

**Marumsco Creek and Farm
Creek Watershed Stream
Corridor Improvement Projects**

0 1,300 2,600 5,200 7,800 10,400 Feet



MARUMSCO CREEK AND FARM CREEK WATERSHED MANAGEMENT PLAN

Stream Corridor Improvement Project

Project ID: 910-SCIP-06

Stream: MarumSCO Creek

Tributary A

Subshed: 910

Type:

Stream Stabilization

Culvert Outfall Stabilization

Trash Removal

Size/Length: 950

Location: Tributary A to MarumSCO Creek north of Jefferson Davis Hwy near Marys Way.

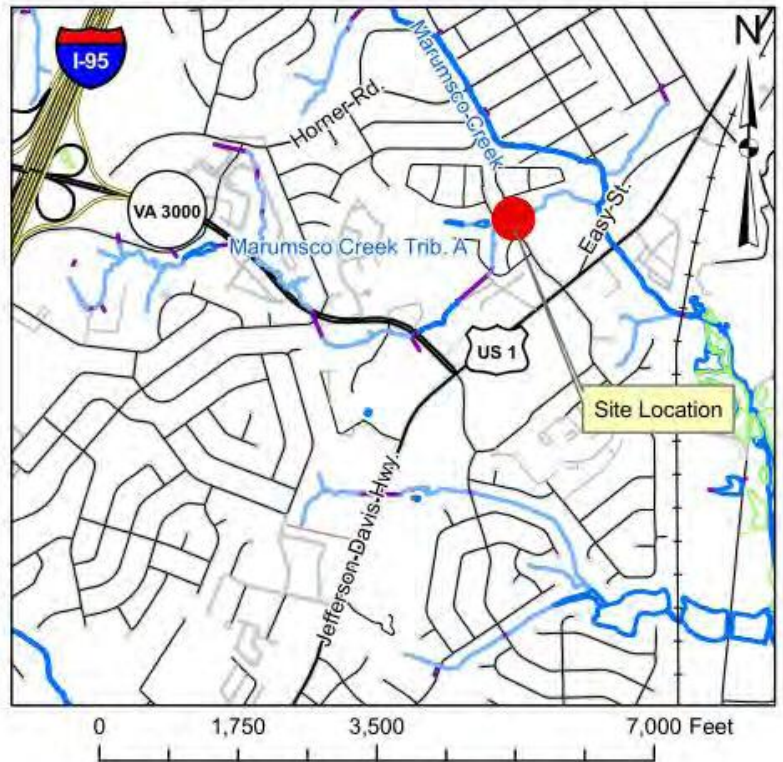
Land Ownership:

WNH Limited Partnership

1400 Eisenhower Cl.

GPIN: 8392-74-2227

Welsh Thomas J Bishop
Our Lady of Angels Church and
St. Thomas Aquinas School
13750 Marys Way
GPIN: 8392-73-8964



PROJECT VICINITY MAP

Problem Description:

Channel Erosion (4D-910-42ER, 4D-910-46ER)

Channel erosion in the project area is divided in two parts. The upper reach of the project is experiencing minor bank erosion. Erosion has currently affected 20 feet of the left streambank and 80 feet of the right streambank with average bank heights of 3-feet.

The lower reach of the project area is severely degraded and is experiencing bank failure with erosion attacking both banks. Current erosion has affected 210 feet of right streambank with bank heights in excess of 8-feet and 80 feet of the left streambank with bank heights in excess of 5-feet.

Impacted Culvert Outfall (4D-910-44SC)

The stream crossing culvert outfall under Marys Way is located at the head of the lower reach of stream. Head cutting has caused undermining of the grouted riprap apron at the culvert outfall. Progressive erosion will continue to degrade and break apart the apron. Additionally, the undermined apron is providing a barrier to fish passage.

Trash (4D-910-45TR)

Moderate quantities of metal scrap were observed along the lower portion of the project reach. Observed trash is mostly industrial in nature. Total volume of trash is estimated to be less than 1 truck load.

Project Concept

Stream Stabilization

The project concept for stabilization of this reach of stream is divided in two parts. Stabilization for the upper reach of the project will involve bioengineering bank plantings. The mild nature of the bank erosion can easily be treated at this time with bank planting that will prevent the stream condition from worsening. A few small instream log structures will also be beneficial in the upper reach to stabilize the headcutting that is occurring.

Bank stabilization of the lower reach of the stream will involve the use of large log and boulder in-stream structures along with stream bank grading and bioengineering. Since the channel is entrenched in this area, higher instream shear stresses will necessitate the usage of heavier structures for stabilization.

Culvert Outfall Stabilization

Stabilization of the culvert outfall will be incorporated into the stream stabilization design. The headcutting and fish barrier at the outfall apron could be stabilized through use of in-stream boulder step-pool structures.

Trash Removal

The project concept also incorporates trash and debris clean up and removal in the vicinity of the stabilization site.

Project Benefits

Stream Stabilization / Outfall Stabilization

The stabilization of this reach of stream will provide water quality, and aquatic habitat conservation benefits for the lower portion of the Marumsco Creek watershed. These benefits include:

Water Quality – Stabilization of the stream will reduce the current sediment loading that is being produced through this reach and impacting the downstream stream reaches. Presence of trash and debris in the stream channel also has many adverse impacts on water quality including introduction of heavy metals, oils, and inorganic compounds into the aquatic habitat. Removal of the trash and prevention of illegal dumping will mitigate the current adverse conditions being created.

Aquatic Habitat Conservation – The grouted riprap apron of the culvert outfall is currently undermined and a significant fish passage barrier. Restoration of the stream in conjunction with the stabilization of riprap apron will proper the growth of diverse aquatic habitat within the project area.

Project Cost:

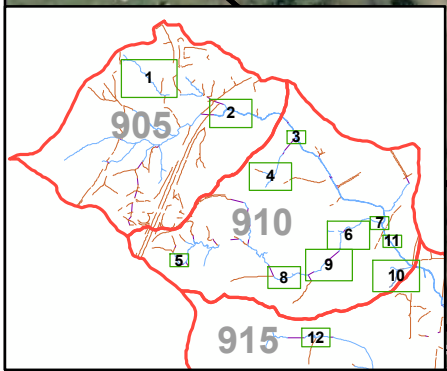
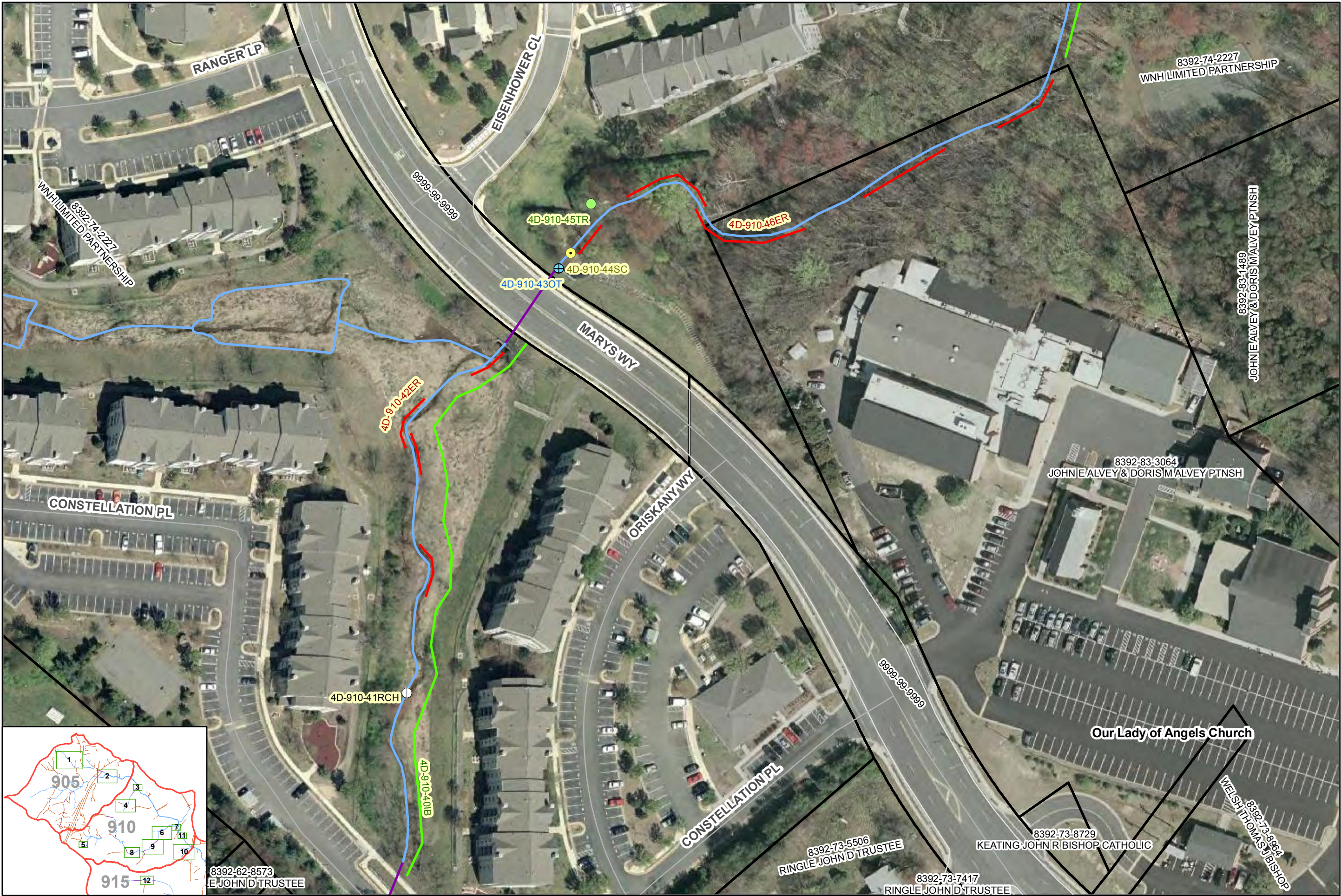
Design Cost: \$140,000

Construction Cost: \$380,000

Total Cost: \$520,000



- Legend**
- Parcels
 - Storm Water Management BMP
 - Wetlands
 - Subsheds
 - Stream
 - Culvert
 - Ditch
 - Erosion
 - Impacted Buffer
 - Channel Modification
 - Coastal Zone
 - Trash
 - Stream Crossing
 - Utility
 - ⊕ SD Outfall
 - Coastal Zone Characterization
 - Miscellaneous Concerns
 - Reach Characterization



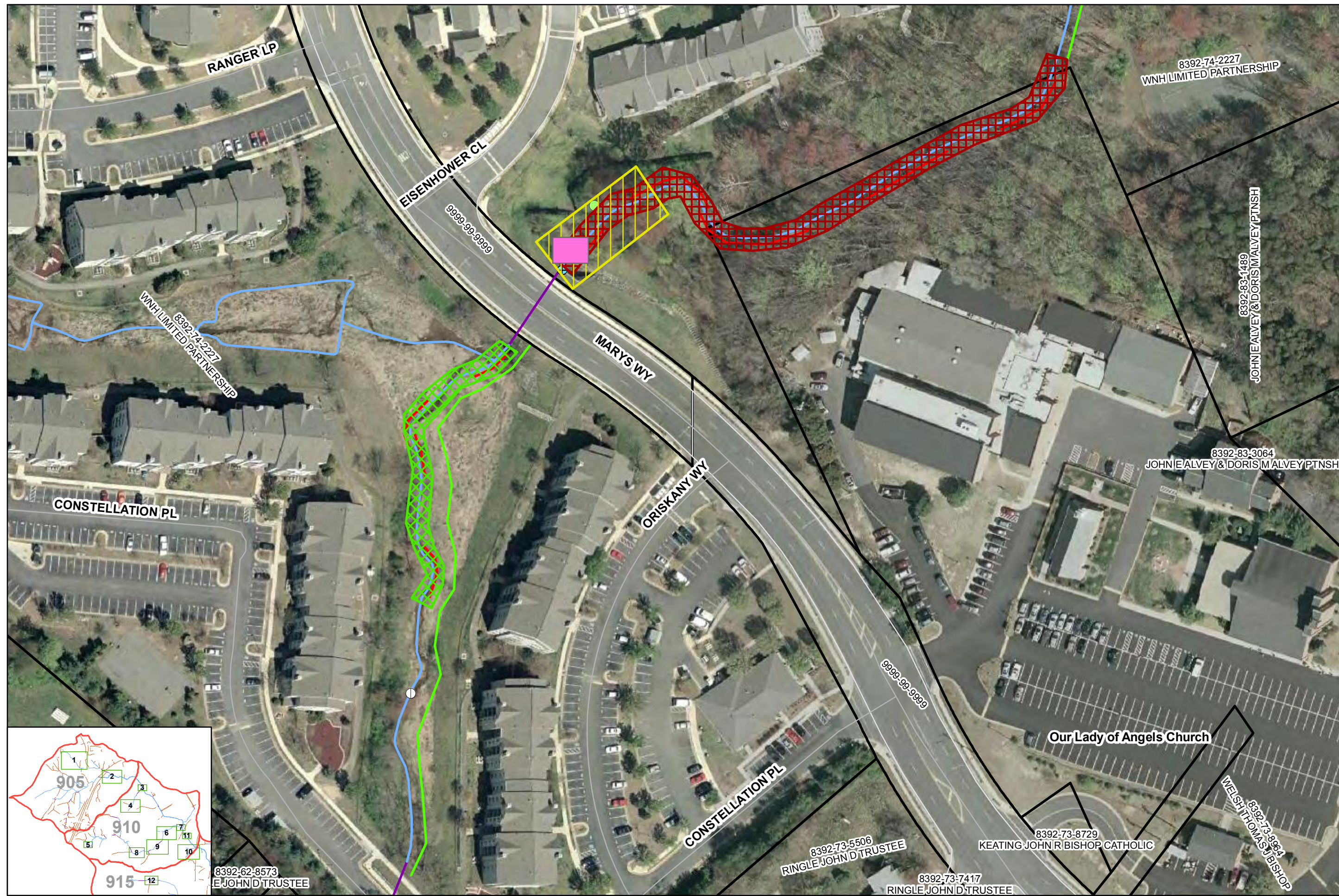
0 37.5 75 150 225 300 Feet
1 inch equals 90 feet

Marumso Creek and Farm Creek Watershed Stream Corridor Improvement Project

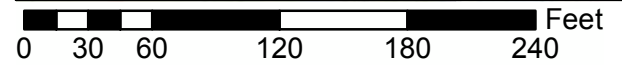


Legend

- Outfall Stabilization
- Stream Stabilization
- Bank Planting
- Trash Removal
- Prevention of Illegal Dumping
- Parcels
- Storm Water Management BMP
- Wetlands
- Stream
- Culvert
- Ditch
- Erosion
- Impacted Buffer
- Channel Modification
- Coastal Zone
- Trash
- Stream Crossing
- Utility
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- Miscellaneous Concerns
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Marumso Creek and Farm Creek Watershed Stream Corridor Improvement Project



1 inch equals 90 feet

4D-910-42ER

Eroding banks along the upper portion of the project reach. Average of 3-foot high erosion observed on left and right banks along a total reach length of 20 ft on the left bank and 80 ft on the right bank.



4D-910-45TR

Failed metal culvert pipe or stormdrain pipe. Source of pipe is unknown. Pipe is creating a jam and collecting trash and debris.



4D-910-44SC

Grouted riprap apron downstream of the Marys Way culvert stream crossing. Apron is undermined and breaking apart. Headcutting at the apron has created a fish migration blockage.



4D-910-46ER

Bank erosion along the lower project reach. Average of 5-foot high erosion observed on the left bank along a total reach length of 80 ft. Average of 8-foot high erosion observed on the right bank along a total reach length of 210 ft.



MARUMSCO CREEK AND FARM CREEK WATERSHED MANAGEMENT PLAN

Stream Corridor Improvement Project

Project ID: 910-SCIP-07

Stream: Marumsko Creek

Tributary A

Subshed: 910

Type:

Stream Stabilization

Trash Removal

Prevention of Illegal Dumping.

Size/Length: 300 LF

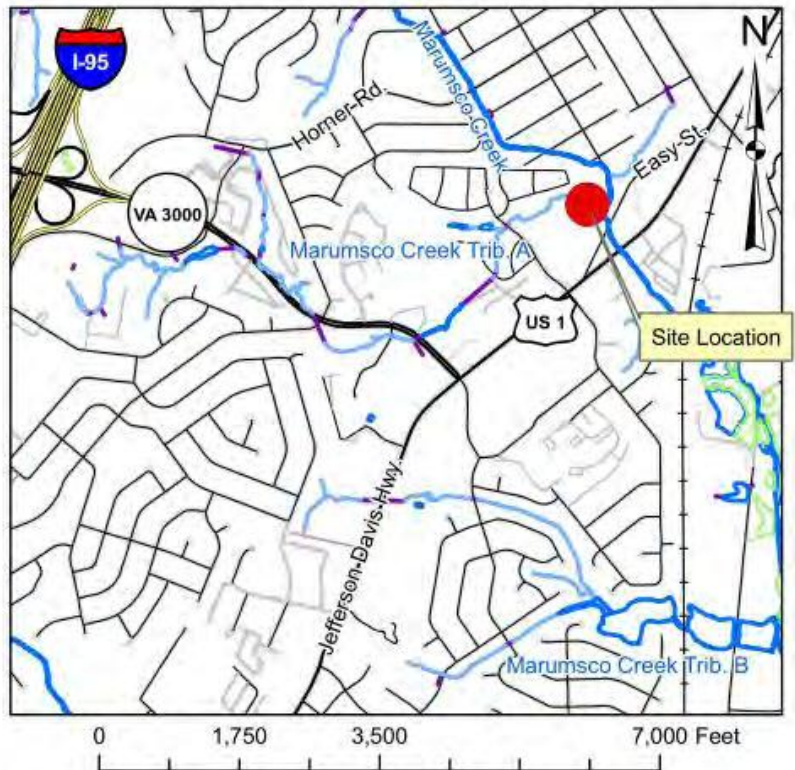
Location: Tributary A to Marumsko Creek east of Jefferson Davis Hwy near Easy St.

Land Ownership:

Alvey, Hazel L

1244 Easy St.

GPIN: 8392-84-4328



PROJECT VICINITY MAP

Problem Description:

Trash (3D-910-51TR and 3D-910-140TR)

Squatting area identified along the lower reach of stream. Squatters have left a significant quantity of trash and debris observed along the lower portion of the project reach. Observed trash is residential and industrial in nature, including floatables, tires, appliances, mattresses and scrap metal. Additionally, three RCP culvert pipes that are not currently serving any purpose are blocking the main flow channel of the stream. Total volume of trash is estimated to be less than 9 truck loads.

Channel Erosion (3D-910-50ERR)

Severely degraded reach of stream is experiencing bank failure with erosion attacking both banks. Current erosion has affected 140 feet of the right streambank with bank heights in excess of 6-feet and 100 feet of the left streambank with bank heights in excess of 8-feet.

Project Concept

Stream Stabilization

The project concept for stabilization of this reach of stream involves stabilization of the channel bed and channel banks through use of constructed in-stream structures and bank grading/planting. Associated channel bank grading and floodplain creation / re-

connection will decrease the erosional stresses created by concentrated flows in the main channel.

Trash Removal / Prevention

The project concept also incorporates trash clean up and removal in the vicinity of the stabilization site. The lower reach of stream is an apparent squatting area. The property owner should be advised to develop measures to prevent future trash dumping on their property.

Project Benefits

Stream Stabilization

The stabilization of this reach of stream will provide water quality benefits for the lower portion of the Marumsco Creek watershed. These benefits include:

Water Quality – Stabilization of the stream will reduce the current sediment loading that is being produced through this reach and adversely impacting the downstream stream reaches. Presence of trash and debris in the stream channel has many adverse impacts on water quality including introduction of heavy metals, oils, and inorganic compounds into the aquatic habitat.

Project Cost:

Design Cost: \$120,000

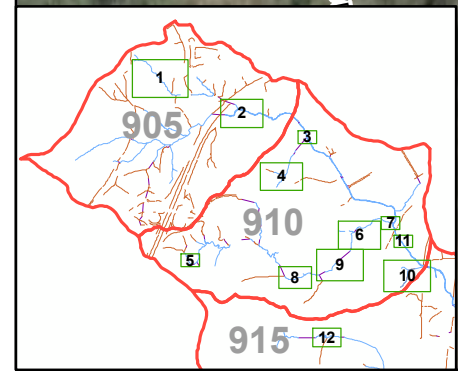
Construction Cost: \$240,000

Total Cost: \$360,000



- Legend**
- Parcels
 - Storm Water Management BMP
 - Wetlands
 - Subsheds
 - Stream
 - Culvert
 - Ditch
 - Erosion
 - Impacted Buffer
 - Channel Modification
 - Coastal Zone
 - Trash
 - Stream Crossing
 - Utility
 - SD Outfall
 - Coastal Zone Characterization
 - Miscellaneous Concerns
 - Reach Characterization

Marumso Creek and Farm Creek Watershed Stream Corridor Improvement Project



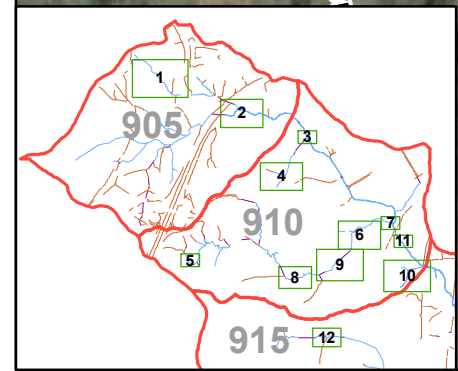
0 15 30 60 90 120 Feet
1 inch equals 40 feet



Legend

-  Outfall Stabilization
-  Stream Stabilization
-  Bank Planting
-  Trash Removal
-  Prevention of Illegal Dumping
-  Parcels
-  Storm Water Management BMP
-  Wetlands
-  Stream
-  Culvert
-  Ditch
-  Erosion
-  Impacted Buffer
-  Channel Modification
-  Coastal Zone
-  Trash
-  Stream Crossing
-  Utility
-  SD Outfall
-  Coastal Zone Characterization
-  Miscellaneous Concerns
-  Reach Characterization

Marumso Creek and Farm Creek Watershed Stream Corridor Improvement Project

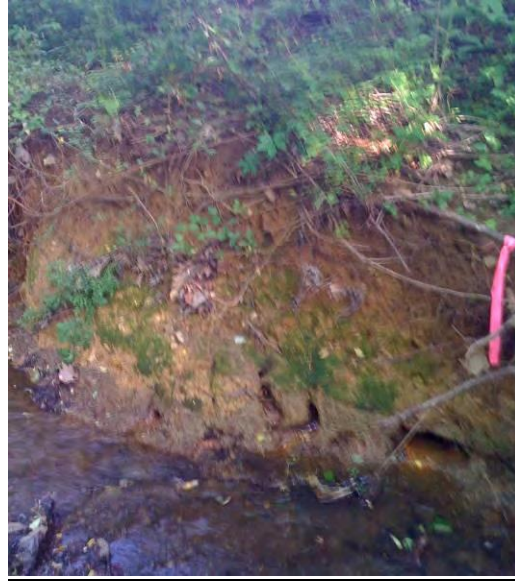


0 12.5 25 50 75 100 Feet

1 inch equals 40 feet

3D-910-42ER

Bank failure. 8-foot high erosion observed on the left bank along a total reach length of 100 ft. Average of 6-foot high erosion observed on the right bank along a length of 140 ft.



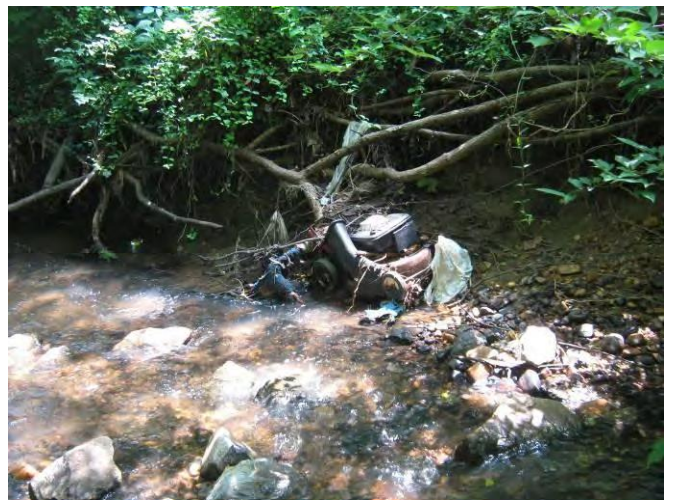
3D-910-51TR

Illegal dumping. There is evidence of squatting. Plastic, clothing, metal, yard waste, and 3 RCP culvert pipes were found in the stream and on the riparian area.



3D-910-140TR

Illegal dumping. Plastic waste, tires, appliances, yard waste, metal and mattresses found in the stream.



MARUMSCO CREEK AND FARM CREEK WATERSHED MANAGEMENT PLAN

Stream Corridor Improvement Project

Project ID: 910-SCIP-08

Stream: Marumsko Creek Trib. A

Subshed: 910

Type:

Stream Stabilization

Outfall Stabilization

Trash Removal/Prevention of Illegal Dumping.

Size/Length: 500 LF

Location: Tributary A of Marumsko Creek south of Prince William Pkwy near Church Hill Dr.

Land Ownership:

Hylbrook Park

PWC Park Authority

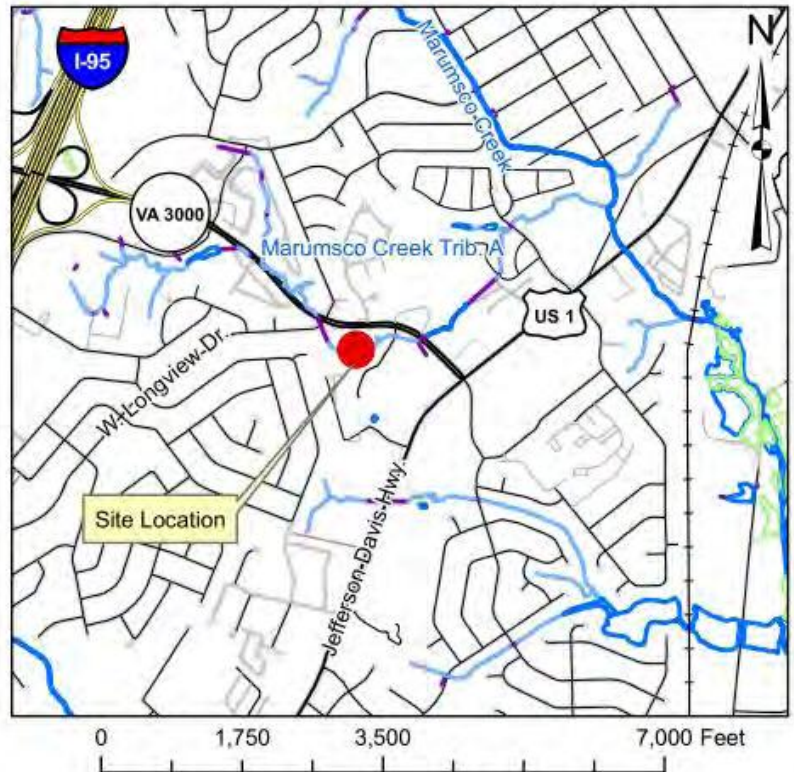
2430 West Longview Drive

GPIN: 8392-52-5142

PWC Board of County Supervisors

13850 Church Hill Drive

GPIN: 8392-52-2520



PROJECT VICINITY MAP

Problem Description:

Impacted Culvert Outfall (4C-910-22SC)

Culvert outfall is located at the head of the degraded reach of stream. Concrete apron is undermined and provides a barrier to fish passage. Erosion and scour hole immediately downstream of the undermined apron observed. Orange staining and sheen was also observed on the outfall apron.

Impacted Storm Drain Outfall (4C-910-25OT)

Storm drain outfall at the right overbank of the degraded reach of stream. Corrosion of the corrugated metal pipe and corrugated metal apron was also observed. The outfall is perched above the streambed and shows evidence of fast erosion. Currently the outfall is stabilized with riprap and wire mesh. This protection is not anticipated to be a long term, sustainable retrofit.

Channel Erosion (4C-910-24ER)

Degraded reach of stream is experiencing widening with erosion attacking both banks. Current erosion has affected a 295 linear foot reach of right streambank and 40

linear foot reach of the left streambank with bank heights in excess of 4-feet. Continued erosion will result in bank encroachment on commercial property.

Channel Erosion (4C-910-30ER)

Degraded tributary of stream is experiencing widening with erosion attacking both banks. Current erosion has affected a 40 linear foot reach of right streambank with bank height in excess of 5-feet.

Trash (4C-910-23TR)

Significant quantities of trash and debris observed along the entire portion of the project reach. Observed trash is residential and industrial in nature, including plastic, construction, metal, and yard waste. Total volume of trash is estimated to be less than 4 truck loads.

Project Concept

Stream Stabilization

The project concept for stabilization of this reach of stream and the tributary to this stream involves stabilization of the channel bed and channel banks through use of bank plantings and constructed in-stream structures such as rock toe and soil lift structures. Associated channel bank grading and floodplain creation / re-connection will decrease the erosional stresses created by concentrated flows in the main channel.

Trash Removal / Prevention

The project concept also incorporates trash and debris clean up and removal in the vicinity of the stabilization site. Trash and debris removal can be accomplished either during a associated stream construction project or separately with volunteers.

Outfall Stabilization

Stabilization of the storm drain outfall and culvert outfall will be incorporated into the stream stabilization design with the in-stream structures for grade stabilization being utilized to protect the endwall from undermining.

Project Benefits

Stream Stabilization / Outfall Stabilization

The stabilization of this reach of stream will provide water quality, infrastructure maintenance and protection, and natural resource conservation benefits for the lower portion of the Marumsco Creek watershed. These benefits include:

Water Quality – Stabilization of the stream will reduce the current sediment loading that is being produced through this reach and impacting the downstream stream reaches. Presence of trash and debris in the stream channel has many adverse impacts on water quality including introduction of heavy metals, oils, and inorganic compounds into the aquatic habitat. Removal of the trash will mitigate the current adverse conditions being created.

Infrastructure Protection – Erosion advancing towards the existing commercial property has the potential to eventually undermine the commercial property and increase the potential for damage to the public.

Natural Resource Conservation – Several natural resources in the area are endangered or impacted by this destabilized system. Continued erosion and channel widening will begin to lead to undermining and trees felling, which in turn will lead to additional channel instabilities, and loss of shade and riparian buffer. Lastly, the aforementioned water quality impacts created by the trash and sediment issues are reducing any water quality benefits that are provided by the open channel and floodplains.

Project Cost:

Design Cost: \$100,000

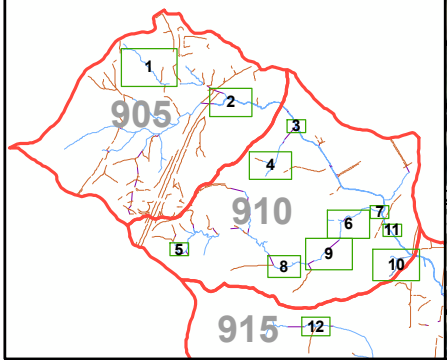
Construction Cost: \$150,000

Total Cost: \$250,000



Legend

- Parcels
- Storm Water Management BMP
- Wetlands
- Subsheds
- Stream
- Culvert
- Ditch
- Erosion
- Impacted Buffer
- Channel Modification
- Coastal Zone
- Trash
- Stream Crossing
- Utility
- SD Outfall
- Coastal Zone Characterization
- Miscellaneous Concerns
- Reach Characterization
























0 35 70 140 210 280 Feet
1 inch equals 70 feet

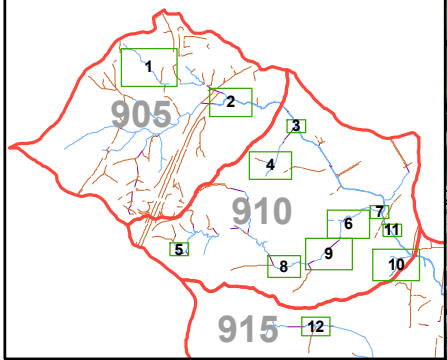
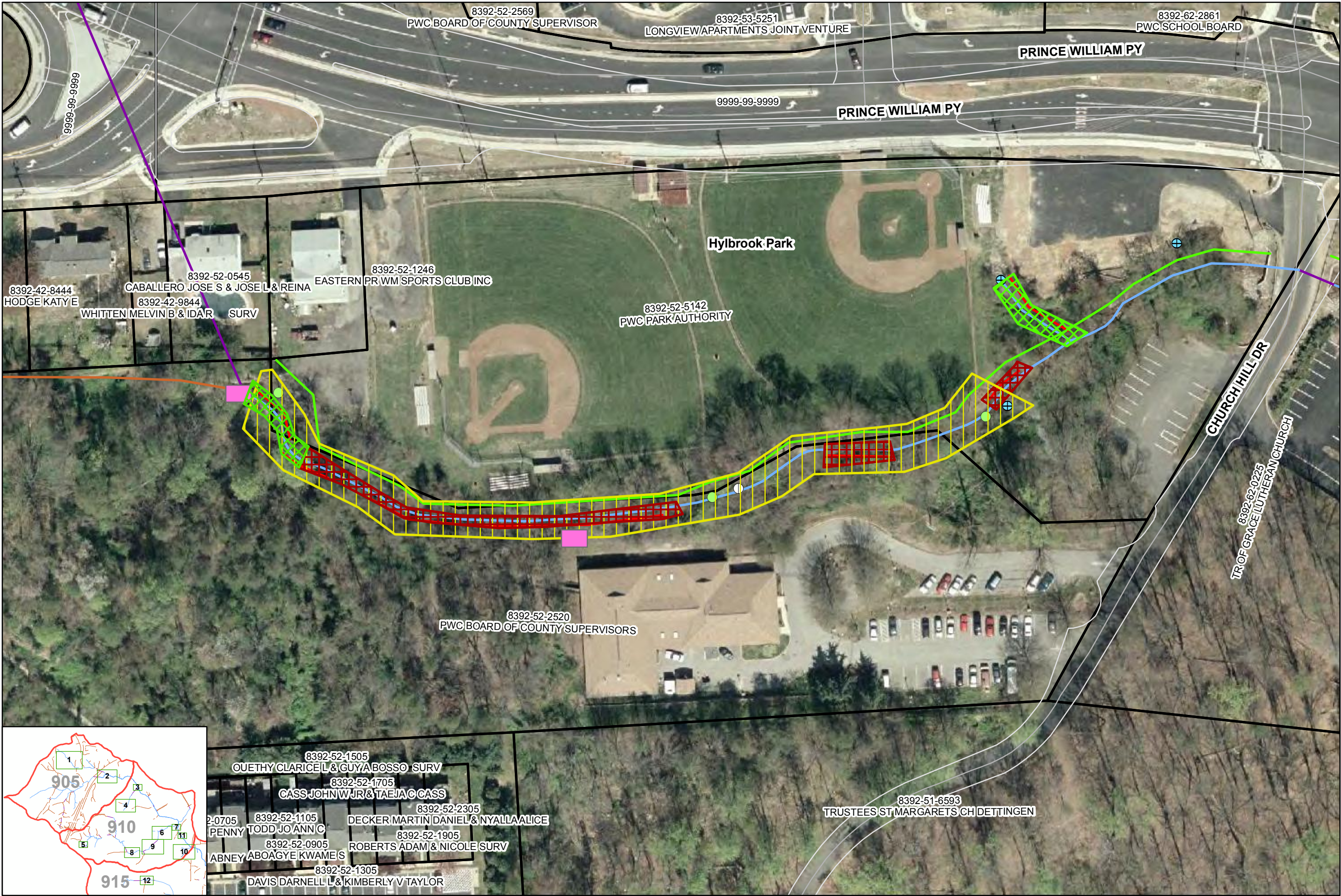
Marumso Creek and Farm Creek Watershed Stream Corridor Improvement Project

910-SCIP-08



Legend

-  Outfall Stabilization
-  Stream Stabilization
-  Bank Planting
-  Trash Removal
-  Prevention of Illegal Dumping
-  Parcels
-  Storm Water Management BMP
-  Wetlands
-  Stream
-  Culvert
-  Ditch
-  Erosion
-  Impacted Buffer
-  Channel Modification
-  Coastal Zone
-  Trash
-  Stream Crossing
-  Utility
-  SD Outfall
-  Coastal Zone Characterization
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-  Reach Characterization



0 25 50 100 150 200 Feet
 1 inch equals 70 feet

**Marumso Creek and
 Farm Creek Watershed
 Stream Corridor
 Improvement Project**

4C-910-22SC

Concrete apron is undermined.



4C-910-23TR

Plastic waste, construction waste, yard waste and metal found in the stream and on the riparian area on the left bank.



4C-910-24ER

Bank widening. Erosion towards commercial property. 4-foot high erosion observed along a total reach length of 40 ft on the left bank and 295 ft on the right bank.



4C-910-25OT

Rusting corrugated metal pipe outfall.
Riprap slope protection held in place with
wire fencing.



4C-910-30ER

Bank widening. Average of 5-foot high
erosion observed along a total reach length
of 40 ft on the right bank



MARUMSCO CREEK AND FARM CREEK WATERSHED MANAGEMENT PLAN

Stream Corridor Improvement Project

Project ID: 910-SCIP-09

Stream: MarumSCO Creek

Subshed: 910

Type:

Stream Stabilization

Culvert Inlet and Outlet Reinforcement

Trash Removal

Size/Length: 450 LF

Location: Tributary A of MarumSCO Creek north of Prince William Pkwy near Jefferson Davis Hwy.

Land Ownership:

PWC School Board

Fred Lynn Middle School

1650 Prince William Pkwy

GPIN: 8392-62-2430

PWC School Board

1640 Prince William Pkwy

GPIN: 8392-62-2861

Vineyard Christian Fellowship Inc

1550 Prince William Pkwy

GPIN: 8392-62-6845

MarumSCO Neighborhoods LLC

13960 Jefferson Davis Hwy

GPIN: 8392-62-8573

MarumSCO Neighborhoods LLC

Griffin Drive Mobile Home Park

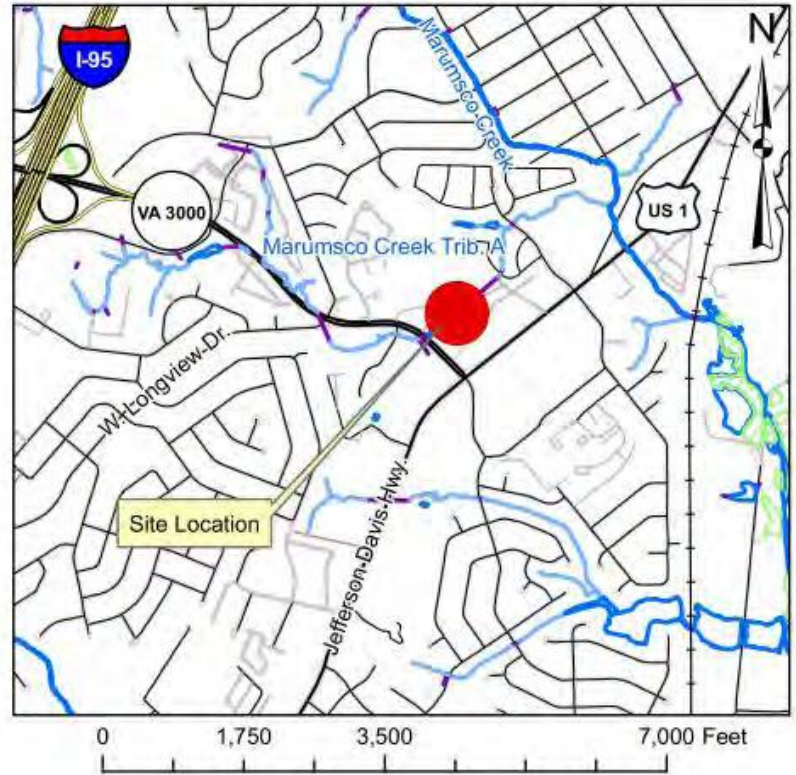
13974 Jefferson Davis Hwy

GPIN: 8392-63-9403

WNH Limited Partnership

1400 Eisenhower Cir.

GPIN: 8392-74-2227



PROJECT VICINITY MAP

Problem Description:

Channel Erosion (4D-910-36ER)

Severely degraded reach of stream is experiencing bank failure with erosion attacking both banks. Current erosion has affected a 150 linear foot reach of right streambank and 100 linear foot reach of the left streambank with bank heights in excess of 4-feet.

Trash (4D-910-37TR, 4D-910-38TR)

Significant quantities of trash and debris observed along the entire project reach. Observed trash is residential and commercial in nature, including floatables, plastic, tires, appliances, yard waste, and scrap metal. Total volume of trash is estimated to be less than 4 truck loads.

Impacted Culvert Inlet and Outfall (4D-910-39SC)

Inlet and outfall of the culvert crossing of the stream are cracking and failing. The culvert is part of the Griffin Drive mobile home community and serves to convey Tributary A below the development. There is significant undermining and erosion at the outfall.

Project Concept

Stream Stabilization

The project concept for stabilization of this reach of stream involves stabilization of the channel bed and channel banks through use of constructed in-stream structures. Associated channel bank grading and floodplain creation / re-connection will decrease the erosional stresses created by concentrated flows in the main channel.

Culvert Inlet and Outfall Stabilization

Stabilization of the culvert inlet and outlet structures will involve providing structural reinforcements. The stream channel around the culvert outfall will also need to be stabilized via rock structure placement and bank plantings.

Trash Removal / Prevention

The project concept also incorporates trash and debris clean up and removal in the vicinity of the stabilization site. A portion of the trash and debris buildup within the stream reach appears to be from maintenance cleaning of the trash and debris racks upstream of the Griffin Drive mobile home community culvert. During maintenance cleaning of the racks, maintenance personnel should be instructed to remove the debris from the channel and haul the waste off-site to a dump.

Project Benefits

Stream Stabilization / Outfall Stabilization

The stabilization of this reach of stream will provide water quality, and infrastructure maintenance and protection benefits for the lower portion of the Marumsco Creek watershed. These benefits include:

Water Quality – Stabilization of the stream will reduce the current sediment loading that is being produced through this reach and impacting the downstream stream reaches.

Infrastructure Maintenance – The culvert outfall is currently undermined and in need of maintenance to prevent failure. Failure of the outfall can potentially lead to further deterioration of stream channel and loss of property.

Project Cost:

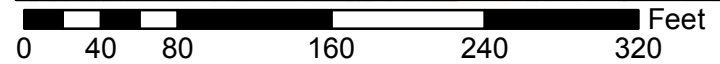
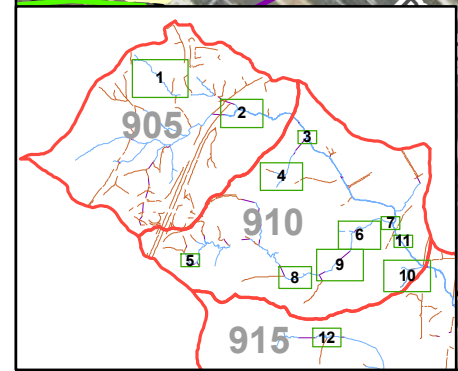
Design Cost: \$120,000

Construction Cost: \$274,500

Total Cost: \$394,500



- Legend**
- Parcels
 - Storm Water Management BMP
 - Wetlands
 - Subsheds
 - Stream
 - Culvert
 - Ditch
 - Erosion
 - Impacted Buffer
 - Channel Modification
 - Coastal Zone
 - Trash
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 - SD Outfall
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 - Reach Characterization

























1 inch equals 100 feet

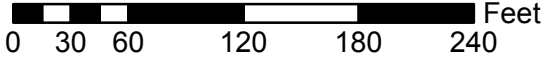
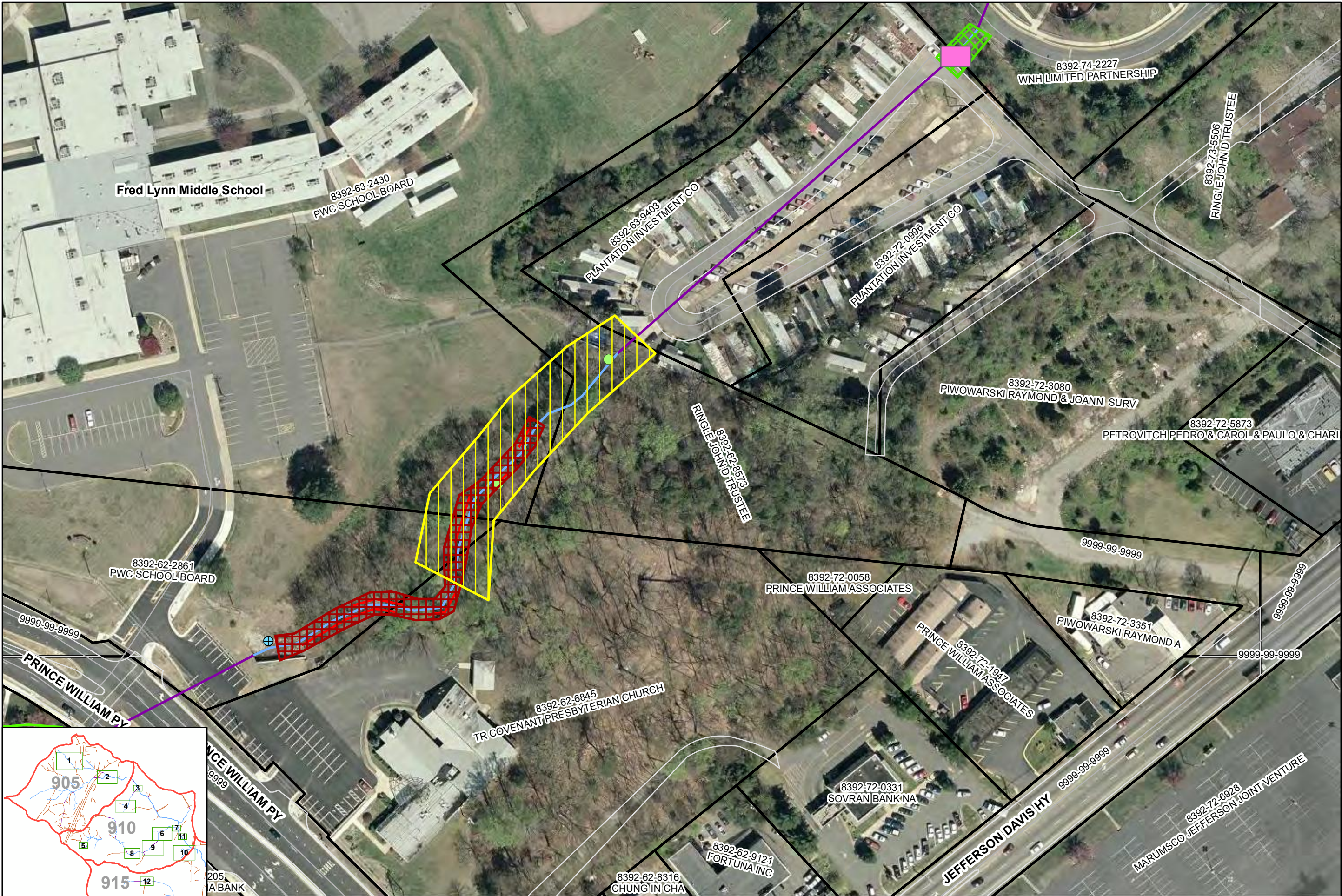
Marumsko Creek and Farm Creek Watershed Stream Corridor Improvement Project



Legend

-  Outfall Stabilization
-  Stream Stabilization
-  Bank Planting
-  Trash Removal
-  Prevention of Illegal Dumping
-  Parcels
-  Storm Water Management BMP
-  Wetlands
-  Stream
-  Culvert
-  Ditch
-  Erosion
-  Impacted Buffer
-  Channel Modification
-  Coastal Zone
-  Trash
-  Stream Crossing
-  Utility
-  SD Outfall
-  Coastal Zone Characterization
-  Miscellaneous Concerns
-  Reach Characterization

Marumso Creek and Farm Creek Watershed Stream Corridor Improvement Project



1 inch equals 100 feet

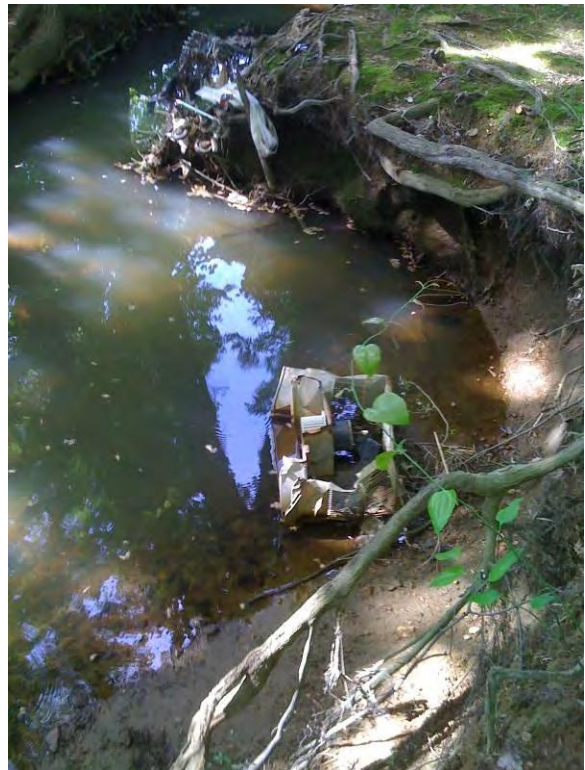
4D-910-36ER

Average of 4-foot high erosion observed along a total reach length of 100 ft on the left bank and 150 ft on the right bank.



4D-910-37TR

Appliances, metal waste, plastic and paper floatables are found throughout this reach of stream.



4D-910-38TR

Plastic waste, appliances, tires and yard waste found in the stream and on the right bank near the trash racks.



4D-910-39SC

Erosion around the outlet of the stream crossing.



MARUMSCO CREEK AND FARM CREEK WATERSHED MANAGEMENT PLAN

Stream Corridor Improvement Project

Project ID: 910-SCIP-10

Stream: Marumsko Creek

Subshed: 910

Type:

Stream Stabilization

Outfall Removal / Replacement

Storm Drain Extension

Wetland Restoration

Trash Removal

Size/Length: 600 LF

Location: Tributary of Marumsko Creek east of Jefferson Davis Hwy near Mount Pleasant Dr.

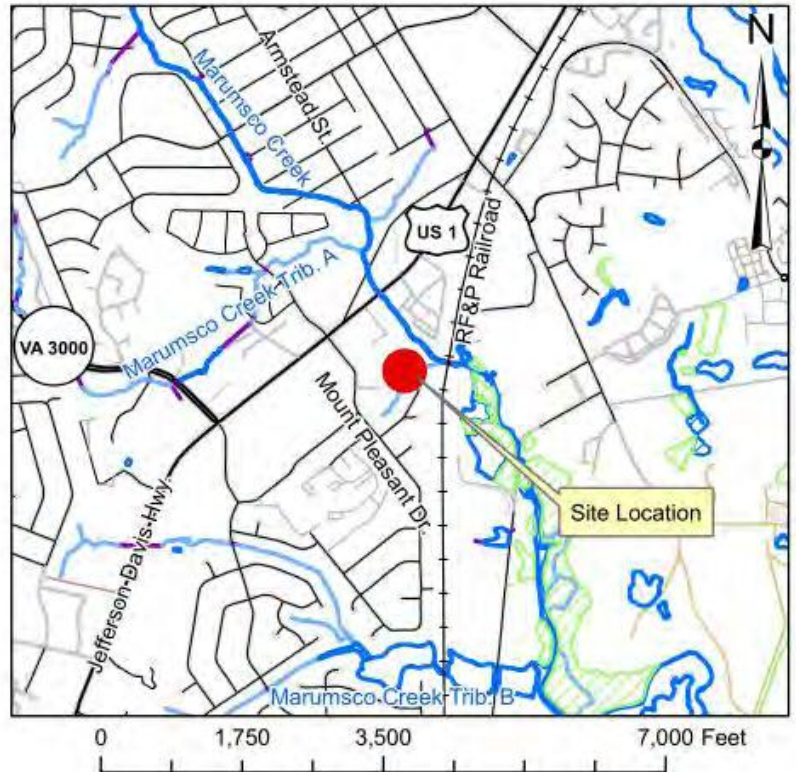
Land Ownership:

Jefferson Park Site

PWC Park Authority

13729 Jefferson Davis Hwy

GPIN: 8392-92-1869



PROJECT VICINITY MAP

Problem Description:

Impacted Storm Drain Outfall (4D-910-168OT)

Storm drain outfall at the head of the degraded reach of stream. Severe head cutting has caused undermining of the endwall foundation for the outfall, and the outfall currently is perched approximately 7 feet above the channel bed. Continued erosion will cause the endwall to fail.

Impacted Utility (4D-910-170UT)

Abandoned storm drain manhole stack located along severely degraded stream reach. Erosion has not currently adversely impacted the concrete manhole stack, but progressive erosion will lead to further exposure of the stack and an increased potential for damage to the stack.

Trash (4D-910-167TR)

Significant quantities of trash and debris observed along the project reach. Observed trash is residential and commercial in nature, including floatables, tires, plastic, appliances, construction, and scrap metal. Total volume of trash is estimated to be less than 12 truck loads.

Channel Erosion (4D-910-169ER)

Severely degraded reach of stream is experiencing both head cutting and widening with erosion attacking both banks. The channel bed and banks are characterized by a dense sand substrate that will continue to allow for moderate to high erosion rates. Current erosion has affected the reach of stream with banks in excess of 20-feet in height.

Channel Erosion (4D-910-166ER)/ Impacted Outfall (4D-910-165OT)

This reach of stream is experiencing severe erosion and widening with erosion attacking both banks. There is an outfall and an exposed pipe in the stream. The pipe could possibly be a historic road crossing, a failed storm water management facility, or some other type of drainage structure which is now abandoned. The inlet of this pipe appears to be buried under the current streambed. The stream banks along the exposed pipe are severely eroded. Current erosion has affected 200 linear feet reach of stream with banks in excess of 5-feet in height.

Project Concept

Stream Stabilization/ Wetland Restoration

The project concept for stabilization the eroded reaches of stream at this site involves stream restoration through bioengineering and channel creation, wetland restoration and installation of new storm drain system. The concept includes stream restoration/reconstruction along the reach of 4D-910-166ER. Reconstruction of the stream channel and removal of the failed stream crossing in this area will reduce the sediment loading created by the current situation.

The stabilization of reach 4D-910-169ER involves backfilling the existing channel with 20-foot high banks and installing a new storm drain system connecting existing storm drain outfall (4D-910-168OT). The extended storm drain system will replace the degraded stream reach. The new storm drain system consists of an undetermined size and length of pipe, a manhole located near the existing manhole 4D-910-170UT, and an energy dissipating outfall structure at the confluence of the two existing streams.

Outfall Stabilization

The outfall located at 4D-910-165OT in the main channel will not be stabilized under the proposed concept but rather shall be removed. Prior to further investigations into the project concept, county should confirm that the outfall is part of a failed drainage system that is eligible for removal over repair. The proposed design involves removal of the abandoned outfall and exposed pipe from the stream and creation of a stream channel through stream restoration and natural channel design techniques.

Stabilization of the storm drain outfall 4D-910-168OT will be achieved by extending the storm drain system and backfilling the existing degraded channel. The extended storm drain system will have a new outfall located near the existing tributary confluence.

Utility Stabilization

At the time of the field reconnaissance, the manhole stack and connected sewer conduit had not been impacted by the degraded channel reach and do not appear to require any structural rehabilitation. It was later determined that this is an abandoned storm drain manhole that is filled with sand and dirt. Therefore it is proposed that the manhole be removed during associated storm drain and stream construction activities.

Trash Removal / Prevention

The project concept also incorporates trash and debris clean up and removal in the vicinity of the stabilization site.

Project Benefits

Stream Stabilization / Outfall Stabilization / Utility Stabilization

The stabilization of this reach of stream will provide water quality, infrastructure maintenance and protection, and natural resource conservation benefits for the lower portion of the Marumscro Creek watershed. These benefits include:

Water Quality – Stabilization of the stream will reduce the current sediment loading that is being produced through this reach and adversely impacting the downstream stream reaches. Presence of trash and debris in the stream channel has many adverse impacts on water quality including introduction of heavy metals, oils, and inorganic compounds into the aquatic habitat. Removal of the trash and prevention of illegal dumping will mitigate the current adverse conditions being created.

Infrastructure Maintenance – The storm drain outfall is currently undermined and in need of maintenance to prevent failure. Failure of the endwall can potentially lead to a chain reaction destabilization of the storm drain pipe system with pipes breaking, joints separating and sinkholes forming.

Natural Resource Conservation – Several natural resources in the area are endangered or impacted by this destabilized system. Continued erosion and channel widening will begin to lead to undermining and trees falling, which in turn will lead to additional channel instabilities, and loss of shade and riparian buffer. Currently the excess sediment produced by the streambank erosion is settling in the stream confluence downstream of the impacted reach. This area could potentially naturally regenerate into a forested wetland; however, the sediment supply is overwhelming all non woody vegetation in the floodplain. Lastly, the aforementioned water quality impacts created by the trash and sediment issues are reducing any water quality benefits that are provided by the open channel and floodplains.

Project Cost:

Design Cost: \$120,000

Construction Cost: \$480,000

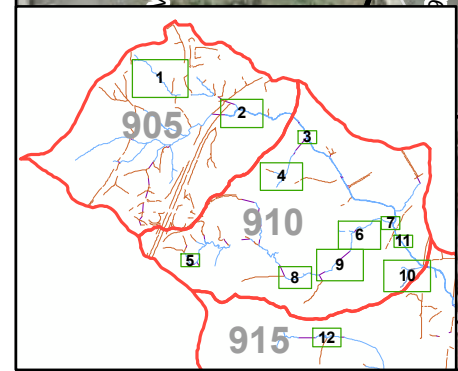
Total Cost: \$600,000

910-SCIP-10



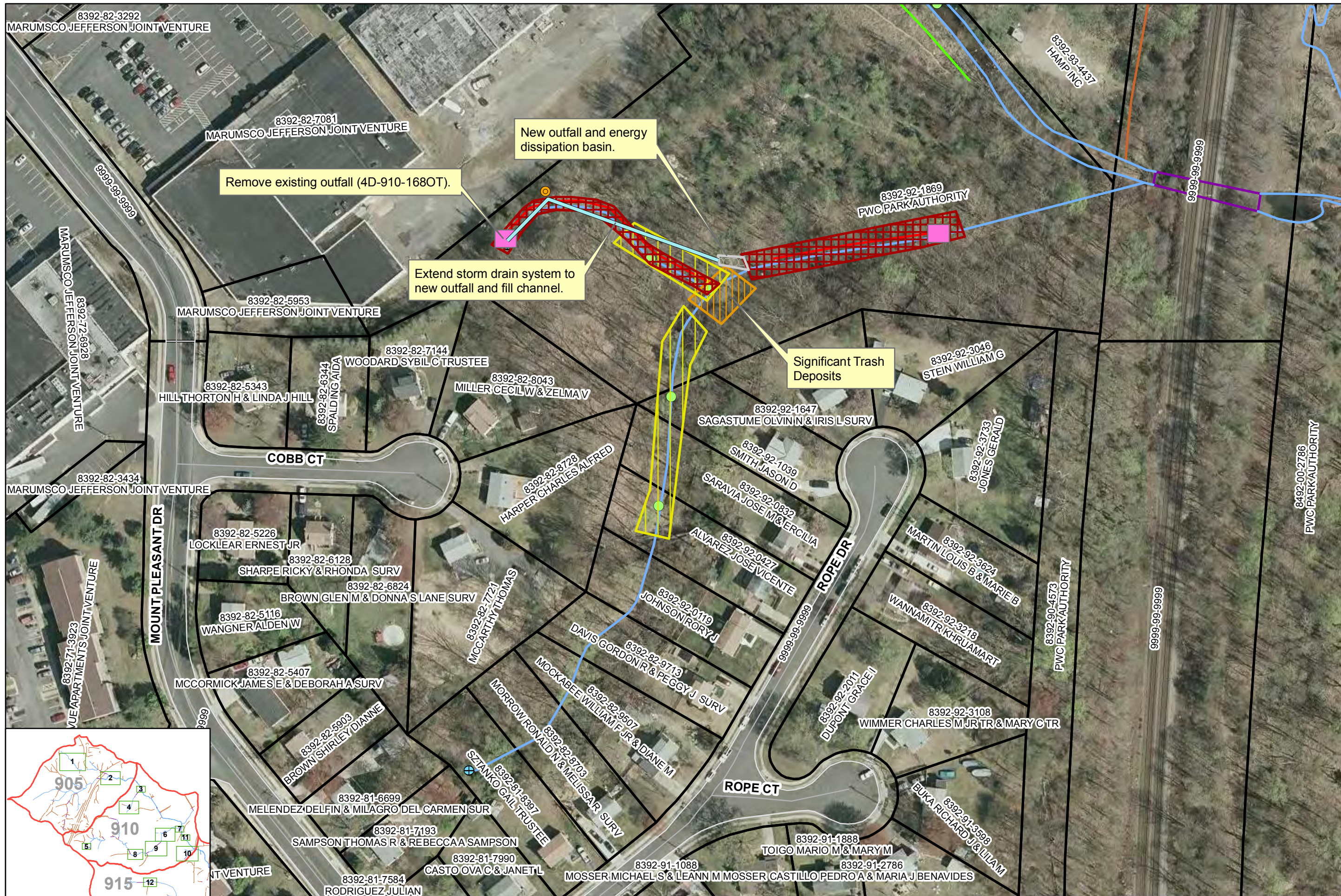
Legend

- Parcels
- Storm Water Management BMP
- Wetlands
- Subsheds
- Stream
- Culvert
- Ditch
- Erosion
- Impacted Buffer
- Channel Modification
- Coastal Zone
- Trash
- Stream Crossing
- Utility
- SD Outfall
- Coastal Zone Characterization
- Miscellaneous Concerns
- Reach Characterization



0 50 100 200 300 400 Feet
1 inch equals 100 feet

**MarumSCO Creek and
Farm Creek Watershed
Stream Corridor
Improvement Project**

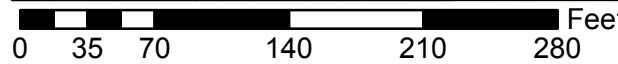
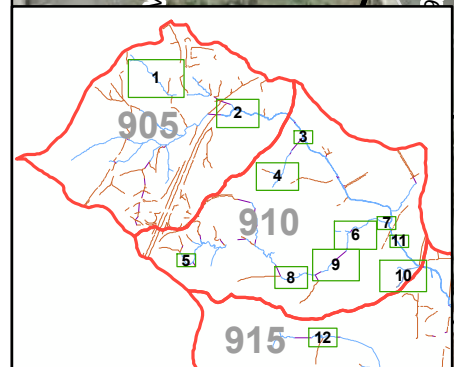


910-SCIP-10



Legend

- Outfall Stabilization
- Stream Stabilization
- Bank Planting
- Trash Removal
- Prevention of Illegal Dumping
- Parcels
- Storm Water Management BMP
- Wetlands
- Stream
- Culvert
- Ditch
- Erosion
- Impacted Buffer
- Channel Modification
- Coastal Zone
- Trash
- Stream Crossing
- Utility
- SD Outfall
- Coastal Zone Characterization
- Miscellaneous Concerns
- Reach Characterization



1 inch equals 100 feet

Marumsc Creek and Farm Creek Watershed Stream Corridor Improvement Project

4D-910-168OT

Undermined outfall, currently perched 7-feet above the streambed.



4D-910-169ER

Highly erodible soil. Massive headcuts and bank widening. Significant sediment source along with sediment deposition downstream. Average of 20-foot high erosion observed along a total reach length of 150 ft on the left and right bank.



4D-910-170UT

Abandoned storm drain manhole. Filled with sand and dirt to within 6-8 ft. of the top. Inlet/Outlet not visible.



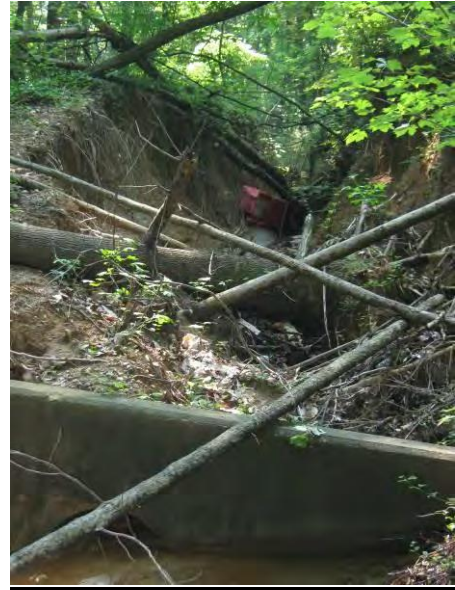
4D-910-166ER

Average of 5-foot high erosion observed along a 200-foot reach length on the left and right bank.



4D-910-165OT

Pipe endwall with failed foundation. Unknown source of pipe. Possibly a failed storm water pond, a historic road crossing, or some other type of drainage structure.



4D-910-167TR

Source of trash is possibly illegal dumping and flooding. Plastic waste, tires, appliances, construction waste and metals found in the stream and on the riparian area.



MARUMSCO CREEK AND FARM CREEK WATERSHED MANAGEMENT PLAN

Stream Corridor Improvement Project

Project ID: 910-SCIP-11

Stream: Marumsko Creek

Subshed: 910

Type:

Outfall Stabilization.

Size/Length: 24" Outfall

Location: Marumsko Creek
east of Jefferson Davis Hwy.
near Jefferson Plaza

Land Ownership:

PWC Park Authority

Jefferson Park Site

13729 Jefferson Davis

Highway

GPIN: 8392-92-1869

Kiang Chang LLC

13725 Jefferson Davis

Highway

GPIN: 8392-83-9348



PROJECT VICINITY MAP

Problem Description:

Impacted Storm Drain Outfall (4D-910-1600T)

Storm drain outfall foundation is completely undermined and is slumping into the channel bed. The joint between pipe and endwall is also broken. There is also erosion around and behind the endwall. Continued undermining of endwall foundation will result in complete failure of the endwall structure adversely impacting the stream. The endwall is located on the left streambank approximately 40 feet downstream of the Route 1 culver crossing of Marumsko Creek.

Project Concept

Outfall Stabilization

Stabilization of the storm drain outfall will require reconstruction of the outfall and stabilization of the streambank behind the outfall.

Project Benefits

Outfall Stabilization

The stabilization of this storm drain outfall will provide infrastructure maintenance and protection benefits for the lower portion of the Marumsko Creek watershed. These benefits include:

Infrastructure Maintenance – The storm drain outfall is currently undermined and in need of maintenance to prevent failure. Failure of the endwall can potentially lead to a chain reaction destabilization of the storm drain pipe system with pipes breaking, joints separating and sinkholes forming.

Project Cost:

Design Cost: \$20,000

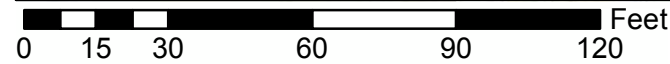
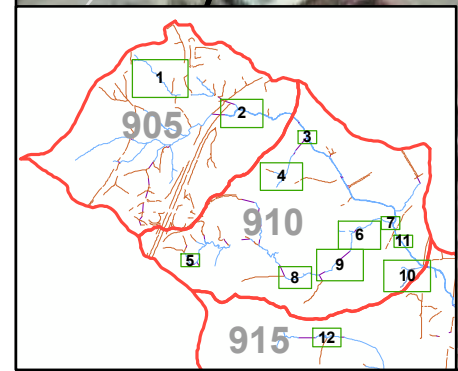
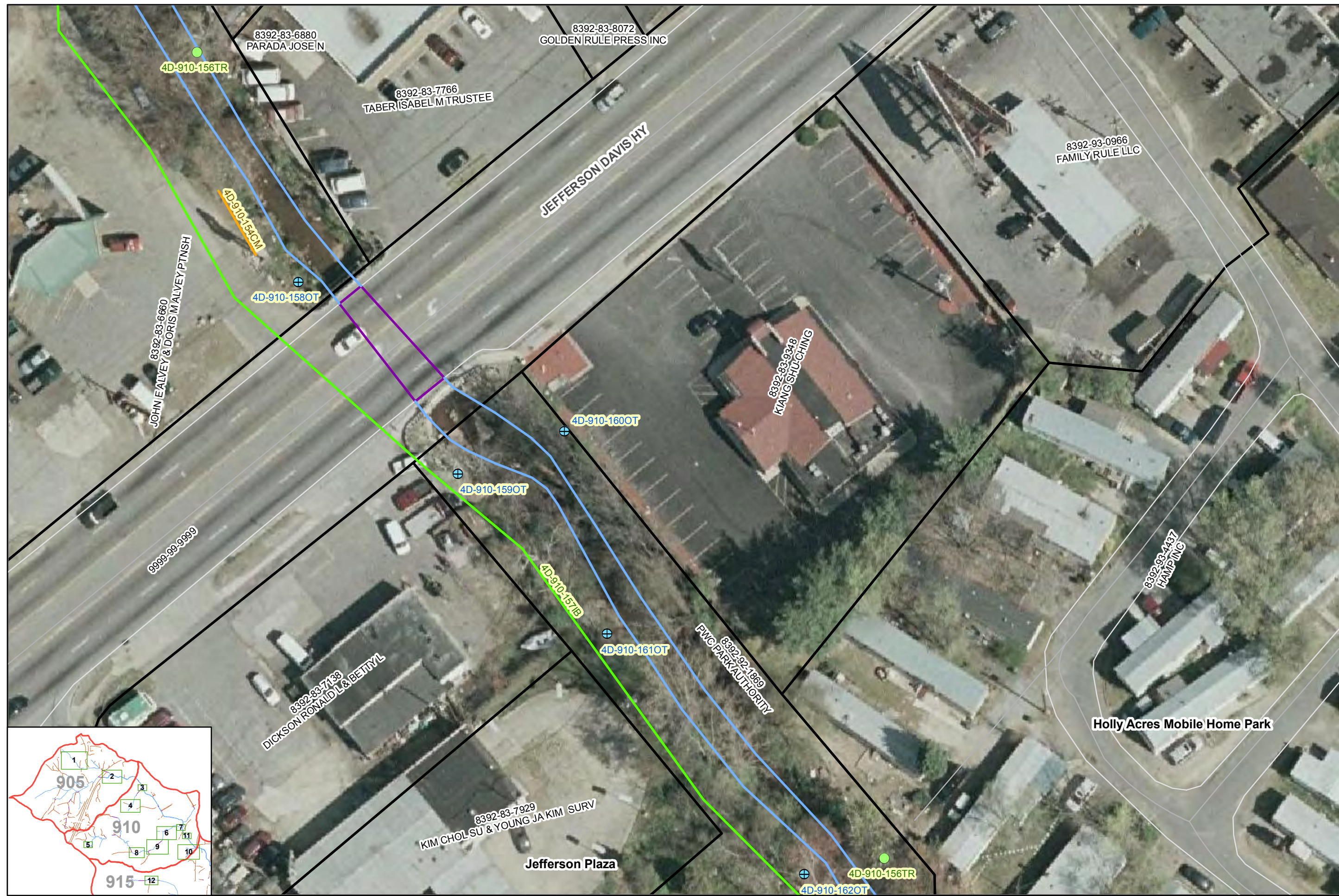
Construction Cost: \$40,000

Total Cost: \$60,000



Legend

-  Parcels
-  Storm Water Management BMP
-  Wetlands
-  Subsheds
-  Stream
-  Culvert
-  Ditch
-  Erosion
-  Impacted Buffer
-  Channel Modification
-  Coastal Zone
-  Trash
-  Stream Crossing
-  Utility
-  SD Outfall
-  Coastal Zone Characterization
-  Miscellaneous Concerns
-  Reach Characterization

























1 inch equals 40 feet

Marumso Creek and Farm Creek Watershed Stream Corridor Improvement Project

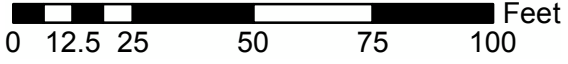
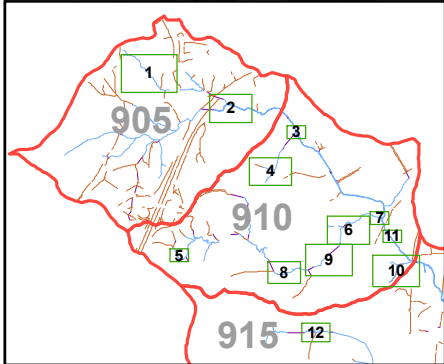
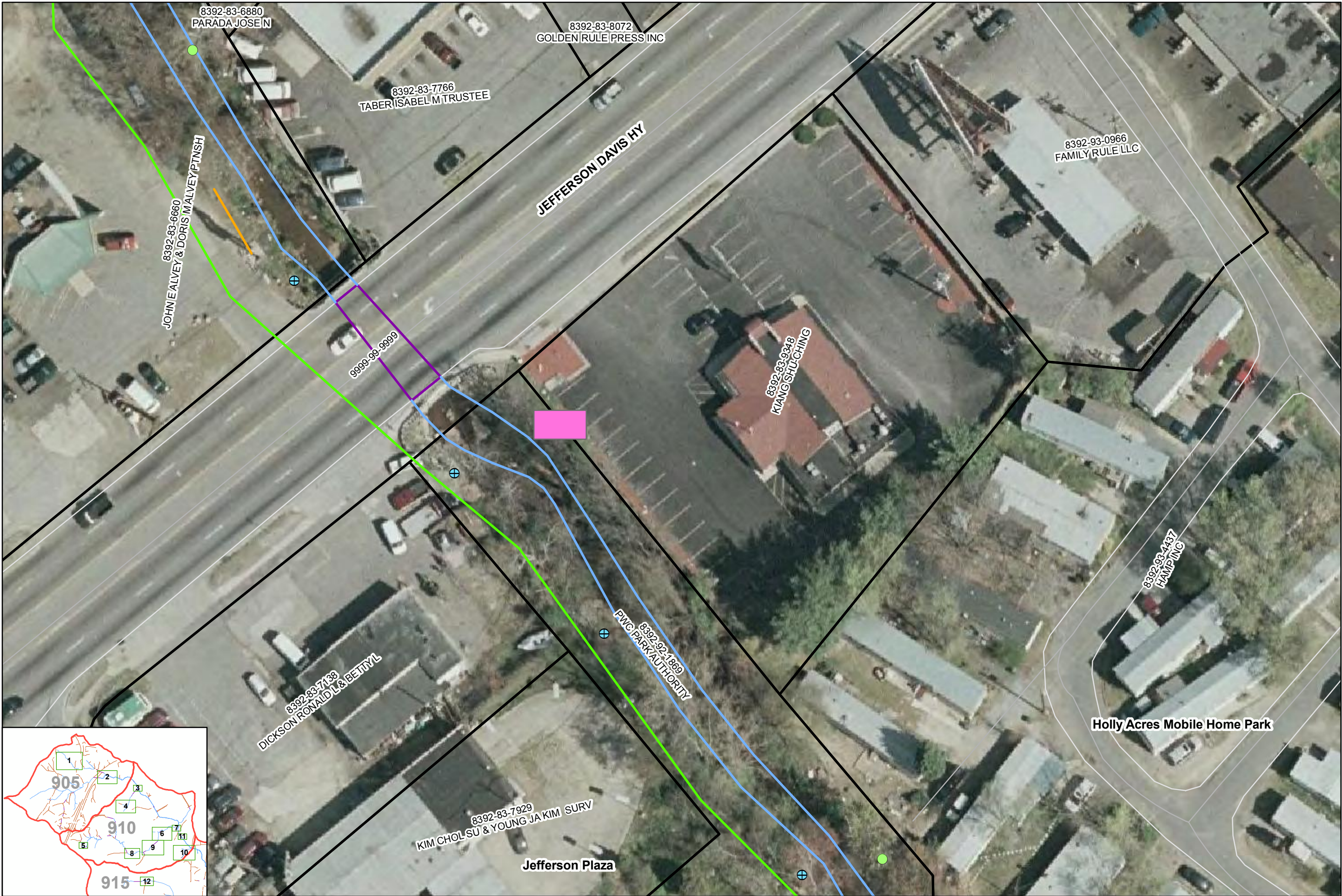
910-SCIP-11



Legend

-  Outfall Stabilization
-  Stream Stabilization
-  Bank Planting
-  Trash Removal
-  Prevention of Illegal Dumping
-  Parcels
-  Storm Water Management BMP
-  Wetlands
-  Stream
-  Culvert
-  Ditch
-  Erosion
-  Impacted Buffer
-  Channel Modification
-  Coastal Zone
-  Trash
-  Stream Crossing
-  Utility
-  SD Outfall
-  Coastal Zone Characterization
-  Miscellaneous Concerns
-  Reach Characterization

Marumso Creek and Farm Creek Watershed Stream Corridor Improvement Project



1 inch equals 40 feet

4D-910-160OT

Outfall foundation completely undermined, slumping and failing. Joint broken inside. Bank erosion around the outfall and behind the outfall.



MARUMSCO CREEK AND FARM CREEK WATERSHED MANAGEMENT PLAN

Stream Corridor Improvement Project

Project ID: 915-SCIP-12

Stream: Tributary 1 to Marumscocreek
Creek Tributary B

Subshed: 915

Type:

Stream Stabilization

Outfall Stabilization

Utility Stabilization

Trash Removal

Size/Length: 800 LF

Location: Tributary 1 of Tributary B to Marumscocreek east of Jefferson Davis Hwy near Doris Ct, upstream of East Longview Drive.

Land Ownership:

Hendrick Automotive Group

14201 Jefferson Davis Hwy

GPIN: 8392-60-0418

Bayvue Apartments Joint Venture

1364 East Longview Dr.

GPIN: 8392-61-7705

McDaniel, Amick J.

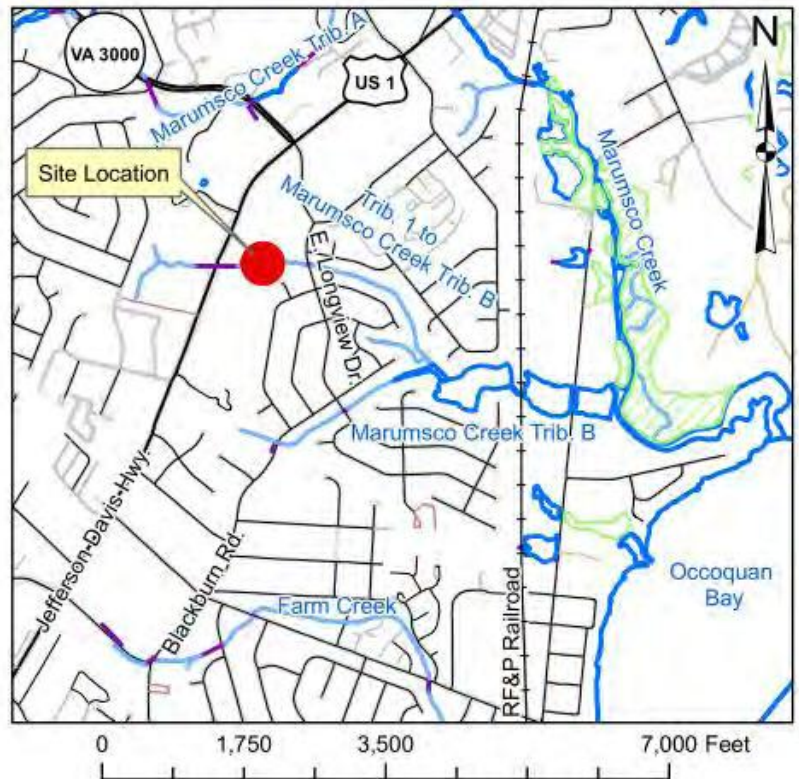
14196 Doris Ct.

GPIN: 8392-60-5228

Problem Description:

Channel Modification (5C-915-01CM) and Erosion (5C-915-02ER, 5C-915-04ER)

Stream section immediately downstream of the Jefferson Davis Highway culvert crossing outfall is channelized using grouted riprap. There is significant undermining of the grouted riprap apron which provides a barrier to fish passage and is also a cause of erosion of natural channel bed downstream. The reach downstream of the grouted riprap apron is also experiencing widening and bank failure with erosion attacking both banks. Current erosion has affected a 310 linear foot reach of right streambank and 185 linear foot reach of the left streambank with bank heights in excess of 7-feet.



PROJECT VICINITY MAP

Impacted Utility (5C-915-05UT)

Sewer line is suspended on steel I-beam above channel bed. The foundations on both sides of the stream on which the steel I-beam rests are undermined and is failing. There is also erosion of the left streambank around the foundation. Continued erosion will lead to progressive deterioration of the foundation and eventual failure.

Impacted Storm Water Management Best Management Practice (BMP) Structure Outfall (5C-915-03OT)

Stormwater management BMP (FAC Id 5197) outfall at the right bank of the degraded reach of stream is corroded. Erosion / headcutting is encroaching and undermining the grouted riprap outfall protection. The outfall currently is perched approximately 6 feet above the channel bed. Continued erosion will cause the endwall to fail.

Trash (5C-915-08TR)

Moderate quantities of trash and debris observed along the lower portion of the project reach. Observed trash is mostly residential in nature, including floatables, plastic and yard waste. Total volume of trash is estimated to be less than 1 truck load.

Project Concept

Stream Stabilization

The project concept for stabilization of this reach of stream involves stabilization of the channel bed and channel banks through use of constructed in-stream structures and bank grading with rock toes. Associated channel bank grading and floodplain creation / re-connection will decrease the erosional stresses created by concentrated flows in the main channel.

Outfall Stabilization

Stabilization of the storm drain outfall will be incorporated into the stream stabilization design with the in-stream structures for grade stabilization being utilized to protect the endwall from undermining. At the time of the field reconnaissance the storm drain endwall was undermined and perched above the streambed, but appears to be salvageable. However, replacement of the outfall may be required, if progressive erosion causes the endwall to fail before a stabilization project can be effectively implemented.

Utility Stabilization

Stabilization of the suspended sewer line will be incorporated into the stream stabilization design with reinforcement of the foundations on both sides of the stream. Associated channel bank grading will decrease the erosional stresses around the foundations.

Trash Removal / Prevention

The project concept also incorporates trash and debris clean up and removal in the vicinity of the stabilization site. A portion of the trash and debris buildup within the stream reach appears to be from maintenance cleaning of the trash and debris racks

upstream of the East Longview Dr. culverts. During maintenance cleaning of the racks, county maintenance personnel should be instructed to remove the debris from the channel and haul the waste off-site to a dump.

Project Benefits

Stream Stabilization / Outfall Stabilization / Utility Stabilization

The stabilization of this reach of stream will provide water quality, aquatic habitat conservation and infrastructure maintenance and protection benefits for the lower portion of the Marumsco Creek watershed. These benefits include:

Water Quality – Stabilization of the stream will reduce the current sediment loading that is being produced through this reach and impacting the downstream stream reaches.

Infrastructure Maintenance – The storm water management BMP outfall is currently undermined and in need of maintenance to prevent failure. Failure of the endwall can potentially lead to a chain reaction destabilization of the storm drain pipe system with pipes breaking, joints separating and sinkholes forming.

Infrastructure Protection – Erosion around the foundations of the steel I-beam has the potential to eventually undermine the foundations completely and lead to its failure.

Aquatic Habitat Conservation – The grouted riprap apron downstream of the culvert outfall is currently undermined and a significant fish passage barrier. Restoration of the stream in conjunction with the stabilization of riprap apron will prompt the growth of diverse aquatic habitat within the project area.

Project Cost:







Design Cost: \$140,000

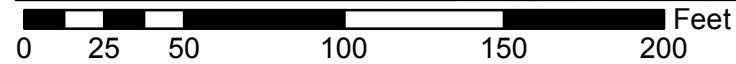
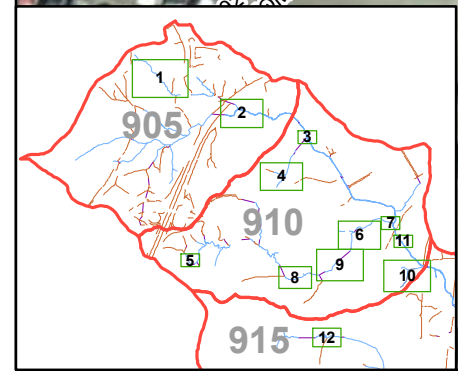
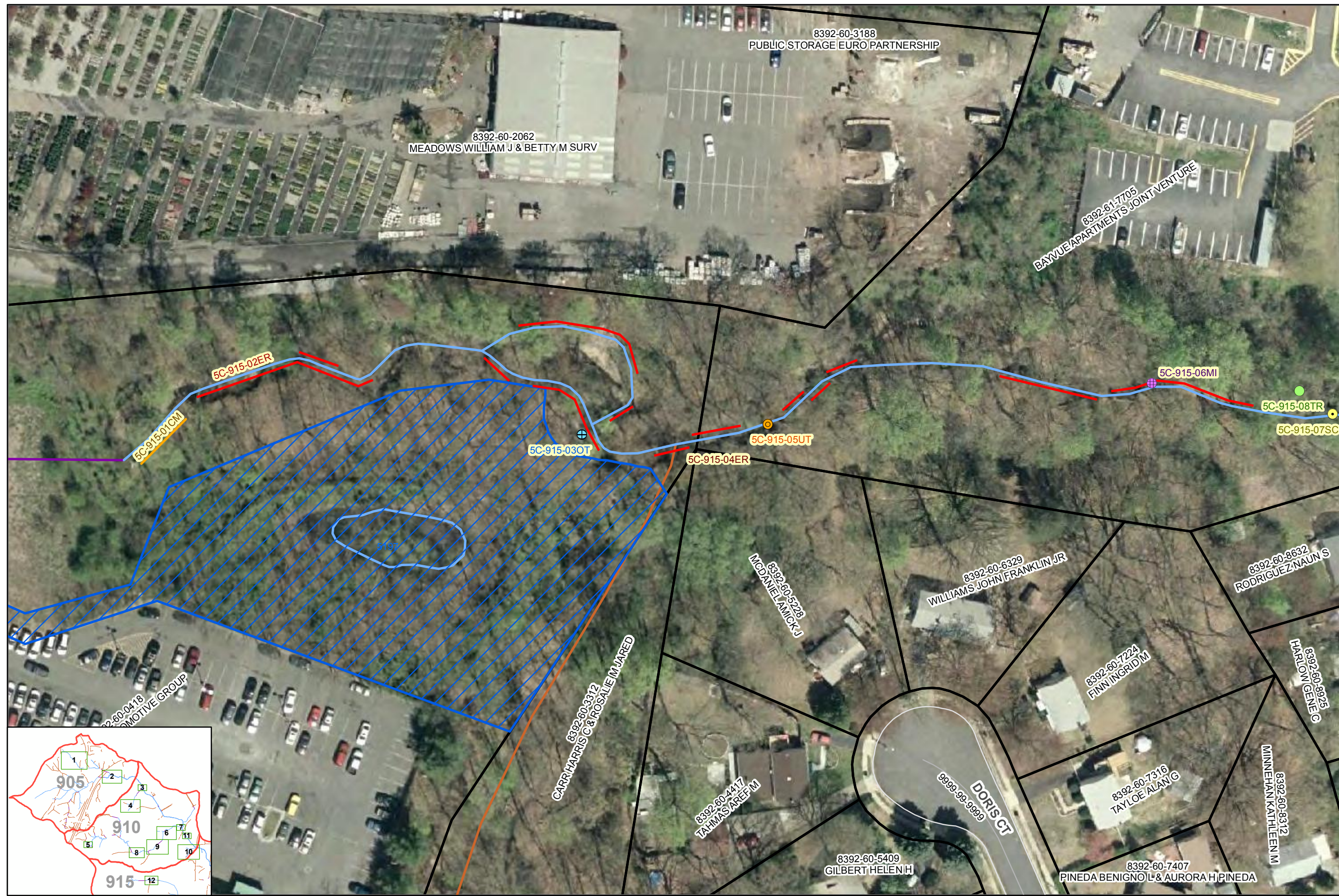
Construction Cost: \$320,000

Total Cost: \$460,000



Legend

-  Parcels
-  Storm Water Management BMP
-  Wetlands
-  Subsheds
-  Stream
-  Culvert
-  Ditch
-  Erosion
-  Impacted Buffer
-  Channel Modification
-  Coastal Zone
-  Trash
-  Stream Crossing
-  Utility
-  SD Outfall
-  Coastal Zone Characterization
-  Miscellaneous Concerns
-  Reach Characterization



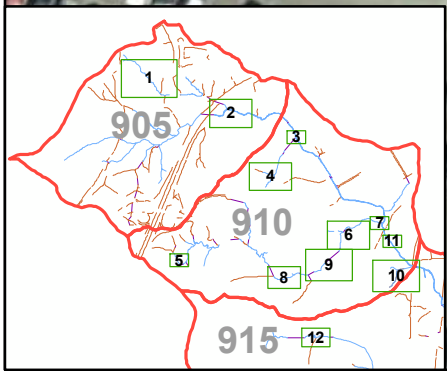
1 inch equals 60 feet

**Marumso Creek and
Farm Creek Watershed
Stream Corridor
Improvement Project**



Legend

- Outfall Stabilization
- Stream Stabilization
- Bank Planting
- Trash Removal
- Prevention of Illegal Dumping
- Parcels
- Storm Water Management BMP
- Wetlands
- Stream
- Culvert
- Ditch
- Erosion
- Impacted Buffer
- Channel Modification
- Coastal Zone
- Trash
- Stream Crossing
- Utility
- SD Outfall
- Coastal Zone Characterization
- Miscellaneous Concerns
- Reach Characterization



0 20 40 80 120 160 Feet

1 inch equals 60 feet

Marumso Creek and Farm Creek Watershed Stream Corridor Improvement Project

8392-60-3188 PUBLIC STORAGE EURO PARTNERSHIP

8392-60-2062 MEADOWS WILLIAM J & BETTY M SURV

8392-61-7705 BAYVUE APARTMENTS JOINT VENTURE

8392-60-0418 HENDRICK AUTOMOTIVE GROUP

8392-60-5228 MCDANIEL AMICK J

8392-60-6329 WILLIAMS JOHN FRANKLIN JR

8392-60-8632 RODRIGUEZ NAUN S

8392-60-3312 CARR HARRIS C & ROSALIE M JARED

8392-60-7224 FINN INGRID M

8392-60-8312 HARLON GENE C

8392-60-4417 TAHMAS AREF M

9999-99-9999 DORIS CT

8392-60-7316 TAYLOR ALAN G

8392-60-8312 MINNEHAN KATHLEEN M

8392-60-5409 GILBERT HELEN H

8392-60-7407 PINEDA BENIGNO L & AURORA H PINEDA

5C-915-01CM

Grouted riprap channel bed that is undermined and slowly breaking apart. The riprap apron starts at the Jefferson Davis Highway culvert outfall and is approximately 50-feet long.



5C-915-02ER

Widening and bank failure. 7-foot high erosion on left and right banks for total reach length of 185 ft on left bank and 310 ft on right bank.



5C-915-04ER

8-foot high bank erosion along the right streambank. Erosion is occurring due to headcutting at the confluence of a shallow drainage swale with tributary 1.



5C-915-03OT

Corrosion observed. Grouted riprap apron failing with a headcut downstream.



5C-915-05UT

Sanitary line suspended on I-beam. Foundation undermined and failing. Progressive deterioration.



5C-915-08TR

Plastic and yard waste accumulated on the left bank possibly because of flooding.

