Long Branch Central Watershed Management Area

Project Overview
Braddock District

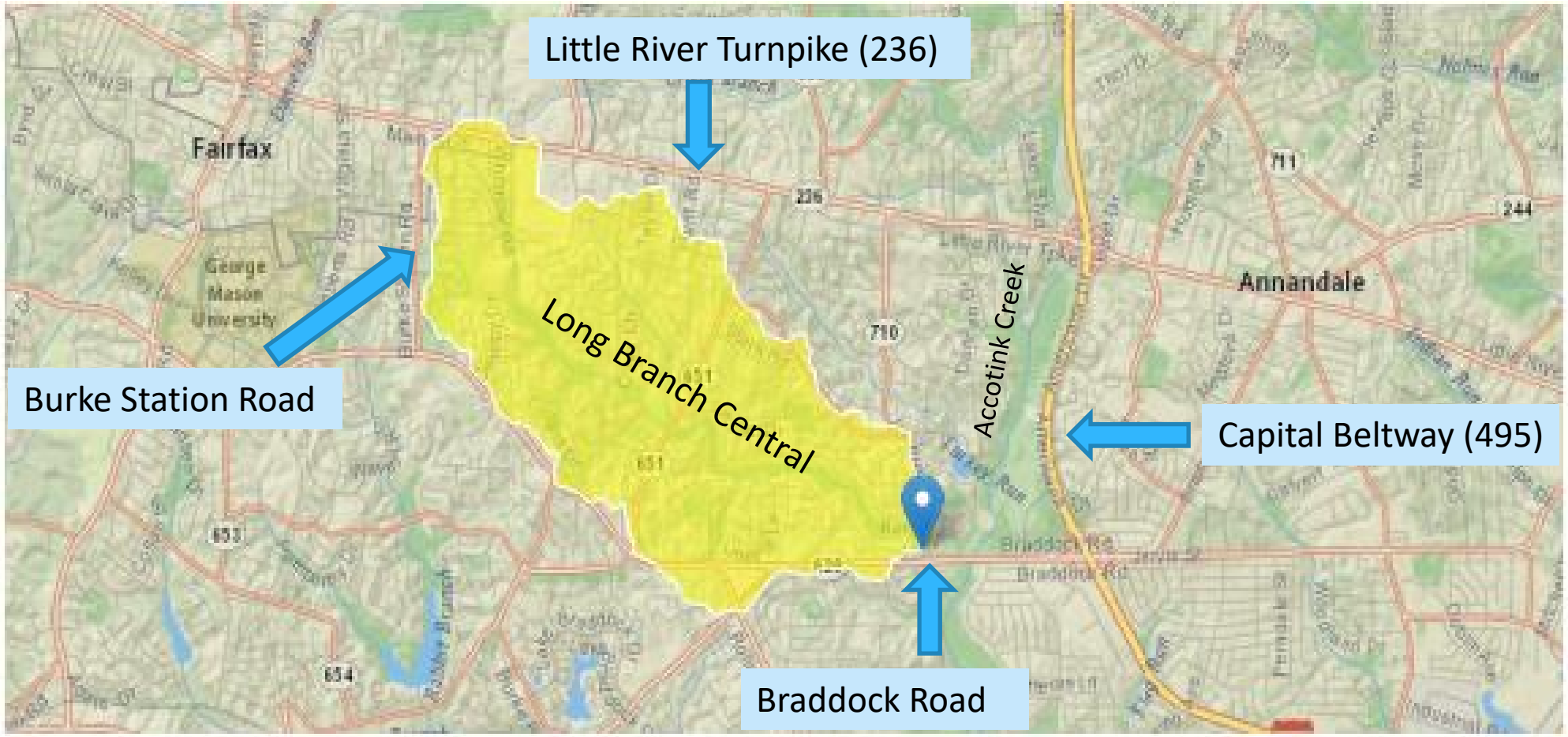
Department of Public Works and Environmental Services
Working for You!

A Fairfax County, VA, publication
November 9, 2022

Project Location

Long Branch Central Watershed

3.71 Square Miles - 12 Miles of Streams



Who's Involved

- County Agencies
  - DPWES
  - FCPA
  - NVSWCD
  - FCPS
- Design Consultant: Biohabitats, Inc.
- Braddock District Supervisor's Office
- Identified Stakeholder Groups:
  - Friends of Long Branch
  - Friends of Accotink Creek
  - Earth Sangha
  - Stone Haven Civic Association
  - Canterbury Woods Civic Association
  - Red Fox Civic Association
  - Rutherford Civic Association
  - Olde Forge – Surrey Square Civic Association
  - Friends of Smokewood Park
- Residents

Relative Stability & Bank Erosion:
Long Branch Main Stem Downstream of Guinea Road

Project Team

Long Branch Central WMA Key Participants

Northern Virginia Soil & Water Conservation District

Willie Woode
Executive Director

Judy Fraser
Conservation Assistance Program Coordinator

Fairfax County Park Authority

Sam Hudson
Park Planning Branch Manager – Planning and Development

Marcos Saurez
Manager, Area 4 Management – Park Operations

John Burke
Manager, Natural Resources Branch – Resource Management

Tammy Schwab
Watch the Green Grow Coordinator– Resource Management

Department of Public Works & Environmental Services

Charles Smith
Project Manager – Stormwater

Shannon Bell
Project Manager - Stormwater

Jonathan Witt, Chris Ruck, Dionna Bucci
Aquatic Ecologists – Stormwater

Rachael Holland
Engineer IV – Stormwater Infrastructure

Tom Richardson
Sanitary Sewer Coordination – Wastewater

Biohabitats Team

Jennifer Zielinski Missett
Project Manager

Joe Berg
Principal in Charge

Rebecca Winer-Skonovd
Watershed Planning Lead

Greg Zuknick
Assessment Lead

Doug Streaker
Restoration Design Lead

Sarah Roberts
Monitoring Lead

Braddock District Supervisor

Marcia Pape
Senior Legislative Aide

Key Stakeholder Groups

Friends of Long Branch

Friends of Accotink Creek

Homeowner & Civic Associations

Development of Fairfax County Stream Restoration and Water Quality Work Plan

Fairfax County, Virginia

- Land area of approximately 400 square miles
- Population of approximately 1.1 million residents
- Includes Fairfax City, the Towns of Herndon and Vienna, George Mason University, Fort Belvoir
- Land Use
  - Residential 88%
  - Commercial 5%
  - Industrial 2%
  - Open Space 4%
  - Other 1%

- MS4 Phase I community
- Stormwater Funding: Stormwater Service District
- 30 watersheds with over 750 miles of perennial streams

Development of Fairfax County Stream Restoration and Water Quality Work Plan

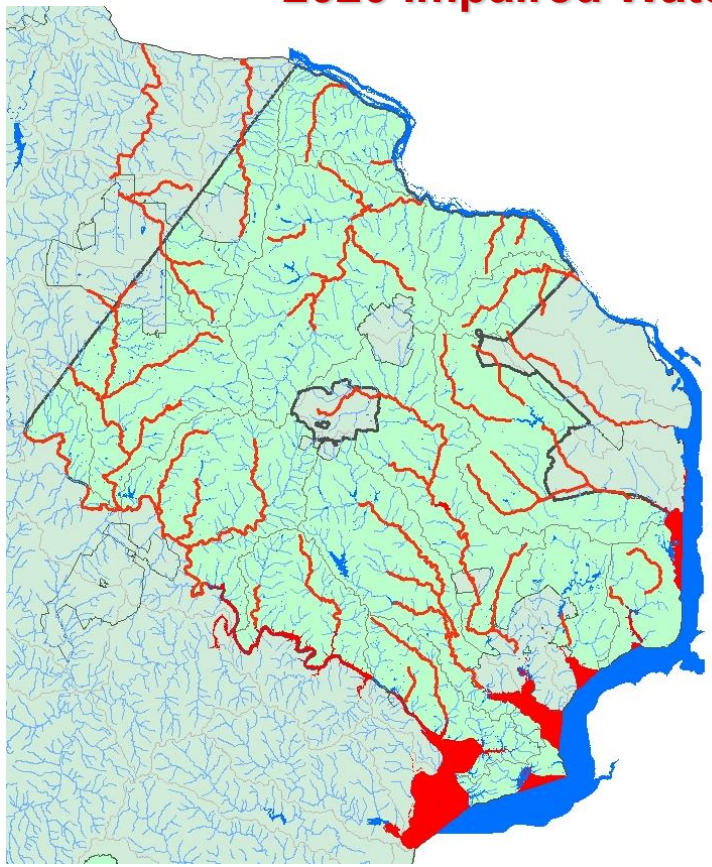
Major Stormwater Project Drivers

1. **Chesapeake Bay TMDL***
   Pollutant Load Reduction Requirements
   a) Nitrogen: 59,400 pounds/year
   b) Phosphorous: 6,500 pounds/year
   c) Sediment: 2,700 tons/year

2. **Local TMDL's**
   a) Sediment (4)
   b) Bacteria (7)
   c) PCB's (tidal portions of Potomac River)
   d) Chloride (1)

3. **105 Impaired Waterbodies**

2020 Impaired Waters



Impaired Segments:
77 Streams
3 Reservoir
29 Estuarine
109 Total

*TMDL – Total Maximum Daily Load – Assigned by the VA Department of Environmental Quality

Development of Fairfax County Stream Restoration and Water Quality Work Plan

Long Branch TMDL

Fairfax County Sediment Load Reduction Requirement = 3,313 tons per year

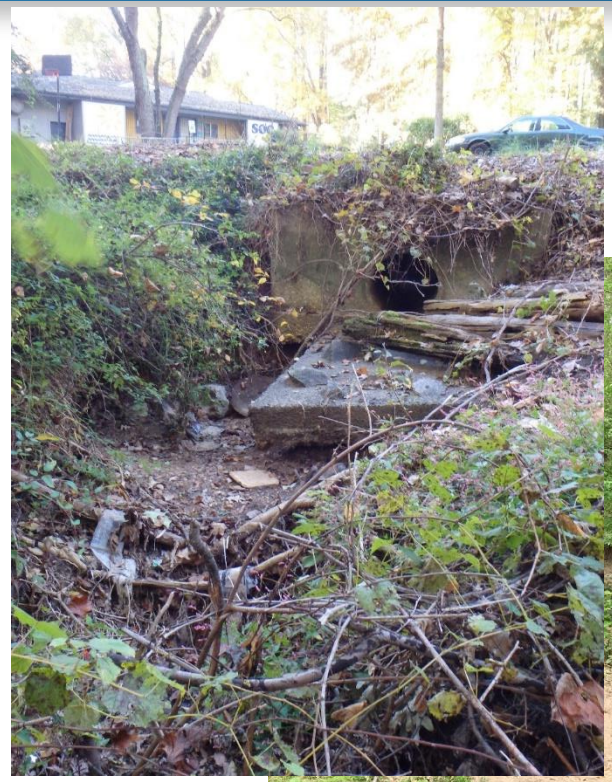
This is the amount of sediment that Fairfax County is required to reduce coming out of Long Branch Central each year under the County's Municipal Separate Storm Sewer System (MS4) permit.

Eroded channel and exposed sewer line at Trapp Rd outfall.

Project Overview

Overarching Project Goals:

- Achieve Long Branch Central TMDL waste load reduction requirements.
- Provide long-term stability and have low maintenance.
- Improve water quality within the Long Branch Central watershed.
- Improve habitat and environmental health (ecological lift).



Degraded Outfall: Long Branch at Laurel Street

Failed Stream Bank: Long Branch near Olde Creek Elementary School

Project Schedule

- Begin Assessment – Fall 2020
- Complete Restoration Work Plan – January 2023
- Complete First Construction Plans – January 2024
- *Begin Construction – Summer 2024
- Construction Ongoing – Through 2029
- Warranty, Monitoring and Maintenance – 2025 through 2032

*Note that project implementation is dependent upon future fund availability.

Massive Bank Erosion: Long Branch Tributary in Old Forge Park

Project Scope

Assess:

- ~12 miles of stream
- ~150 outfall
- County maintained SW facilities

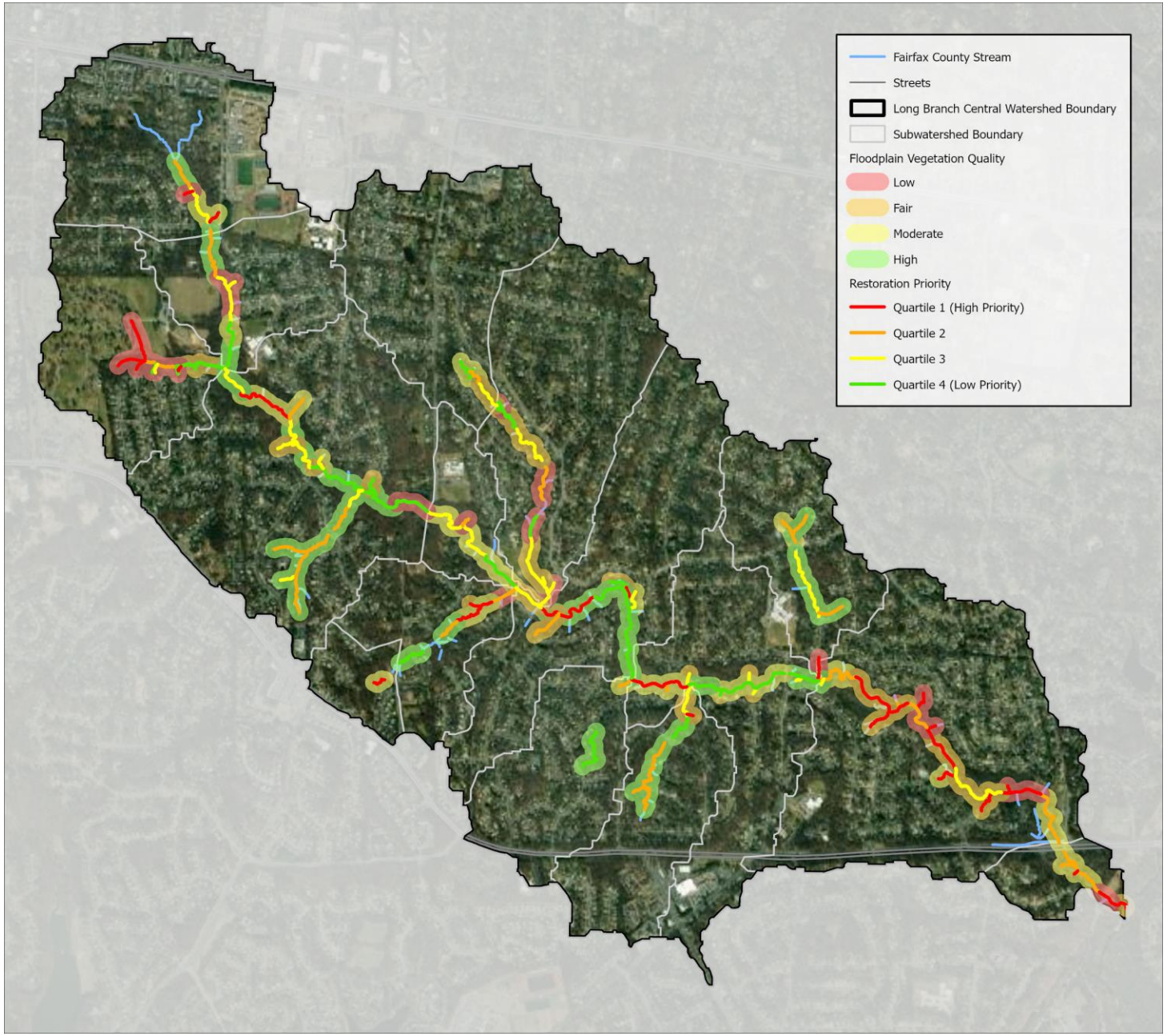
Restore:

- 20 proposed projects
- ~6.5 miles of stream and outfall channels
- ~75 outfalls
- Renovate county SW facilities (optional)

Undermined Concrete Ditch: Long Branch in Smokewood Park Downstream of Whiteacre Dr

RESTORING LONG BRANCH

Preliminary Project Identification and Prioritization



RESTORING LONG BRANCH

Monitoring – Before, During and After Construction

		Stream Pyramid					Fairfax Ecological Recovery Wheel[1]						Biohabitats Recommendation
		Hydrology	Hydraulic	Geomorphology	Physicochemical	Biology	Physiochemical	Aquatic Structural Diversity	Species Composition	Riparain Structural Diversity	External Exchanges	Physical Conditions	Absence of threats
Monitoring Parameter	**Purpose**												
Flow Monitoring/Hydrology													
Water level (optional/USGS)	Continuously record stream stage and temperature, to document stream flow and basic physicochemical parameters. Calibrate stream flow to other metrics measured	•	•		•		•					•	
Rating curve (USGS)	Calibrate water level monitoring to determine velocity and discharge.		•				•				•		
Groundwater level	Continuous levelogger and setup in a transect perpendicular to the stream channel. Establish baseline water table for comparison after restoration.	•					•			•	•	•	
Rain Gauge	Rainfall (by USGS @ Little Run) - to help address rainall-runoff hydrologic relationships; validate rainfall from larger models/sources; infiltration /overbank	•	•				•				•		
Time-lapse photography	Photo document stream conditions during the course of the storm hydrograph. Document rain events that cause overbank flows.	•	•	•			•			•	•	•	
Erosion/Sediment													
Bank pins (BH/USGS)	Determine bank erosion rates. 2 of the 3 set co-located with typical riffle and pool cross section locations. Could be correlated to discharge if conducted by USGS.			•			•				•	•	
BANCS/BEHI	Qualify severity and extent of bank erosion. Predict rate of erosion. Erosion rate prediction can be calibrated with bank pins.		•	•			•				•	•	
Streambank soil sampling	Determine bulk density and nutrient content of stream bank soils to refine loading estimates. Ties in with BANCS and protocol 1 calculations for TMDL load reductions			•	•		•				•	•	
Point bar estimated sedment volume	Quantifies stream bed sediment. Meaure of embeddedness.			•		•	•	•	•				
Geomorphology (Sediment)													
Longitudinal profile	Determine slope facets, riffle-pool spacing.			•			•					•	
Cross section (BH/USGS)	Determine hydraulic geometry to estimate discharge and track changes in channel form over time.			•			•					•	
Planform	Track stream erosion and migration. Field measurement or lidar.			•			•					•	
Substrate analysis	Determine substrate size for sediment transport and stability calculations.			•			•	•				•	
Water Quality													
Continuous water quality	Follows FFX protocols.				•		•			•			•
Monthly grab samples	Follows FFX protocols.				•		•			•			•
Chloride	Follows FFX protocols.				•		•				•		•
Biology													
FFX Co RBP Assessment	Qualify instream habitat quality					•							
Benthic sampling (County)	Determine the community structure and diversity.					•		•	•	•	•		•
eDNA Sampling	Grab sample. Assay for up to four libraries selecting from five options: phytoplankton, salamander/amphibian, macroinvertebrates, fish, or terrestrial vertebrates DNA. Efficient biological sampling method with libraries continually being advanced.					•		•	•		•		
Fish						•			•	•	•		
Leaf pack / CWD quantification (instream)	Qualify instream habitat quality					•	•	•			•		
Photo documentation	Documentation of stream condition annually, QA/QC			•		•	•	•		•	•		
Floodplain Quality[2]													
Riparian plot sampling	Assess riparian community structure and function			•				•	•	•	•		•
Floodplain Quality Assessment Index	Quantify potentail floodplain quality resources.			•				•	•	•	•	•	

Light yellow shading = Monitoring parameter already measured as part of Assessment and Prioritiziation; or will be measured and project specific reaches
Light orange shading = Monitoring parameter being conducted by others (County/USGS),
Light blue shading = Monitoring metric not assigned in first year plan, but will need to be inclued in additional years
Light green shading = Long-term Monitoring parameter conducted by others (County/USGS) for overall County goals (not necessarily project specific)

1. Will need to develop success criteria/metrics based on project goals. May include elements outside project limits or the scope of this project. Based on Fairfax version of the SER 5-Star Recovery Wheel
2. Vegetation Quality is not a metric on the Stream Pyramid, a forested resource is prioritized as part of geomorphology and the physical structure of trees and roots. This element is treated in a more nuanced approach with the Fairfax Recovery Wheel

Monitoring

- Initial phase includes establishment of extensive monitoring by:
  - Fairfax County Stormwater
  - Biohabitats, Inc.
  - US Geological Survey (8 new gage stations)
- Years 2 and 3 of baseline monitoring begins in December 2022
- Project level monitoring built into design tasks
- Long term monitoring will continue indefinitely

20 Proposed Restoration Projects

20 Proposed Projects

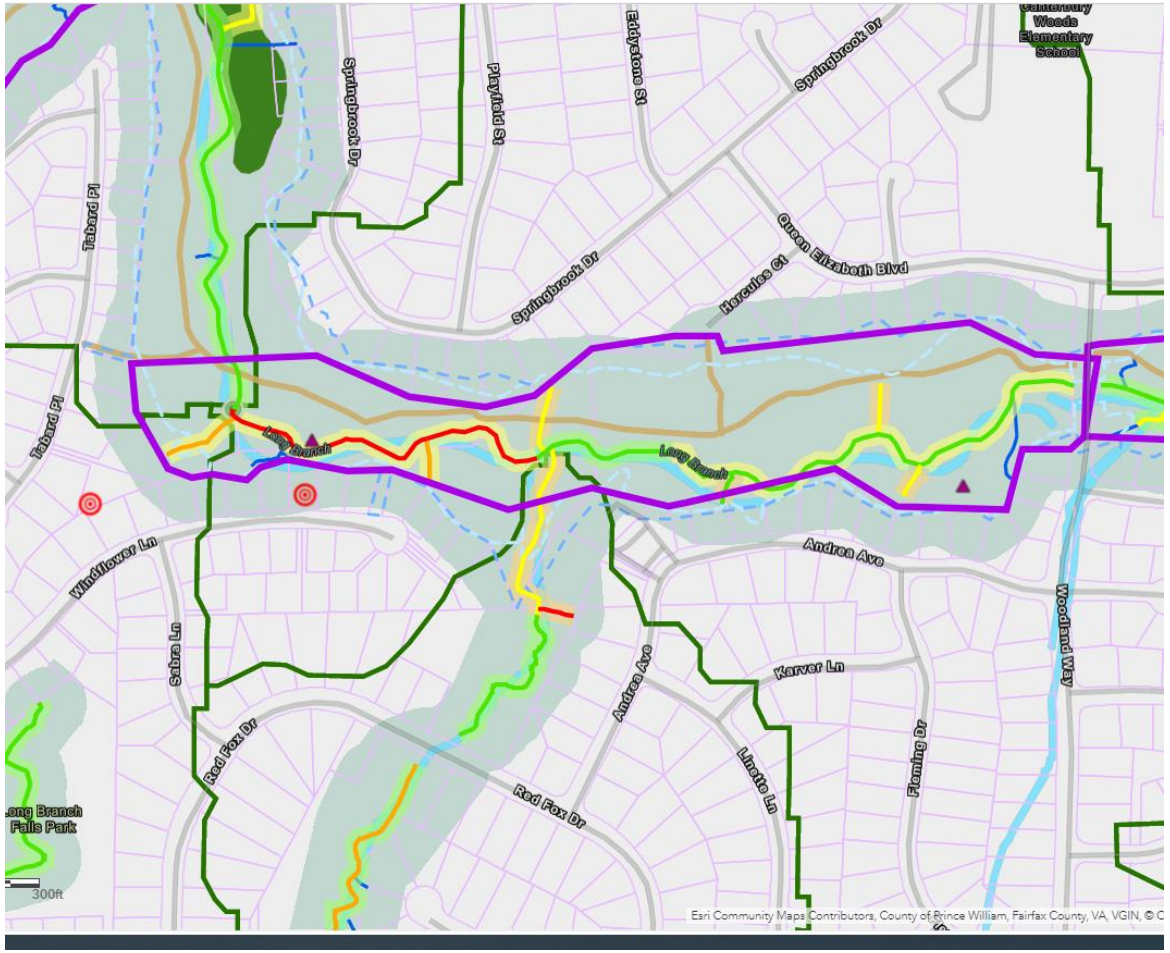
- Grouped by location
- Range from upstream to downstream
- Focused on outfalls and stream channels
- Include three (3) optional stormwater pond renovations

Setting Project Goals

Individual Project Goals:

- Will be based on the conditions where the project is proposed.
- Focus on restoring highly degraded channels to stop erosion.
- Seek to avoid impacts to higher quality resources.
  - For example: good quality/stable stream areas or floodplain forest.
- Improve ecological function where possible.
  - For example: fish habitat or vegetation in the floodplain.
- Minimize tree impacts.

Tabard Place to Woodland Way



Tabard Place to Woodland Way

Widening stream channel with poor alignment into downstream culvert; large supply of sediment and streambed material in front of two culvert openings.

Widened stream channel with active bank erosion and an alignment nearing private properties.

Large deposit of streambed material to be harvested.

Widened perennial natural outfall channel.

Overview

This restoration project extends from Tabard Place east to Woodland Way and is located on Fairfax County Park Authority property. The Fairfax County Park Authority property is bound by private properties to the north and south throughout the entire restoration project area. The restoration area includes 3,340 linear feet of stream, regulated floodplains and wetlands, and a forested riparian corridor with many mature trees. The existing floodplain understory is minimal and overshadowed by Beech and Tulip Poplars with little presence of invasive plant species. An active sewer line runs along the stream and crosses it in multiple locations; however, no exposed pipes have been identified. A high traffic asphalt and natural surface trail with a large pedestrian foot bridge is located within the project area.

The western (upstream) stream reaches, and associated outfall channels, have downcut and widened due to past increases in stormwater runoff from development throughout the contributing drainage area. The stream banks along these segments (shown on the restoration opportunity map in red, orange, and yellow) are three (3) to six (6) feet high with shallow tree root depths and a lack of surface protection exposing the banks to continued erosion. The stream here is disconnected from its floodplain. The eastern (downstream) stream reaches (shown on the restoration opportunity map in green) are in good condition with stable stream features and good instream habitat, although there are areas with undermined trees falling into the stream and causing limited erosion. The stream is connected to its floodplain in this area, with erosion on the floodplain due to excessive storm flows which remove leaf litter and organic debris. The floodplain forest has almost no understory or tree recruitment due to excessive browsing by white-tailed deer. Although there are many large trees, the overall forest diversity is low. The farthest downstream part of the project area has a steep stream slope toward Woodland Way. This steep stream reach could become unstable in the future, causing significant erosion and adjustment of the stable portion immediately upstream.

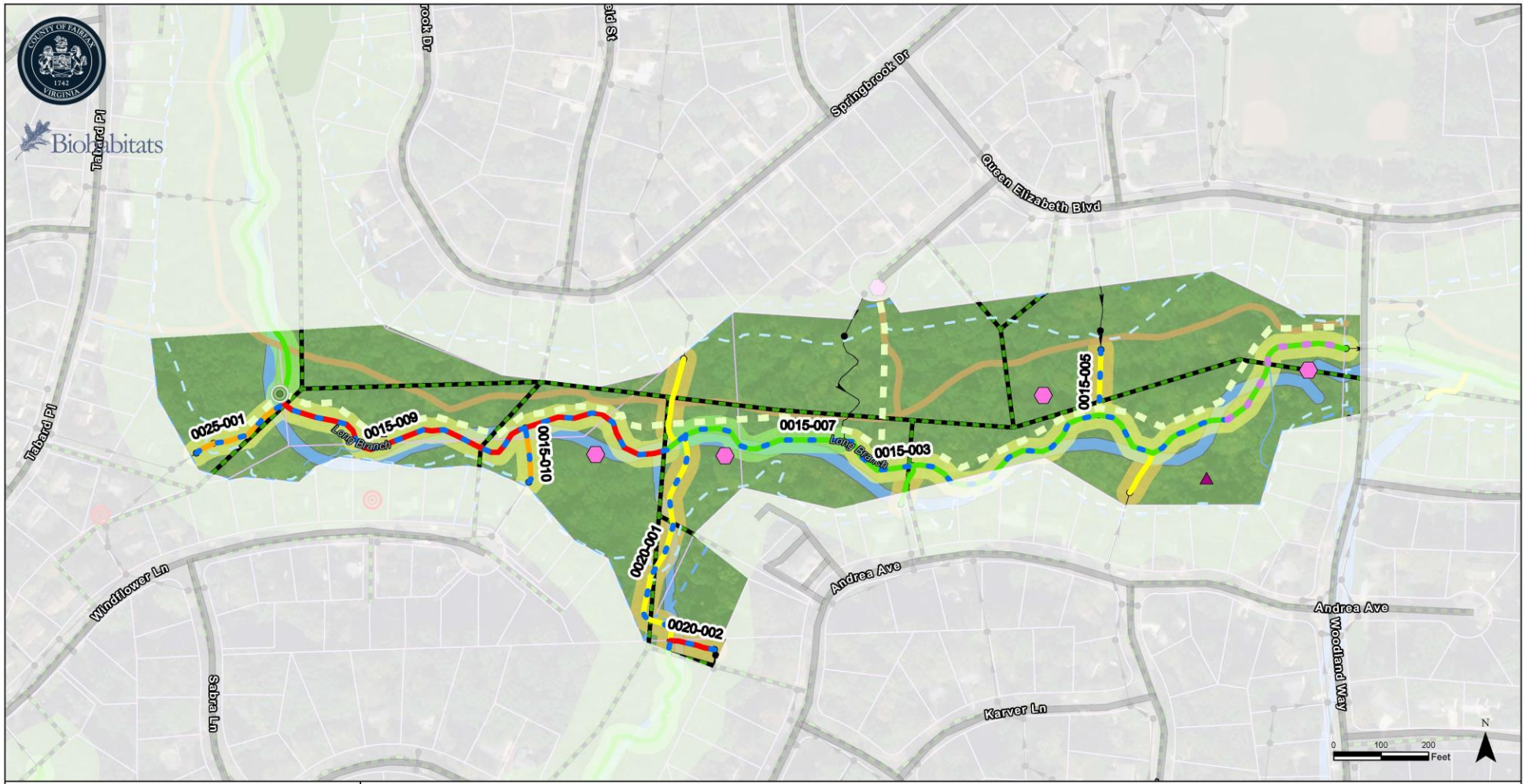
Restoration Goals and Methods

This project will focus on stabilizing the eroding reaches on the upstream portion of the project area, improving aquatic habitat, protecting the stable downstream portion of the project area, preventing stream erosion near Woodland Way, and improving the health of the riparian forest throughout the corridor.

Restoration methods that may be employed:

- Place rock structures within western stream reaches and near Woodland Way to reduce channel erosion and migration toward private property, increase channel "roughness", and improve habitat for fish and other aquatic organisms. Structures will be placed in the existing channel extents and some grading will occur.
- Stabilize outfall channels using rock and wood structures to stop erosion and improve habitat where possible.
- Protect the stable eastern stream reaches except in isolated areas where undermined trees may be taken down to prevent them falling in the stream. Large wood may be placed in the channel on a limited basis to protect banks and improve habitat for fish and other aquatic organisms.
- Placement of wood to increase channel and floodplain "roughness", improve resiliency, and improve both habitat and biodiversity.
- Conduct restoration planting throughout the floodplain. Trees in poor health may be removed to reduce hazard trees, open light gaps to assist in regeneration, and provide large woody debris.

Tabard Place to Woodland Way



Long Branch Central Watershed

Fairfax County, Virginia

Restoration Opportunity:

Tabard Place to Woodland Way

September 2022

Existing Conditions

- Stream
- Parcel Boundary
- Fairfax County Floodplain
- FEMA 100-yr Floodplain
- Monitoring Station
- Resource Protection Area

National Wetland Inventory
- Water

Citizen Response
- Area of Value

Floodplain Vegetation Quality
- Fair
- Moderate
- High

Restoration Priority
- Quartile 1
- Quartile 2
- Quartile 3
- Quartile 4

Existing Infrastructure

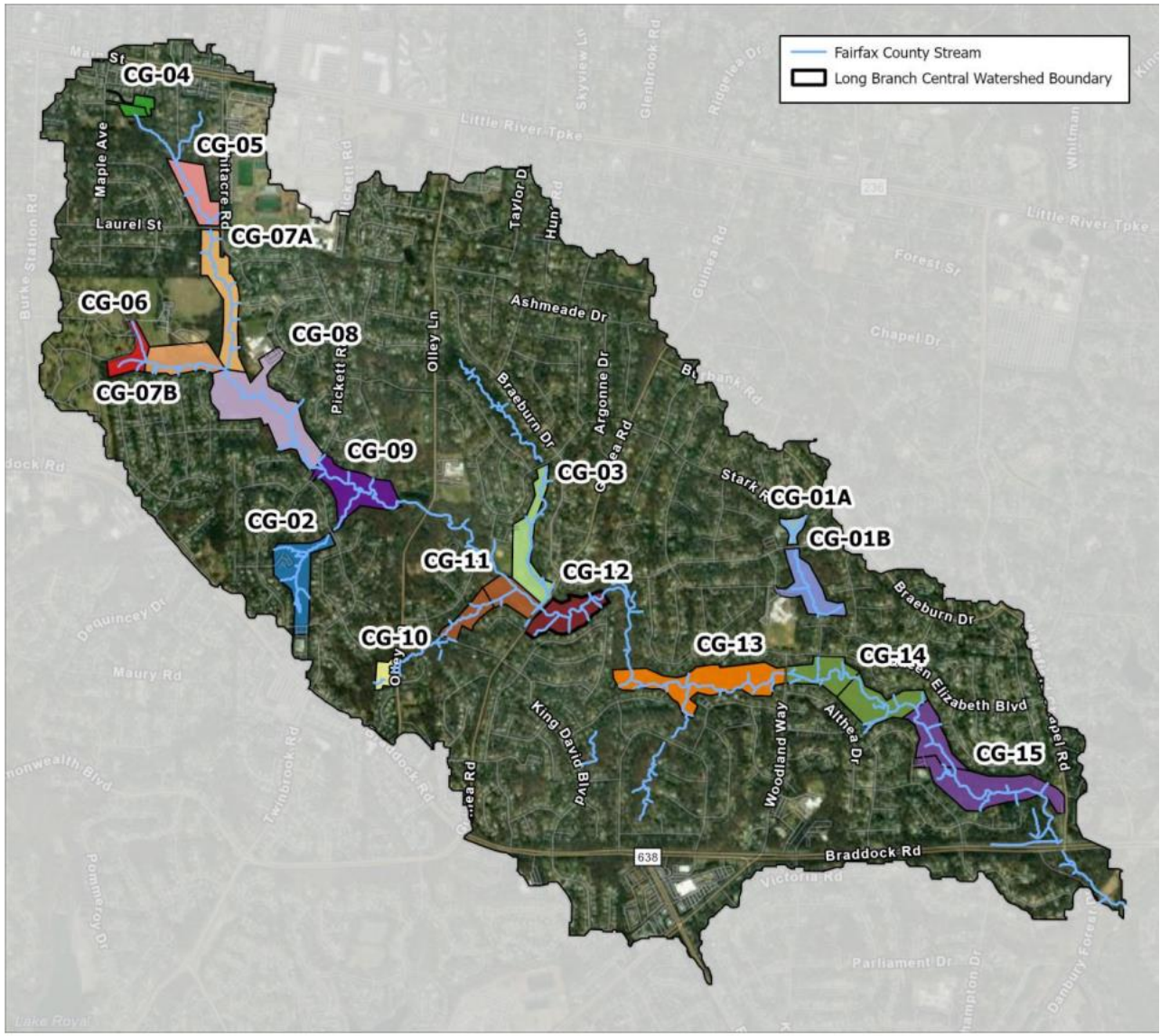
- Trail
- Storm Drain Node
- Storm Drain
- Sanitary Sewer

Restoration Elements

- Construction Access
- Stockpile
- Channel Realignment
- Channel Modification

Project Grouping for Permitting + Construction

CG-01A	Ilda Pool at Braeburn Drive
CG-01B	Willow Woods Park South of Braeburn Drive
CG-02	Olde Forge Park
CG-03	Kristin Lane to Rutherford Park
CG-04	Newcombe Stormwater Pond Holly Park Stormwater Pond
CG-05	Smokewood Park, North of Laurel Street
CG-06	Somerset – Ceralene Drive to Dansk Court
CG-07A	Smokewood Park, South of Laurel Street
CG-07B	Dansk Court to Flintridge Court
CG-08	Olde Creek Elementary School to Pickett Road
CG-09	Pickett Road to Tara Drive
CG-10	Olley Lane Regional Stormwater Pond near Surrey Square Park
CG-11	Rutherford Park El James Drive to Rutherford Park
CG-12	Guinea Road to Tabard Place
CG-13	Tabard Place to Woodland Way
CG-14	Woodland Way to Dora Court Long Branch Stream Valley Park – Dora Ct to Cockney Ct – West
CG-15	Long Branch Stream Valley Park – Dora Ct to Cockney Ct – East Canterbury Woods Park – Cockney Ct to Wakefield Chapel Rd



RESTORATION APPROACH

Hawkins Cove
Anne Arundel County, MD

RESTORATION TECHNIQUES

Floodplain Log Sills
Bacon Ridge at Elks Camp
Anne Arundel County, MD

RESTORATION TECHNIQUES

Regenerative Stormwater Conveyance (RSC)
Carriage Hills
Anne Arundel County, MD

Discussion & Additional Information

Discussion & Questions

For **Public Comment** and Additional Information or to Provide Input, Please Visit the Project Web Page: https://www.fairfaxcounty.gov/publicworks/long-branch-input

With Questions, You Can Contact the DPWES Project Managers:

Shannon Bell – shannon.bell@fairfaxcounty.gov

Charles Smith – charles.smith@fairfaxcounty.gov

Or by phone: 703-324-5500, TTY 711

Old Grade Control Structure: Long Branch Main Stem Canterbury Woods Downstream of Woodland Way