County Department of Public Works, Storm Water Management Division, Bureau of Environmental Services in collaboration with the Howard County Administration is developing solutions to safeguard Ellicott City from future flooding events. Since 2011, three significant storm events caused extensive damage to downtown Ellicott City. The County has employed resources to evaluate flood reduction solutions that would still retain the function of the downtown corridor and minimize the impact to the public. Most recently Howard County Executive, Calvin Ball, established the Ellicott City Safe and Sound Plan (ECSSP) which outlines a suite of flood mitigation options.

The ECSSP has divided the proposed plan into two phases. Phase 1 focuses on ensuring public safety, supporting business and property owners, maintaining Ellicott City's historic charm, and developing a more inclusive, community-driven process. Phase II builds on these principals and includes a comprehensive flood mitigation approach through infrastructure improvement projects.

The projects included in the preferred plan were submitted as part of the Section 404 permit process, as they are anticipated to result in unavoidable impacts to the Waters of the US and floodplains along the Tiber, Hudson, and New Cut Tributaries. Note that not all components of the ECSSP are part of the JPA; the four flood attenuation projects that are outside of the historic district are excluded here. Anticipated cultural impacts to historic resources will require additional evaluation of the projects through the Section 106 process. The lead federal agency for these processes has been identified as the US Army Corps of Engineers.

Howard County has taken an integrated approach to developing a preferred Phase II mitigation plan to address flooding in Ellicott City by including agencies, stakeholders and the public during the decision making process. The preferred mitigation plan includes seven key sites located along Frederick Road/Main Street from approximately 8777 Frederick Road east to the Patapsco River in downtown Ellicott City. Implementation of the preferred mitigation plan will have the greatest effect at reducing flooding risk to life and property in Ellicott City, preserving the historical integrity and future economic vitality of the community.

1.0 Project Background

Hudson Branch, a tributary of the downstream Tiber River (aka Tiber-Hudson Branch), itself a tributary to the Patapsco River, winds along Main St. in Ellicott City, Howard County, Maryland. Runoff from the 1.55 square mile watershed of the Hudson Branch, the upland boundaries of which extend north and west of the US 40 / US 29 interchange, flows through a confined channel and occasional storm culverts along both the north and south sides of Main St. before meeting its confluence with the 0.54 square mile watershed of the Tiber Branch in a parking lot south of Main St. (Parking Lot 'D'). The Tiber River continues eastward from Parking Lot 'D' in a confined channel where it meets its confluence with the 1.55 square mile watershed of the New Cut Branch. The combined flow of this total 3.7 square mile watershed (the remaining 0.06 sq. mi runs to the combined channel at the downstream end) continues through a confined channel under several historic buildings before meeting its ultimate confluence with the Patapsco River.

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

The confined nature of the channel, due in part to the steep topography surrounding Main St., as well as the historic buildings which line or straddle its immediate banks, contributes to the dramatic flooding experienced in the Main St. corridor during certain intense rainfall events. The development within the watershed, built over time beginning with Ellicott City's founding in 1772, some of which is managed for quantity control to varying degrees, up to and including the 100-year (1% annual exceedance probability) event, also plays a role. Historically, Ellicott City has also experienced severe flooding from "bottom-up" events, where high flows in the nearby Patapsco River backwater into the lower end of the downtown area along historic Main St., as was the case during major flooding from Tropical Storm Agnes in 1972. Flooding from backwatering events affects the lower end of Main Street and can cause significant damage, however this type of flooding typically occurs over a longer period of time, giving residents and emergency response personnel time to implement emergency plans and evacuate flood-prone areas. Conversely, flooding from high-intensity, "top-down" events, has proved not only extremely damaging, but extremely dangerous, as flash-flooding does not provide residents and visitors in flood-prone areas time to evacuate the area. Additionally, these events include high-velocity flow of flood waters, leading to high tractive forces that exacerbate damage to buildings and infrastructure, as well as the risk of injury and fatalities. Flash flooding events in 2011, 2016 and 2018 all have demonstrated the destructive nature of these "top-down" events.

The remnants of Tropical Storm Lee on September 7, 2011 caused severe flooding along a sizeable stretch of Main Street inundating vehicles and surrounding homes and businesses with runoff anywhere from a few inches to several feet deep. Flooding closed Main Street for two days, and required the County Emergency Operations Center to be active for 10 days following the flooding. Direct costs from this event were approximated at $1.5 million.

The next severe flooding event experienced on Main St. and surrounding areas occurred during an intense thunderstorm on July 30, 2016. Approximately 6" of rain fell in just over 2 hours, an event with an annual exceedance probability of 0.1% based on 3-hour National Oceanic and Atmospheric Administration (NOAA) Precipitation Data for the region. The storm caused widespread flooding of the Main St. community and its surrounding homes and businesses with flooding in excess of 6' feet deep. Several buildings along the channel experienced significant damage, and dozens of cars were washed downstream into the Patapsco River, resulting in two fatalities. This damage extended up Main St. from the historic district to the West End area just east of US 29. Economic studies evaluating the impact of the 2016 flood estimated that this event alone could reduce economic activity in Howard County by $42 million and up to $67 million when multiplier effects are included. Recovery efforts and emergency stream wall repairs on County-owned property cost approximately $9.4 million[2]. The County compiled statistics from the 2016 event that also reflect the severity of that event: 246 vehicles were damaged or destroyed, Main St was closed for 69 days, and 146 buildings were impacted.

On May 27, 2018, severe thunderstorms passing through Howard and Baltimore Counties dropped approximately 6.6" of rain in 3 hours, with locally heavier rainfall along the south side of the Ellicott City watershed. Flooding from this event was similarly catastrophic in magnitude to the flooding experienced in 2016, and caused one fatality. Flooding along Main St. and throughout the historic district was widespread; a large culvert conveying the Hudson Branch below Ellicott Mills Drive collapsed, breaching the roadway embankment and sending a surge of water downstream. Major structural damage was experienced along roadways and buildings throughout

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

the area. Recovery efforts and repairs on County-owned property from this event total approximately $23.2 million; 120 vehicles were damaged or destroyed, Main St was closed for 24 days and 180 buildings were impacted, with the Emergency Operations Center open for 23 days.

Multiple studies have been performed in Ellicott City since the flooding event in 2011, focused on in-depth hydrologic and hydraulic analyses, case studies, economic impact reports, community advisory committee reports, and flood proofing investigations. These studies have been completed by groups with diverse backgrounds, including community groups, the US Army Corps of Engineers, and consultants of various disciplines, to identify solutions that would minimize community impacts.

Following the July 2016 event, Howard County undertook development of a comprehensive flood mitigation plan. The proposed flood mitigation strategies considered many combinations of individual improvement projects. Improvement projects generally fell within two categories; flood attenuation facilities to store excess runoff and release flows at a measured rate, and conveyance improvements that would help move runoff through the town more efficiently. The improvement plans varied widely in their cost, impact to the surrounding community, and their mitigation effectiveness. The 2016 flood mitigation study (McCormick Taylor, 2016) identified conceptual mitigation improvements, which were then further evaluated and discussed within the County administration, engineers, and community advisory groups including the Flood Work Group. Flood mitigation strategies were presented at multiple public meetings, where the results of iterative H&H analyses were presented to the public. The County received hundreds of recommendations and suggestions from the public following these meetings and throughout the planning process. Additional improvement strategies were still being evaluated when the 2018 flooding event hit Ellicott City.

After the 2018 event, the second devastating flood in as many years, the need for large-scale, substantial and effective mitigation solutions was reinforced. To provide impactful mitigation benefits that could significantly reduce flooding from the 100-year recurrence and larger storm events, solution plans with greater cost and resource impacts were considered. A 5-year mitigation plan of improvement projects was selected by the County administration, and permitting, property acquisitions and initial steps were taken to begin implementation of this plan. The 2018 election cycle introduced a new County administration team, which reevaluated the previously selected 5-year plan. The new administration considered additional mitigation plans and further analyses to assess the effectiveness of plans that had less impact on the community but still resulted in major reductions to downtown flooding. The new mitigation objective was to develop a plan that reduced flood depths within lower Main Street to less than 3 feet for a simulated flash flood event similar to the historical 2016 event.

As part of Phase 1 of the Ellicott City Safe and Sound Plan, the County proceeded with enhancement of the emergency public alert system, initiated an ongoing program of debris management in the stream channel to clear several tons of debris from the waterways, and provided flood mitigation assistance grants for floodproofing and creation of the Community Development Corporation (CDC) Exploration Committee. These improvements will help improve public safety, support property owners and businesses, and setup the framework for community involvement in future mitigation solutions. However, implementation of larger-scale,

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

Phase II mitigation solutions are needed to meet flood mitigation objectives and provide the associated benefits to the community.

Phase II of the EC Safe and Sound plan was informed by over 60 different mitigation scenarios evaluated for flood reduction effectiveness and their approximate level of impact to the community. Independent of County H&H studies, in 2019 the USACE began a study to independently evaluate the H&H results and associated impacts of the 60 mitigation alternatives. The USACE study aimed to provide the County feedback on preferred plans, and on potential projects that may not have been considered; this study has not yet been released to the public.

Ultimately, multiple solutions were presented to the community in May 2019 at a public meeting and forum. The County solicited feedback from the community on the five short-listed plans, and using information gathered throughout the entire process, identified the preferred alternative as "Option 3G.7.0". The details of this plan are presented in the "Ellicott City 'Safe and Sound' Plan: Flood Mitigation Options", and presented herein. This alternatives analysis fulfills a portion of the requirements for the federally-mandated Clean Water Act Section 404 permit review process, since these projects will impact federally regulated Waters of the US.

Below is a list of studies that have been completed in the immediate downtown area, contributing to the selection of the preferred plan. Electronic copies of these studies are available online at www.ecsafeandsound.org/reports.

- Ellicott City 'Safe and Sound' Plan: Flood Mitigation Options, Howard County
- Ellicott City Watershed Master Plan, Howard County
- Ellicott City Hydrology and Hydraulic Study and Concept Mitigation Analysis, Howard County
- Nonstructural Flood Proofing Study for Ellicott City, USACE
- Case Study: Ellicott City Flood Event 2016, Howard County
- 2016 Tiber-Hudson Stream Corridor Assessment
- 2016 Ellicott City Flood Recovery Community Advisory Group Final Report
- The economic Impact of the 2016 Ellicott City Flood
- Historic Ellicott City Flood Work Group Report 2015
- Previous Ellicott City Flood Studies (Multiple)

2.0 Purpose and Need

Purpose

The over-arching objective of the Safe and Sound plan is to improve public safety. More specific objectives were to reduce flood depths in Lower Main St. and around structures on the West End (west of Ellicott Mills Dr.) to three feet (3') or less, and out-of-channel flow velocities to five feet per second (5 fps) or less, for the simulated 7/30/16 flash flood storm event. The water surface reduction to three feet or less is based on the depth at which floodproofing becomes an effective means for preserving existing structures. Phase 1 mitigation solutions include floodproofing, debris management, and emergency alerts, but these solutions alone will not meet public safety and community preservation objectives.

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

Need

Engineering studies of many flood mitigation alternatives have shown that large-scale infrastructure upgrades are necessary for the community to withstand significant, flash flood storm events such as the devastating historic events in 2011, 2016 and 2018. The statistics in Table 2.1 reflect some of the measureable costs from these events, and while the social costs and flooding impacts to historical resources are more difficult to assess, they are no less detrimental to the community.

Table 2.1 Howard County compiled statistics reflecting impacts of recent historic flooding events.*

	Historical Flooding Event		
	Sept. 2011	**July 2016**	**May 2018**
Fatalities	0	2	1
Costs	$1,598,016	$9,407,563	$23,217,156
Vehicles Impacted	Not Available	246	120
Days Main Street was closed	2	69	24
Days EOC Open	10	28	23
Days DAC Open	Not Available	26	11
Power/Gas Outage	35,277	8,489	734
No. of buildings impacted	Not Available	146	180

*All statistics provided are approximate except for days EOC and DAC were open.
EOC-Howard County Emergency Operations Center
DAC-Howard County Disaster Assistance Center

Although the meteorological probability of these historic events happening was very low, history has proven that these events do occur and will continue to occur in the future, with the likelihood of greater event frequency due to climate change. Without large-scale improvements, the community will continue to experience dangerous and destructive flooding and the associated economic, social and historical costs.

3.0 Proposed Plans for Flood Mitigation, Ellicott City Safe and Sound Phase II

Preliminary designs for flood mitigation projects were developed as part of Phase II of the Howard County Safe and Sound Plan. Over the past several years, the County has engaged the public along with the Master Planning team to develop the preferred plan, or suite, of mitigation projects to reduce flooding within the Main Street corridor yet balance and preserve elements within the Historic District. In total, over 60 plans, representing many combinations of projects, were evaluated, however, for purposes of presenting a concise, substantive alternatives analysis, four proposed alternative plans are presented below.

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

Table 3.1 Proposed flood mitigation plan alternatives and the projects included within each alternative plan.

	Alternatives			
Projects	*Alternative 1* *No Build*	*Alternative 2* *Implementation of 3G.7.0*	*Alternative 3* *Partial Implementation of 3G.7.0*	*Alternative 4* *Implementation of Previous 5-yr Plan*
Modified Floodplain	--	4 Buildings Removed	4 Buildings Removed	10 Buildings Removed
Quaker Mill Flood Attenuation Facility	--	X	X	X
Lot D Channel Expansion (Hudson Bend)	--	--	--	X
T-1 Flood Attenuation Facility	--	X	X	--
H-7 Flood Attenuation Facility	--	X	X	X
NC-3 Flood Attenuation Facility	--	X	X	--
Maryland Avenue High Flow Bypass Culverts	--	X	--	X
Lower Main Street Channel Constriction Removal	--	X	X	X
North Tunnel	--	X	X	--
8777 Frederick Road Culvert Improvement	--	X	X	X
8600 Frederick Road High Flow Bypass	--	X	X	X
8552 Main Street Flood Berm/8534 Main Street High Flow Bypass Pipe	--	X	X	X

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

Alternative 1 - No Build

The No Build Alternative includes Phase 1 objectives to enhance the Emergency Public Alert System. This alternative does not address the purpose and need of the study and was used to provide a baseline for comparison.

Alternative 2 – Full Implementation of 3G.7.0 Plan

The 3G.7.0 plan includes 11 distinct projects; four of these projects are flood attenuation facilities located outside the Ellicott City historic district (but within the watershed). The four flood attenuation facilities are not included in this permit submission and therefore are not discussed herein. The seven projects included in this plan and discussed below are in various stages of design, and generally include floodplain grading, construction of enlarged conveyance structures and additional culverts for bypass of high flows, and removal of existing channel restrictions that are currently reducing channel capacity. A brief description of each of the seven projects is provided below:

- 8777 Frederick Road Culvert Improvement Project– Project includes channel and floodplain grading upstream and downstream of existing crossing below Frederick Road to increase channel conveyance capacity and improve overall channel and floodplain stability. Existing crossing below Frederick Road will be expanded to approximately 40' wide. The existing structure at 8777 Frederick Road may potentially be displaced from its current location for floodplain grading and installation of the new crossing. The property at 8777 Frederick Road (HO-364) has been determined to be eligible for the National Register of Historic Places.
- 8600 Frederick Road High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream of current entrance to existing 96"/108" CMP cross culvert to expand the channel and increase capacity. A headwall structure at the upstream end will include a weir to direct high flows into four (4) bypass culverts, while maintaining base flow through the existing culvert. The downstream end of the existing culvert will be shifted upstream to a new endwall location, opening up stream that is currently inside the 96"/108" CMP cross culvert. The bypass pipes will discharge at this same outfall location. The bypass pipe installation may potentially displace six existing structures at addresses: 8637-8639 Frederick Road, 8629 Frederick Road, 8611 Frederick Road, 8601 Frederick Road, 8590 Main Street, and 8578 Main Street. The structures at addresses 8637-8639 Frederick Road and 8629 Main Street are located within the National Register listed Ellicott City Historic District (HO-78) and National Register eligible Frederick Road Survey District (H)-899).
- 8552 Main Street Flood Berm/8534 Main Street High Flow Bypass Pipe Project – Project includes channel and floodplain grading upstream and downstream of a proposed 8' diameter cross culvert that will be placed parallel to the existing 8' CMP culvert. The proposed cross culvert will improve conveyance of high flows through the area. The flood berm at 8552 Main Street is designed to minimize floodplain flows from entering Frederick Road. Grading at downstream end of culverts may include potential displacement of structures with addresses 8526 – 8522 Main Street, 8518 Main Street, 8512 Main Street and garage, and the garage

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

at 8500 Main Street. The flood berm may potentially displace or impact historical resources at addresses 8548-8560 West Main Street. These properties are located within the Ellicott City Historic District.

- Lower Main Street Channel Constriction Removal Project – Project includes removing constrictions over the existing stream channel to restore conveyance capacity of the channel. The back of 6 buildings located over the existing stream channel will be removed from the 100-year floodplain, for 8081 Main Street (deck only), 8085-8089 Main Street, 8095-8101 Main Street (first floor only), 8109-8111-8113 Main Street, and 8125 Main Street. This includes HO-359, HO-586, HO-360 in MHT records and are located within the Ellicott City Historic District.
- Lower Main Street Terraced Floodplain Project – Project includes removing Tiber Alley, and 4 buildings located over the existing stream channel (8069, 8059, 8055, and 8049 Main Street). This includes HO-330 and HO-669 in MHT records. All of the buildings are located within the Ellicott City Historic District.
- Maryland Avenue High Flow Bypass Culverts Project – Project includes channel grading in Hudson/Tiber to facilitate bypass of high flows into a proposed headwall for two 10' diameter bypass culverts to relieve flooding. Bypass culverts will convey high flows between B&O museum buildings, below CSX railroad to the Patapsco River. MD Ave bypass culverts outfall will be stabilized with riprap and adequate energy dissipation measures. Project may potentially impact the historic Ellicott City Station of the B&O Railway (HO-71), which is located within the Ellicott City Historic District.
- North Tunnel Project – Project includes channel and floodplain grading at upstream end of proposed tunnel location to install entrance structure for the proposed high flow, bypass. High flow bypass will be approximately 15' in diameter and will convey flow beneath Court Avenue approximately 1600' to outfall in the Patapsco River, upstream of the Main Street bridge. The details of the entrance structure have not been defined, but impact plates provide schematic representation of potential design. The tunnel outfall will be stabilized with riprap and adequate energy dissipation measures. The project is set within the Ellicott City Historic District.

Alternative 3 – Partial Implementation of 3G.7.0 Plan-No Maryland Ave Bypass Culverts

This alternative plan includes all projects listed in Alternative 2, except the Maryland Ave Bypass Culverts. Construction of the Maryland Avenue bypass culverts will require temporary disturbance to the downtown area during construction and will have multiple construction challenges. The proximity of the culverts to the B&O Museum and adjacent historic railroad building will require close monitoring during construction to ensure no impacts to those historic structures. The culverts will also need to be bored beneath the CSX railroad, requiring additional coordination and cost, and will have Waters of the US impacts along the Patapsco River to construct an energy dissipation structure at the culverts outfall.

From a resource impact perspective, removing the Maryland Avenue culverts project from the plan, eliminates approximately 11,172 SF of floodplain impacts, and reduces permanent Waters of the US Impacts along the Patapsco River by 132 LF (3,515 total LF for

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

the Alternative 2 to 3,383 total LF for Alternative 3). However, the removal of this component of the ECSSP will result in the full project purpose not being met. These culverts provide an additional conduit for the flow from the New Cut and Tiber Branches, as well as the portion of the Hudson Branch downstream of the North Tunnel, to reach the Patapsco; currently all this flow bottlenecks at the channel that flows below the railroad bridge, adjacent to the Railroad Museum, to the Patapsco. Without this component, the target reductions in flood depth and velocity are unlikely to be fully achieved.

Alternative 4 – Implementation of Previous 5-Year Plan

The previous 5-yr plan included many of the same projects that are in *Alternative 2, 3G.7.0.* A significant distinction between *Alternative 4* and *Alternative 2*, is that *Alternative 4* includes full removal of 10 buildings along Lower Main Street, whereas A*lternative 2* includes removal of only four buildings in this area, along with modification of six additional buildings to remove only portions of the buildings above the stream channel.

The overall mitigation plan for this alternative does not include flood attenuation facilities T1 and NC3, whereas the plans in Alternatives 2 and 3 do include those flood attenuation facilities.

The North Tunnel is not included in this alternative.

4.0 Preferred Alternative

Following the public meeting held May 2, 2019, the Administration reviewed all the public feedback and compiled study data, and ultimately determined that moving forward with all seven of the proposed projects suggested in the 3G.7.0 plan (*Alternative 2*) provides the most significant improvement to Ellicott City flooding from an impact/benefit perspective. The preferred *Alternative 2* achieves the primary objective of improving public safety, while minimizing impacts to historical resources and maintaining economic and social viability of the community.

Alternative 2 provides the greatest flood mitigation of all the alternatives presented. With this alternative, flooding depths along Lower Main St from historical flash flood events can be managed with traditional floodproofing measures. In addition to improving safety, this means flooding impacts to historic buildings in the downtown area will be less detrimental to those structures, and they will be more accessible for the community in the future.

Under this alternative, there will be impacts to historic structures, though these impacts have been and will continue to be mitigated. Alternative 4 was the previously "preferred" strategy, but based on public feedback and feedback from preservation agencies, the

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

County administration sought alternative projects that could provide better flood mitigation with reduced structure impacts to downtown. Through detailed analyses and additional investigations, the County arrived at the reduced impacts associated with *Alternative 2*. The County remains open to mitigation strategies for historic resources and will continue to coordinate with agencies and evaluate strategies as part of the federally-led Section 106 process. A programmatic agreement between the County, USACE, Maryland Historic Trust, and other relevant parties will be developed to plan for reduction and resolution of historic impacts associated with the chosen alternative.

This alternative will not only reduce the damages and danger associated with significant floods, but it will also reduce the occurrence of flooding. The impact of smaller storm events is not specifically addressed or discussed in this analysis, but the reduced occurrence of smaller flooding events is certainly a benefit of alternatives 2, 3, and 4 that should be acknowledged, and this reduction is the most significant under the preferred *Alternative 2.*

Natural resource impacts of the preferred alternative will be significant, however the tributaries impacted are not of high ecological value, as the Waters of the US are confined, armored channels through the majority of the reach. With implementation of Alternative 2, there are opportunities for improved ecology of the stream channel through Main St., since implementation of the North Tunnel project will protect the downstream confined channel from major, scour-inducing flooding for most events. As design progresses the County will consider adding natural features to restored channel sections that promote improved ecology, reduce scouring potential and improve stability of stream banks that are not currently armored.

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0
[2] County sourced statistics (various County data sources).

Table 4.1 Impacts and evaluation criteria of proposed alternatives

	Alternatives			
Evaluation Criteria[2]	***Alternative 1*** ***No Build***	***Alternative 2*** ***Implementation of 3G.7.0***	***Alternative 3*** ***Partial Implementation of 3G.7.0***	***Alternative 4*** ***Implementation of Previous 5-yr Plan***
Natural Resource Impact - WUS	0	3,181 LF	3,049 LF	2,676 LF
Natural Resource Impact - Floodplain	0	280,799 SF	269,627 SF	244,225 SF
Short-Term Costs (5 - 10 yr)	$35M[1]	$113.5M - $140M	$110M - $137M	$56.5M
Buildings Impacted	180[1]	23 (16 structures removed, 6 modified, 1 additional impacted)	23 (16 structures removed, 6 modified, 1 additional impacted)	23 (22 structures removed, 1 additional impacted)
Implementation Timeframe	N/A	8 yr	5 yr	5 yr
Max Flood Depth - Lower Main St 7/30/16 Flash Flood Event	6-8 ft	3 ft	4.1 ft	5.5 ft
Average Flood Velocity - Lower Main St 7/30/16 Flash Flood Event	10.3 fps	2.9 fps	2.9 fps	3 fps

[1] Future anticipated based on recent historic events.

[2] Criteria and values reflect estimates only for projects discussed within this analysis.

Conclusion

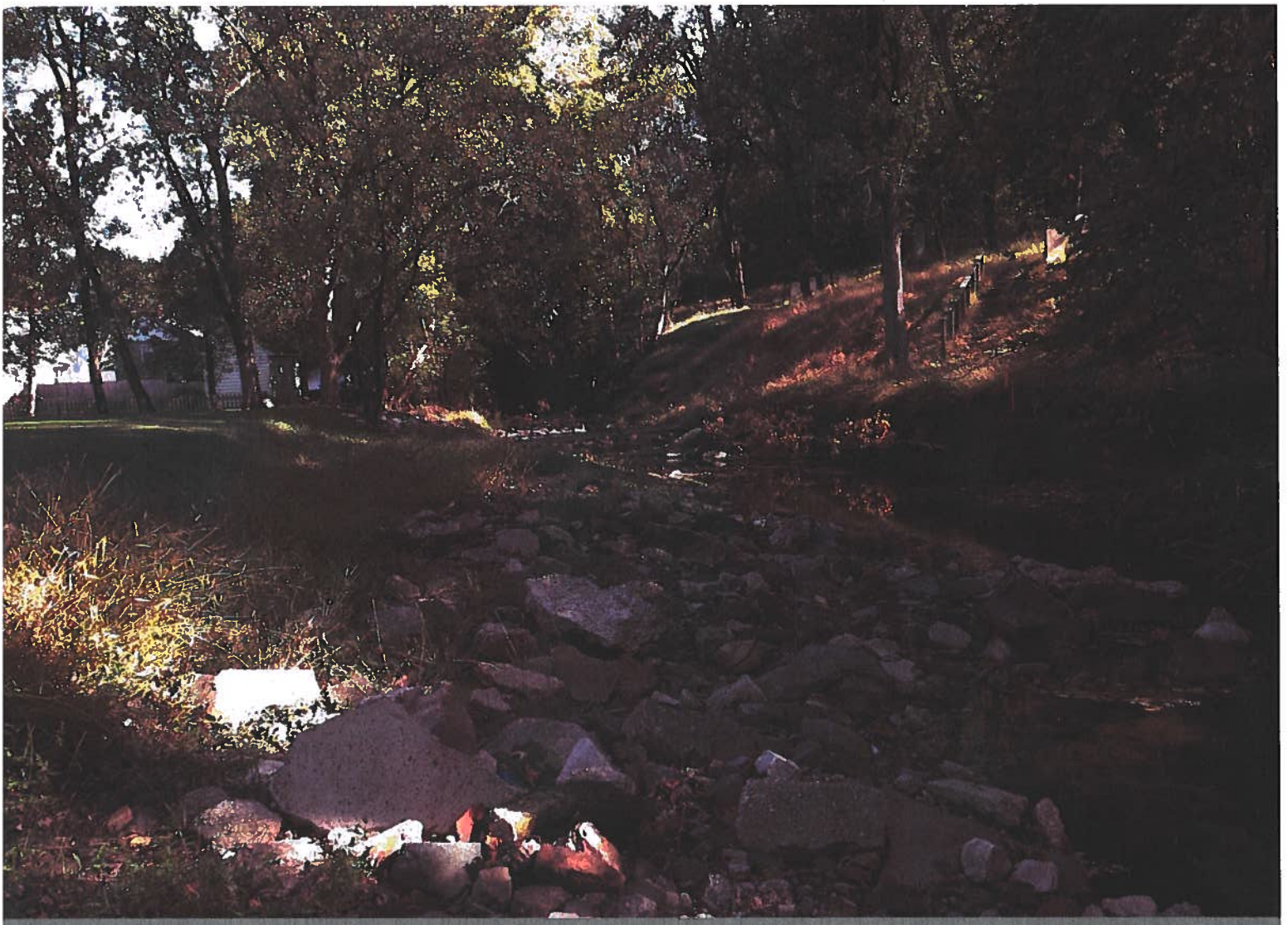
Proposed impacts of the preferred *Alternative 2* include 3,181 linear feet (50,345 square feet) of permanent impacts to the Patapsco River, Tiber Run, and perennial tributaries, and 280,799 square feet of permanent impacts in the 100-year floodplain.

[1] https://www.howardcountymd.gov/LinkClick.aspx?fileticket=eMST_nkc4RU%3d&portalid=0

[2] County sourced statistics (various County data sources).

Attachment 6: Supplementary Plan Information

-Includes Hudson Branch Stream Restoration Project report (previously submitted to agencies under permit 2019-60176), which is combined with the 8777 Culvert Improvement project in this amendment



HUDSON BRANCH STREAM RESTORATION

NATIONWIDE PERMIT 27 – AQUATIC HABITAT RESTORATION, ESTABLISHMENT AND ENHANCEMENT ACTIVITIES

PREPARED FOR:

Howard EcoWorks
Attn: Lori Lilly
9770 Patuxent Woods Drive, Suite 309
Columbia, MD 21046
llilly@howardecoworks.org

ECOSYSTEM SERVICES

Prepared by Ecosystem Services
1739 Allied St. Suite A, Charlottesville, VA
434.953.0735
dan@ecosystemservices.us

Last Revised: 1/17/2019

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APPENDIX D: IPaC Report

APPENDIX E: Cultural Resources Information

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APPENDIX G: Joint Permit Application

1. INTRODUCTION

1.1. Project Description

Located in Ellicott City, Maryland, the proposed water quality improvement project consists of restoring approximately 573 linear feet of Hudson Branch, a tributary to the Tiber River.

1.2. Project Location

The project area is along Frederick Road in Ellicott City, Maryland, approximately 500 feet west of the intersection of Rogers Avenue and Frederick Road. The project area encompasses several parcels along Frederick Road, mapped on Tax Map #24, Grid 12, Parcels 0683, 0684, 0685, and 0687.

1.3. Project Setting and Land Use

The project area lies within the Piedmont Plateau physiographic province. The project is within the historic section of Ellicott City and is characterized by single family residences on the northern bank and mixed hardwood forest and a cemetery on the southern bank. The topography surrounding the project area is gently sloping on the northern bank and very steep on the southern bank. The forested areas are composed of hardwood species such as black walnut (*Juglans nigra*), northern red oak (*Quercus rubra*), sycamore (*Platanus occidentalis*), tulip poplar (*Liriodendron tulipifera*), and box elder (*Acer negundo*). The landscaped portions of the project are dominated by turf grass species, with box elder, red maple (*Acer rubrum*), and black walnut sporadically throughout. All water resources within the project area drain to the Tiber River (HUC: 02130906).

1.4. Purpose and Need

The overall purpose of the project is to stabilize eroding banks along Hudson Branch, and to install in-stream structures to dissipate energy during high flows. In addition to water quality improvements and pollutant reductions (sediment, nitrogen, phosphorus) from riparian buffer and stream restoration, the primary goal is to re-establish a functional stream corridor that will maintain dimension, pattern, and profile.

1.5. Existing Conditions

Hudson Branch is currently experiencing lateral instability in the form of eroding bed and banks. This is primarily due to the amount of impervious area within the watershed associated the urban nature of the watershed. Residential and commercial development upstream of the project area has removed or impaired riparian zones and channelized the flow of Hudson Branch, increasing the velocity of the water and the amount of erosion downstream.

2. METHODOLOGY

2.1. Restoration Design

The natural channel design approach for this project was to use knowledge of stream morphology and hydraulic processes to provide a stream geometry and profile that will sufficiently dissipate energy to not

erode or cause further downstream instability. Stream energy is dissipated through increasing roughness, increasing flow area, reducing slopes and providing flood plain connection.

The restoration design may employ both rock and log structures to provide grade control, transition steep slopes, and deflect erosive flow. The project assessment and design adhered to a functional assessment process that considers the biological, chemical, and physical stream functions and anticipated improvements. The proposed restoration will involve channel grading, excavation, and select structure placement to reestablish stable dimension, pattern and profile. Structures and bioengineering measures to be utilized include but are not limited to constructed riffles, rock steps, brush toe, soil lifts, branch layering, and live stakes. Stream banks and riparian buffers will be planted with native trees, shrubs, and grasses. The channel will be regraded to re-establish a stable pattern, profile, and dimensions. Appendix B attached provides a design plan set showing the location of channel grading, pools, and structures.

An initial hydraulic analysis was performed on the stream to identify areas with hydraulic parameters such as velocity and shear stress that exceed stable conditions. This information was used to define the proposed structure placement and channel slope. Empirical data from published research concerning steep gradient step-pool morphology and hydraulics to anticipate stable geometric relationships was then used to determine the preliminary estimate of the number of steps, pool length, channel width and other parameters. This information was used to develop an alignment and cross-sections to do further hydraulic analysis of the proposed conditions. Boulder sizing was determined according to entrainment principles based on maximum shear stresses at different locations in the stream channel. Cobble sizing was determined using the USACE Steep-Slope, Riprap design procedures (1991) as well as the Isbash Curve for supercritical velocity vs. median grain diameter.

The riparian zone will be planted with overstory trees American sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), black willow (*Salix nigra*), and black gum (*Nyssa sylvatica*). Understory species are to include persimmon (*Diospyros virginiana*), silky dogwood (*Cornus amomum*), pawpaw (*Asimina triloba*), spicebush (*Lindera benzoin*), common ninebark (*Physocarpus opulifolius*), and southern arrowwood (*Viburnum dentatum*). Plan Sheet 9 of Appendix B provides a full planting schedule and plan for the riparian buffer zone, as well as permanent seeding mixtures.

All areas of land disturbance associated with the installation of structures and grading will be reseeded with native grasses and herbaceous species that were selected for their importance for wildlife food and cover. Plan Sheets 4, 6, and 7 of Appendix B provide a full erosion and sediment control narrative including measures and maintenance notes.

3. PERMIT CONSIDERATIONS

3.1. Unavoidable Impacts

Due to the nature of the proposed stream restoration activities, there will be an unavoidable temporary stream impact. The temporary impact is detailed below:

IMPACT #	ID	TYPE	SIZE	COWARDIN CLASSIFICATION
1	S1/S2	Temporary	573 linear feet	R3UB

This temporary impact involves the construction of structures within the stream channel and the regrading of the stream bank in select places. These structures are designed to minimize erosion by dissipating energy and deflecting erosive flow. Temporarily impacted areas outside of the stream channel will be restored or constructed to stable contours and planted.

3.2. Regional Conditions

None of the Regional Conditions for the Nationwide Permit #27 are expected to be applicable to this project. The project does not propose any shellfish seeding, does not take place within the coastal plain portion of Maryland, nor does it take place in any tidal marsh.

3.3. Construction and Monitoring

All construction will be supervised by an appointed representative of Ecosystem Services and will be completed in the late winter or early spring. Post-construction monitoring will occur to ensure that all stream improvements and riparian buffer plantings are established and functioning properly. Monitoring will consist of photographic documentation of all stream enhancement work and will be submitted yearly for two years post-construction, unless stream improvements are not functioning properly. If stream improvements are not functioning properly corrective actions will be prescribed, documented once satisfactorily installed, and reported to Maryland Department of the Environment (MDE).

3.4. Agency Coordination

The Nationwide Permit 27 Application will be sent to the United States Army Corps of Engineers (USACE) – Baltimore District for review and to initiate coordination with the Maryland Department of the Environment, Maryland Historical Trust, Maryland Department of Natural Resources, and any other applicable local, state, and federal agencies.

3.5. Federally Listed Species and Designated Critical Habitat

The U.S. Fish and Wildlife Service's online Information for Planning and Consultation (IPaC) (Appendix D) tool was used to generate a list of threatened and endangered species that may occur within the study area. There are no threatened, endangered, or candidate species listed as potentially occurring within the study area. There are no designated critical habitats, National Wildlife Refuges, fish hatcheries, or wetlands listed as occurring within this study area.

3.6. Historic Resources

Based on a preliminary review of Medusa, Maryland's Cultural Resource Information System, there are several historic resources listed within the vicinity of the project area and on the Maryland Inventory of Historic Properties (MIHP). The Essie Hammond House (MIHP HO-899) occurs within the project area, but is to be removed by others as part of separate County project before the start of the Hudson Branch Stream Restoration project. The Richard Malone House (MIHP HO-1103) is the only other structure listed within the project area. This structure is currently inhabited and will be entirely avoided during construction and will not be affected by the finished stream restoration. National Pike Milestone No. 11 (HO-592) is present along Frederick Road outside of the project area, the Frederick Road Bridge (HO-653) is present upstream of the project area, and the Ellicott City Colored School (HO-585) is present to the east of the project area. The proposed project will avoid these resources and no adverse effects to these resources are proposed. The Nelson House (HO-1117) is listed on the Inventory, but records indicate that it was demolished in 2013. The entire project lies within the Frederick Road Survey District (HO-899), but outside of the Ellicott City Historic District listed on the National Register of Historic Places. The Frederick Road Survey District is defined by the buildings constructed along Frederick Road between 1840 and 1920. Since this project does not propose to alter any of the structures listed on the MIHP and the completed project will not be readily visible from Frederick Road, no adverse effects to the survey district or this resource are expected.
Please refer to Appendix E for Cultural Resources information and a Cultural Resources map of the project area.

3.7. Submerged Aquatic Vegetation

The proposed restoration reach does not contain submerged aquatic vegetation.

3.8. Anadromous Fish Use Area

The proposed restoration will not occur within designated anadromous fish use areas.

3.9. Designated Critical Resource Waters

Hudson Branch has not been designated as a critical resource water.

3.10. Invasive Species

The proposed planting plan includes only native plant species specific to the region. No invasive species are proposed to be planted as part of this project. Currently, invasive species are not a problem within the study area, and there is no invasive species treatment or management plan associated with this project.

3.11. Navigation

The proposed stream is not navigable therefore there will be no impacts to navigation.

3.12. Aquatic Life Movements

No permanent or temporary crossings, culverts, or bridges that could impede aquatic life movements will be used.

3.13. Spawning Areas

The IPaC search, included in Appendix D, shows there are no designated spawning areas associated with Hudson Branch.

3.14. Migratory Bird Breeding Areas

Hudson Branch is not a known breeding area for migratory birds. Construction of the proposed stream restoration will comply with the appropriate regulations for the protection of birds including the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. A review of the Maryland Bird Conservation Partnership's online eagle nest map did not reveal any eagle nests in the vicinity of the project.

3.15. Shellfish Beds

The proposed stream channel contains no known shellfish beds.

3.16. Suitable Material

All the proposed stream stabilization activities are based on natural channel design principles with the use of natural stone and wood free of toxic pollutants.

3.17. Water Supply Intakes

There are no water supply intakes associated with Hudson Branch in the study area.

3.18. Adverse Effects from Impoundments

The proposed restoration activities do not include the creation of impoundments of water, accelerating the passage of water and/or restricting the flow of water.

3.19. Management of Water Flows

The proposed stream restoration activities are being designed to withstand expected high flows and will not impede normal or base flow conditions. The pre-construction course, condition, capacity and location of the stream channel are being altered in accordance with natural channel design principles as part of the restoration effort.

3.20. Fills within FEMA-mapped 100-Year Floodplains

This project takes place within the FEMA-mapped 100-Year floodplain. Construction activities will adhere to the erosion and sediment control measures described on the attached plan. No permanent fill will be placed within the FEMA-mapped 100-year floodplain. Excess material used in the restoration process will be removed at the completion of construction.

3.21. Equipment

Soil disturbance from equipment will be minimized to the maximum extent practicable during construction.

Areas that have been disturbed will be immediately reseeded with temporary seed mix. Once brought to final grade, denuded areas will be planted with either a permanent grass seed mix or the prescribed riparian herbs and shrubs. Please refer to the erosion and sediment control methods and proposed planting plan on the attached plan set.

3.22. Soil Erosion and Sediment Controls

All stream restoration activities will be in accordance with the Maryland Department of the Environment Water Management Administration Standards and Specifications for Soil Erosion and Sediment Control and any locally applicable ordinances. Construction practices will also adhere to the Virginia Stream Restoration Best Management Practices Handbook. Please refer to design plan included in Appendix B.

3.23. Removal of Temporary Fills

Any temporary fills used during the stream restoration activities will be removed in their entirety and the affected areas will be returned to pre-construction stable contours and revegetated with a permanent erosion and sediment control seed mix.

3.24. Proper Maintenance

All proposed stream restoration structures or fill will be properly maintained in accordance with the NWP general conditions as well as any activity-specific conditions added by the district engineer.

3.25. Single and Complete Project

The proposed stream restoration project is a single and complete project.

3.26. Wild and Scenic Rivers

Hudson Branch is not designated as a Wild and Scenic River.

3.27. Tribal Rights

The proposed stream restoration activities are not known to impair reserved tribal rights, including reserved water rights and treaty fishing and hunting rights.

3.28. Mitigation

The proposed stream restoration project is expected to improve aquatic habitat and water quality and is expected to not require mitigation. Any impacts caused by this project will be temporary.

3.29. Safety of Impoundment Structures

There will be no impoundment structures associated with the completed project.

3.30. Water Quality

The proposed stream restoration project aims to improve water quality by stabilizing stream banks, reducing erosion, and improving riparian buffer width and quality.

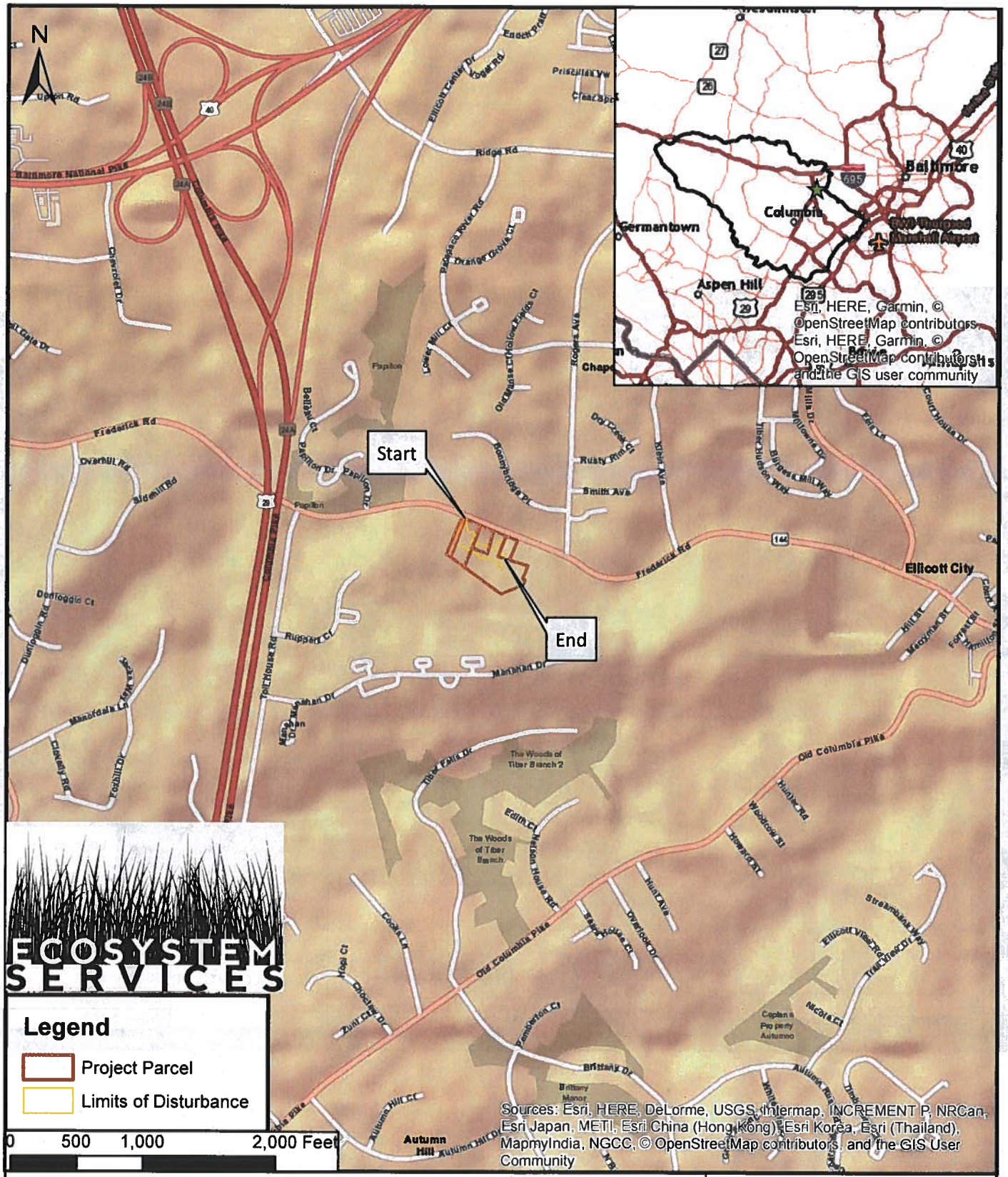
3.31. Coastal Zone Management

There are no expected impacts to Coastal Zone Management activities as part of the proposed project.

4. CONCLUSIONS

On behalf of our client, Howard EcoWorks, Ecosystem Services, LLC respectfully requests your approval of the Pre-Construction Notification for Nationwide Permit 27 – Aquatic Habitat Restoration, Establishment, and Enhancement Activities for the Hudson Branch Restoration project in Ellicott City, Maryland.

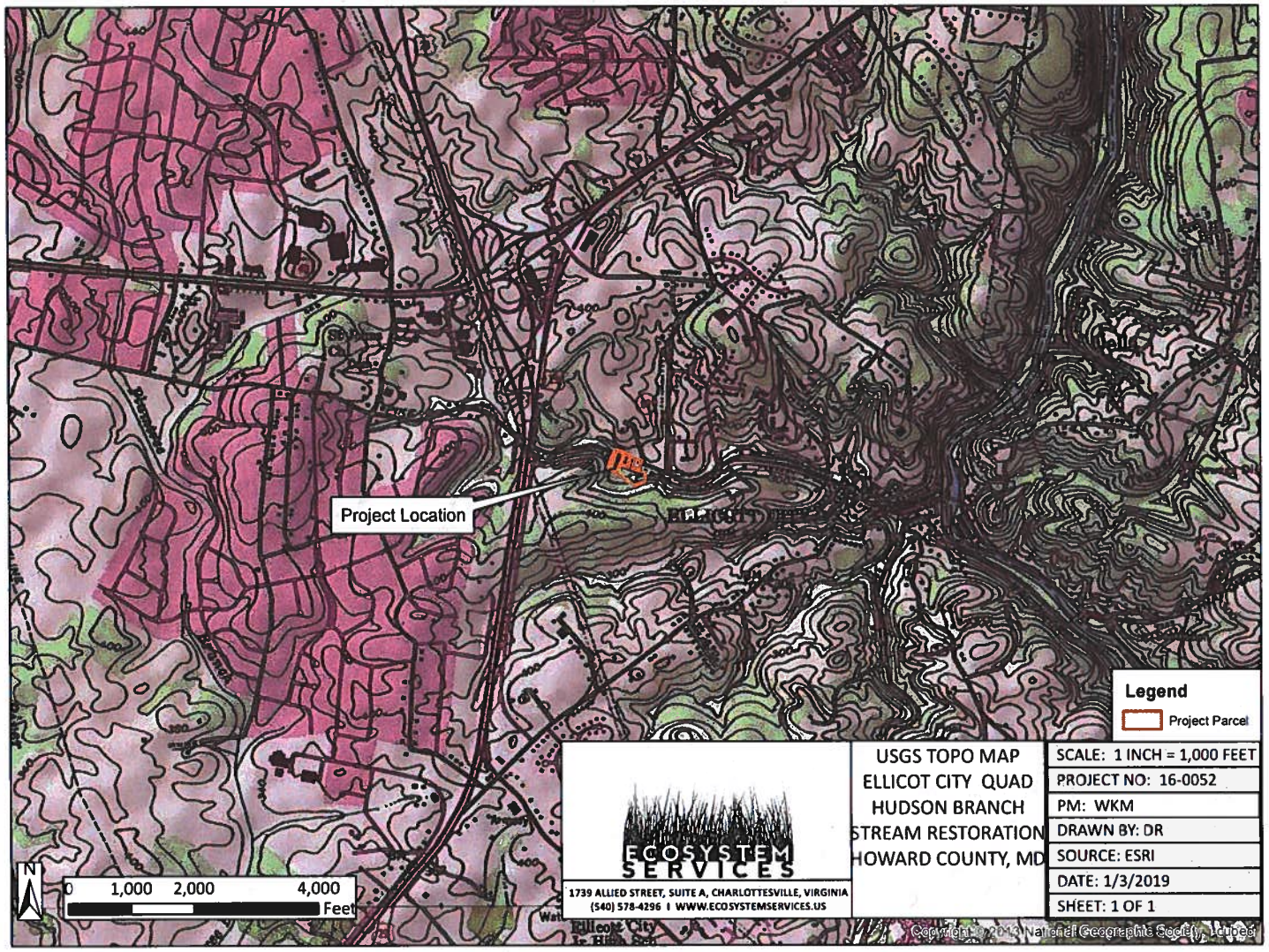
APPENDIX A: Location Maps

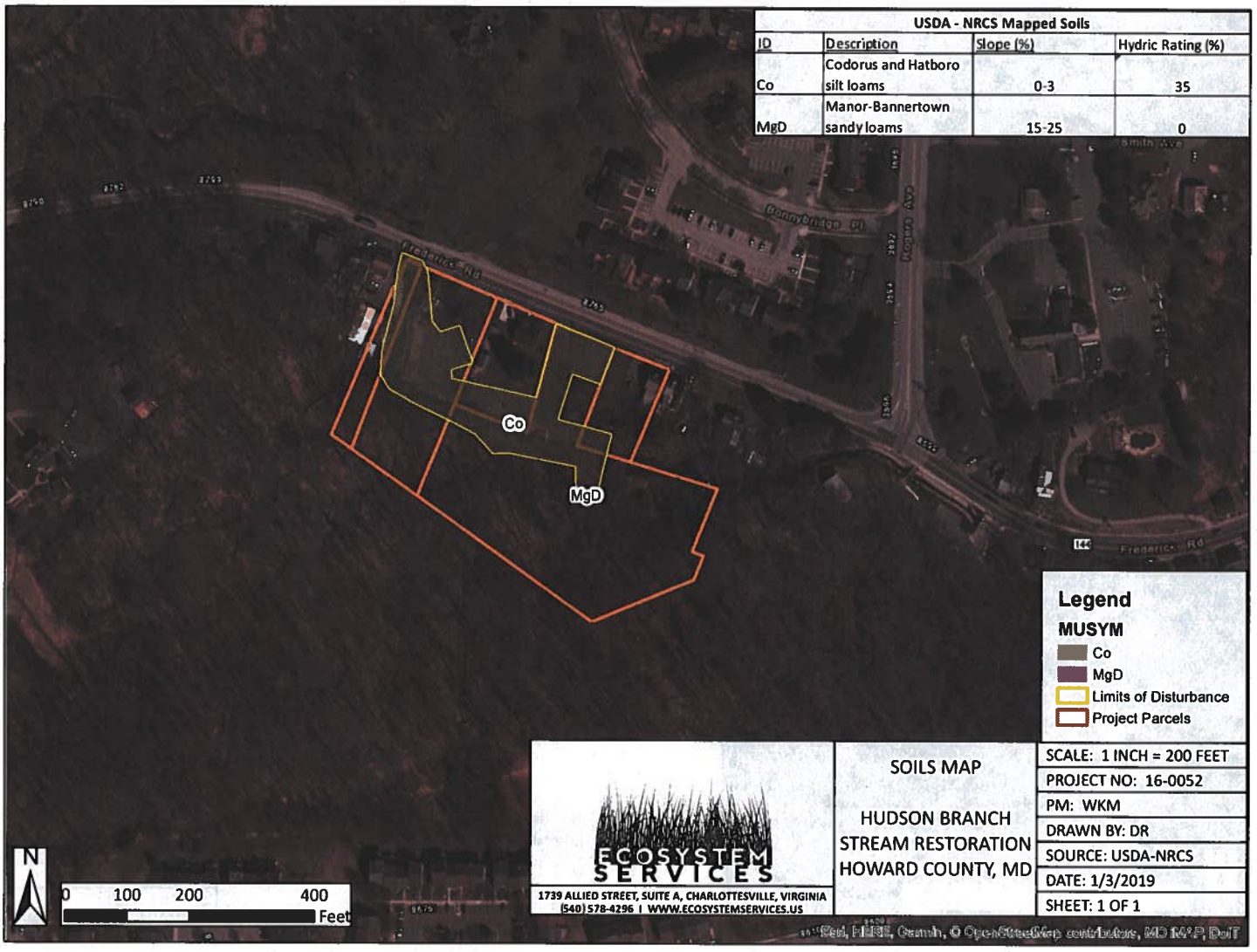


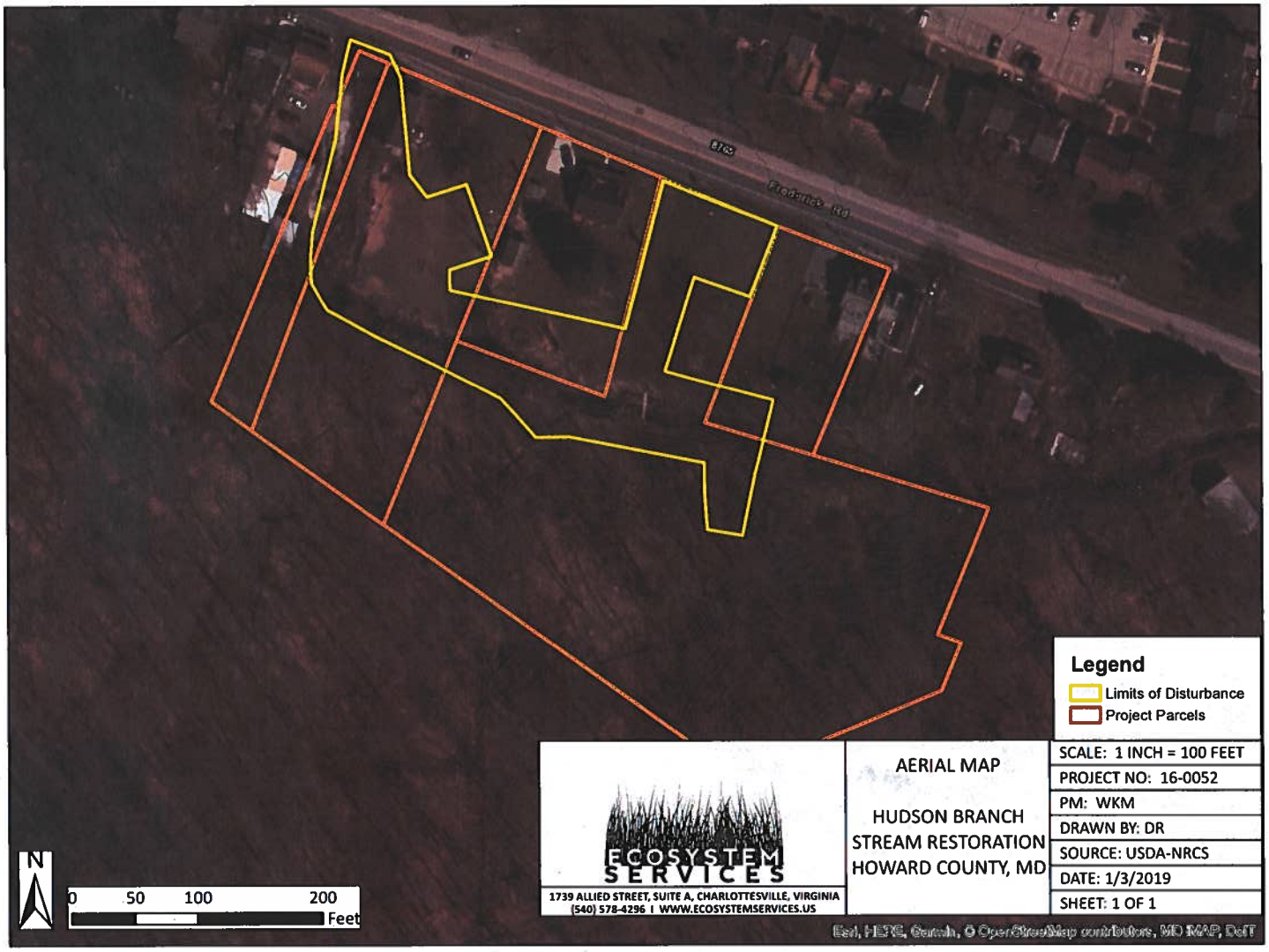
VICINITY MAP
HUDSON BRANCH STREAM RESTORATION
Howard County, Maryland

1739 Allied Street, Suite A, Charlottesville, Virginia
(540) 578 4296 | WWW.ECOSYSTEMSERVICES.US

SCALE: 1 inch = 1,000 feet
PROJECT NO: 16-0052
PM: WKM
DRAWN BY: DR
SOURCE: ESRI
DATE: 1/3/2019
SHEET: 1 of 1


Project Location
Legend
Project Parcel
N
0 1,000 2,000 4,000
Feet
ECOSYSTEM SERVICES
1739 ALLIED STREET, SUITE A, CHARLOTTESVILLE, VIRGINIA
(540) 578-4296 I WWW.ECOSYSTEMSERVICES.US
USGS TOPO MAP
ELLICOT CITY QUAD
HUDSON BRANCH
STREAM RESTORATION
HOWARD COUNTY, MD
SCALE: 1 INCH = 1,000 FEET
PROJECT NO: 16-0052
PM: WKM
DRAWN BY: DR
SOURCE: ESRI
DATE: 1/3/2019
SHEET: 1 OF 1
Copyright © 2013 National Geographic Society, i-cubed


USDA - NRCS Mapped Soils
ID | Description | Slope (%) | Hydric Rating (%)
Co | Codorus and Hatboro silt loams | 0-3 | 35
MgD | Manor-Bannertown sandy loams | 15-25 | 0
Co
MgD
Legend
MUSYM
Co
MgD
Limits of Disturbance
Project Parcels
N
0 100 200 400
Feet
ECOSYSTEM SERVICES
1739 ALLIED STREET, SUITE A, CHARLOTTESVILLE, VIRGINIA
(540) 578-4296 | WWW.ECOSYSTEMSERVICES.US
SOILS MAP
HUDSON BRANCH STREAM RESTORATION
HOWARD COUNTY, MD
SCALE: 1 INCH = 200 FEET
PROJECT NO: 16-0052
PM: WKM
DRAWN BY: DR
SOURCE: USDA-NRCS
DATE: 1/3/2019
SHEET: 1 OF 1
Esri, HERE, Garmin, © OpenStreetMap contributors, MD iMAP, DoIT


Frederick Rd
Legend
Limits of Disturbance
Project Parcels
N
0 50 100 200
Feet
ECOSYSTEM SERVICES
1739 ALLIED STREET, SUITE A, CHARLOTTESVILLE, VIRGINIA
(540) 578-4296 I WWW.ECOSYSTEMSERVICES.US
AERIAL MAP
HUDSON BRANCH
STREAM RESTORATION
HOWARD COUNTY, MD
SCALE: 1 INCH = 100 FEET
PROJECT NO: 16-0052
PM: WKM
DRAWN BY: DR
SOURCE: USDA-NRCS
DATE: 1/3/2019
SHEET: 1 OF 1
Esri, HERE, Garmin, © OpenStreetMap contributors, MD MAP, DeIT

APPENDIX B: 100% Plan Set

HUDSON BRANCH
STREAM RESTORATION (100%)

HOWARD COUNTY, MARYLAND

PROJECT LOCATION MAP

VICINITY MAP
SCALE 1" = 500'

PROJECT INFORMATION

1 CLIENT
ALLIANCE FOR THE CHESAPEAKE BAY
501 6TH STREET
ANNAPOLIS, MD 21403
CONTACT LORI LILLY
PHONE (503) 791-8435
EMAIL LLILLY@ALLIANCEFORTHEBAY.ORG

PROJECT AGENT KIP MUMAW PE
PROJECT ENGINEER KIP MUMAW PE
ECOSYSTEM SERVICES LLC
209 2ND ST SW SUITE 2A
CHARLOTTESVILLE VA 22902
CONTACT KIP MUMAW PE
540 239 1428
KIP@ECOSYSTEMSERVICES.US

2 PROPERTY OWNER PRIVATE LANDOWNERS (SEE EXISTING CONDITIONS SHEET)
3 TOTAL ACREAGE OF DISTURBANCE +/- 1.2 AC
4 PROJECT WATERSHED PATAPSCO RIVER
5 HYDROLOGIC UNIT CODE 02130906 (8-DIGIT)

LEGEND

- PROPERTY LINE
- EXISTING 1' CONTOUR LINE
- EXISTING 5' CONTOUR LINE
- EXISTING FEMA 100YR FLOOD LIMITS
- EXISTING FEMA 500YR FLOOD LIMITS
- EXISTING DRIVEWAY
- EXISTING STREAM THALWEG
- EXISTING FENCE
- EXISTING TREE
- PROPOSED LIMITS OF DISTURBANCE
- PROPOSED 1' CONTOUR LINE
- PROPOSED 5' CONTOUR LINE
- PROPOSED CHANNEL CENTERLINE
- PROPOSED TOP OF BANK

ESC LEGEND

- LOD — LIMITS OF DISTURBANCE
- SF — SILT FENCE
- CE — CONSTRUCTION ENTRANCE
- SSP — STOCKPILE/STAGING
- TREE TO BE REMOVED
- TREE PROTECTION

APPROVAL

REGULATORY AUTHORITY SIGNATURE TITLE DATE

REGULATORY AUTHORITY SIGNATURE TITLE DATE

SHEET LIST	
1	COVER
2	EXISTING CONDITIONS
3	GRADING PLAN & PROFILE
4	EROSION & SEDIMENT CONTROL PLAN
5	DETAILS
6	DETAILS (E&S)
7	NOTES & DETAILS (E&S)
8	PLANTING PLAN
9	PLANTING DETAILS

PROJECT NARRATIVE

LOCATED IN HOWARD COUNTY MARYLAND THE PROPOSED PROJECT CONSISTS OF RESTORING AND STABILIZING SELECT SECTIONS OF APPROXIMATELY 800 LINEAR FEET OF HUDSON BRANCH A TRIBUTARY TO THE PATAPSCO RIVER THE PRIMARY GOAL IS TO RE-ESTABLISH A FUNCTIONAL STREAM AND RIPARIAN CORRIDOR THAT WILL MAINTAIN DIMENSION PATTERN AND PROFILE

PROPOSED ACTIVITIES WILL INVOLVE CHANNEL BANK AND FLOODPLAIN GRADING EXCAVATION AND SELECT STRUCTURE PLACEMENT STRUCTURES AND BIOENGINEERING MEASURES INCLUDING ROCK CROSS VANE BOULDERS FOR TOE PROTECTION AND SOIL LIFTS WILL BE UTILIZED STREAM BANKS AND RIPARIAN BUFFERS WILL BE PLANTED WITH NATIVE TREES SHRUBS LIVE STAKES AND GRASSES

GENERAL NOTES

1 ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE
2 THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT (410) 313-1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF WORK
3 THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE
4 THE EXISTING TOPOGRAPHY IS TAKEN FROM (FIELD RUN OR AERIAL) SURVEY WITH (MAXIMUM ONE FOOT) CONTOUR INTERVALS PREPARED BY (ANT, INC. & MCCORMICK TAYLOR, INC.)
5 ADDITIONAL FIELD SURVEYS WERE CONDUCTED BY ECOSYSTEM SERVICES LLC
6 ADDITIONAL BASE MAPPING OBTAINED FROM HOWARD COUNTY GIS AND MARYLAND DEPARTMENT OF NATURAL RESOURCES
7 HORIZONTAL DATUM NAD83 MARYLAND STATE PLANE ZONE, US FOOT
8 VERTICAL DATUM NAVD 88, US FOOT
9 THE CONTRACTOR SHALL CONTACT "MISS UTILITY" AT 811 OR 1-800-257-7777 PRIOR TO ANY LAND DISTURBING ACTIVITIES
10 ALL WORK SHALL BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL STANDARDS
11 ANY WORK THAT IS REQUIRED FOR THE SUCCESSFUL COMPLETION OF THE PROJECT AS SPECIFIED IN THIS SET OF PLANS BUT NOT SPECIFICALLY ADDRESSED IN THE PLAN SET SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO COMPLETE SUCH WORK
12 THE PROJECT DOES NOT INCLUDE THE ADDITION OF ANY IMPERVIOUS COVER NO INCREASE IN RUNOFF WILL RESULT FROM THIS PROJECT
13 NO WORK SHALL BEGIN WITHOUT ACQUISITION OF ALL LOCAL, STATE AND FEDERAL PERMITS AND APPROVALS
14 SHOULD A DISCREPANCY BE FOUND IN THE PLAN SET, THE CONTRACTOR SHALL CONSULT WITH PROJECT ENGINEER PRIOR TO COMPLETION OF SPECIFIC WORK
15 ALL GRADING ACTIVITIES SHALL INCLUDE REMOVAL AND TEMPORARY STOCKPILING OF TOP SOIL, EXECUTION OF GRADING, AND REPLACEMENT OF TOPSOIL TO ACHIEVE FINAL GRADES
16 THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS AS A RESULT OF ITS WORK PERFORMED DURING THE CONTRACT PERIOD THIS RESPONSIBILITY SHALL INCLUDE RE-SEEDING DISTURBED AREAS AND TEMPORARY ACCESS ROADS
17 THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND STAGING MATERIAL INSIDE THE LIMITS OF DISTURBANCE UNLESS PRIOR APPROVAL BY THE PROJECT ENGINEER IS PROVIDED
18 CLEARING & GRUBBING SHALL BE CONFINED TO THOSE AREAS NEEDED FOR CONSTRUCTION ACCESS AND GRADING
19 UNDER NO CIRCUMSTANCES ARE TREES OVER 6" DBH TO BE REMOVED WITHOUT PRIOR APPROVAL FROM THE PROJECT ENGINEER UNLESS OTHERWISE SPECIFIED WITHIN THIS PLAN SET
20 THE CONTRACTOR IS RESPONSIBLE FOR ALL TAKE-OFF QUANTITIES INCLUDING BUT NOT LIMITED TO FILL STONE, AND VEGETATIVE MATERIALS
21 PLAN VIEW LOCATION OF STRUCTURES IS APPROXIMATE STRUCTURE PLACEMENT SHOULD FOLLOW THE PROFILE VIEW AND STRUCTURE DETAILS
22 IF SITE OR CONSTRUCTION CONSTRAINTS PREVENT POOL OR STRUCTURE ELEVATIONS FROM BEING CONSISTENT WITH THE PLAN SET, THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER TO FIELD MODIFY THE ELEVATIONS
23 ALL SECTION VIEWS ARE ORIENTED LOOKING DOWNSTREAM UNLESS OTHERWISE SPECIFIED
24 IN CONFORMANCE WITH DPOR REGULATIONS SECTION 54 1-112 INVITED BIDDERS MUST DISCLOSE (I) WHETHER BIDDER IS A RESIDENT OR NONRESIDENT OF THE COMMONWEALTH (II) WHETHER THE PROPER LICENSE OR CERTIFICATE HAS BEEN ISSUED TO THE BIDDER AND (III) THE INFORMATION REQUIRED OF THE BIDDER TO SHOW EVIDENCE OF PROPER LICENSURE OR CERTIFICATION UNDER THE PROVISIONS OF THE ABOVE MENTIONED CORRESPONDING CHAPTER

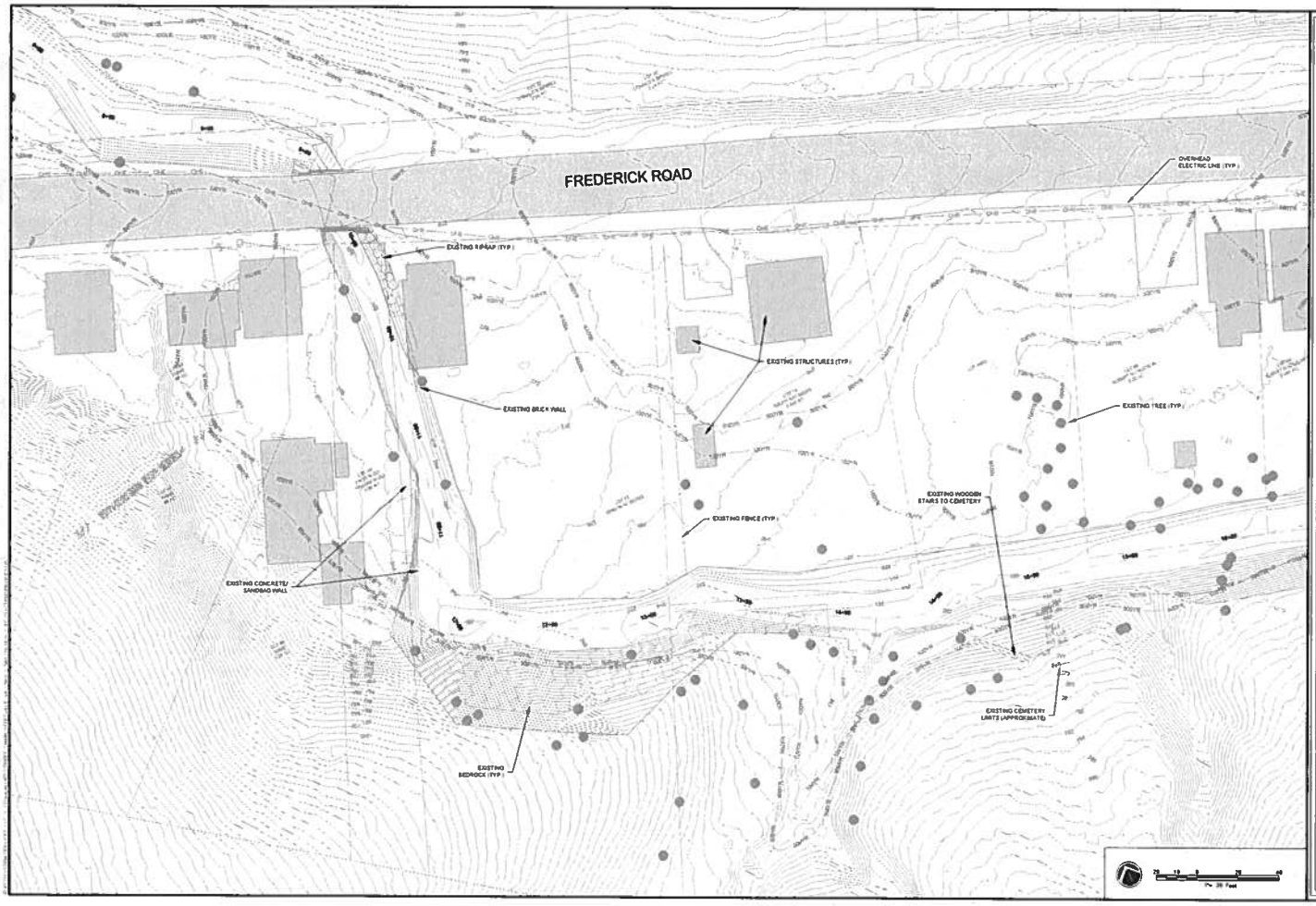
PROJECT MANAGER	KMM
DESIGNED	CAT
DRAWN	CAT/JAT
PROJECT #	16-0052
DATE	8/2018

3739-A Allied Street
Charlottesville VA 22903
540 239 1428
ECOSYSTEMSERVICES.US

NOT FOR CONSTRUCTION

REVISION

ECOSYSTEM SERVICES



ECOSYSTEM SERVICES

1739-A Allied Street
Charlottesville, VA 2290
540 239 1428
ecosystemservices.us

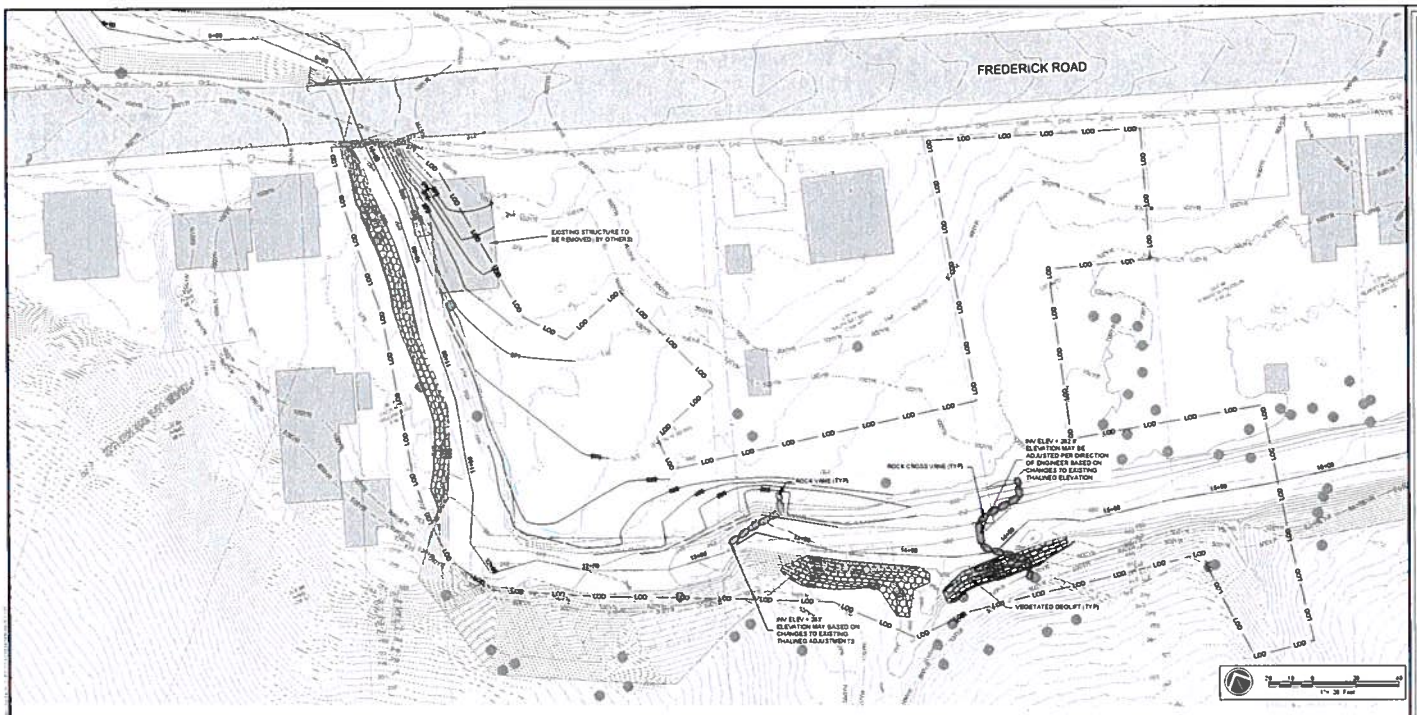
HUDSON BRANCH
STREAM RESTORATION (100%)

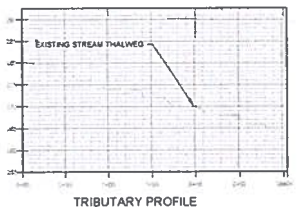
EXISTING CONDITIONS

HOWARD COUNTY, MARYLAND

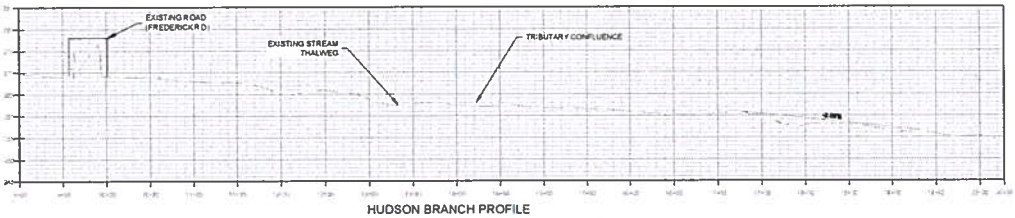
PROJECT MANAGER
DESIGNED
DRAWN
PROJECT #
DATE
SHEET

2





TRIBUTARY PROFILE



HUDSON BRANCH PROFILE

ECOSYSTEM SERVICES
1739-A Allied Street
Charlottesville, VA 22902
540 239 1428
ecosystemservices.us

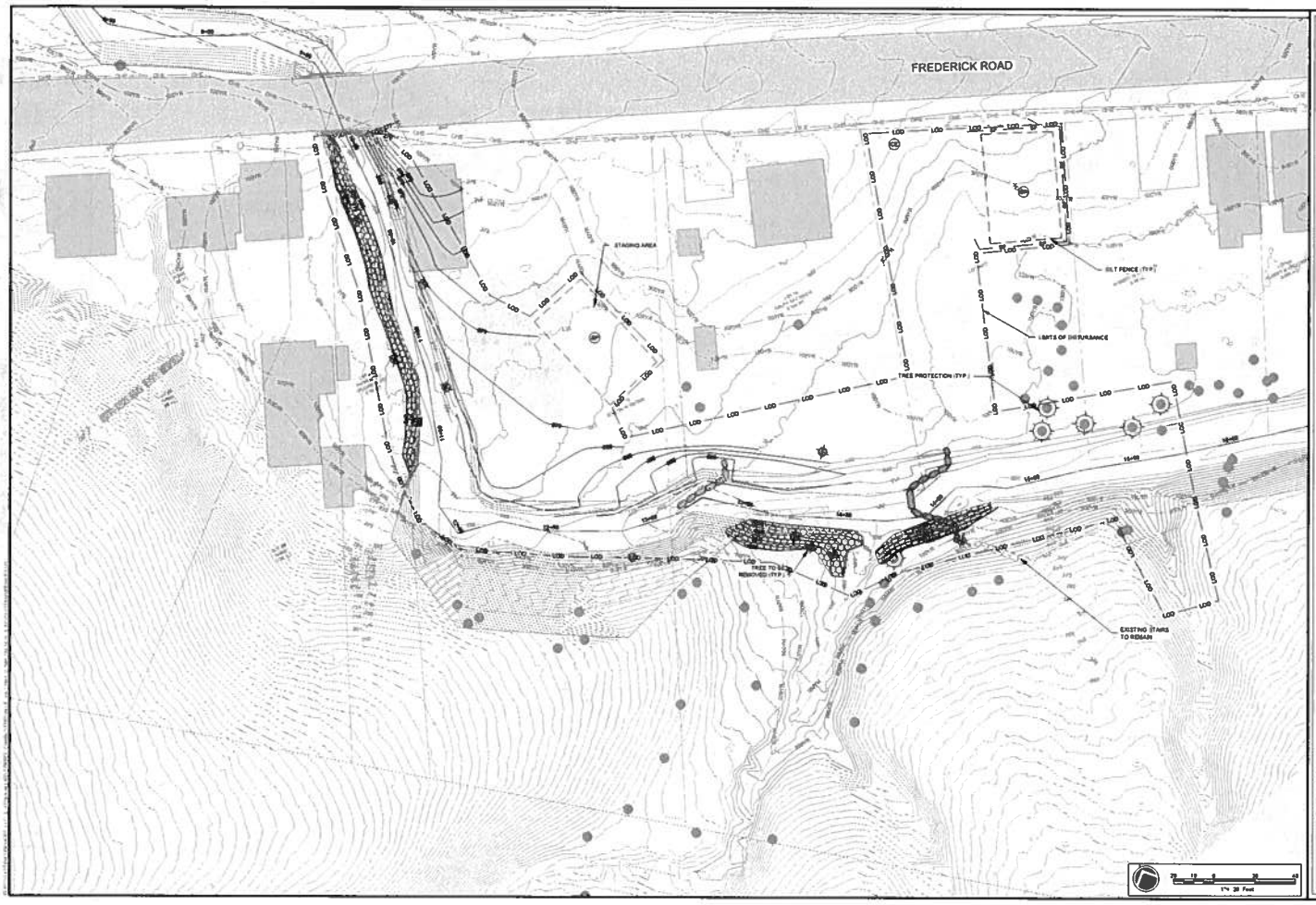
NOT FOR CONSTRUCTION

HUDSON BRANCH
STREAM RESTORATION (100%)

GRADING PLAN & PROFILE

HOWARD COUNTY, MARYLAND

PROJECT MANAGER	WKM
DESIGNED	CAT
DRAWN	CAT/JAT
PROJECT #	16-0063
DATE	8/24/18
SHEET	3



ECOSYSTEM SERVICES

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Charlottesville VA 2290
540 239 1428
ecosystemservices.us

HUDSON BRANCH
STREAM RESTORATION (100%)

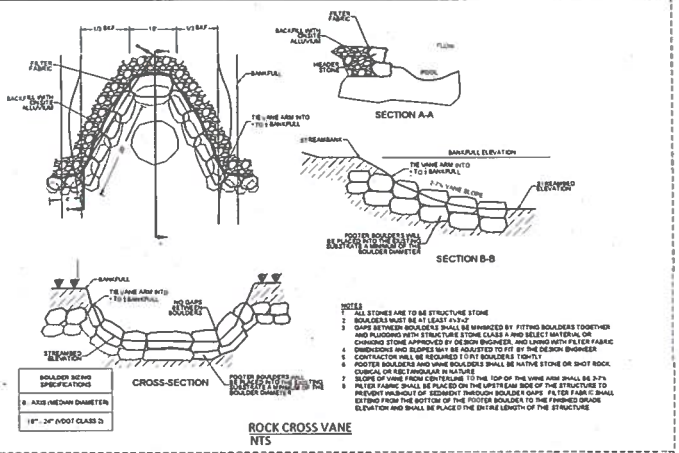
EROSION AND SEDIMENT CONTROL PLAN

HOWARD COUNTY, MARYLAND

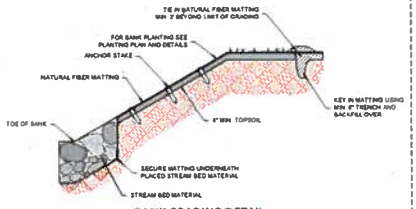
REVISION

PROJECT MANAGER
DESIGNED
DRAWN
PROJECT #
DATE
SHEET

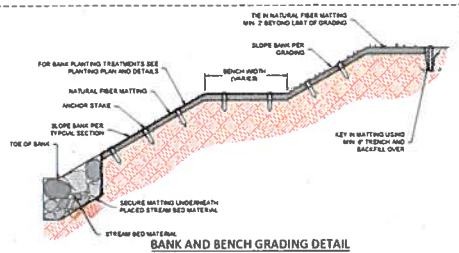
4



ROCK CROSS VANE
NTS



BANK GRADING DETAIL
NTS



BANK AND BENCH GRADING DETAIL
NTS

CLASS D - NONWOVEN GEOTEXTILE FABRIC SPECIFICATIONS			
WEIGHT- TYPICAL	APPARENT OPENING SIZE MAX AWM	GRAB TENSILE STRENGTH MIN (LBS)	PUNCTURE STRENGTH (LBS)
9 OZ/SY (ASTM D-4261)	0.21 (ASTM D-4751)	120 (ASTM D-4632)	65 (ASTM D-4833)

SOIL STABILIZATION MATTING SPECIFICATIONS

GRADED SLOPES & STREAM BANKS

1 MATTING SHALL BE MONOFILAMENT POLYPROPYLENE COIR TWINE MADE OF COIR FIBER OBTAINED FROM FRESH WATER CURED COCONUT HUSKS.

2 SOIL STABILIZATION MATTING SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS

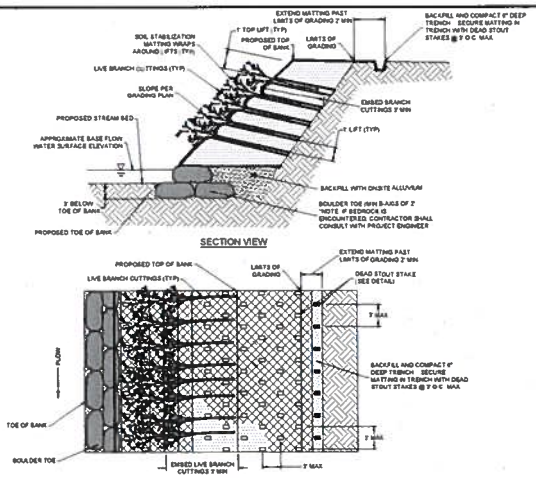
WEIGHT: 28 OZ/SY (ASTM D 3776)
THICKNESS: 0.35 IN (ASTM D 1777)
DRY TENSILE STRENGTH
MACHINE DIRECTION - 2024 LBS/SF
CROSS DIRECTION - 1168 LBS/SF
(ASTM D 4595)
WET TENSILE STRENGTH
MACHINE DIRECTION - 1776 LBS/SF
CROSS DIRECTION - 936 LBS/SF
(ASTM D 4595)
OPEN AREA: 30%

SOIL LIFTS

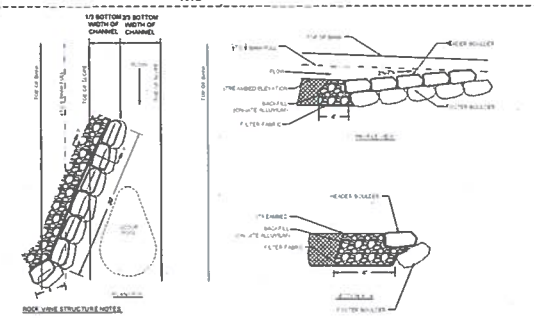
MATTING SHALL BE A DOUBLE LAYERED BIODEGRADABLE EROSION CONTROL FABRIC MADE UP OF AN OUTER LAYER OF HIGH STRENGTH COIR FABRIC AND AN INNER LAYER OF LIGHTWEIGHT JUTE FABRIC TIED TOGETHER.

3 SOIL STABILIZATION MATTING SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS

WEIGHT: 33.3 OZ/SY (ASTM D 5261)
THICKNESS: 0.35 IN (ASTM D 5199)
HIDE WIDTH TENSILE STRENGTH (OUTER LAYER)
1005 X 838 LBS/FT (ASTM D 4595)
HIDE WIDTH TENSILE STRENGTH (INNER LAYER)
512 X 466 LBS/FT (ASTM D 4595)
SHEAR STRESS: 4.5 PSF



VEGETATED GEOLIFT
NTS



ROCK VANE STRUCTURE NOTES

1 BOULDERS MUST BE AT LEAST 4'x3'x2'
2 USE FILTER FABRIC TO SEAL GAPS BETWEEN BOULDERS
3 DIG A TRENCH BELOW THE BED FOR FOOTER BOULDERS. START AT BANK AND PLACE FOOTER BOULDERS FIRST AND THEN HEADER BOULDERS. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS
4 INSTALL FILTER FABRIC FOR DRAINAGE BEGINNING AT THE MIDDLE OF THE HEADER BOULDERS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER BOULDERS, AND THEN UPSTREAM FOR A MINIMUM OF 300 FEET
5 USE WELL GRADED MIX OF RIPOT REVETMENT RIP RAP AND CLASS 1 STONE OR ON-SITE ALLUVIUM ON UPSTREAM SIDE OF STRUCTURE
6 AFTER ALL STONE HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH ON SITE ALLUVIUM TO THE ELEVATION OF THE TOP OF THE HEADER BOULDER
7 FILTER FABRIC SHALL BE TRIMMED ALONG THE TRANSITION BETWEEN THE STONE BACKFILL AND THE HEADER BOULDERS SO THAT THE FILTER FABRIC DOES NOT OVERLAP THE HEADER BOULDERS

ROCK VANE
NTS

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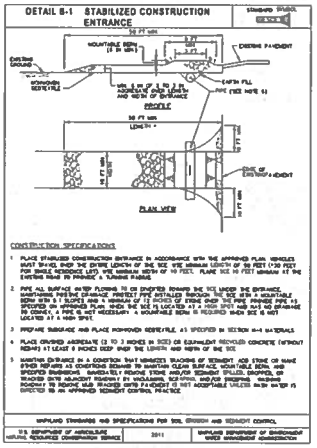
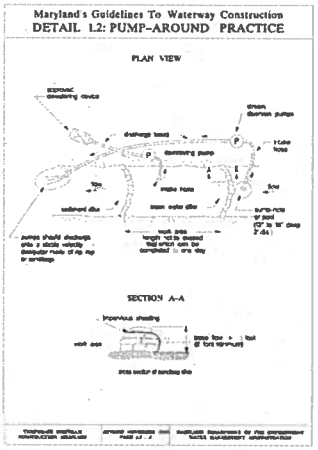
HUDSON BRANCH
STREAM RESTORATION (100%)

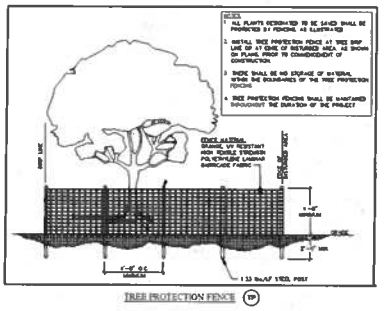
DETAILS (STREAM)

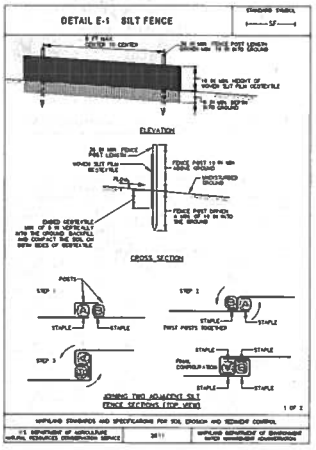
HOWARD COUNTY, MARYLAND

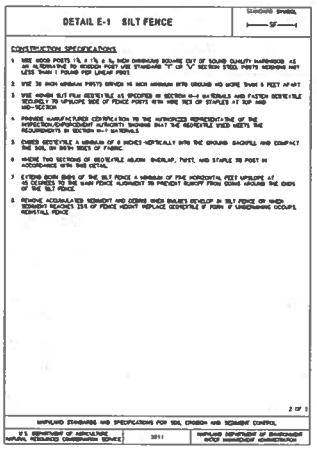
REVISION	
PROJECT MANAGER	
DESIGNED	CAT
DRAWN	CAT/JAT
PROJECT #	10-0052
DATE	8/26/13
SHEET	5

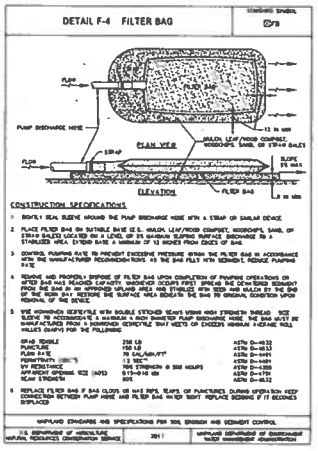












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HUDSON BRANCH
STREAM RESTORATION (100%)

DETAILS (E&S)

HOWARD COUNTY, MARYLAND

REVISION	
PROJECT MANAGER	WR
DESIGNED	CA
DRAWN	CATLIN
PROJECT #	18-005
DATE	8/24/1
SHEET	6

EROSION AND SEDIMENT CONTROL NOTES

A. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH DISTURBANCE EXCEPT THAT NECESSARY FOR INSTALLATION OF THE CONTROLS

B. ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE INSTALLED AND MAINTAINED ACCORDING TO THE CRITERIA CONTAINED IN THE MOST CURRENT VERSION OF THE MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

C. ALL CLEARING AND GRADING SHALL BE COMPLETED IN THE FOLLOWING SEQUENCE

1. LIMIT INITIAL CLEARING AND GRUBBING FOR THE INSTALLATION OF THE CONSTRUCTION ENTRANCE, PERIMETER CONTROLS AND ANY REMAINING CONTROLS
2. INSTALL STABILIZED CONSTRUCTION ENTRANCE, PERIMETER SILT FENCE AND ANY OTHER SEDIMENT CONTROLS
3. CLEAR, GRUB AND GRADE THE REMAINDER OF THE SITE AS SPECIFIED BY THE LIMITS OF DISTURBANCE SHOWN ON THE ATTACHED PLAT
4. PROVIDE TEMPORARY STABILIZATION OF ANY AREA THAT WILL NOT BE ACTIVELY GRADED WITHIN THREE (3) DAYS
5. CONSTRUCT ANY STRUCTURES AND UTILITIES
6. PROVIDE FINAL GRADING AND STABILIZATION ACCORDING TO THE SEEDING OR SODDING SPECIFICATIONS (MINIMUM STABILIZATION BY SEEDING AND MULCHING)
7. AFTER THE SITE HAS BEEN STABILIZED WITH ADEQUATE VEGETATION AND WITH THE PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROL PRACTICES AND STABILIZE REMAINING DISTURBED AREAS

D. ALL EROSION AND SEDIMENT CONTROL DEVICES REQUIRE CONTINUAL MAINTENANCE. ANY CONTROLS THAT ARE DAMAGED OR DISTURBED SHALL BE RESTORED OR REPAIRED BEFORE THE END OF EACH DAY

E. DEVELOPMENT ACTIVITIES SHALL NOT IMPAIR ANY DRAINAGE, CREATE AN EROSION HAZARD, OR CREATE A SOURCE OF SEDIMENT TO ANY ADJACENT WATERCOURSE, WETLAND, OR PROPERTY

F. ANY PUMPING OF WATER MUST BE FILTERED AND DONE ACCORDING TO THE CRITERIA CONTAINED IN THE MOST CURRENT VERSION OF THE MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

G. FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN THREE (3) CALENDAR DAYS FOR ALL SEDIMENT CONTROLS, STOCKPILES AND 3:1 OR GREATER SLOPES, AND SEVEN (7) DAYS FOR ALL OTHER DISTURBED AREAS ON THE SITE NOT BEING ACTIVELY GRADED

EROSION AND SEDIMENT CONTROL MEASURES

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MOST CURRENT VERSION OF THE MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. NO EROSION AND SEDIMENT CONTROL STRUCTURE SHALL BE REMOVED WITHOUT THE APPROVAL OF THE ESC INSPECTOR

PUMP AROUND PRACTICE (DETAIL 1.2 - MDE WATERWAY CONSTRUCTION GUIDELINES)

PUMP AROUND PRACTICE WILL BE INSTALLED WHERE NECESSARY TO ENSURE PROPER STREAM FLOW MAINTENANCE AND CLEAN WATER DISCHARGE FROM ACTIVE WORK AREAS. SPECIFIC LOCATIONS ARE NOT SPECIFIED ON PLANS AS THE LOCATION AND METHODS WILL VARY THROUGHOUT THE DURATION

FILTER BAG (DETAIL F-4)

FILTER BAG OR AN APPROVED ALTERNATIVE SHALL BE USED AS PART OF THE PUMP AROUND PRACTICE.

TEMPORARY STONE CONSTRUCTION ENTRANCE (DETAIL B-1)

A TEMPORARY STONE CONSTRUCTION ENTRANCE WILL BE PROVIDED AS SHOWN ON THESE PLANS

SILT FENCE (DETAIL E-1)

SILT FENCE WILL BE INSTALLED AT LOCATIONS SHOWN ON THESE PLANS IN ORDER TO INTERCEPT AND DETAIN SMALL AMOUNTS OF SEDIMENT FROM THE DISTURBED AREAS DURING CONSTRUCTION OPERATIONS IN ORDER TO PREVENT SEDIMENT FROM LEAVING THE SITE

TEMPORARY SEEDING & MULCHING

TEMPORARY SEEDING AND MULCHING WILL BE APPLIED WITHIN 7 DAYS TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. FOR TEMPORARY SEEDING USE 50% OF THE RECOMMENDED RATES OF FERTILIZER, LIME AND FULL AMOUNT OF SEED AND MULCH REQUIRED FOR REGULAR SEEDING. MULCHING SHALL CONSIST OF HARDWOOD MULCH

PERMANENT SEEDING

PERMANENT SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN (7) DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRAD BUT WILL REMAIN UNDISTURBED FOR LONGER THAN FOURTEEN (14) DAYS

TEMPORARY SEEDING MIXTURE:

THE FOLLOWING TEMPORARY SEEDS SPECIES SHALL BE USED FOR TEMPORARY SOIL STABILIZATION. WHERE SEASONS TRANSITION IT IS RECOMMENDED TO COMBINE BOTH HEAT AND COLD TOLERANT SPECIES. ANNUAL RYE GRASS SHALL NOT BE USED

Common Name	Botanical Name	Application Rate (lbs/ac)	Planting Period
Rye Grain	Secale cereale	25	Nov. 1st - April 30th
Wheat	Triticum aestivum	33	Nov. 1st - April 30th
German Millet	Setaria italica	13	May 1st - Sept. 30th
Browntop Millet	Urochloa ramosa	13	May 1st - Sept. 30th

B-4-5 STANDARDS AND SPECIFICATIONS FOR PERMANENT STABILIZATION

B-4-4 STANDARDS AND SPECIFICATIONS FOR TEMPORARY STABILIZATION

Temporary Seeding Summary

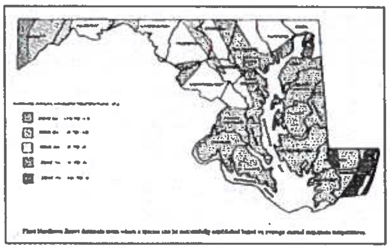

Figure B.5: USDA Plant Hardiness Zones

Table B.1: Temporary Seeding for Site Stabilization

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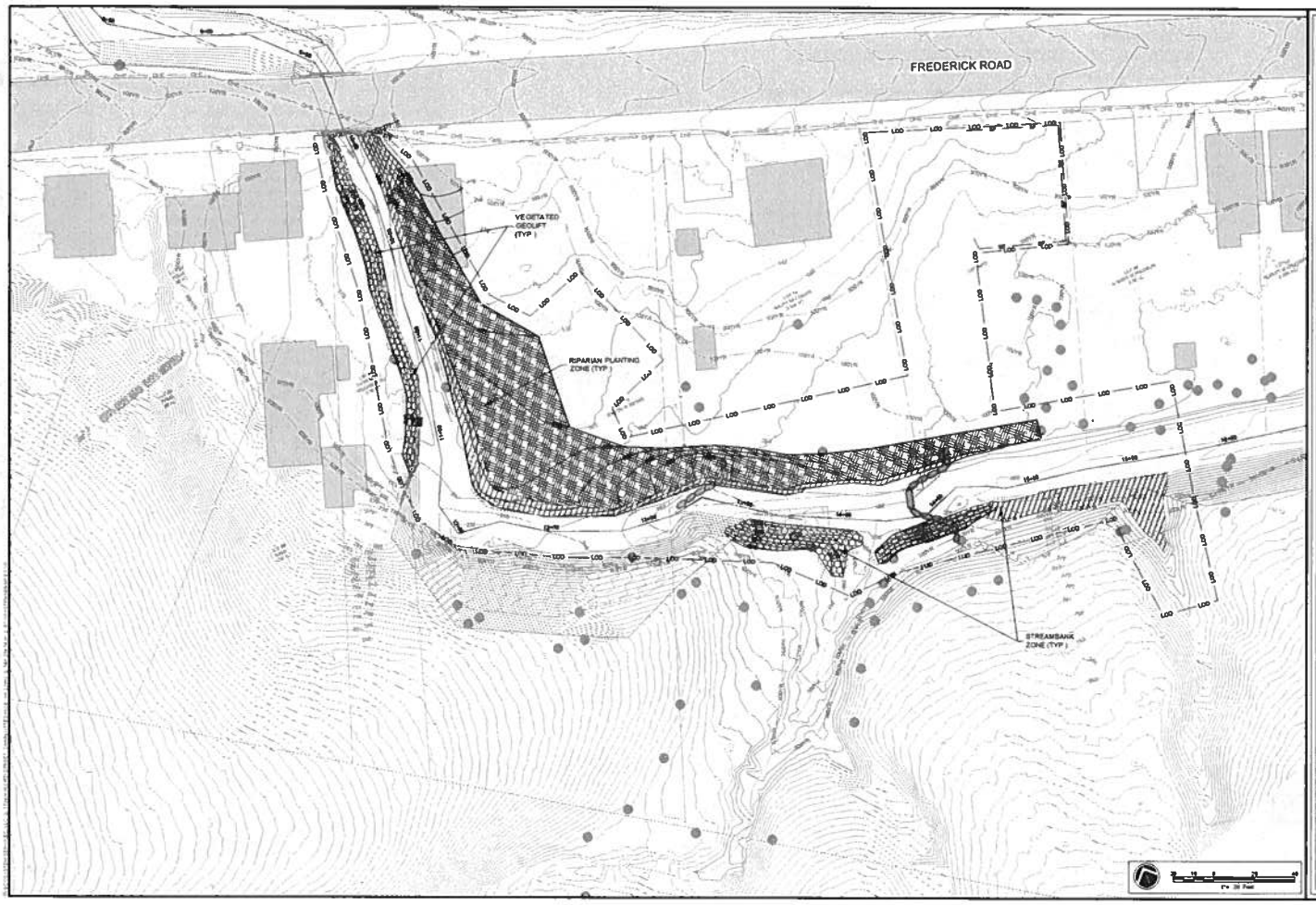
HUDSON BRANCH
STREAM RESTORATION (100%)
NOTES & DETAILS (ESC)
HOWARD COUNTY, MARYLAND

REVISION

PROJECT MANAGER	WKM
DESIGNED	CAT
DRAWN	CAT/JAT
PROJECT #	16-0052
DATE	8/24/18



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HUDSON BRANCH
STREAM RESTORATION (100%)

PLANTING PLAN

HOWARD COUNTY, MARYLAND

PROJECT MANAGER
DESIGNED CAT
DRAWN CAT / JAT
PROJECT # 19-0052
DATE
SHEET

8

LANDSCAPE SPECIFICATIONS

1 PLANT MATERIAL NAMES ARE IN COMPLIANCE WITH HORTUS THIRD SIZES AND GRADING ARE TO COMPLY WITH THE LATEST EDITION OF AMERICAN STANDARDS FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN

2 ALL WORK SHALL BE COORDINATED WITH TRADES

3 USE EXISTING TOPSOIL AND/OR PROVIDE NEW TOPSOIL WHICH IS FERTILE FRIABLE NATURAL LOAM SURFACE SOIL REASONABLY FREE OF SUBSOIL, FOREIGN MATTER, ROOTS STUMPS AND STONES LARGER THAN 2" IN DIMENSION

4 CONTRACTOR SHALL ASCERTAIN LOCATION OF ALL UTILITIES PRIOR TO EXCAVATION

5 CONTRACTOR SHALL MAINTAIN PLANT MATERIAL DURING INSTALLATION MAINTENANCE SHALL BECOME RESPONSIBILITY OF OWNER UPON ACCEPTANCE OF WORK

6 WHEN THE LANDSCAPE WORK IS COMPLETED THE OWNERS REPRESENTATIVE WILL, UPON WRITTEN REQUEST MAKE AN INSPECTION TO DETERMINE ACCEPTABILITY IF WORK IS NOT ACCEPTABLE, REPLACE REJECTED WORK AND CONTINUE MAINTENANCE UNTIL REINSPECTION AND APPROVAL

7 GUARANTEE ALL MATERIALS AND LABOR FOR 12 CALENDAR MONTHS AFTER ACCEPTANCE

A MAKE REPLACEMENTS OF ALL DEAD PLANTS IN IMPAIRED CONDITIONS IN EARLY FALL FOLLOWING PLANTING
B AND ADDITIONALLY IN THE EARLY SPRING FOR THE SAME OR OTHER MATERIALS WHICH ARE DEAD OR IMPAIRED FROM THE WINTER CONDITIONS

8 WITHIN 10 DAYS AFTER ACCEPTANCE THE CONTRACTOR SHALL DELIVER AN OUTLINE OF MAINTENANCE PROCEDURES RECOMMENDED FOR THIS PLANTING TO THE OWNER

9 IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY DURING THE GUARANTEE PERIOD TO PROVIDE WRITTEN NOTICE TO THE OWNER OF ANY MAINTENANCE PRACTICE WHICH IN THEIR OPINION WILL AFFECT THE GUARANTEE IF NOT REMEDIED PROMPTLY

10 DO NOT MAKE SUBSTITUTIONS BID MATERIALS SHOWN ON PLANS CONTRACTOR IS ENCOURAGED TO PROVIDE WRITTEN ALTERNATE LIST OF MATERIALS SIZES AND NUMBERS SUBSTITUTION FOR COST EFFECTIVE MAINTENANCE OF DESIGN INTEGRITY

11 THE PROJECT ENGINEER RESERVES THE RIGHT TO ACCEPT OR REJECT ANY MATERIAL THAT HE/SHE DEEMS UNACCEPTABLE REJECTED MATERIAL SHALL BE REMOVED PROMPTLY FROM THE SITE

12 ALL PLANT MATERIAL SHALL BE NURSERY GROWN UNLESS OTHERWISE SPECIFIED PRUNING SHALL BE DONE BEFORE PLANTING OR DURING THE PLANTING OPERATION

13 ALL PLANT MATERIAL SHALL BE COVERED AND PROTECTED FROM EXCESSIVE DRYING DURING TRANSIT

14 ANTI-DESICCANTS SHALL BE APPLIED ON ALL MATERIAL DUG WHILE IN FOLIAGE

15 MULCH MATERIAL SHALL BE EITHER SHREDDED HARDWOOD MULCH OR APPROVED EQUAL MATERIAL SHALL BE MULCHING GRADE, UNIFORM IN SIZE, AND FREE OF FOREIGN MATTER

16 TOPSOIL MIXTURE SHALL BE 2 PARTS EXISTING SOIL MIXED EVENLY WITH 1 PART SPHAGNUM PEAT MOSS OR PEAT HUMUS EXISTING SOIL SHALL BE FREE OF STONES LUMPS, PLANTS ROOTS, AND OTHER DEBRIS OVER 1 1/2 INCHES IT SHALL NOT CONTAIN TOXIC SUBSTANCES HARMFUL TO PLANT GROWTH TOPSOIL SHALL HAVE A pH RANGE OF 5 0 TO 7 0

17 PLANTING PROCEDURES FOR TREES AND SHRUBS

A PLANTING SHALL OCCUR IN ACCORDANCE WITH ALL DETAILS
B TREES AND SHRUBS SHALL BE PLACED IN THE PLANTING PIT BY LIFTING FROM THE BALL (NEVER FROM THE BRANCHES OF TRUNK) ALL PLANT MATERIAL SHALL BE PLACED IN A STRAIGHT POSITION WITHIN THE PLANTING PIT WITH THE MOST DESIRABLE SIDE PLACED TOWARDS THE PROMINENT VIEW (SIDEWALK, STREET, ETC)
C THE TREE PIT SHALL BE BACK FILLED WITH A SOIL MIXTURE AS PER SPECIFICATIONS THE PIT SHALL BE FILLED HALFWAY INITIALLY AND TAMPED FIRMLY ALL ROPES WIRES ETC ON THE ROOTBALL SHALL BE CUT AND THE BURLAP OR BALL WRAP PULLED BACK TO THE EDGE OF THE ROOTBALL COMPLETE BACKFILLING PLANT PIT AND TAMP FIRMLY BACKFILL SOIL SHALL NOT COVER TOP OF ROOTBALL MULCH ROOTBALL AND SAUCER WITH MINIMUM 3 INCHES SHREDDED OR CHIPPED HARDWOOD OR PINE MULCH WATER THOROUGHLY OR UNTIL PLANT PIT IS FILLED

PLANT LIST

FLOODPLAIN BENCH PLANTING ZONE (650 STEMS/AC)			
Common Name	Botanical Name	Stock Type	Quantity
American Sycamore	Platanus occidentalis	Container/Bare Root	13
River Birch	Betula nigra	Container/Bare Root	13
Black Gum	Nyssa sylvatica	Container/Bare Root	13
Paw Paw	Asimina triloba	Container/Bare Root	13
Persimmon	Diospyros virginiana	Container/Bare Root	13
Silky Dogwood	Cornus amomum	Container/Bare Root	13
Red Maple	Acer rubrum	Container/Bare Root	13
Tulip Poplar	Liriodendron tulipifera	Container/Bare Root	13
Spicebush	Lindera benzoin	Container/Bare Root	13
Arrowwood Viburnum	Viburnum dentatum	Container/Bare Root	13
Serviceberry	Amelanchier alleghenensis	Container/Bare Root	13
STREAM BANK PLANTING ZONE (3' SPACING O.C.)			
Common Name	Botanical Name	Stock Type	Quantity
Soft Rush	Juncus effusus	Bare Root/Plug	150
Fringed Sedge	Carex crinita	Bare Root/Plug	150
Bladder Sedge	Carex intumescens	Bare Root/Plug	150
Woodoats	Chasmanthium latifolium	Bare Root/Plug	150
Virginia Wild Rye	Elymus virginicus	Bare Root/Plug	150
Switch Grass	Panicum virgatum	Bare Root/Plug	155
Woolgrass	Scirpus cyperinus	Bare Root/Plug	150
Swamp Milkweed	Asclepias incarnata	Bare Root/Plug	150
Scarlet Beebalm	Monarda didyma	Bare Root/Plug	150
Joe Pye Weed	Eupatorium maculatum	Bare Root/Plug	150
STREAM BANK PLANTING ZONE (3' SPACING O.C.)			
Common Name	Botanical Name	Stock Type	Quantity
Silky Dogwood	Cornus amomum	Live Stake	530
Ninebark	Physocarpus opulifolius	Live Stake	530
Black Willow	Salix nigra	Live Stake	530
VEGETATED GEOLIFTS (BRANCH LAYERING 2" O.C.)			
Common Name	Botanical Name	Stock Type	
Silky Dogwood	Cornus amomum	Live Stakes	
Black Willow	Salix nigra	Live Stakes	
Ninebark	Physocarpus opulifolius	Live Stakes	

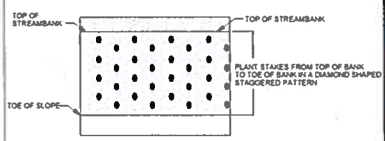
PERMANENT SEEDING MIXTURE:

THE FOLLOWING PERMANENT SEED MIX SHOULD BE PLANTED ON ALL DISTURBED AREAS IMMEDIATELY AFTER FINAL GRADING AT A RATE OF 25 LBS/ACRE

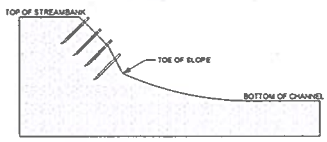
ERNST MIX #112 - MD UPPER MIDLAND RIPARIAN MIX

22% INDIANGRASS PA ECOTYPE (SORGHASTRUM NUTANS PA ECOTYPE)
22% RIVER OATS WV ECOTYPE (CHASMANTHIUM LATIFOLIUM (UNIOLA LATIFOLIA), WV ECOTYPE)
20% VIRGINIA WILDRYE, PA ECOTYPE (ELYMUS VIRGINICUS PA ECOTYPE)
15% BIG BLUESTEM 'NIAGARA' (ANDROPOGON GERARDII 'NIAGARA')
5% AUTUMN BENTGRASS ALBANY PINE BUSH-NY ECOTYPE (AGROSTIS PERENNANS ALBANY PINE BUSH-NY ECOTYPE)
5% PARTRIDGE PEA, PA ECOTYPE (CHAMAECRISTA FASCICULATA (CASSIA F), PA ECOTYPE)
2% MARYLAND SENNA (SENNA MARILANDICA (CASSIA M))
2% WILD SENNA, VA & WV ECOTYPE (SENNA HEBECARPA (CASSIA H), VA & WV ECOTYPE)
2% BONESET PA ECOTYPE (EUPATORIUM PERFOLIATUM, PA ECOTYPE)
1 5% COMMON SNEEZEWEED PA ECOTYPE (HELENIUM AUTUMNALE, PA ECOTYPE)
1% SWAMP MILKWEED PA ECOTYPE (ASCLEPIAS INCARNATA, PA ECOTYPE)
1% NEW YORK IRONWEED, PA ECOTYPE (VERNONIA NOVEBORACENSIS PA ECOTYPE)
1% SPOTTED JOE PYE WEED PA ECOTYPE (EUPATORIUM MACULATUM (EUPATORIADELPHUS MACULATUS), PA ECOTYPE)
0 5% WILD BERGAMOT (MONARDA FISTULOSA)

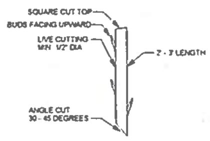
LIVE STAKE DETAIL
NTS



PLAN VIEW



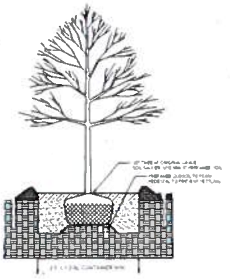
CROSS SECTION VIEW



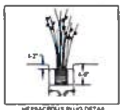
LIVE STAKE DETAIL

NOTES

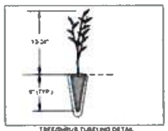
1 DO NOT INSTALL STAKES THAT HAVE BEEN SPLIT
2 STAKES MUST BE INSTALLED WITH BUDS POINTING UPWARDS
3 STAKES SHOULD BE INSTALLED PERPENDICULAR TO BANK
4 STAKES SHOULD BE 1/2 TO 2 INCHES IN DIAMETER AND 2 TO 3 FT LONG
5 STAKES SHOULD BE INSTALLED LEAVING 1/5 OF STAKE ABOVE GROUND



TREE PLANTING DETAIL



HERBACEOUS PLUG DETAIL
NOT TO SCALE



TREE/SHRUB TUBELING DETAIL
NOT TO SCALE

PLANTING DETAILS

SEEDLING / LINER BAREROOT PLANTING DETAIL

PLANTING NOTES:

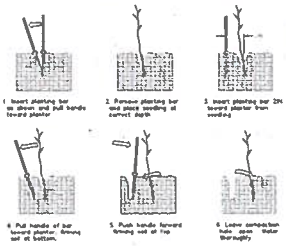
PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12in long, 4in wide and 1in thick at center

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches (10in) below the root collar

DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR

(FOR FLOODPLAIN BUFFER PLANTING AND UPLAND BUFFER PLANTING)



1 Insert planting bar as shown and pull handle toward planter
2 Remove planting bar and place seedling at correct depth
3 Insert planting bar 2IN toward planter from seedling
4 Pull handle of bar toward planter, firming soil at bottom
5 Push handle forward firming soil at top
6 Leave compaction hole open Water thoroughly

NOTES

1 OTHER PLANTING METHOD CAN BE USED WITH THE PERMISSION OF THE PLANTING SUPERVISOR

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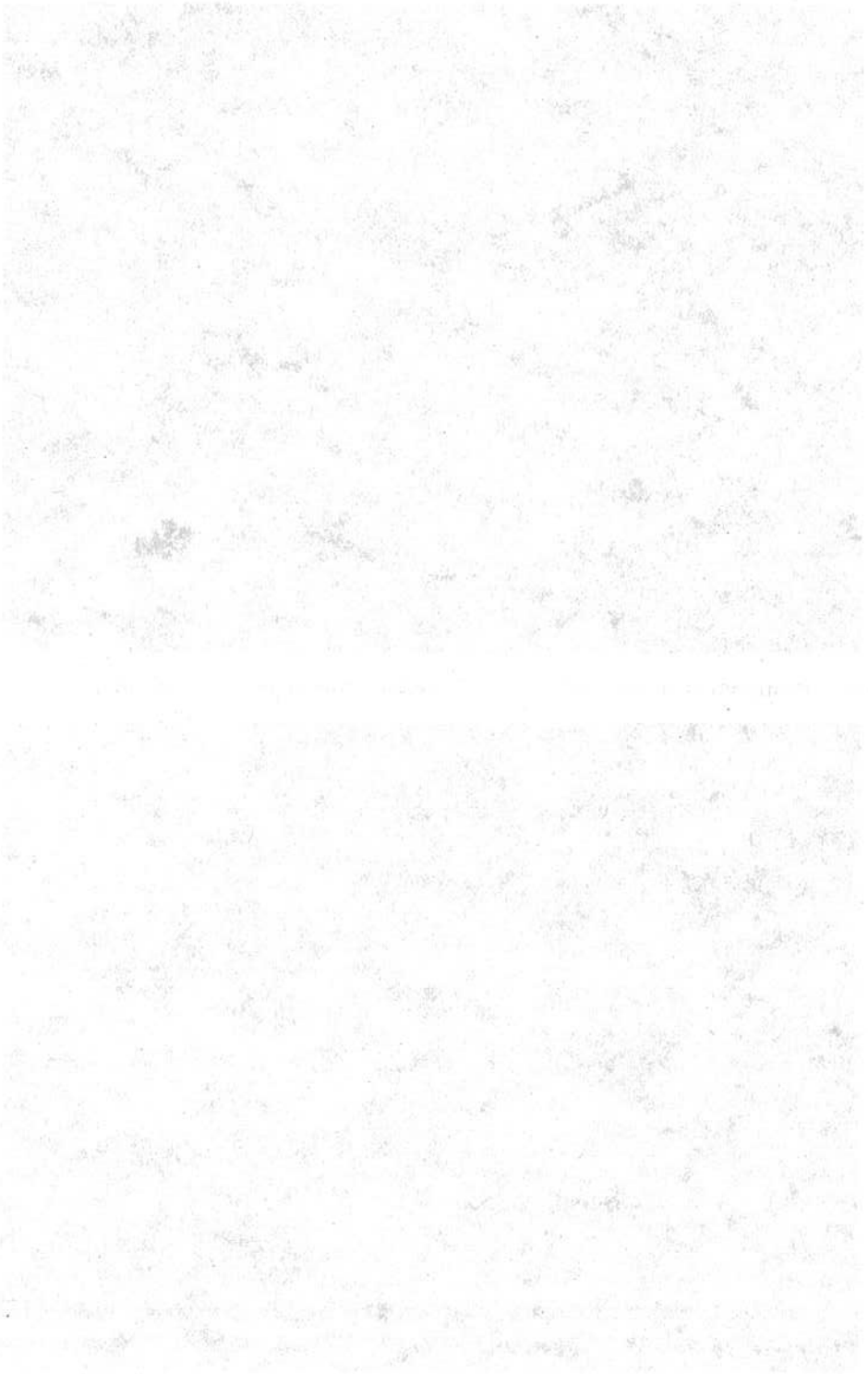
HUDSON BRANCH
STREAM RESTORATION (100%)
PLANTING DETAILS
HOWARD COUNTY, MARYLAND

REVISION

PROJECT MANAGER	WKM
DESIGNED	CAT
DRAWN	CAT/JAT
PROJECT #	16-0052
DATE	9/24/18
SHEET	9

APPENDIX C: Site Photographs



Study Area Photographs
Hudson Branch Stream Restoration
Ellicott City, Maryland

1. Looking upstream at Hudson Branch in the eastern portion of the study area.

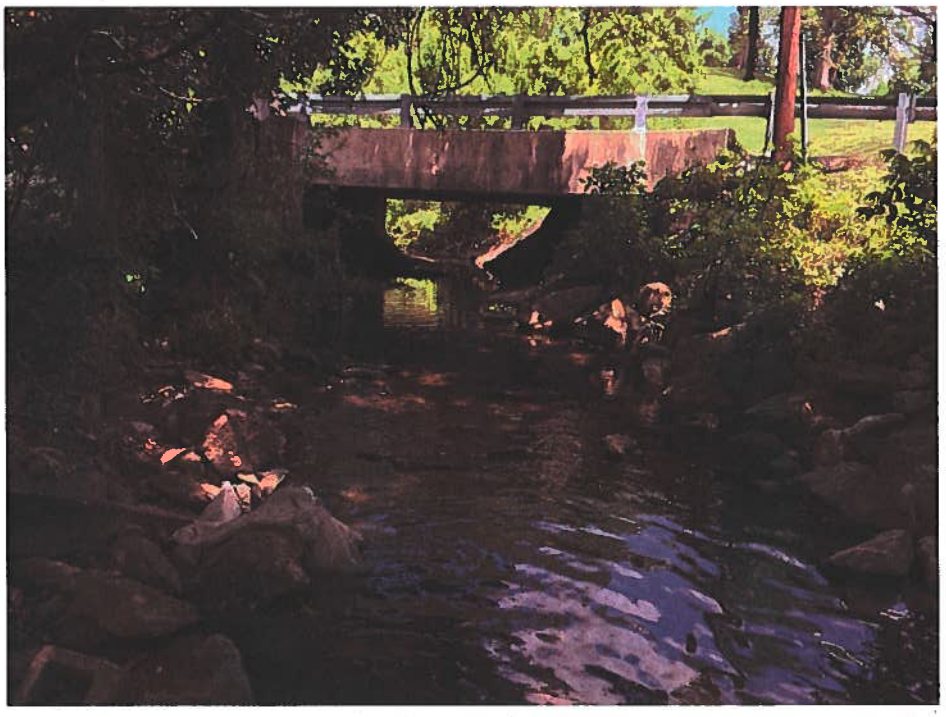
2. Looking upstream at Hudson Branch in the center of the study area.

Study Area Photographs
Hudson Branch Stream Restoration
Ellicott City, Maryland

3. Looking upstream at Hudson Branch from the western portion of the study area.

4. Looking upstream at Hudson Branch from the western portion of the study area.

Study Area Photographs
Hudson Branch Stream Restoration
Ellicott City, Maryland



5. Looking upstream at Hudson Branch as it enters the study area under Frederick Road.

6. Looking upstream at an unnamed intermittent tributary to Hudson Branch in the central portion of the study area.

APPENDIX D: IPaC Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127
http://www.fws.gov/chesapeakebay/
http://www.fws.gov/chesapeakebay/endsppweb/ProjectReview/Index.html

In Reply Refer To:
Consultation Code: 05E2CB00-2017-SLI-1787
Event Code: 05E2CB00-2019-E-00735
Project Name: Hudson Branch Stream Restoration

November 14, 2018

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
(410) 573-4599

Project Summary

Consultation Code: 05E2CB00-2017-SLI-1787

Event Code: 05E2CB00-2019-E-00735

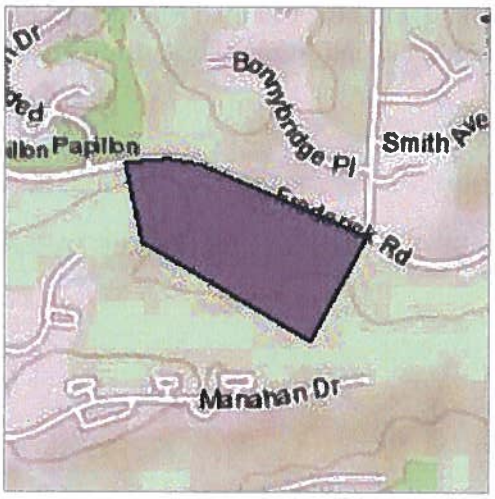
Project Name: Hudson Branch Stream Restoration

Project Type: WATER QUALITY MODIFICATION

Project Description: The proposed project is a stream restoration project in Ellicott City, Maryland.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/39.26885519358203N76.81241751132903W



Counties: Howard, MD

Endangered Species Act Species

There is a total of 0 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

REFUGE INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1A

RIVERINE

- R5UBH