APPENDIX D.2: FEASIBILITY CONCEPTS
STREAM RESTORATION SITES

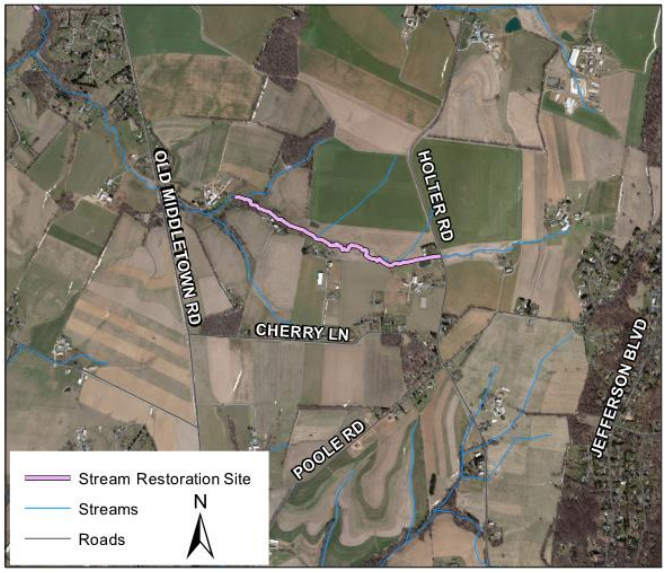
SITE ID: CATO-2018-STRE-0001

Prioritization Ranking: 1
Planning/Construction Level Cost Estimate: $2,671,181
Estimated Cost/Impervious Acre: $58,310

General BMP Information:	
Structure Location:	Cherry Lane and Holter Road
Northing/Easting:	632,642.98/1,162,513.14
NPDES Watershed:	Catoctin Creek
MDE 8 Digit Watershed:	Catoctin Creek (02140305)
Stream Use Class:	I-P
Proposed Restoration General Information:	
Restoration Type:	Stream Restoration
Functional Lift Potential:	Geomorphic Level
Project Length (LF):	4,581
Estimated Treatment/Reductions:	
Impervious Area Credit (ac):	45.81
TN (lbs/yr):	344
TP (lbs/yr):	312
TSS (lbs/yr):	205,595

Required Permitting:	
Frederick County SWM Review	**X**
Erosion and Sediment Control (ESC):	**X**
Grading Permit:	**X**
Joint Permit Application (JPA)/General Waterway Construction Permit:	**X**
Construction NOI:	**X**
Other: Construction is not permitted to take place in this stream within the March 15 – June 15 closure period.	

Eroded bank along CATO-2018-STRE-0001



Vicinity map for CATO-2018-STRE-0001

EXISTING SITE CONDITIONS

The site is a first order stream located on four parcels. One of the adjacent landowners noted that the GIS parcel boundaries are incorrect in the vicinity of the upstream portion of the site. Land use surrounding the site and throughout the site's drainage area consists almost entirely of agriculture and pasture. Holter Road serves as the upstream boundary, and an intermittent tributary approximately 4,600 LF west of Holter Road serves as the downstream boundary. Bank erosion resulting from recent channel incision is present in the downstream portion of the site where channel sinuosity is very low (Photos 1-4). There is approximately 1,200 feet of livestock fencing present along both sides of the channel in the downstream portion of the stream reach. There are two locations where livestock and tractors can currently cross the stream channel; one is near the downstream extend of the site, and the other is between the house and adjacent pond. The upstream portion of the site is characterized by more frequent meanders and the presence of legacy sediment (Photo 7). Erosion along meanders has exposed approximately 7 feet of a perforated PVC pipe (aerial imagery shows roughly 3-4 feet of exposure in 2007), and has exposed the base of a power line utility pole (Photos 5 and 6). The exposed pole is one of several poles being used to support overhead power lines located within the floodplain throughout the entire site except for the upstream most 900 feet. These power lines cross the stream channel several times throughout the site. FCSS sampling conducted within the site boundaries in 2013 resulted in a Poor BIBI rating.

PROPOSED RESTORATION

Restoration Approach: The proposed restoration should address the channel incision by using a natural channel design approach to install grade control structures in the downstream portion of the site, while also stabilizing the eroded banks. The possibility of floodplain reconnection through legacy sediment removal exists along the upstream portion of the site characterized by meanders. Natural vegetation regeneration should be considered as a landscaping/planting option in areas of legacy sediment removal. The location of the overhead power lines should be taken into consideration if riparian tree plantings are desired. The stream bank that is abutting the upstream pond embankment should be stabilized as part of the restoration to ensure the embankment is not threatened by erosion in the future. Protection and relocation of utility poles prior to and during construction activities should be evaluated during final design.

Access: Three potential access options are depicted on the concept map. Two of the proposed access paths utilize private driveways, and the third option uses Holter Road. Maintenance of Traffic options will need to be explored during final design for the delivery of construction materials and equipment if Holter Road is used for access, as no shoulders are present. The presence of an underground gas pipeline and overhead utilities along the west side of Holter Road will also need to be taken into consideration when evaluating access options. A path for the movement of equipment within the site will need to be evaluated during final design and should be coordinated with the applicable landowners.

Livestock Fencing: Final design should also evaluate the relocation of livestock fencing during construction, and maintaining one or two locations where livestock can cross the stream. The concept map shows potential livestock crossings where the existing crossings are located. The landowner will be given the opportunity to decide on the location of future crossings during the final design process. All livestock fencing decisions should also be coordinated with the Catoctin and Frederick Soil Conservation District.

Stream Function Improvements: Significant biological uplift achieved by a restoration project is unlikely due to the lack of forest within the drainage area, but improved stability and connection to the floodplain should result in a significant geomorphic uplift.

ANTICIPATED SITE CONSTRAINTS

A mapped wetland (PEM1A) is located in the floodplain along the site's downstream section. Possible impacts to overhead utilities throughout the site. Possible impacts to overhead utilities and a gas line if the site is accessed from Holter Road. Any in-stream work will need to occur outside of the 3/15 – 6/15 closure period.

Photo 1: Looking downstream at bank erosion along meander bends

Photo 2: Looking upstream at channel incision

Photo 3: Looking upstream at bank erosion and channel incision at confluence with pond outfall channel

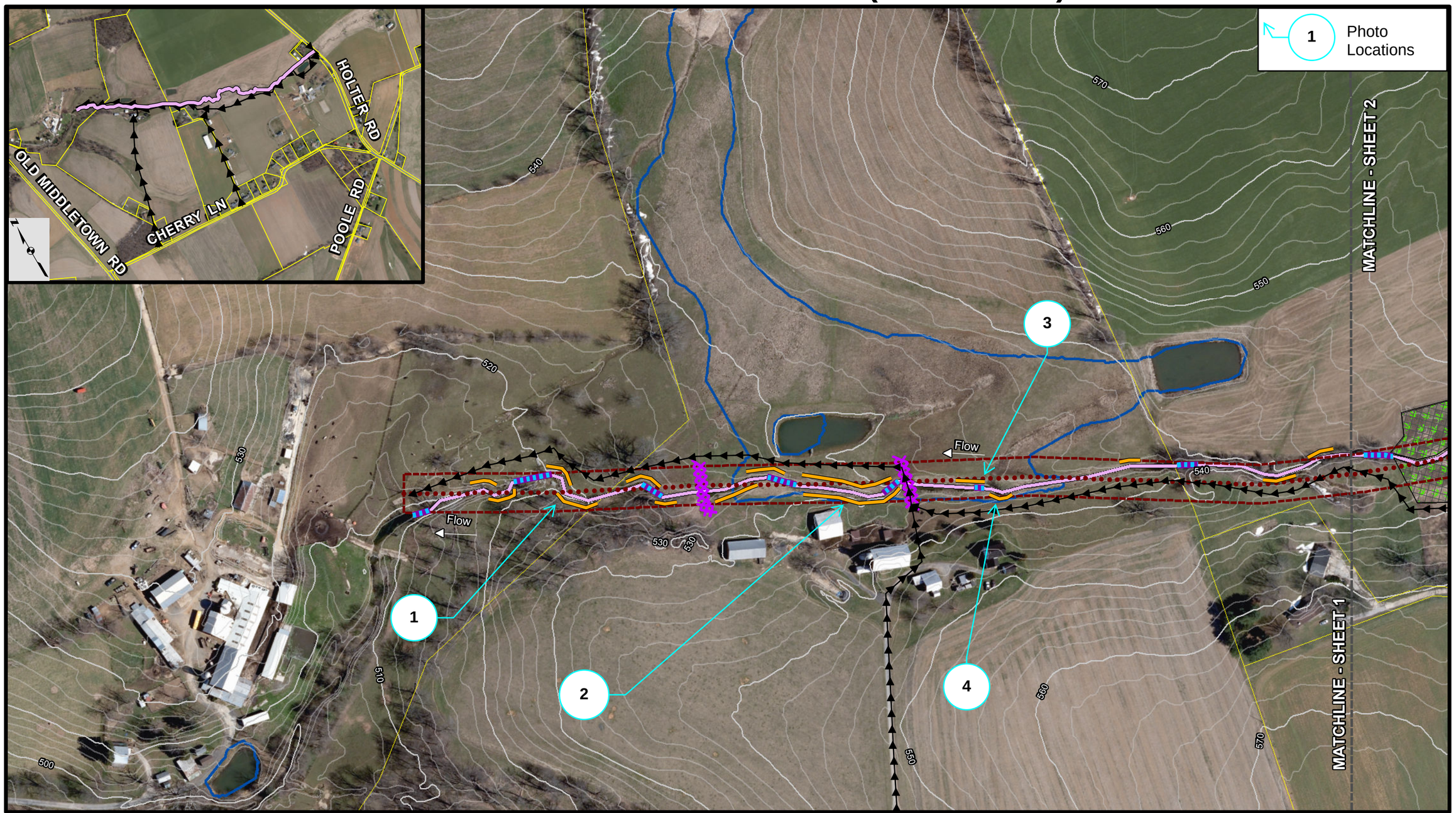
Photo 4: Looking upstream at bank erosion and recent bar formation

Photo 5: Looking upstream at bank erosion exposing a perforated PVC pipe

Photo 6: Looking downstream at utility pole on edge of stream bank with base partially exposed in the stream

Photo 7: Looking north at eroded bank with hydric soil below legacy sediment deposits

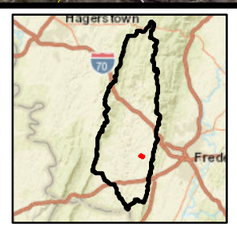
Catoctin Creek Watershed Assessment
Site ID: CATO-2018-STRE-0001 (Sheet 1 of 2)



Dewberry®

Dewberry Engineers, Inc.

10461 MILL RUN CIRCLE
SUITE #300
OWINGS MILLS, MARYLAND 21117
PHONE: 410.265.9500
FAX: 410.265.8875

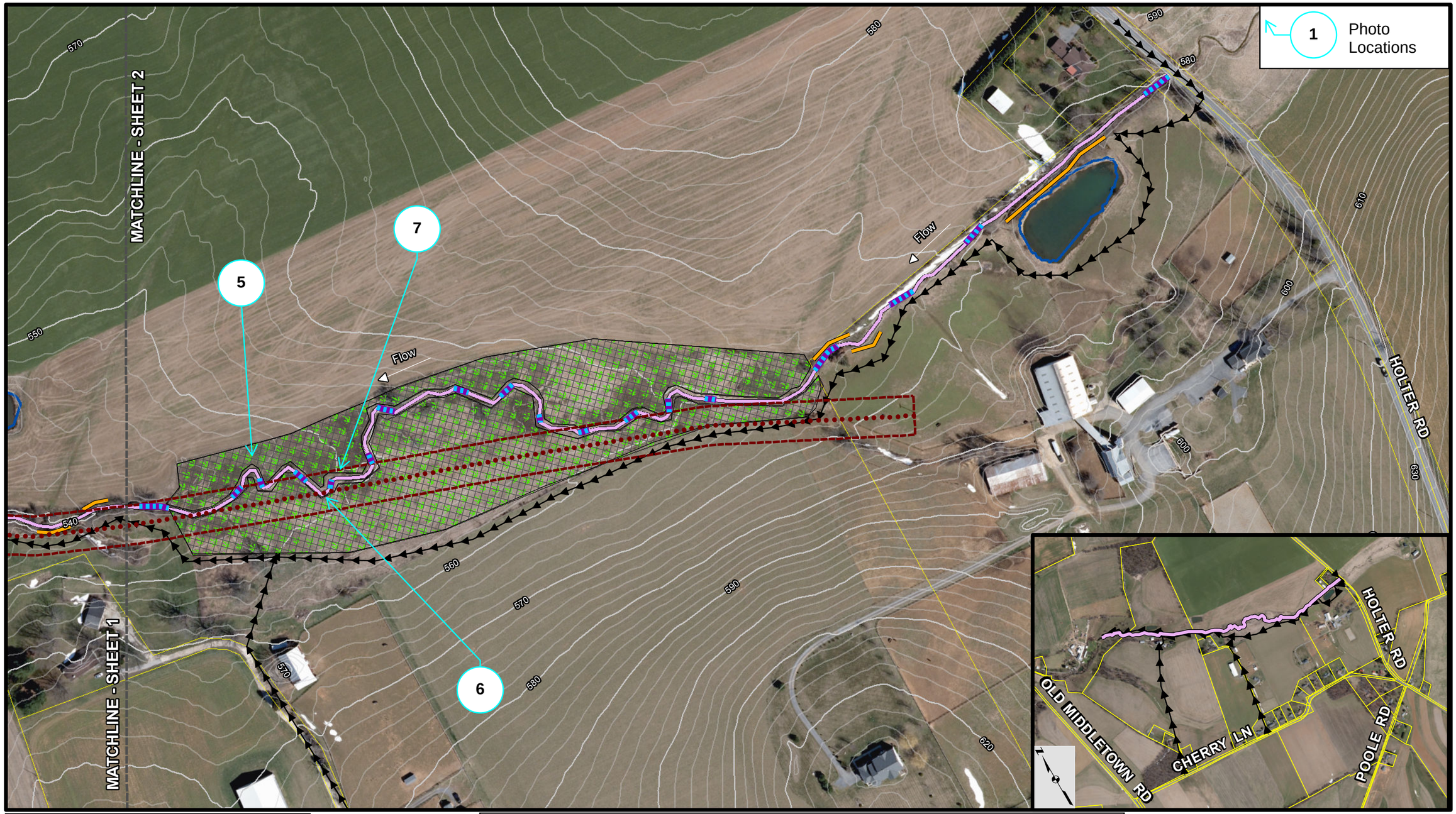


- Stream Restoration Site
- Instream Grade Control
- Bank Stabilization
- Overhead Utility
- Estimated Utility ROW
- Floodplain Reconnection
- Riparian Enhancement
- Potential Crossing
- Proposed Access
- Parcels
- DNR Wetlands
- Contours

0 100 200 Feet

FREDERICK COUNTY, MARYLAND 1748

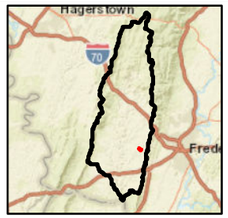
Catoctin Creek Watershed Assessment
Site ID: CATO-2018-STRE-0001 (Sheet 2 of 2)



Dewberry®

Dewberry Engineers, Inc.

10461 MILL RUN CIRCLE
SUITE #300
OWINGS MILLS, MARYLAND 21117
PHONE: 410.265.9500
FAX: 410.265.8875



- Stream Restoration Site
- Instream Grade Control
- Bank Stabilization
- Overhead Utility
- Estimated Utility ROW
- Floodplain Reconnection
- Riparian Enhancement
- Potential Crossing
- Proposed Access
- Parcels
- DNR Wetlands
- Contours

0 100 200 Feet

FREDERICK COUNTY, MARYLAND 1748

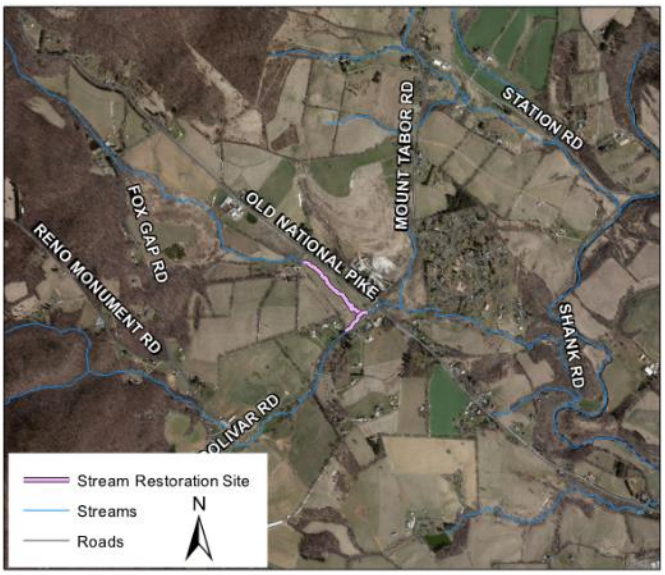
SITE ID: CATO-2018-STRE-0018

Prioritization Ranking: 2
Planning/Construction Level Cost Estimate: $1,043,166
Estimated Cost/Impervious Acre: $58,310

General BMP Information:	
Structure Location:	Bolivar Road and Old National Pike
Northing/Easting:	656,360.94/1,144,384.61
NPDES Watershed:	Catoctin Creek
MDE 8 Digit Watershed:	Catoctin Creek (02140305)
Stream Use Class:	III-P
Proposed Restoration General Information:	
Restoration Type:	Stream Restoration
Functional Lift Potential:	Biological Level
Project Length (LF):	1,789
Estimated Treatment/Reductions:	
Impervious Area Credit (ac):	17.89
TN (lbs/yr):	134
TP (lbs/yr):	122
TSS (lbs/yr):	80,290

Required Permitting:	
Frederick County SWM Review	**X**
Erosion and Sediment Control (ESC):	**X**
Grading Permit:	**X**
Joint Permit Application (JPA)/General Waterway Construction Permit:	**X**
Construction NOI:	**X**
Other: Construction is not permitted to take place in this stream within the October 1 - April 30 closure period.	

Eroded meander bend along CATO-2018-STRE-0018



Vicinity map for CATO-2018-STRE-0018

EXISTING SITE CONDITIONS

The site is a first order stream located on two parcels currently used as pasture for approximately 15-20 cattle. No livestock fencing exists on the site, and several cattle were in the stream during the site visit (Photos 4 and 5). One existing livestock and tractor crossing area was observed during the field visit. The upstream site boundary is marked by a bridge associated with a private driveway crossing (Photo 11), while the downstream boundary is its confluence with Bolivar Branch. Parcel GIS data indicates that the private driveway is owned by the adjacent landowner. Bank erosion is present throughout the entire length of stream (Photos 1, 2, and 5-10), and is most severe in the downstream section (Photo 1). An intermittent tributary drains to the site approximately 520 feet downstream of the driveway, and a mapped wetland (PEM1A) drains to the stream near the site's downstream boundary (Photo 2). An old concrete structure that's in poor condition spans the channel approximately 370 feet upstream of the confluence with Bolivar Branch (Photo 3). The majority of the site has a wide floodplain absent of woody vegetation. There are no overhead utilities present throughout the proposed restoration site. No FCSS data exists for this site.

PROPOSED RESTORATION

Restoration Approach: The proposed restoration should utilize the wide floodplain void of trees and utilities by incorporating floodplain reconnection in the design. Final design teams will need to evaluate if floodplain reconnection through natural channel design or legacy sediment removal is more appropriate for this site. An old concrete structure that exists in the channel should be removed during construction. Grade control should be installed in the channel bed at various points along the stream to prevent future incision. Stabilization of the intermittent tributary (as shown on the concept map) should be included in the overall restoration project. A mix of natural vegetation regeneration and tree plantings should be considered within the reconnected floodplain area. Consider combining this restoration site with CATO-2018-STRE-0020, including bank stabilization between Bolivar Road and Old National Pike.

Access: Two potential access options are depicted on the concept map. The first option utilizes the existing gate off of Bolivar Road, and the second option uses an existing gate and break in the guardrail off of Old National Pike. Maintenance of Traffic options will need to be explored during final design for the delivery of construction materials and equipment, as no shoulders are present at each location. The presence of overhead utilities at both proposed access points will need to be taken into consideration when evaluating access options. A path for the movement of equipment within the site will need to be evaluated during final design and should be coordinated with the landowner.

Livestock Fencing: Livestock fencing should be installed at a distance from the channel that does not result in debris catching in the fence during high flows, but close enough to the stream that provides enough room for the existing livestock to remain on the parcel. The concept map shows a potential livestock and tractor crossing where the existing crossing is located. The landowner will be given the opportunity to decide on the location of the future crossing during the final design process. All livestock fencing decisions should also be coordinated with the Catoctin and Frederick Soil Conservation District.

Stream Function Improvements: While no FCSS data exists for this site, a significant portion of the headwaters that drain to this site are densely forested, and the creation of suitable habitat for macroinvertebrates and fish may result in measurable biological uplift.

ANTICIPATED SITE CONSTRAINTS

Impacts to available cattle space will need to be considered during the design. Any in-stream work will need to occur outside of the 10/1 – 4/30 closure period. A mapped wetland (PEM1A) is located in the floodplain along the downstream portion of the site. Overhead utilities exist at proposed access locations.

Photo 1: Looking upstream at eroded bank

Photo 2: Looking upstream at eroded bank and a seep that is draining a small riparian wetland

Photo 3: Looking upstream at broken concrete structure within the channel

Photo 4: Looking upstream at livestock in the channel

Photo 5: Looking downstream at bank erosion and livestock in the channel

Photo 6: Looking upstream at bank erosion

Photo 7: Looking upstream at bank erosion and quartz boulders in channel

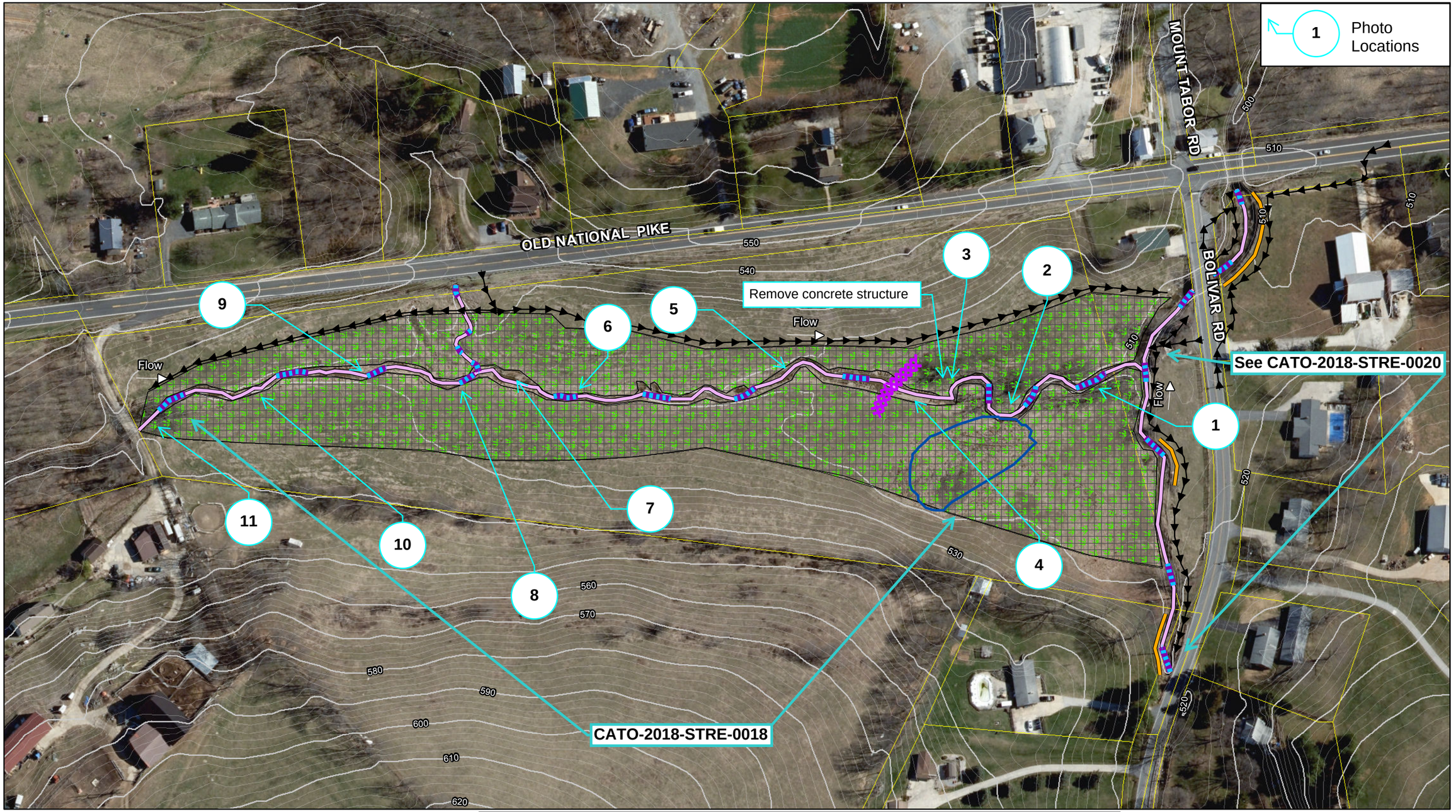
Photo 8: Looking upstream at bank erosion

Photo 9: Looking downstream at bank erosion

Photo 10: Looking upstream at bank erosion

Photo 11: Looking upstream at driveway crossing, which is also the upstream extent of the stream site/parcel

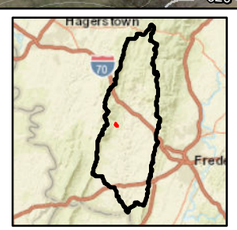
Catoctin Creek Watershed Assessment
Site ID: CATO-2018-STRE-0018



Dewberry®

Dewberry Engineers, Inc.

10461 MILL RUN CIRCLE
SUITE #300
OWINGS MILLS, MARYLAND 21117
PHONE: 410.265.9500
FAX: 410.265.8875



- Stream Restoration Site
- Instream Grade Control
- Bank Stabilization
- Channel Realignment
- Floodplain Reconnection
- Riparian Enhancement
- Potential Crossing
- Potential Access
- Parcels
- DNR Wetlands
- Forest Resource
- Contours

0 75 150 Feet

FREDERICK COUNTY, MARYLAND 1748

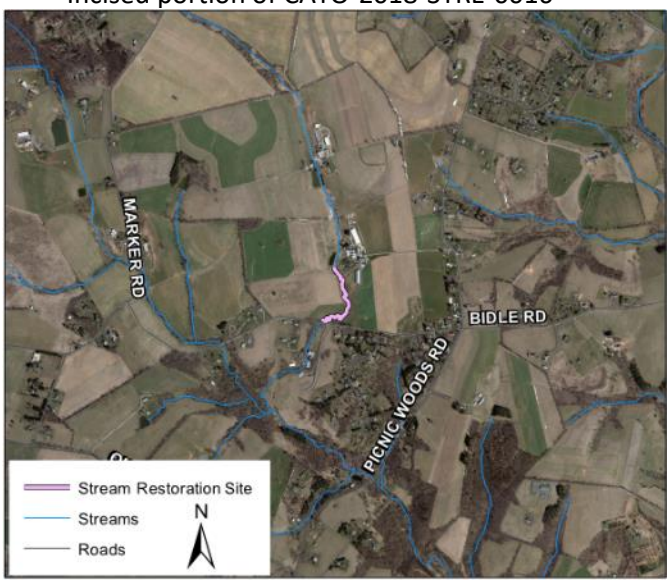
SITE ID: CATO-2018-STRE-0016

Prioritization Ranking: 3
Planning/Construction Level Cost Estimate: $1,038,651
Estimated Cost/Impervious Acre: $58,310

General BMP Information:	
Structure Location:	Bidle Road and Picnic Woods Road
Northing/Easting:	645,145.27/1,147,620.35
NPDES Watershed:	Catoctin Creek
MDE 8 Digit Watershed:	Catoctin Creek (02140305)
Stream Use Class:	I-P
Proposed Restoration General Information:	
Restoration Type:	Stream Restoration
Functional Lift Potential:	Biological Level
Project Length (LF):	1,781
Estimated Treatment/Reductions:	
Impervious Area Credit (ac):	17.81
TN (lbs/yr):	134
TP (lbs/yr):	121
TSS (lbs/yr):	79,943

Required Permitting:	
Frederick County SWM Review	**X**
Erosion and Sediment Control (ESC):	**X**
Grading Permit:	**X**
Joint Permit Application (JPA)/General Waterway Construction Permit:	**X**
Construction NOI:	**X**
Other: Construction is not permitted to take place in this stream within the March 15 – June 15 closure period.	

Incised portion of CATO-2018-STRE-0016



Vicinity map for CATO-2018-STRE-0016

EXISTING SITE CONDITIONS

The site is a first order stream located on a single parcel used for agriculture and as a pasture immediately adjacent to the stream. The majority of the drainage area is composed of pastures and agricultural land, and a large portion of the headwaters is surrounded by emergent wetlands and protected forest lands. The upstream site boundary is a private gravel road that functions as a fjord where the stream crosses (no existing culvert – Photo 10). At the downstream site boundary the stream flows under Bidle Road through two metal pipes (Photo 1). The downstream portion of the site is characterized by large meander bends with rapidly eroding cut banks (Photos 3 and 5). Erosion has exposed an approximately 15 foot section of an iron pipe (Photo 4) at one meander bend (aerial imagery shows no exposure in 2007). The upstream portion of the site is less sinuous, but is still exhibiting erosion from incision (Photos 6, 8, and 9) and livestock trampling. High turbidity and algae growth were present throughout the entire site during the field visit (Photos 6 and 7), but were not present upstream of the gravel road crossing. An existing livestock stream crossing is located approximately 725 feet downstream of the gravel road (Photo 7). There are no overhead utilities present throughout the proposed restoration site. No FCSS data exists for this site, but the lack of habitat observed in the field and poor water quality conditions would likely result in a Very Poor BIBI rating.

PROPOSED RESTORATION

Restoration Approach: The proposed restoration should utilize the wide floodplain void of trees in the downstream section by incorporating floodplain reconnection in the design. Final design will need to evaluate if floodplain reconnection through natural channel design or legacy sediment removal is more appropriate for this site. Grade control should be installed throughout the site, but especially in the upstream portion to prevent future incision. A mix of natural vegetation regeneration and tree plantings should be considered within the reconnected floodplain area. Improvements to the existing gravel road crossing should be evaluated during final design to provide a cost-effective passageway for aquatic organisms.

Access: Two potential access options are depicted on the concept map. The first option utilizes the private gravel driveway, and the second option uses Bidle Road. Maintenance of Traffic options will need to be explored during final design for the delivery of construction materials and equipment if Bidle Road is used for access, as no shoulders are present. A path for the movement of equipment within the site will need to be evaluated during final design and should be coordinated with the landowner.

Livestock Fencing: Livestock fencing should be installed at a distance from the channel that does not result in debris catching in the fence during high flows, but close enough to the stream so there is enough room for the existing livestock to remain on the parcel. Limiting the amount of stream that's accessible to livestock should help improve water quality throughout the proposed restoration reach. The concept map shows a potential livestock crossing where the existing crossing is located. The landowner will be given the opportunity to decide on the location of the future crossing during the final design process. All livestock fencing decisions should also be coordinated with the Catoctin and Frederick Soil Conservation District.

Stream Function Improvements: An abundance of aquatic biota were observed upstream of the site; therefore, it is believed that significant biological uplift is feasible if CATO-2018-SRE-0016 is restored.

ANTICIPATED SITE CONSTRAINTS

Coordination with property owner will be needed for placement of cattle fencing, and impacts to the exposed iron pipe. Any in-stream work will need to occur outside of the 3/15 – 6/15 closure period.

Photo 1: Looking downstream at Bidle Road crossing

Photo 2: Looking upstream at eroded bank

Photo 3: Looking downstream at bank erosion along two meander bends

Photo 4: Looking downstream at pipe exposed at meander bend

Photo 5: Looking downstream at two meander bends in the foreground and valley wall in the background

Photo 6: Looking upstream at eroding bank and turbid water from livestock activity

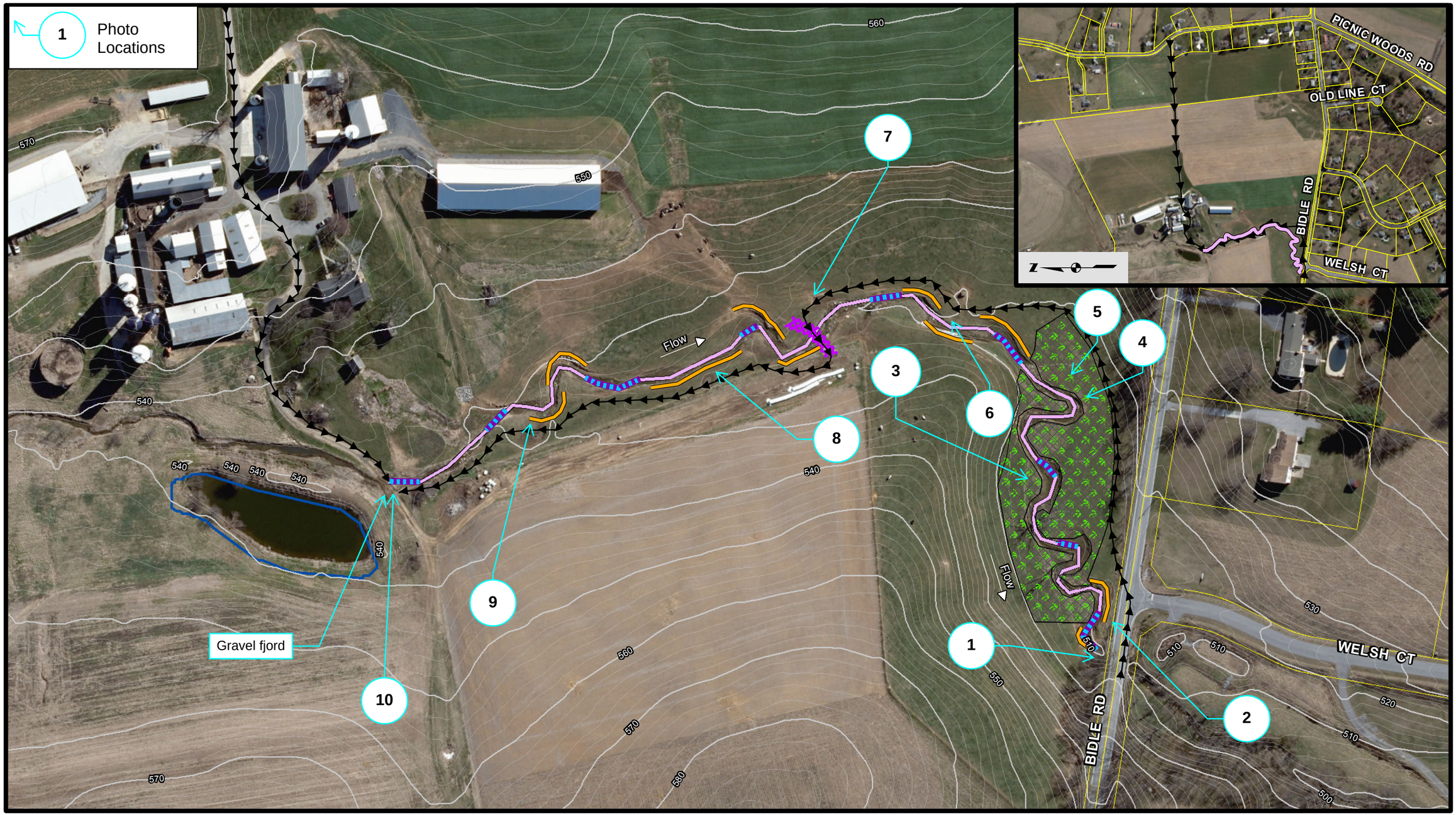
Photo 7: Looking upstream at livestock access point and algae growth in the stream

Photo 8: Looking upstream at channel incision and bank erosion

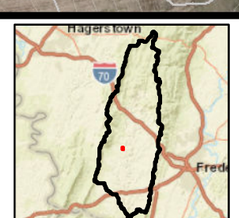
Photo 9: Looking downstream at bank erosion and livestock

Photo 10: Looking east at gravel road stream crossing, which is the upstream extent of the restoration site

Catoctin Creek Watershed Assessment
Site ID: CATO-2018-STRE-0016



Dewberry®
Dewberry Engineers, Inc.
10461 MILL RUN CIRCLE
SUITE #300
OWINGS MILLS, MARYLAND 21117
PHONE: 410.265.9500
FAX: 410.265.8875



Stream Restoration Site	Floodplain Reconnection	Parcels
Instream Grade Control	Riparian Enhancement	Forest Resource
Bank Stabilization	Potential Crossing	DNR Wetlands
Channel Realignment	Potential Access	Contours

0 75 150 Feet

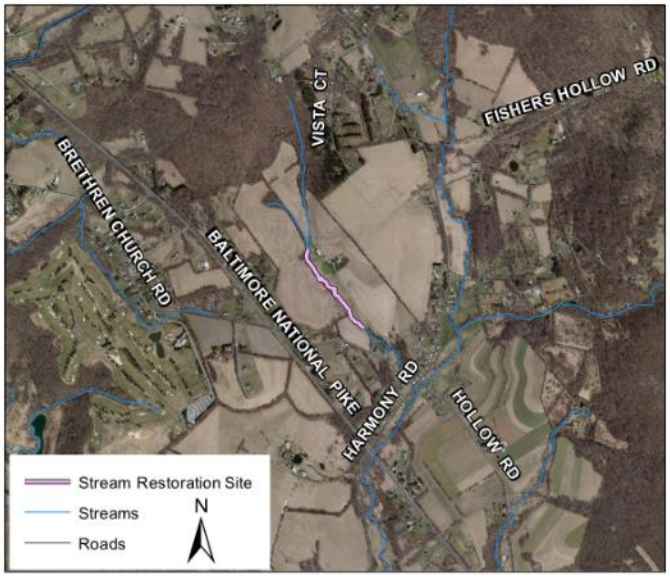
SITE ID: CATO-2018-STRE-0008

Prioritization Ranking: 4
Planning/Construction Level Cost Estimate: $1,172,103
Estimated Cost/Impervious Acre: $58,310

General BMP Information:	
Structure Location:	Brethren Church Road and Harmony Road
Northing/Easting:	667,239.50/1,161,049.64
NPDES Watershed:	Catoctin Creek
MDE 8 Digit Watershed:	Catoctin Creek (02140305)
Stream Use Class:	I-P
Proposed Restoration General Information:	
Restoration Type:	Stream Restoration
Functional Lift Potential:	Physiochemical Level
Project Length (LF):	2,010
Estimated Treatment/Reductions:	
Impervious Area Credit (ac):	20.10
TN (lbs/yr):	151
TP (lbs/yr):	137
TSS (lbs/yr):	90,214

Required Permitting:	
Frederick County SWM Review	**X**
Erosion and Sediment Control (ESC):	**X**
Grading Permit:	**X**
Joint Permit Application (JPA)/General Waterway Construction Permit:	**X**
Construction NOI:	**X**
Other: Construction is not permitted to take place in this stream within the March 15 – June 15 closure period.	

Incised portion of CATO-2018-STRE-0008



Vicinity map for CATO-2018-STRE-0008

EXISTING SITE CONDITIONS

The site is a first order stream located on a single parcel that is mainly dedicated to agriculture. A narrow riparian buffer exists along both sides of the stream channel, and the site's headwaters are largely composed of forest. The upstream boundary is the confluence of two first order streams that flow over a grassed road crossing before entering a steep and rocky upstream portion of the site (Photo 12), and the downstream boundary is a private driveway crossing (Photo 1). The stream flows through a 12" smooth metal culvert pipe that's in poor condition at the driveway crossing (Photo 1). Bank erosion is present throughout most of the site (Photos 2-4), but is most prevalent and severe in areas just downstream of head cuts (Photo 7). Three head cuts were observed within the site (Photos 5, 8, 10 and 11), the largest of which is the furthest upstream (Photos 10 and 11). One of the head cuts is migrating through a high flow channel that formed downstream of a woody debris obstruction, which also caused backwater conditions upstream (Photo 6). Bank erosion was also observed at the 12" HDPE outfall for the adjacent farm pond (Photo 9). Historic aerial photography suggest that the HDPE outfall was installed in 2013, and the observed bank disturbance may be from soil that was not stabilized following the installation of the outfall pipe. It is believed that an 8" CMP pipe found just downstream of the HDPE pipe is the old pond outfall. Overhead utilities are present between the stream and driveway throughout the downstream portion of the site, and a separate overhead line running perpendicular to the stream crosses the channel

approximately 675 feet upstream of the driveway crossing. FCSS sampling conducted within the site boundaries in 2009 resulted in a Fair BIBI rating.

PROPOSED RESTORATION

Restoration Approach: The proposed restoration should utilize a natural channel design approach that focuses on repairing head cuts to prevent their further upstream migration resulting in downstream incision and degradation. The area surrounding the HDPE pond outfall pipe should be stabilized during the restoration. The final design team may consider installing a headwall and outfall protection at the pipe location. Channel realignment is proposed within a short section of the site where a new channel has formed downstream of a debris jam. Straightening the channel through this steep stretch of stream to help prevent the formation of future high flow channels and head cuts should be considered during final design. Riparian buffer enhancement should be discussed with the property owner to see if they would be willing to have a portion of their agricultural land converted to a forested buffer. The location of the overhead power lines should be taken into consideration if riparian tree plantings are proposed during the final design. The replacement of the downstream culvert should also be discussed with the property owner because the failure of the existing pipe could have a negative impact on the proposed restoration project. The possibility of installing a bridge at the crossing should be considered during final design. Improvements to the upstream grassed crossing should also be considered.

Access: The site will need to be accessed from a private driveway that meets Brethren Church Road. The downstream portion of the site can be accessed from where the paved driveway crosses the stream. The upstream portion of the site can be accessed where the paved driveway veers to the west and meets with a grassed driveway that crosses the stream. Other site access points and a path for the movement of equipment within the site will need to be evaluated during final design and should be coordinated with the landowner.

Stream Function Improvements: The surrounding agriculture fields reduce the chance of improving a Fair BIBI score, but higher bedform diversity and an enhanced riparian area may result in migration and colonization of some macroinvertebrates from the forested headwaters. At a minimum, stream bed stabilization used to prevent further degradation from head cut propagation should dramatically improve water quality.

ANTICIPATED SITE CONSTRAINTS

There are possible specimen tree and overhead utility impacts in the riparian area. Any in-stream work will need to occur outside of the 3/15 – 6/15 closure period.

Photo 1: Looking upstream at downstream driveway crossing and damaged metal culvert

Photo 2: Looking upstream at eroded bank and woody debris on bar

Photo 3: Looking upstream at bank erosion and channel incision

Photo 4: Looking upstream at channel incision

Photo 5: Looking downstream at head cut

Photo 6: Looking upstream at channel deposition and backwater caused by downstream obstruction

Photo 7: Looking east at severely eroded bank

Photo 8: Looking upstream at head cut

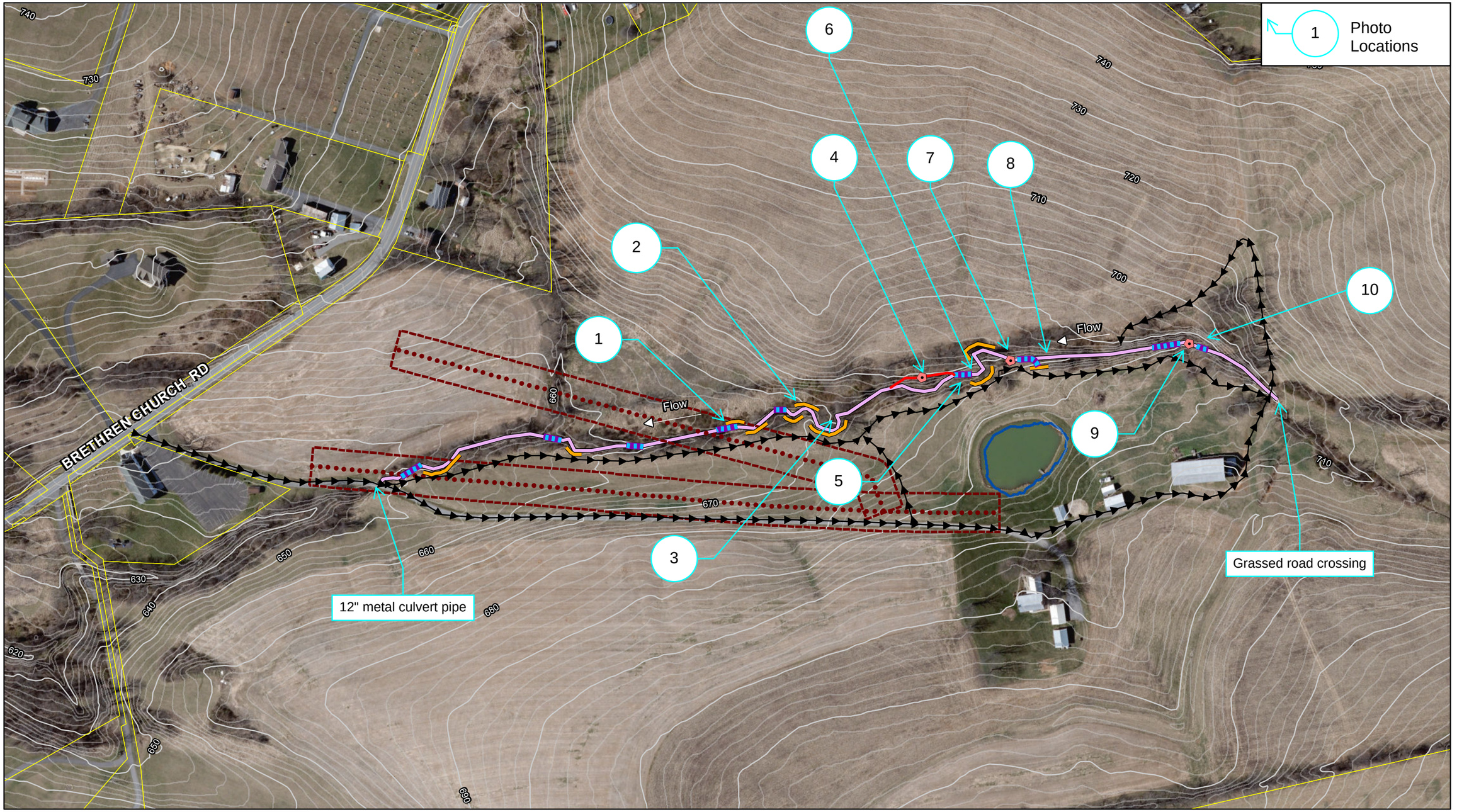
Photo 9: Looking at bank erosion caused by HDPE pond outfall

Photo 10: Looking upstream at head cut

Photo 11: Looking downstream at incision below head cut

Photo 12: Looking west at grass road crossing at the upstream extent of the site

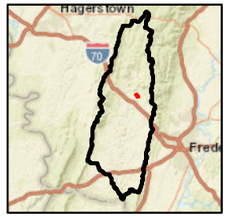
Catoctin Creek Watershed Assessment
Site ID: CATO-2018-STRE-0008



Dewberry®

Dewberry Engineers, Inc.

10461 MILL RUN CIRCLE
SUITE #300
OWINGS MILLS, MARYLAND 21117
PHONE: 410.265.9500
FAX: 410.265.8875



- Stream Restoration Site
- Instream Grade Control
- Bank Stabilization
- Channel Realignment
- Overhead Utility
- Estimated Utility ROW
- Headcut Repair
- Potential Access
- Parcels
- DNR Wetlands
- Contours

0 100 200 Feet

FREDERICK COUNTY, MARYLAND 1748

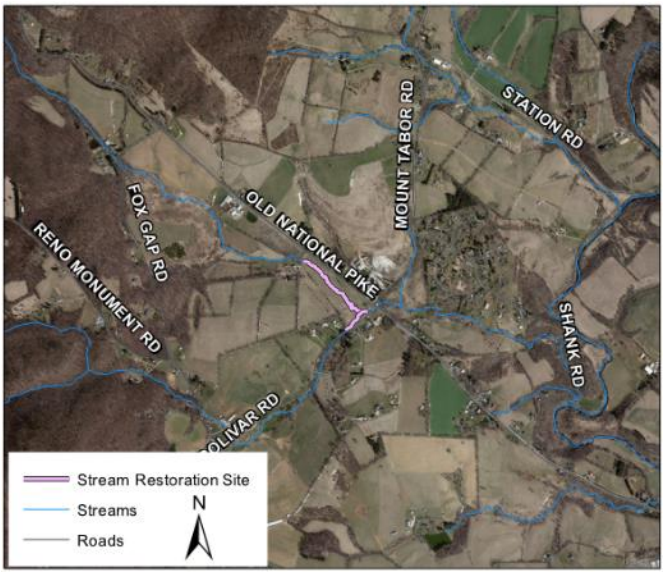
SITE ID: CATO-2018-STRE-0020

Prioritization Ranking: 6
Planning/Construction Level Cost Estimate: $428,579
Estimated Cost/Impervious Acre: $58,310

General BMP Information:	
Structure Location:	Bolivar Road and Old National Pike
Northing/Easting:	655,830.49/1,144,846.28
NPDES Watershed:	Catoctin Creek
MDE 8 Digit Watershed:	Catoctin Creek (02140305)
Stream Use Class:	III-P
Proposed Restoration General Information:	
Restoration Type:	Stream Restoration
Functional Lift Potential:	Geomorphic Level
Project Length (LF):	735
Estimated Treatment/Reductions:	
Impervious Area Credit (ac):	7.35
TN (lbs/yr):	55
TP (lbs/yr):	50
TSS (lbs/yr):	32,987

Required Permitting:	
Frederick County SWM Review	**X**
Erosion and Sediment Control (ESC):	**X**
Grading Permit:	**X**
Joint Permit Application (JPA)/General Waterway Construction Permit:	**X**
Construction NOI:	**X**
Other: Construction is not permitted to take place in this stream within the October 1 - April 30 closure period.	

Eroded meander bend along CATO-2018-STRE-0020



Vicinity map for CATO-2018-STRE-0020

EXISTING SITE CONDITIONS

The site is a second order stream located on three parcels, two currently used as pasture, and the third is residential. The upstream boundary is a CMP culvert that conveys the stream under Bolivar Road (Photo 7). The stream crosses under Bolivar Road for a second time (Photo 2) before meeting the downstream site boundary, which is a bridge where the stream flows under Old National Pike. Bank erosion is occurring in a few locations along the site (Photos 1, 3, 4 and 6), including an area where overhead and underground utilities are being threatened (Photo 6). A fence currently crosses the stream at one of the property boundaries (Photo 5). Overhead and underground utilities are present throughout the length of this site. The majority of the site has no riparian buffer. No FCSS data exists for this site.

PROPOSED RESTORATION

Restoration Approach: The proposed restoration should use a natural channel design approach to stabilize the bed and banks. The channel is likely too close to a residential property and Bolivar Rd. for floodplain reconnection to be an option. Grade control should be installed in the channel bed at various points along the stream to prevent future incision. Consider combining this restoration site with CATO-2018-STRE-0018.

Access: Three potential access options are depicted on the concept map. The first option utilizes the existing gate off of Bolivar Road, and the second option uses an existing break in the guardrail along Bolivar Roads, and the third option

uses a private driveway, and a grass path that leads to a gate. Maintenance of Traffic options will need to be explored during final design for the delivery of construction materials and equipment, as no shoulders are present at each the first two access options. The presence of overhead utilities at all proposed access points will need to be taken into consideration when evaluating access options. A path for the movement of equipment within the site will need to be evaluated during final design and should be coordinated with the landowner.

Livestock Fencing: The final design team should coordinate with the landowner to evaluate installing livestock fencing along the portion of the site that's between the two Bolivar Road crossings. All livestock fencing decisions should also be coordinated with the Catoctin and Frederick Soil Conservation District.

Stream Function Improvements: The stretch of stream is likely too small for a restoration project to result in significant biological uplift, but geomorphic uplift is obtainable. Site access and proximity to the adjacent road would make it challenging to extend this site upstream, but combining this proposed project with CATO-2018-STRE-0018 should result in an overall improvement in available habitat within the two restoration reaches.

ANTICIPATED SITE CONSTRAINTS

Impacts to available cattle space will need to be considered during the design. Any in-stream work will need to occur outside of the 10/1 – 4/30 closure period. A fence currently crosses the stream at one of the property boundaries, and fencing is in place at several of the proposed access locations. The property owners will need to be involved in a discussion of removing, replacing, or relocating the fencing as part of the project. Overhead utilities exist at proposed access locations, and both overhead and underground utilities exist along the majority of the site.

Photo 1: Looking downstream at erosion upstream of Old National Pike Bridge

Photo 2: Looking downstream at Bolivar Road culvert

Photo 3: Looking upstream at bank erosion

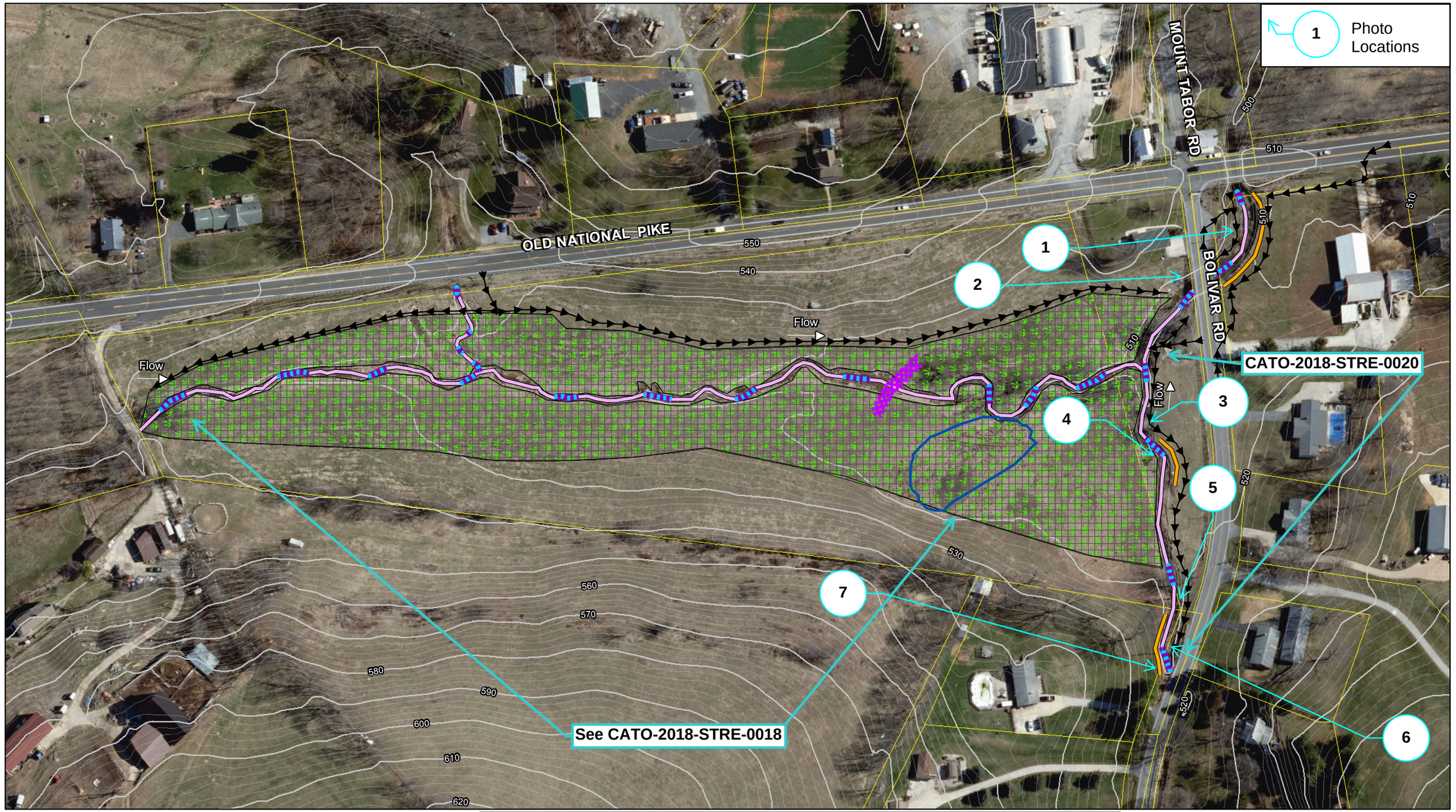
Photo 4: Looking upstream at recent bank erosion/mass wasting

Photo 5: Looking upstream at fence crossing stream along property boundary

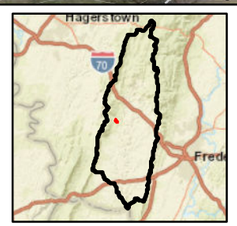
Photo 6: Looking downstream at bank erosion near utilities

Photo 7: Looking upstream at Bolivar Road culvert

Catoctin Creek Watershed Assessment
Site ID: CATO-2018-STRE-0020



Dewberry®
Dewberry Engineers, Inc.
10461 MILL RUN CIRCLE
SUITE #300
OWINGS MILLS, MARYLAND 21117
PHONE: 410.265.9500
FAX: 410.265.8875



- Stream Restoration Site
- Instream Grade Control
- Bank Stabilization
- Channel Realignment
- Floodplain Reconnection
- Riparian Enhancement
- Potential Crossing
- Potential Access
- Parcels
- DNR Wetlands
- Forest Resource
- Contours

0 75 150 Feet

FREDERICK COUNTY, MARYLAND 1748