1947 - Town of Occoquan Design of Priority Nature-Based Solutions for Flood Resilience

Application Details

Funding Opportunity:	1447-Virginia Community Flood Preparedness Fund - Project Grants - CY23 Round 4
Funding Opportunity Due Date:	Nov 12, 2023 11:59 PM
Program Area:	Virginia Community Flood Preparedness Fund
Status:	Under Review
Stage:	Final Application
Initial Submit Date:	Nov 11, 2023 7:48 PM
Initially Submitted By:	Adam Linn
Last Submit Date:	
Last Submitted By:	

Contact Information

Primary Contact Information

Active User*:	Yes
Type:	External User
Name*:	Mr. (Salutation) Adam (First Name) Christopher (Middle Name) Linn (Last Name)
Title:	Town Manager
Email*:	alinn@occoquanva.gov
Address*:	P.O. Box 195
	Occoquan (City) Virginia (State/Province) 21225 (Postal Code/Zip)
Phone*:	703-398-0262 Ext. Phone ###-###-####
Fax:	###-###-####
Comments:	

Organization Information

Status*:	Approved
Name*:	OCCOQUAN, TOWN OF
Organization Type*:	County Government
Tax ID*:	54-0842144

Unique Entity Identifier (UEI)*: MSC3EG7RJEE5

Organization Website: http://www.occoquanva.gov/

Address*: P.O. Box 195

Occoquan (City) Virginia (State/Province) 22125- (Postal Code/Zip)

Phone*: (703) 491-1918 Ext.
###-###-####

Fax: ###-###-####

Benefactor:

Vendor ID:

Comments:

VCFPF Applicant Information

Project Description

Name of Local Government*: Town of Occoquan

Your locality's CID number can be found at the following link: Community Status Book Report

NFIP/DCR Community Identification Number (CID)*: 510124

If a state or federally recognized Indian tribe,

Name of Tribe:

Authorized Individual*: Adam (First Name) Linn (Last Name)

Mailing Address*: P.O. Box 195
Address Line 1

Address Line 2

Occoquan (City) Virginia (State) 22125 (Zip Code)

Telephone Number*: 703-491-1918

Cell Phone Number*: 703-398-0262

Email*: alinn@occoquanva.gov

Is the contact person different than the authorized individual?

Contact Person*: No

Enter a description of the project for which you are applying to this funding opportunity

Project Description*:

The Town of Occoquan will design several high priority green infrastructure projects (nature-based solutions) to mitigate stormwater flooding. The implementation of nature-based solutions in flood problem areas will also contribute to better water quality, shading and reduction of urban heat island, and greening of the historic downtown. The location of these green infrastructure opportunities was determined via a flood modeling exercise completed by the Town through a CFPF grant in 2023.

Low-income geographic area means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

Is the proposal in this application intended to benefit a low-income geographic area as defined above?

Benefit a low-income geographic area*: No

Information regarding your census block(s) can be found at census.gov

Census Block(s) Where Project will Occur*: 9003.1

Is Project Located in an NFIP Participating Community?*: Yes

Is Project Located in a Special Flood Hazard Area?*: Yes

Flood Zone(s) (if applicable): Zone X, Zone A, Zone AE

Flood Insurance Rate Map Number(s) (if applicable): 51153C0209E and 511530217E

Eligibility CFPF - Round 4 - Projects

Eligibility

Is the applicant a local government (including counties, cities, towns, municipal corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these)?

Local Government*: Yes

Yes - Eligible for consideration
No - Not eligible for consideration

Does the local government have an approved resilience plan and has provided a copy or link to the plan with this application?

Resilience Plan*: Yes

Yes - Eligible for consideration under all categories
No - Eligible for consideration for studies, capacity building, and planning only

If the applicant is not a town, city, or county, are letters of support from all affected local governments included in this application?

Letters of Support*: N/A

Yes - Eligible for consideration
No - Not eligible for consideration
N/A - Not applicable

Has this or any portion of this project been included in any application or program previously funded by the Department?

Previously Funded*: No

Yes - Not eligible for consideration
No - Eligible for consideration

Has the applicant provided evidence of an ability to provide the required matching funds?

Evidence of Match Funds*: Yes

Yes - Eligible for consideration
No - Not eligible for consideration
N/A - Match not required

Scoring Criteria for Flood Prevention and Protection Projects - Round 4

Scoring

Category Scoring:

Hold CTRL to select multiple options

Project Category*: Any other nature-based approach, Stream bank restoration or stabilization

Is the project area socially vulnerable? (based on ADAPT Virginia?s Social Vulnerability Index Score)

Social Vulnerability Scoring:

Very High Social Vulnerability (More than 1.5)
High Social Vulnerability (1.0 to 1.5)
Moderate Social Vulnerability (0.0 to 1.0)
Low Social Vulnerability (-1.0 to 0.0)
Very Low Social Vulnerability (Less than -1.0)

Socially Vulnerable*: Moderate Social Vulnerability (0.0 to 1.0)

Is the proposed project part of an effort to join or remedy the community?s probation or suspension from the NFIP?

NFIP*: No

Is the proposed project in a low-income geographic area as defined below?

"Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

Low-Income Geographic Area*: No

Projects eligible for funding may also reduce nutrient and sediment pollution to local waters and the Chesapeake Bay and assist the Commonwealth in achieving local and/or Chesapeake Bay TMDLs. Does the proposed project include implementation of one or more best management practices with a nitrogen, phosphorus, or sediment reduction efficiency established by the Virginia Department of Environmental Quality or the Chesapeake Bay Program Partnership in support of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan?

Reduction of Nutrient and Sediment Pollution*: Yes

Does this project provide ?community scale? benefits?

Community Scale Benefits*: Less than 25% of census block

Expected Lifespan of Project

Expected Lifespan of Project*: Over 20 Years

Comments:

This project was identified through a townwide planning effort to evaluate the effectiveness and conditions of the local stormwater system. Long-term green infrastructure opportunities will be advanced during this phase.

Scope of Work - Projects - Round 4

Scope of Work

Upload your Scope of Work

Please refer to Part IV, Section B. of the grant manual for guidance on how to create your scope of work

Scope of Work*: Occoquan_Scope of Work.pdf

Comments:

As a follow up to a flood modeling exercise completed by the Town through a CFPF grant in 2023 (Round 3), the Town will design several high priority green infrastructure projects (nature-based solutions) to mitigate stormwater flooding.

Budget Narrative

Budget Narrative Attachment*: Round 4 - 2023 CFPF Budget Narrative.pdf

Comments:

Scope of Work Supporting Information - Projects

Supporting Information - Projects

Provide population data for the local government in which the project is taking place

Population*: 1200.00

Provide information on the flood risk of the project area, including whether the project is in a mapped floodplain, what flood zone it is in, and when it was last mapped. If the property or area around it has been flooded before, share information on the dates of past flood events and the amount of damage sustained

Historic Flooding data and Hydrologic Studies*: Historic Flooding data and Hydrologic Studies.pdf

Include studies, data, reports that demonstrate the proposed project minimizes flood vulnerabilities and does not create flooding or increased flooding (adverse impact) to other properties

No Adverse Impact*: No Adverse Impact.pdf

Include supporting documents demonstrating the local government's ability to provide its share of the project costs. This must include an estimate of the total

project cost, a description of the source of the funds being used, evidence of the local government's ability to pay for the project in full or quarterly prior to reimbursement, and a signed pledge agreement from each contributing organization

Ability to Provide Share of Cost*: Ability to Share Cost.pdf

A benefit-cost analysis must be submitted with the project application

Benefit-Cost Analysis*: BenefitCost.pdf

Provide a list of repetitive loss and/or severe repetitive loss properties. Do not provide the addresses for the properties, but include an exact number of repetitive loss and/or severe repetitive loss structures within the project area

Repetitive Loss and/or Severe Repetitive Loss Properties*: Repetitiveloss.pdf

Describe the residential and commercial structures impacted by this project, including how they contribute to the community such as historic, economic, or social value. Provide an exact number of residential structures and commercial structures in the project area

Residential and/or Commercial Structures*:

The structures impacted are both residential and commercial inside the historic district of the town as well as just outside. Within the historic district there are approximately 90 businesses and 200 residents. The number of actual residential and commercial structures impacted by the project will depend on the surveys and determination of locations of the nature-based infrastructure opportunities.

If there are critical facilities/infrastructure within the project area, describe each facility

Critical Facilities/Infrastructure*:

Town Hall and the Police Department are likely to be within the green infrastructure solution design areas. Town Hall is the Town Government building that is open to the public for business, commercial and recreational transactions. Town Hall is also a planned power and warming station in case of power outage emergencies. The police department is a separate government building used as a command center for emergency management and critical incidents within the Town.

Explain the local government's financial and staff resources. How many relevant staff members does the local government have? To what relevant software does the local government have access? What are the local government's capabilities?

Financial and Staff Resources*:

The Town of Occoquan has a total budget for FY2024 of approximately $3.6million. The Town has 6 administrative staff and 3 contractual staff (Town Engineer, Zoning Administrator, Town Attorney) that are relevant to this project. Occoquan utilizes QBO for its accounting software but has no project management software.

Identify and describe the goals and objectives of the project. Include a description of the expected results of the completed project and explain the expected benefits of the project. This may include financial benefits, increased awareness, decreased risk, etc.

Goals and Objectives*:

During this follow-on phase, the project team will advance up to four (4) high priority green infrastructure opportunities (also referred to nature-based solutions) to 50% design and conduct sub-surface explorations and survey to verify the viability of these designs. These opportunities will reduce flood problem areas and will also contribute to better water quality, shading and reduction of urban heat island, and greening of the historic downtown The designs created in this project will permit the Town to begin implementation of the nature-based solutions.

Outline a plan of action laying out the scope and detail of how the proposed work will be accomplished with a timeline identifying expected completion dates. Determine milestones for the project that will be used to track progress. Explain what deliverables can be expected at each milestone, and what the final project deliverables will be. Identify other project partners

Approach, Milestones, and Deliverables*: Milestones.pdf

Where applicable, briefly describe the relationship between this project and other past, current, or future resilience projects. If the applicant has received or applied for any other grants or loans, please identify those projects, and, if applicable, describe any problems that arose with meeting the obligations of the grant and how the obligations of this project will be met

Relationship to Other Projects*:

In 2023, the Town was awarded funding through the DCR Community Flood Preparedness Fund (CFPF), Round 3, (CFPF-22-03-52) to assess the physical connectivity, characteristics, and condition of its stormwater system, evaluate the system?s capacity under current and future climate conditions, and identify opportunities to implement green and grey stormwater infrastructure (referred to herein as Phase 1). The proposed project would be to advance nature-based solutions in areas identified in CFPF-22-03-52.

For ongoing projects or projects that will require future maintenance, such as infrastructure, flood warning and response systems, signs, websites, or flood risk applications, a maintenance, management, and monitoring plan for the projects must be provided

Maintenance Plan*: Maintenance Plan.pdf

Describe how the project meets each of the applicable scoring criteria contained in Appendix B. Documentation can be incorporated into the Scope of Work Narrative

Criteria*:

Projects:
This is an ?Other Nature-based approach? project which is 20 points.
Social Vulnerability Index Score is Moderate Social Vulnerability which is 5 points.
Community scale of benefits is less than 25% of the census block which is 0 points.
The expected lifespan of the project is over 20 years which is 10 points.
This is not for NFIP probation or suspension which is 0 points.
The proposed project is not of a low-income geographic area which is 0 points.
The proposed project implements a Chesapeake Bay TMDL BMP which is 5 points.
Total points equal 40 points.

Budget

Budget Summary

Grant Matching Requirement*:	Projects that will result in nature-based solutions - Fund 70%/Match 30%
Total Project Amount*:	$150,000.00
REQUIRED Match Percentage Amount:	$45,000.00

BUDGET TOTALS

Before submitting your application be sure that you meet the match requirements for your project type.

Match Percentage:	30.00% Verify that your match percentage matches your required match percentage amount above.
Total Requested Fund Amount:	$105,000.00
Total Match Amount:	$45,000.00
TOTAL:	$150,000.00

Personnel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Fringe Benefits

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Travel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Equipment

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Supplies

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Construction

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Contracts

Description	Requested Fund Amount	Match Amount	Match Source
Engineering Contractor	$105,000.00	$45,000.00	Capital Improvement Program Funds
	$105,000.00	**$45,000.00**	

Maintenance Costs

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Pre-Award and Startup Costs

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Other Direct Costs

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Long and Short Term Loan Budget - Projects - VCFPF

Budget Summary

Are you applying for a short term, long term, or no loan as part of your application?

If you are not applying for a loan, select "not applying for loan" and leave all other fields on this screen blank

Long or Short Term*: Not Applying for Loan

Total Project Amount: $0.00

Total Requested Fund Amount: $0.00

TOTAL: $0.00

Salaries

Description	Requested Fund Amount
No Data for Table	

Fringe Benefits

Description	Requested Fund Amount
No Data for Table	

Travel

Description	Requested Fund Amount
No Data for Table	

Equipment

Description	Requested Fund Amount
No Data for Table	

Supplies

Description	Requested Fund Amount
No Data for Table	

Construction

Description	Requested Fund Amount
No Data for Table	

Contracts

Description	Requested Fund Amount
No Data for Table	

Other Direct Costs

Description	Requested Fund Amount
No Data for Table	

Supporting Documentation

Supporting Documentation

Named Attachment	Required	Description	File Name	Type	Size	Upload Date
Detailed map of the project area(s) (Projects/Studies)		Detailed maps of project area	Supporting Docs - Detail maps of project area.pdf	pdf	459 KB	11/11/2023 02:03 PM
FIRMette of the project area(s) (Projects/Studies)		FIRMette of Project area	Supporting Docs - FIRMette of project area.pdf	pdf	266 KB	11/11/2023 02:04 PM
Historic flood damage data and/or images (Projects/Studies)		Historic flood data	Supporting Docs - Historic Flooding data and Hydrologic Studies.pdf	pdf	1 MB	11/11/2023 02:39 PM
A link to or a copy of the current floodplain ordinance		Link to requested documentation	Supporting Docs - links and social vulnerability index score.pdf	pdf	158 KB	11/11/2023 02:23 PM
Maintenance and management plan for project		Not Applicable	Maintenance and Management Plan for Project.pdf	pdf	94 KB	11/11/2023 03:07 PM
A link to or a copy of the current hazard mitigation plan		Links to Hazard Mitigation Plans	Supporting Docs - Hazard Mitigation Plan Links.pdf	pdf	61 KB	11/11/2023 02:24 PM
A link to or a copy of the current comprehensive plan		Links to requested Vision 2026 Occoquan Comprehensive Plan	Supporting Docs - links and social vulnerability index score.pdf	pdf	158 KB	11/11/2023 02:25 PM
Social vulnerability index score(s) for the project area		Social Vulnerability Index Score is provided in the file Supporting Docs -links and social vulnerability index score.pdf	Supporting Docs - links and social vulnerability index score.pdf	pdf	159 KB	11/11/2023 02:15 PM
Authorization to request funding from the Fund from governing body or chief executive of the local government		Council Resolution	R-2023-16 Grant Endorsement.pdf	pdf	124 KB	11/11/2023 03:03 PM
Signed pledge agreement from each contributing organization						
Maintenance Plan		Not Applicable	Maintenance Plan.pdf	pdf	86 KB	11/11/2023 03:08 PM

Benefit-cost analysis must be submitted with project applications over $2,000,000. in lieu of using the FEMA benefit-cost analysis tool, applicants may submit a narrative to describe in detail the cost benefits and value. The narrative must explicitly indicate the risk reduction benefits of a flood mitigation project and compares those benefits to its cost-effectiveness.

Benefit Cost Analysis

Other Relevant Attachments

Letters of Support

Description	File Name	Type	Size	Upload Date
No files attached.				

Resilience Plan

Resilience Plan

Description	File Name	Type	Size	Upload Date
Town of Occoquan's resilience plan elements are not contained within an adopted "stand alone" plan; however, attached is a Resilience Plaining Overview that details all the various planning documents that satisfies the required CFPF Resilience Plan elements and together constitute a Resilience Plan.	Occoquan VA - Resilience Plan Nov 23.pdf	pdf	1 MB	11/11/2023 01:58 PM

TOWN OF OCCOQUAN

Circa 1734 ● Chartered 1804 ● Incorporated 1874
314 Mill Street ● PO Box 195 ● Occoquan, Virginia 22125
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Town of Occoquan Resilience Plan | Nov. 2023

In response to the resilience plan requirements for grants funded by the **Community Flood Preparedness Fund** ("the CFPF" or "Fund") the Town of Occoquan ("the Town") has prepared the following Resilience Planning Overview. It consists of formal, relevant plans used by the Town to prioritize potential projects and to assist the Town in securing funding for critical studies, plans, and projects.

Appendix F of the 2023 CFPF Grant Manual identifies the contents of a resilience plan as including the following elements:

1. *It is project-based with projects focused on flood control and resilience.*
2. *It incorporates nature-based infrastructure to the maximum extent possible.*
3. *It includes considerations of all parts of a locality regardless of socioeconomics or race.*
4. *It identifies and includes all flooding occurring in all areas of the community, not just within the SFHAs, and provides the number and location of repetitive loss and severe repetitive loss properties. Repetitive loss and/or severe repetitive loss often occurs outside of the SFHA and to properties not captured in NFIP reporting. All flooding should be tracked and addressed by the community.*
5. *If property acquisition and/or relocation guidelines are included, the guidelines include equitable relocation strategies for all affected and where land is acquired. Property acquisitions must remain undeveloped, as permanent open space and under ownership or easement by the locality in perpetuity, except that flood control structures may be built on the property.*
6. *It includes a strategy for debris management.*
7. *It includes administrative procedures for substantial development/substantial improvement of structures within the SFHA.*
8. *It includes coordination with other local and inter-jurisdictional projects, plans, and activities and has a clearly articulated timeline or phasing for plan implementation.*
9. *Is based on the best available science, and incorporates climate change, sea level rise, and storm surge (where appropriate), and current flood maps.*

Occoquan's resilience plan elements are not contained within an adopted "stand alone" plan. Consistent with Appendix F of the 2023 Grant Manual, however, this Resilience Planning Overview details how various planning documents of the town satisfy the required CFPF Resilience Plan elements.

The following plans and studies for the Town of Occoquan each have components which satisfy elements of the Resilience Plan requirements and together constitute a Resilience Plan.

- Northern Virginia Hazard Mitigation Plan (2017)
- Town of Occoquan Comprehensive Plan - Vision 2026 (2021 Update)
- Stormwater Management Program Review (January 8, 2020)
- Virginia Coastal Resilience Master Plan Phase 1 (December 2021)
- Resilient Critical Infrastructure A Roadmap for Northern Virginia (2018)
- Tree Protection Ordinance § 155.088 (Landscape Plan § 155.075-155.089)
- Occoquan's Chesapeake Bay Preservation Overlay District Ordinance (2022)
- FEMA Preliminary Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report (2020)
- Occoquan's Town Code Title XV: Land Usage
    - Chapter 151 – Floods
    - Chapter 152 – Erosion and Sediment Control
    - Chapter 153 – State Stormwater Management Program
    - Chapter 155 – Site Plan
    - Chapter 156 – Subdivisions
    - Chapter 157 – Zoning
- Town of Occoquan Winter Weather Playbook (2022)

Appendix F of the 2022 Grant Manual provides examples of elements of plans that local governments may have that would be appropriate to include in a submission. A number of those examples applicable in the case of the Town of Occoquan are identified below and under each the town has noted a specific plan and/or a specific plan section that addresses that element. Together these fulfill the Resilience Plan requirement.

I. Equity based strategic polices for local government-wide flood protection and prevention.

Northern Virginia Hazard Mitigation Plan (2017) Section XVI (Pages 7-109 – 7-113) The Occoquan Mitigation and Action plan prioritize actions across the organization and coordinates with Prince William County Emergency Management and other applicable governmental and quasi-governmental agencies. The actions range from public information campaigns related to Dam failures and developing response plans, to nature-based solutions, infrastructure upgrades, and building protections to enhance the resilience of residents.

Occoquan Floodplain Ordinance O-2016-01: This ordinance ensures that future development and major retrofits comply with flood-resilient building standards, which protect residents living in the floodplain.

II. Proposed projects that enable communities to adapt to and thrive through natural or human hazards.

Northern Virginia Hazard Mitigation Plan (2017): This plan prioritizes protection against natural and human hazards through the range of actions noted within Section XVI (Pages 7-109-7-113).

Vision 2026 Comprehensive Plan: The Occoquan Comprehensive Plan's (2021) Chapter 7: Environmental Stewardship aims to provide for the harmonious use of land that meets the need of Occoquan, while enhancing the area's environmental quality. The Chapter focuses on the following principles: (1) avoidance of development on sensitive natural features; (2) reduction of nonpoint sources of pollution; (3) education programs on wildlife habitat preservation and pollution prevention; (4) Chesapeake Bay Preservation Ordinance enforcement; (5) protection of perennial streams; (5) and development and enforcement of other environmental regulations.

The Comprehensive Plan's Action Plan includes several projects and action items that address the goals and objectives stated throughout the Comprehensive Plan. Projects range from completing a traffic study and continued review and update of ordinances to ensure updated development standards that protect and improve the community, to developing a town-wide master plan and developing a public boardwalk that incorporates vegetation buffers to mitigate stormwater runoff and support wildlife habitats.

Stormwater Management Program Review: This review identified stormwater-related projects needed to address issues identified as part of a 2018 stormwater evaluation. Some project funding was incorporated in town capital plans. The town is now evaluating use of SLFRF funds to address capacity and climate change as opposed to just patching the existing, aging system.

The Town partnered with Prince William County in 2018 to conduct a preliminary investigation and evaluation of the town's three main stormwater systems that run through the historic district and discharge directly into the Occoquan River. Since then, we have been working closely with Prince William County to perform a comprehensive review of the Town's stormwater program, including existing public underground and surface infrastructure, private facilities, as well as identify opportunities for stream restoration. Our intent is to incorporate natural elements to aid in stormwater management and to combat climate change. Part of this assessment includes evaluating the stormwater management program within the town and establishing a Stormwater Utility Fee to aid in maintaining and upgrading the town's infrastructure now and into the future.

FEMA Preliminary Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report (2020): The Town of Occoquan was included in the update to Prince William County's FIRMs and FIS. This was the first update to the Town's flood maps since 1995. This update creates non-regulatory flood risk assessment products, using the latest technologies and the most current data, so that residents, homeowners, business owners, and community officials may understand their local flood risk and take action to keep people and property safe from floods. The Town participated in this process and provided public communication regarding the appeal process. Approval of the new FIRMS are expected in 2022.

Capital Improvement Programming: Annually through the budget process, the town allocates funding for stormwater projects. These projects are usually spot projects associated with flooding and stormwater issues. In FY 2022, the town is planning to address two public safety hazards associated with the Town's stormwater system. In addition, the Town is considering allocating a significant portion of the Town's Coronavirus State and Local Fiscal Recover Funds (SLFRF) funding allocation toward stormwater improvements identified as part of the Town's resiliency planning process.

III. Documentation of existing social, economic, natural, and other conditions present in the local government.

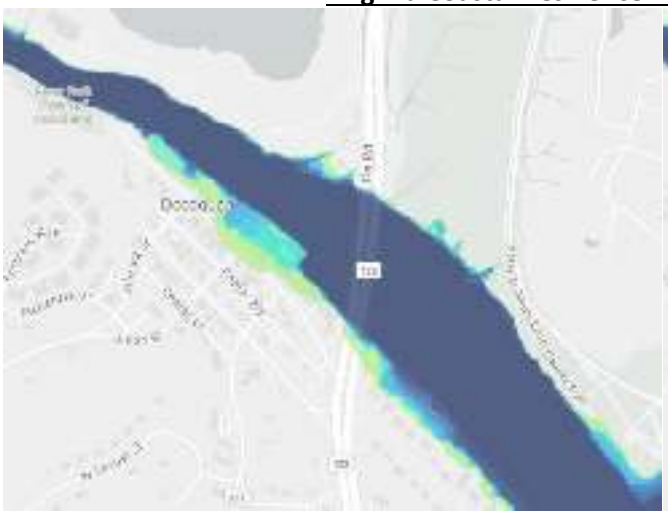
The Occoquan Comprehensive Plan provides comprehensive demographic data and contextual overview of the population, land use and development, and open space and recreation. The Plan also addresses housing and growth.

IV. Review of the vulnerabilities and stressors, both natural and social in the local government.

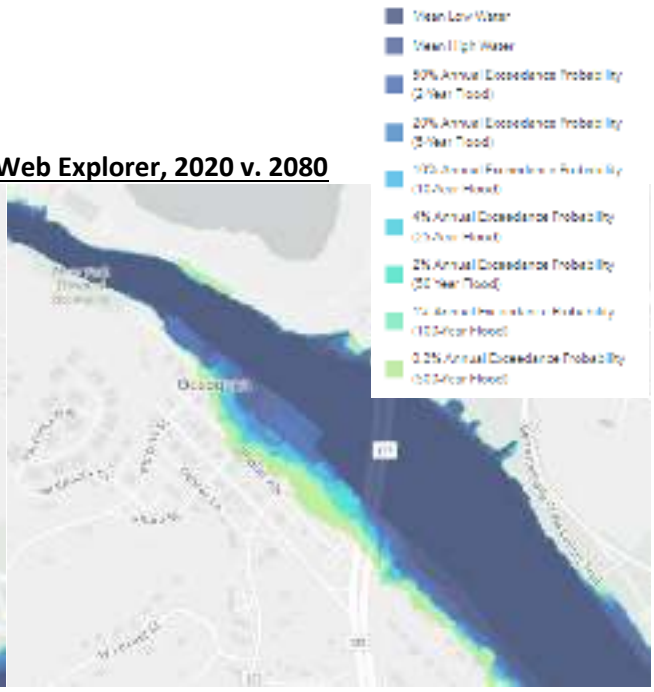
The Occoquan Comprehensive Plan addresses vulnerabilities and stressors within the economy including small business, the environment, and community.

The Virginia Coastal Resilience Master Plan Phase 1: The Town of Occoquan is included in the Coastal Virginia Master Plan Phase 1 as part of the Chesapeake Bay watershed. While this first phase does not examine existing or future flood hazards for riverine and stormwater flooding as affected by sea level rise, it does compare baseline conditions to future changes in sea level rise and coastal flood hazard events. According to this data, current rain events, such as the 2-year and 10-year storms, which are now contained within the banks of the Occoquan River will instead impact areas in the Town now only inundated by much more significant storm events by 2080.

Virginia Coastal Resilience Web Explorer, 2020 v. 2080



Occoquan – 2020



Occoquan - 2080

The Virginia Coastal Resilience Master Plan Phase 1 references the **Northern Virginia Regional Commission's (NVRC) Resilient Critical Infrastructure Road Map for Northern Virginia.** This document is a planning framework that is meant to begin a process of identifying actions that can be taken now that might decrease the severity of future consequences of climate change. This roadmap focuses on building resilience of critical infrastructure sectors in Northern Virginia to projected climate stressors of heat, precipitation, and seal level rise over an 80-

year period. The Town of Occoquan is within the Northern Virginia Regional Commission Planning Area and within the evaluation area.

V. Forward-looking goals, actionable strategies, and priorities as seen through an equity-based lens.

The Occoquan Comprehensive Plan includes an Action Plan that identifies key projects and policies that aim to achieve the goals outlined in the planning document. This document guides the land use decisions of the town and includes a specific chapter (Chapter 7) focused on environmental stewardship and ensuring that the support of a thriving community is congruent with its environment and beneficial to the entire community.

VI. Strategies that guide growth and development away from high-risk locations that may include strategies in comprehensive plans or other land use plans or ordinances, or other studies, plans or strategies adopted by a local government.

Occoquan's Floodplain Ordinance O-2016-01 ensures that future development and major retrofits comply with flood-resilient building standards, which protect residents living in the floodplain. The ordinance also ensures that development is directed away from Special Flood Hazard Areas.

The Occoquan Comprehensive Plan Environmental Stewardship Chapter 7 specifically cites the avoidance of development on sensitive natural features and the enforcement of the Chesapeake Bay Preservation Ordinance as guiding principles.

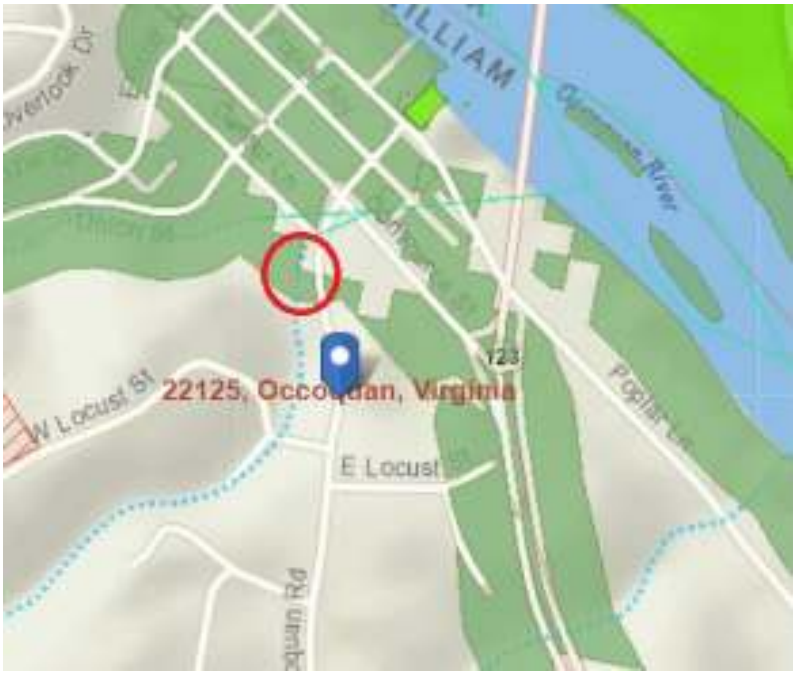
Chesapeake Bay Preservation Overlay District Ordinance – Located within the Town Code Title XV: Land Usage Chapter 157, the Chesapeake Bay Preservation Overlay District (Section 157.159(b)(8)) specifies that land clearing, land disturbance, or development exceeding 500 square feet on slopes 20% or greater is prohibited.

VII. Proposed acquisition of land or conservation easements or identification of areas suitable for conservation particularly areas identified as having high flood attenuation benefit by *ConserveVirginia* or similar data driven tools.

Occoquan is mapped within the ConserveVirginia tool. Additionally, **Occoquan's Floodplain Ordinance** addresses areas to restrict future development due to increased flood risk.

Oaks III Land Purchase for Conservation: In 2013, the Town of Occoquan purchased 17 acres of property just outside of the Town's limits and placed it in a conservation easement in order to protect the property from development that would result in a negative impact on stormwater and flooding potential in the region, and specifically to the town. This area is noted in the above ConserveVirginia map as a managed conservation area.

Furnace Branch: In addition, the Town obtained ownership of property on Washington Street where Furnace Branch stream runs through the center of town with the aim of conserving the space as a natural area and identifying future stream restoration projects for the site to aid in stormwater management, promotion of natural vegetation and ecosystems, and wildlife sanctuary.



VIII. Identification of areas suitable for property buyouts in frequently flooded areas.

As a small community, the Town has limited need for property buyouts; however, the town does review opportunities for property purchases that will limit development upstream from the town that would negatively impact the town's stormwater program and increase flood risk for the community. For example, the town's purchase of 17 acres of woodlands that it placed in a conservation easement outside of town was done in an effort to reduce the potential impact on the town's flood risk. Since the purchase in 2013, a walking/hiking trail has been blazed and the trail will be incorporated into the County's larger Greenway trail program connecting the town's downtown and the County's government center for pedestrians.

IX. Identification of critical facilities and their vulnerability throughout the local government such as water and sewer or other types identified as "lifelines" by FEMA.

FEMA identifies lifelines as the most fundamental services in the community that, when stabilized, enable all other aspects of society to function. FEMA has identified the following Community Lifelines: (1) Safety and Security; (2) Food, Water, Shelter; (3) Health and Medical; (4) Energy; (5) Communications; (6) Transportation; and (7) Hazardous Material. Of these Community Lifelines, the town has direct responsibility over Safety and Security, which includes law enforcement, government service and community safety; Communications as it relates to infrastructure, alerts and warning messages, Finance and responder communications; and Transportation as it relates to town-owned roads, sidewalks and trails.

The town coordinates with the Prince William County Office of Emergency Management through our Town Police Department during emergencies that impact the region. In addition, the Town operates its own emergency operations program for more localized events, often seeking and obtaining resources to respond to the emergency, as well as coordinating preparation and recovery activities.

The town currently has event emergency response plans designed for each event, has developed a **Winter Weather Playbook (2022)** and is currently in the process of developing an Occoquan Emergency Response Plan Weather Emergencies. These documents assist the town in preparing, responding and recovering from localized emergencies that have a direct impact on the town.

The Town is currently in the process of working with the County to obtain funding to install a generator connection on the Town's administrative building so as to ensure continuity of services during times of emergency, as well as create the opportunity for the building to serve as a warming center or shelter for more severe emergencies.

In reference to infrastructure, the Town is directly responsible for management of its **Stormwater Program**. In 2018, the Town partnered with Prince William County to perform an analysis on the Town's stormwater system's three main systems that empty directly into the Occoquan River. The analysis resulted in the **Stormwater Management Program Review** (2020) and identification of capital projects that have been incorporated and reviewed in the Town's annual Capital Improvement Program throughout the years. As part of this process, Occoquan identified and analyzed the vulnerabilities of its infrastructure system as it relates to existing stormwater infrastructure and is seeking to perform a comprehensive review of the Town's system to identify existing and future conditions and develop an actionable plan that takes into account capacity, water quality, and climate change and reduces risk to private property.

The other lifelines identified by FEMA are all managed by other agencies and quasigovernmental entities within the Town of Occoquan. The Town is in regular communication with these agencies and is engaged with the various agencies on their emergency planning and public communication processes. For example, the Town's drinking water and sewer service is provided by Prince William County Service Authority (PWCSA). The Town

coordinates regularly with PWCSA to ensure resiliency and quality in the delivery of these services to the community. In addition, Occoquan communicates regularly with Fairfax Water, who provides drinking water to PWCSA and operates the Occoquan Reservoir located just upstream from the Town of Occoquan. The Town is part of Fairfax Water's emergency operations planning for the Dam, including regularly testing the Dam Siren, an early warning system in place in case of Dam failures. Electric and gas utilities are provided by Dominion Power and Washington Gas, respectively. Finally, the Town coordinates regularly with the Virginia Department of Transportation (VDOT) who has maintenance and emergency response responsibilities for the main roads that run through the town and connect Occoquan to the greater Prince William and Fairfax areas. VDOT is a key partner of the town in terms of ensuring critical infrastructure is maintained, but also for preparation, response, and recovery from emergency events impacting Occoquan.

X. Identified ecosystems/wetlands/floodplains suitable for permanent protection.

Oaks III Conservation Purchase: In 2013, the Town of Occoquan purchased 17 acres of property just outside of the town's limits in Prince William County. The property, known as Oaks III, was planned for development, but the town was concerned that development would result in increased stormwater and flooding risk for those below the property – namely, the Town of Occoquan. Ultimately, the town purchased the property and placed a conservation easement on it to protect the wooded area from development, as well as retain greenspace in the growing urban setting. Today, the property serves as a passive recreation space for the community and includes a blazed hiking/walking trail, which will ultimately provide a pedestrian connection between Occoquan's downtown and the County Government Center as part of the County's Greenway Trail. Also, as a designated conservation area, the Town works with the Northern Virginia Conservation Trust on annual site inspections to ensure proper management of the conservation easement. In addition, since taking ownership of the property, there have been general conversations regarding stormwater planning on the site in order to address stormwater contributions into the town's system as it flows through the town to the Occoquan River.

Along the Occoquan River, the Town maintains Mamie Davis Park, a passive park area that provides access to the Town's public riverwalk and boat dock. The park is located within the flood zone and partially in the floodway.

Furnace Branch natural area is located on Washington Street and is home to Furnace Branch Stream that runs through the center of town and discharges into the Occoquan River. The property is currently maintained as a natural space and is part of the Town's stormwater system.

XI. Identified incentives for restoring riparian and wetland vegetation.

While the riverbank along the Town of Occoquan has mostly been developed, there is some natural riparian vegetation along the banks of the Occoquan and the town supports continued planting of native vegetation within the community.

In 2009 the Town adopted a native plant and tree protection ordinance with the stated objectives of (1) promoting and protecting appropriate native vegetation; (2) promoting microhabitats in urban areas for conservation of wildlife by establishing new wildlife habitat and maintaining existing wildlife habitat; (3) creating larger, more connected plant habitats, helping ensue the future of native plant species by increasing their ability to respond to changes in climate; (4) conserving scarce water resources by promoting water-efficient landscaping through the use of appropriate native plants which, once established, typically require much less water than other species; (5) reducing the use of chemical fertilizers and pesticides to maintain landscaping; (6) reducing the negative impacts of landscape maintenance on local air quality; (7) reducing the negative impacts on the land from the use of inappropriate vegetation and poorly planned landscaping; (8) reducing the financial costs of landscaping maintenance; and (9) encouraging creative landscaping designs that further the above stated goals. This ordinance was incorporated into the section of the Town Code requiring landscape plans under Chapter 155.

XII. A framework for implementation, capacity building and community engagement.

For many years, the Town of Occoquan has served as a site for the Friends of the Occoquan Spring and Fall river cleanup. It is a community event that invites volunteers to come to the community and remove trash from the town and river in order to reduce trash from entering the Chesapeake Bay watershed. This serves as an opportunity to educate the community on the importance and benefits of protecting our watershed.

In June 2022, the Town of Occoquan is launching RiverFest and Craft Show, a two-day street festival that will feature Conservation Alley, providing a strong focus on environmental protections. This event will bring opportunities to the public to learn more about the importance of protecting the river and watershed by bringing key stakeholders directly to the community including Potomac River National Wildlife Refuge, Potomac River Keepers Network, U.S. Fish and Wildlife, and Prince William County Park Rangers, in addition to other public and private conservation groups.

XIII. A characterization of the community including population, economics, cultural and historic resources, dependence on the built environment and infrastructure and the risks posed to suchinfrastructure and characteristics by flooding from climate change, sea level rise, tidal events orstorm surges or other weather.

Occoquan is a town with a population of 1,174 (U.S. Census Bureau, 2019) with a medium household income of $110,833. Chartered in 1804, the Town of Occoquan is located along the Occoquan River in the northeastern portion of Prince William County. The Town occupies approximately 125 acres, including 25 acres of the Occoquan River. While the built portion of the Town is located along the southern shore of the Occoquan River, the Town boundary actually extends to the mean low tide line of the northern shoreline, which is in Fairfax County. The Town is situated at the "fall line," which is the boundary between the Piedmont and Coastal Plain geological provinces and represents the end of the navigable waters of the Occoquan River. The downtown and Poplar Lane portions of Occoquan are on a relatively level and low–lying plain adjacent to the river. To the southwest of this low–lying plain is a ridge underlain by mostly granite rock. The ridge is dissected by several small streams that empty into the river. The largest stream is Ballywhack Branch. The other streams are Furnace Branch, Boundary Branch, Phelps Creek, and the tributary of Boundary Branch designated as Edgehill Creek. High ground is generally rolling with some very steep slopes and rocky outcrops adjacent to streams and the river plain.

While Occoquan has successfully maintained much of its small-town charm, surrounding areas of Prince William differ significantly in terms of scale, density, and design. Within a one-mile radius are several automobile-oriented shopping centers and a commuter parking lot – all starkly in contrast to the Town's pedestrian friendly atmosphere. The surrounding unincorporated areas of Woodbridge and Lake Ridge have populations of 68,081[1] and 44,716 respectively, dwarfing the Town's population of 1,174[2].

Our History

Occoquan established its commercial and residential successes long before Virginia was a colony when Captain John Smith traveled to the Occoquan River on one of his exploratory voyages of the Chesapeake Bay in 1608. The rolling hills, strong waterfalls, and natural beauty of the area attracted entrepreneurs like John Ballandine. During the late eighteenth century, Occoquan grew into a full-service town with mills, forges, stores, tolling points, and multiple residences.

The most famous of these residences is Rockledge Mansion, built in 1758 with stone from Occoquan's own quarry of Virginia blue stone. Supposedly designed by the famous William Buckland, the home still sits perched above the town. The remains of the Town's main mill, one of the first automated mills in the United States, now

[1] 2020 Prince William County Annual Population Estimates
[2] 2019 American Community Survey

serves as the Occoquan Historical Society's Mill House Museum. The success and beauty of eighteenth-century Occoquan attracted more entrepreneurs. Its most successful gentleman, Nathaniel Ellicott, built the town's first bridge and with partners provided the acreage on which the town was formally platted in 1804. The 1800s proved quite prosperous for Occoquan – multiple residences and storefronts established an attractive stopping point for those journeying to the Nation's Capital. Many of the buildings constructed during this era are still intact along Mill and Commerce Streets.

In 1916, a major fire destroyed a number of commercial structures on Commerce, Union, and Mill Streets. Other fires over the years have destroyed significant buildings, including the mill in 1924 and Ebenezer Church in 1923. The Church was soon rebuilt on the same site where it still stands.

The progress of the twentieth century proved difficult for Occoquan, but the town has persevered none the less. Silting of the Occoquan River has been a recurring concern since the early 19th century, while flooding from spring rains and fall hurricanes and tropical storms are a constant threat. Previously a stopping point on the main north-south route of the east coast, the coming of Route 1 and I-95 diminished Occoquan's importance as a way station. But Occoquan's endurance and eclectic mix of the historic and the modern has resulted in the town becoming popular and successful once again.

In 1984, Occoquan secured its status as an official Historic District listed on the National Register of Historic Landmarks. Inside the boundaries of the District sit a multitude of individually registered buildings and sites that still lend the town a quaint appearance. Zoning ordinances allow for a combination of residential and commercial buildings that keep Occoquan both profitable and attractive to its citizens and visitors. The Architectural Review Board establishes and monitors the historically accurate appearance of the town in order to persistently attract visitors from all over the world.

Throughout its history, Occoquan has experienced a multitude of disasters, from fires to flooding, that has molded and shaped the town into what it is today. Of note, in 1972 Hurricane Agnes caused the Occoquan River to swell well beyond its normal boundaries. On June 22, 1972, floodwaters roared over the Occoquan High Dam causing significant damage to Fairfax Water treatment facilities and destroying the 1878 iron Pratt truss bridge that served vehicular traffic along Route 123. Hurricane Agnes dumped more than 16 inches of water in 36 hours in Occoquan. Properties on the north and eastern end of town flooded, boats were displaced over land, and floodwaters completely inundated parts of Mill Street, causing damage to streets and other infrastructure, and effectively eliminating many of the traditional businesses associated with a small town in that era – most were simply unable to reopen after the devastation.

In the 21st century flooding has become a more prominent threat to Occoquan. The Occoquan River is tidal and both spring rains and fall hurricanes and tropical storms periodically caused river-based flooding, particularly during periods of high tide. Hurricane Isabel in 2002, a storm in May of 2008, Hurricane Irene in 2011, and another storm in May of 2014, are examples. Far more unpredictable and sometimes more damaging, however, are rains that result in the flash flooding of the town's creeks, a problem arguably attributable in part to upstream development outside of town boundaries that has increased the amount of impervious surfaces while simultaneously generating sediment that has reduced the carrying capacity of the town's streams. Tropical Storm Lee in September 2011 is an example of this.

Recent Flooding events in Occoquan

XIV. Strategies to address other natural hazards that would cause, affect or result from flooding events including earthquakes; storage of hazardous materials; landslides/mud/debris flow/rock fall; prevention of wildfires that would result in denuded lands making flooding, mudslidesor similar events more likely; or preparations for severe weather events including tropical storms or other severestorms, including winter storms.

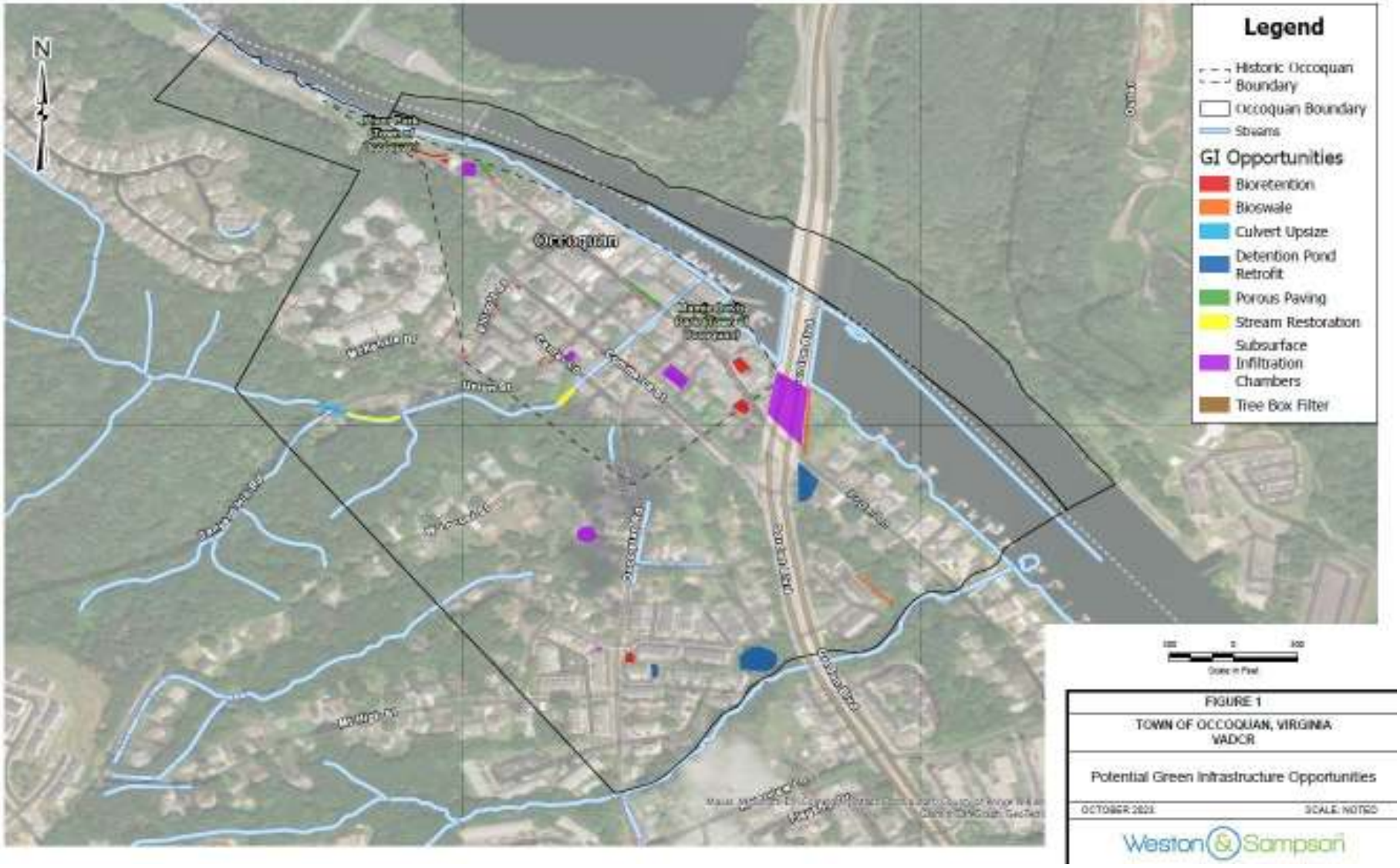
The town coordinates with the Prince William County Office of Emergency Management through our Town Police Department during emergencies that impact the region. In addition, the Town operates its own emergency operations program for more localized events, often seeking and obtaining resources to respond to the emergency, as well as coordinating preparation and recovery activities.

The town currently has event emergency response plans designed for each event, has developed a **Winter Weather Playbook (2022)** and is currently in the process of developing an Occoquan Emergency Response Plan for Weather Emergencies. These documents assist the town in preparing, responding to, and recovering from localized emergencies that have a direct impact on the town.

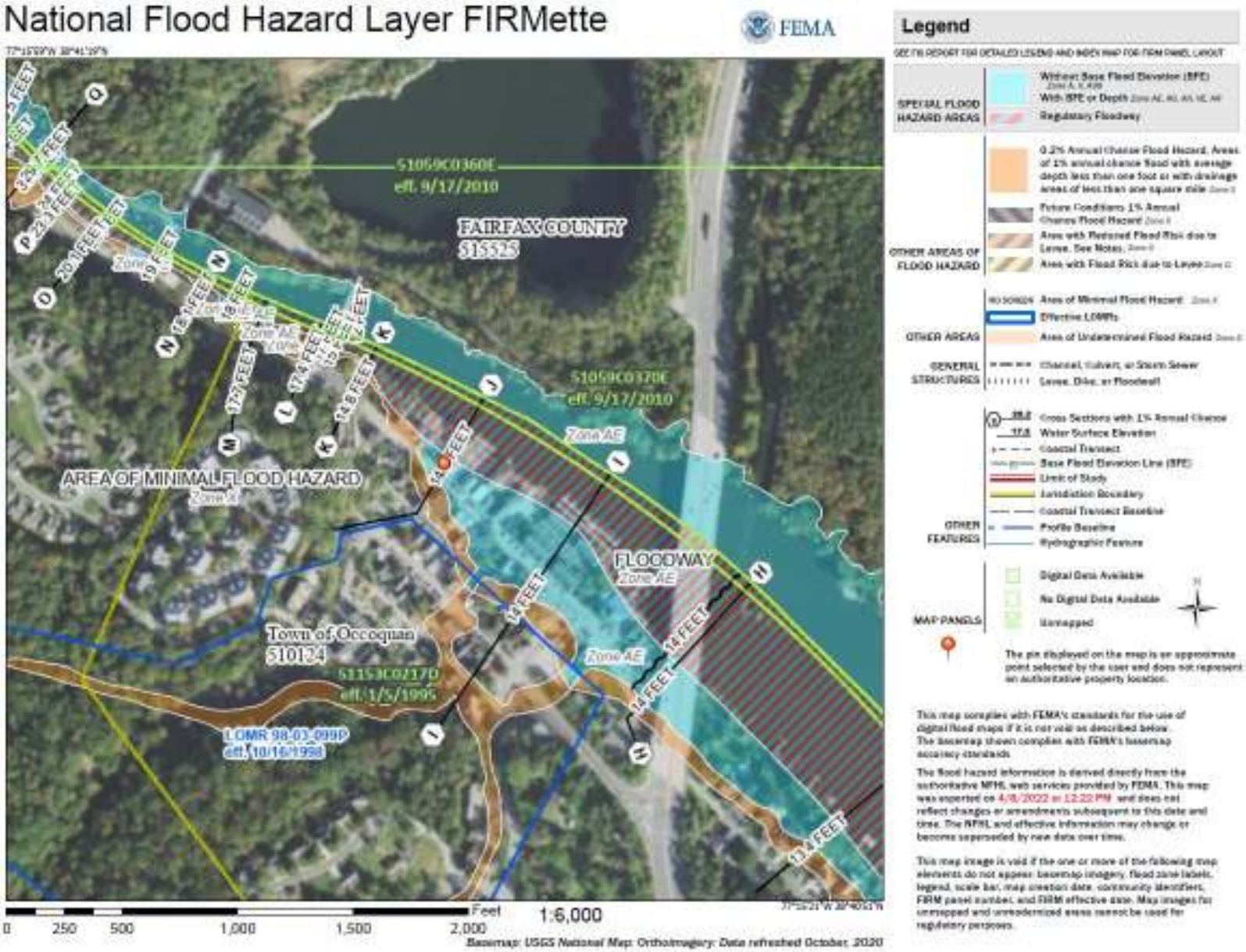
Supporting Documentation

- **Project Map – Incorporated Boundaries of Occoquan, VA**

Site Map of Potential Green Infrastructure Options



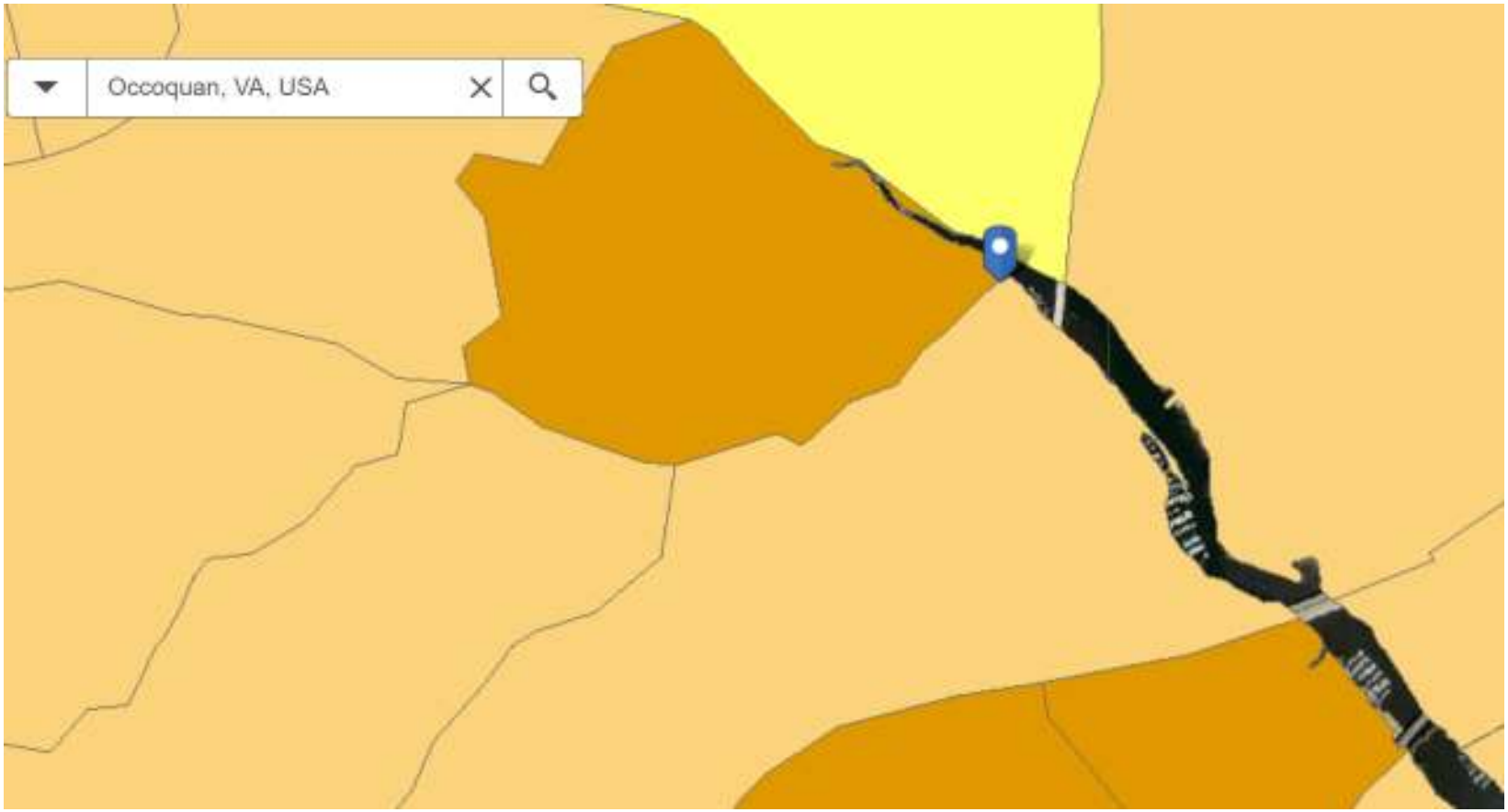
- [National Flood Hazard Layer FIRMette]



- **Floodplain Ordinance O-2016-01**

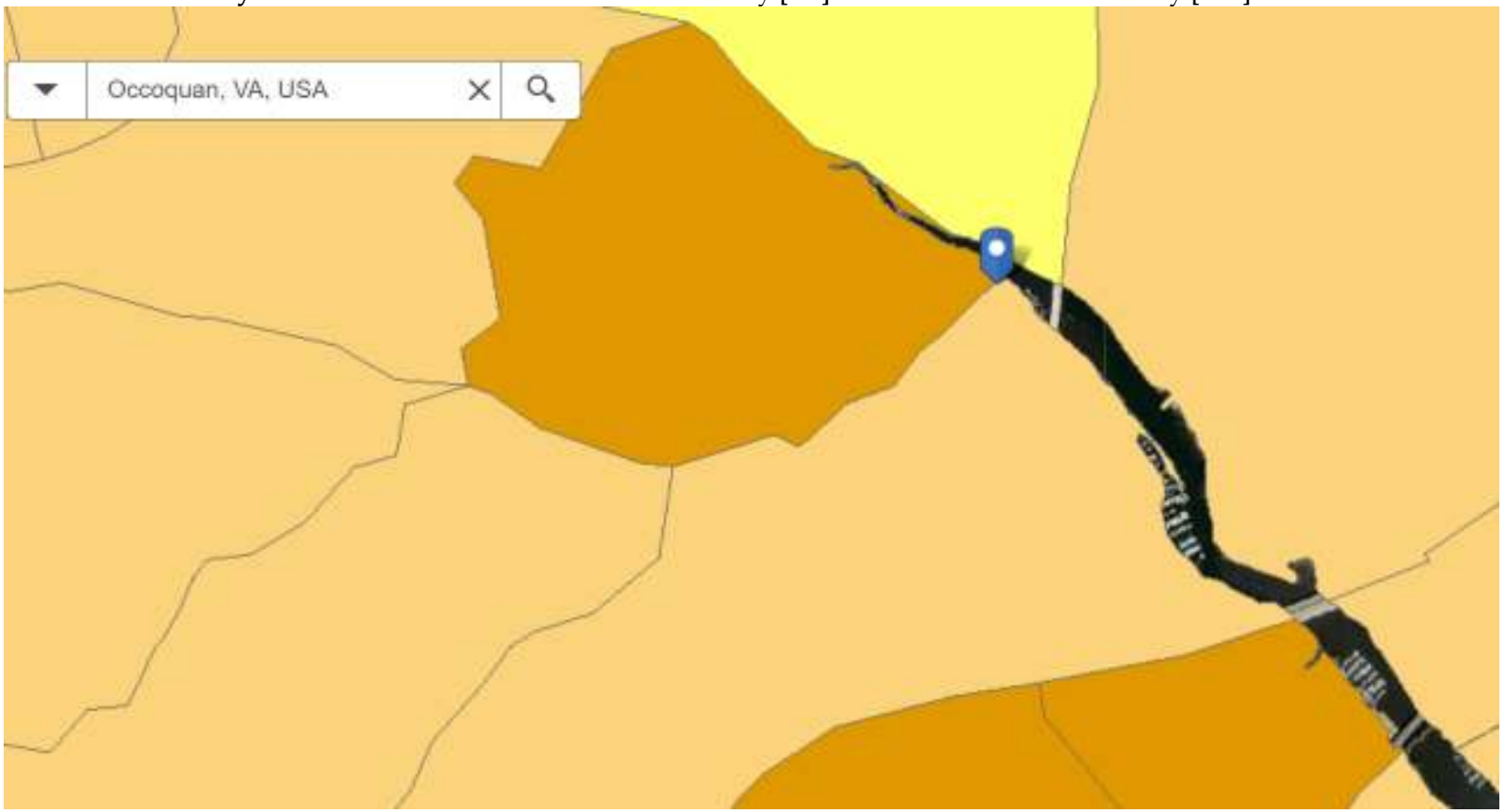
- **Vision 2026: Occoquan Comprehensive Plan 2016-2026**

- **Social Vulnerability Index Score:** Moderate Social Vulnerability [0.2] and Low Social Vulnerability [-0.0]



Adapt VA's Virginia Vulnerability Viewer – Occoquan, VA

- **Floodplain Ordinance O-2016-01**
- **Northern Virginia Regional Hazard Mitigation Plan (2017)**
- **Vision 2026: Occoquan Comprehensive Plan 2016-2026**
- **Social Vulnerability Index Score:** Moderate Social Vulnerability [0.2] and Low Social Vulnerability [-0.0]



Adapt VA's Virginia Vulnerability Viewer – Occoquan, VA

Hazard Mitigation Plan Links:

2022 Northern Virginia Hazard Mitigation Base Plan

https://www.pwcva.gov/assets/2023-02/NOVA%20Hazard%20Mitigation%20Base%20Plan%20FINAL-%20Natural%20Hazards%20Only%20w%20Annexes.pdf

2022 Town of Occoquan Hazard Mitigation Annex

https://www.pwcva.gov/assets/2023-02/17-C%20Town%20of%20Occoquan%20Annex%20-%202022%20NOVA%20HMP%20FINAL.pdf

- **Floodplain Ordinance O-2016-01**

- **Vision 2026: Occoquan Comprehensive Plan 2016-2026**

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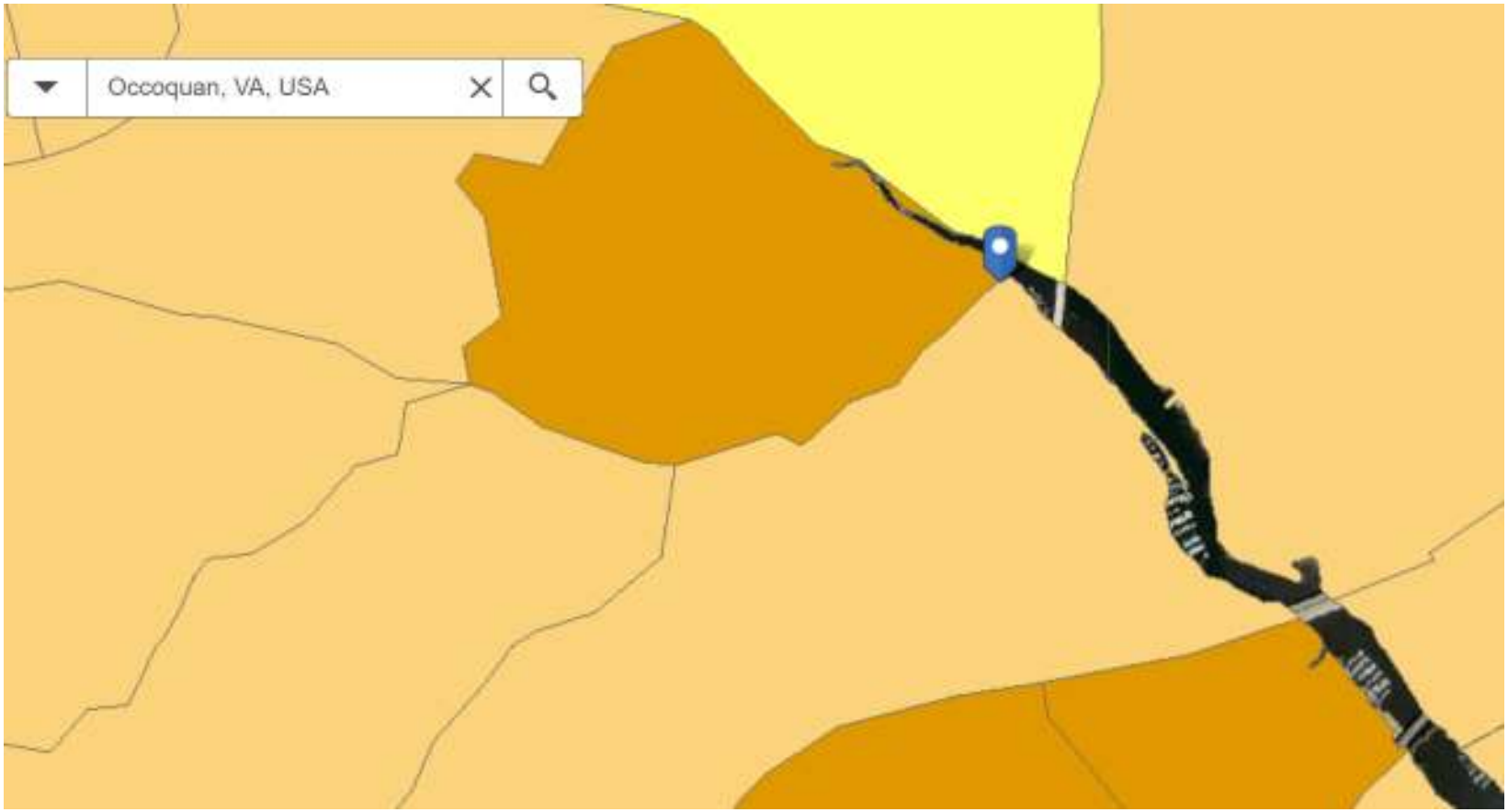


Adapt VA's Virginia Vulnerability Viewer – Occoquan, VA

Historic Flooding data and Hydrologic Studies

The Town is currently completing a Hydraulic and Hydrologic (H/H) model which shows the functioning of the town stormwater infrastructure under current and future climate conditions. To develop this H/H model, the Town's consultants reviewed historical flood events – including extents and depths of flooding. The following historical events were used to calibrate the H/H model.

Agnes 1972

14 inches in 24 hours

20 feet plus over river height

Wayward boats bob up and down on Occoquan's flooded Main Street

Eloise 1975

6.77 inches of rain in 24 hours

Schools, roads closed in worst flood since Agnes

Potomac News

You-pump gas may cost jobs

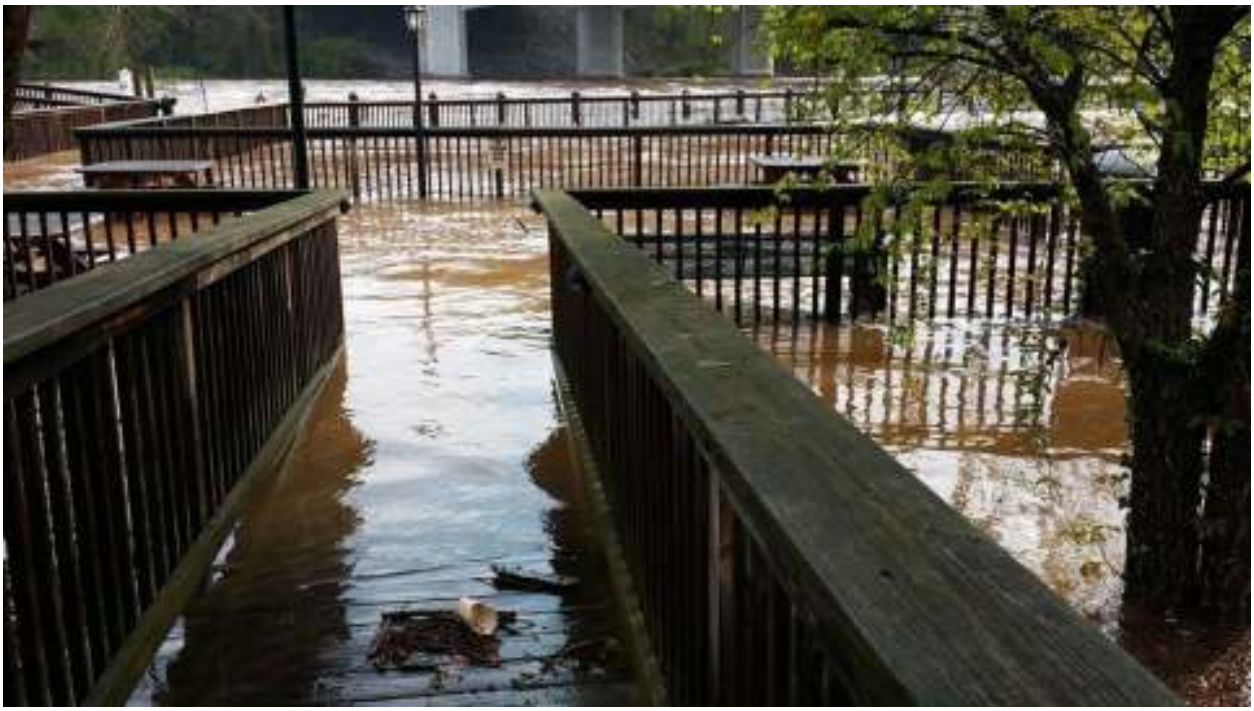
Church to mark 125th year

Dumfries race lacking in animosity

May 2008

September 2011 - Lee

May 2014



Studies

The following studies were reviewed to develop the H/H model and identify high priority actions, including the green infrastructure opportunities that the Town is seeking funding to design.

- Comprehensive Plan Vision 2026 (2021 Update)
- Town of Occoquan Storm Water Management Program Review (2020)
- Town Ordinance Title XV: Land Usage (2004)
- Floodplain Study and Proposed Structures (2019)

TOWN OF OCCOQUAN, VIRGINIA
RESOLUTION

RESOLUTION ENDORSING SUBMISSION OF AN APPLICATION TO THE VIRGINIA COMMMUNITY FLOOD PREPAREDNESS FUND GRANT

WHEREAS, one of the highest natural risks to affect the Town of Occoquan according to the 2022 Northern Virginia Hazard Mitigation Plan is flooding and flash flooding; and

WHEREAS, since its inception, the Town of Occoquan has managed its stormwater program and participates regionally on planning efforts to increase community resiliency; and

WHEREAS, the Virginia Department of Conservation and Recreation (DCR) manages the Virginia Community Flood Preparedness Fund (CFPF) to provide support for regions and localities across Virginia to reduce the impacts of flooding by empowering communities to develop and implement action-oriented approaches to bolster flood preparedness and resilience; and

WHEREAS, the Town of Occoquan has received a CFPF Round 3 grant from DCR to assess the physical connectivity, characteristics, and condition of its stormwater system, evaluate the system's capacity under current and future climate conditions, and identify opportunities to implement green and grey stormwater infrastructure; and

WHERAS, DCR has solicited applications for competitive awards that include the design of priority nature-based solutions for flood resilience; and

WHEREAS, town staff has recommended that this funding be used to retain a firm to develop designs for nature-based solutions for flood resilience that would mitigate stormwater flooding and enhance the Town's resilience to floods; and

WHEREAS, if awarded, the grant budget will be established on a reimbursement basis; and

WHEREAS, the CFPF grant requires a 30% funding match, totaling $45,000 for this application and that local match would be available as part of the Stormwater Improvements incorporated into the Town of Occoquan FY2024 Capital Improvement Program.

NOW, THEREFORE, BE IT RESOLVED, the Occoquan Town Council, meeting in regular session this 5th day of December, 2023 endorses submission of an application for such purpose to the Virginia Department of Conservation and Recreation's Virginia Community Flood Preparedness Fund Grant.

Adopted by the Town Council of the Town of Occoquan, Virginia this 5th Day of December 2023.

MOTION: **DATE: December 5, 2023**
Town Council Meeting

SECOND:

Votes
Ayes:
Nays:
Absent from Vote:
Absent from Meeting:

BY ORDER OF THE TOWN COUNCIL

Attested:

Earnest W. Porta, Jr., Mayor **Philip Auville, Town Clerk**

Maintenance and Management Plan for Project

This project is for up to four (4) green infrastructure solutions to 50% design and to conduct sub-surface explorations and survey to verify the viability of these designs. Maintenance and management for the plan is not applicable.

Maintenance Plan for Project

This project is for up to four (4) green infrastructure solutions to 50% design and to conduct sub-surface explorations and survey to verify the viability of these designs. Maintenance plan is not applicable.

Appendix B: Budget Narrative Template

Applicant Name:
Community Flood Preparedness Fund &
Resilient Virginia Revolving Loan Fund
Detailed Budget Narrative
Period of Performance: _____ through _____
Submission Date: 11/10/2023

Grand Total State Funding Request	$ 105,000.00
Grand Total Local Share of Project	$ 45,000.00
Federal Funding (if applicable)	$
Project Grand Total	$150,000.00
Locality Cost Match	% 30%

Breakout By Cost Type	Personnel	Fringe	Travel	Equipment	Supplies	Contracts	Indirect Costs	Other Costs	Total
Federal Share (if applicable)									
Local Share						45,000			45,000.00
State Share						105,000			105,000.00
Pre-Award/Startup									
Maintenance									
Total	$	$	$	$	$	$ 150,000	$	$	$150,000.00

The proposed contract costs is to hire a contract engineering firm to (1) engage in fieldwork to support impementable nature-based solutions, (2) Design priority nature-based solutions, and (3) create community engagement through corrdination with abutters and green infrastructure education.

TOWN OF OCCOQUAN

Circa 1734 ● Chartered 1804 ● Incorporated 1874
314 Mill Street ● PO Box 195 ● Occoquan, Virginia 22125
www.occoquanva.gov

SCOPE OF WORK

Needs and Problems

The Town of Occoquan experiences periodic flooding, particularly in the spring and fall, from two primary sources. First among these is the Occoquan River. Flooding associated with spring thaws and rains to the west, and fall hurricanes or tropical storms that create a tidal bore, are fairly common, occurring roughly every other year. Intensity varies significantly, but damage is typically limited to riverfront property and the water rarely reaches the level of Mill Street. Although of understandable concern to riverfront property owners (some of whom have built seawalls), the potential for river-based flooding is fairly predictable, and the combination of weather forecasts and assessments of potential river levels from Fairfax County Water Authority (who operates the Occoquan High Dam approximately one mile to the west of the Town) typically provide sufficient advance notice for precautions to be taken. Additionally, most riverfront property owners appear to recognize that periodically high river levels and accompanying flooding are acceptable risks associated with choosing to live on a riverbank.

The second primary source of flooding in Occoquan is flash-flooding from three major streams that flow through Town to the Occoquan River –Ballywhack Creek, Furnace Branch, and Boundary Branch. This flooding is much less predictable, affects inland properties in Town, endangers traffic on major streets in Town, and over time has damaged and weakened the Town's aging stormwater infrastructure. Each of these tributaries originates outside of Town, thus drawing from watersheds well beyond Town boundaries, and is significantly affected by development and stormwater practices beyond the Town's control. Sitting at the bottom of hillsides along the banks of the Occoquan River, the Town of Occoquan and its stormwater management system is a recipient of runoff, some uncontrolled, from developments and roadways outside of Occoquan.

After major flash flooding associated with Tropical Storm Lee in 2011, the Town instituted a variety of measures to begin the process of addressing flooding associated with water runoff from outside of Town. Ballywhack Creek enters Town boundaries by traveling underneath Tanyard Hill Road/Union Street. From there it crosses several private properties and then feeds directly into the Town's underground stormwater system and flows into the Occoquan River.

Property owners at 407 and 409 Union Street, where Ballywhack Creek flows into Town, have regularly experienced flooding, even during modest rainfall, as a result of water sheeting across the road from a hillside, water over-topping Tanyard Hill Road when a culvert for Ballywhack Creek becomes blocked, or water running down Tanyard Hill Road from outside of Town. After Tropical Storm Lee the Town paid for the inspection and removal of debris from a concrete channel and tunnel that had been installed on the properties following Hurricane Agnes in 1972. Additionally, the Town petitioned the County to upgrade a stormwater management pond on the property of an out-of-town HOA (LRPRA), upgrade the debris catchers on Ballywhack Creek outside of Town, and regularly inspect and clean the culvert under Tanyard

Hill Road before anticipated rainfall.

[Map 1] Town of Occoquan Downtown along the Occoquan River, 2018. Existing locations of the three main stormwater systems that run through Occoquan and exit into the Occoquan River: Ellicott Street system, Union Street System and Coopers Alley System. The Town of Occoquan has responsibility for management of its Stormwater Program.

Over the years, Prince William County has taken all of these petitioned actions. Additionally, the Town purchased some of the wooded property at the corner of Tanyard Hill and Old Bridge Roads and placed it in a conservation easement to prevent further development that it was believed would generate additional stormwater runoff. The conservation easement allows for the possibility of the construction of a stormwater detention facility. VDOT has also installed an asphalt drainage ditch to capture some of the water that sheets across Tanyard Hill Road.

The Town has also adopted the practice of making financial contributions to remediation efforts on private property where those remediation efforts contribute to the improvement of the Town's stormwater management system and where the damage requiring remediation can be attributed to flows from outside of Town and deficiencies in the Town's aging stormwater infrastructure.

In the spring of 2018 Prince William County presented a study it had conducted of some of the primary arteries associated with the Town's stormwater infrastructure. It is important to note that this was not a comprehensive study of the Town's system, but rather a detailed inspection

of various stormwater collection points and three underground arteries. Notably, it did not include comprehensive analyses of either Ballywhack Creek, Furnace Branch, or Boundary Branch. Occoquan's underground stormwater infrastructure is a hodgepodge of legacy installations from development over an extended period of time. No comprehensive map exists. Among the concerns the study revealed was (a) original deficiencies in some installations, (b) private encroachments, and (c) deterioration of materials with age and use.

In 2023, the Town was awarded funding through the DCR Community Flood Preparedness Fund (CFPF), Round 3, to assess the physical connectivity, characteristics, and condition of its stormwater system, evaluate the system's capacity under current and future climate conditions, and identify opportunities to implement green and grey stormwater infrastructure (referred to herein as Phase 1). The Town is requesting additional funding to advance several high priority green infrastructure opportunities (also referred to nature-based solutions). These opportunities were chosen based on their potential to mitigate stormwater flooding, their location relative to the existing drainage system, and the physical characteristics and ownership of the parcel in which they would be located.

Goals & Objectives:

During this follow-on phase, the project team will advance up to four (4) green infrastructure solutions to 50% design and conduct sub-surface explorations and survey to verify the viability of these designs.

Types of Green Infrastructure Being Considered

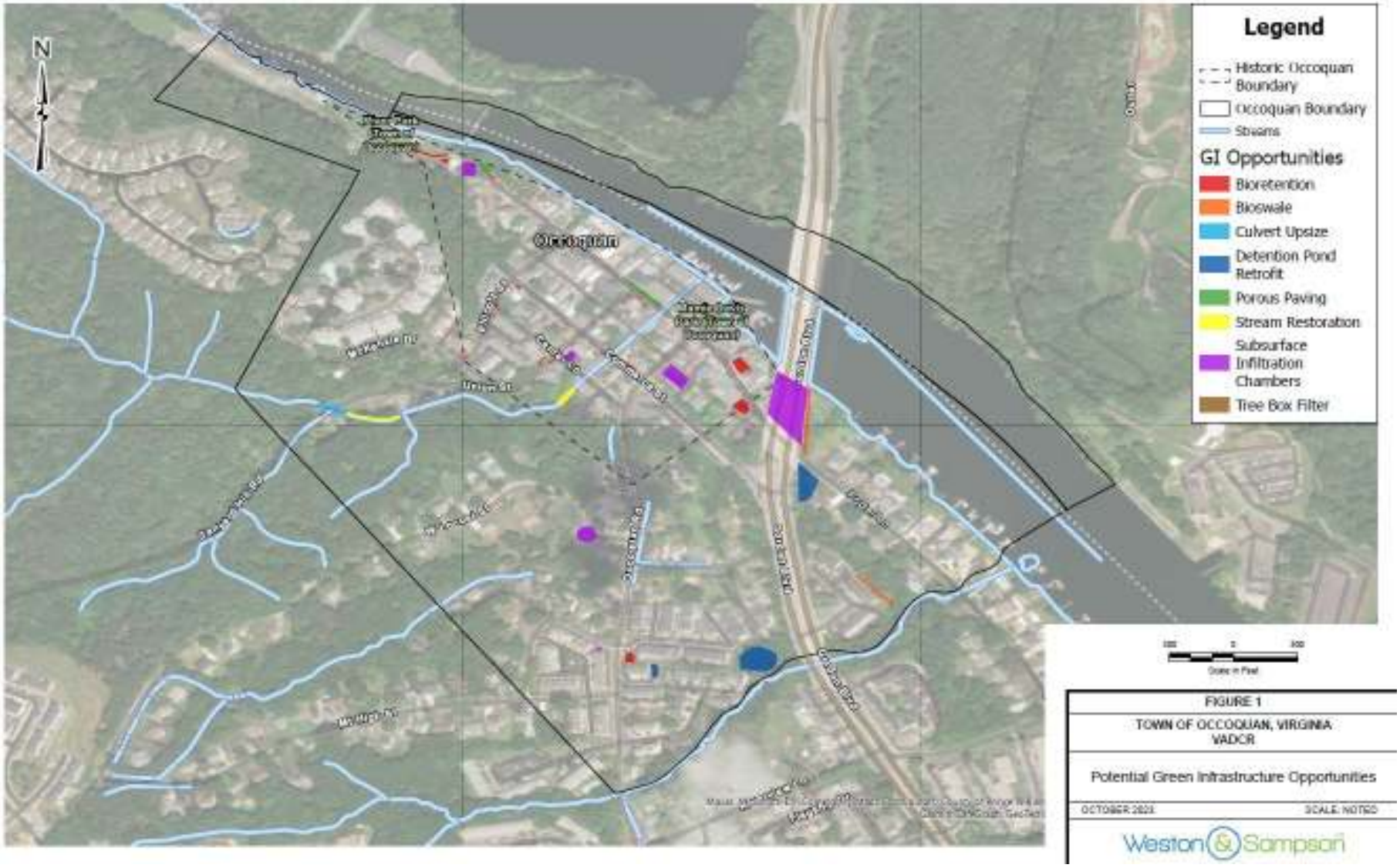
Mid to Large Scale Opportunities

- Stream Restoration
- Water Level Control for existing water bodies
- Constructed Wetlands
- Sub-surface Infiltration Chambers

Site Specific

- De-paving Impermeable Spaces
- Bioretention Basins
- Conveyance Swales
- Porous Pavement
- Tree Trenches
- Tree Box Filters
- Sub-surface Infiltration Chamber

Site Map of Potential Green Infrastructure Options



Work Plan

Task 1 – Project Kickoff

1.1 Project Kickoff Meeting

At the onset of the project, the Project Team will review and commit to a detailed proposed schedule, which outlines key milestones, including projected meeting dates. An agreed-upon schedule will ensure that the project keeps moving forward and is completed within the grant timeframe required by the funder, the Virginia Department of Conservation and Recreation

1.2 Project Management

During the project, the Project Team will meet as needed to track progress, review materials, discuss project challenges and opportunities, and provide quarterly progress reports to the VA DCR CFPF team.

Task 2 – Development of Base Mapping to Support Implementable Nature-Based Solutions

2.1 Environmental Receptors Mapping

The Project Team will use publicly available data to create an environmental constraints map and locate environmental receptors in the vicinity of the proposed nature-based solutions project areas. The assessment will include reviewing potential impacts of regulatory and site features related to floodplains, wetlands, etc.

Resource areas will then be field verified by a certified individual (a Professional Wetland Delineator or even a Virginia State Waters Delineator (VSWD) certification, if appropriate) trained in the Army Corp of Engineers, Virginia Water Protection program, and the Virigina Marine Resources Commission regulatory requirements. This work generally includes:

- Site walk of Project Areas
- Identification of resource areas based on vegetation, soils, and hydrology
- Flagging and documentation of resource areas including Type of wetland, Vegetation encountered, Soils encountered, and Types of hydrology present.
- Identification of Vernal Pools, habitat, and species documented at each vernal pool, if necessary.
- Survey of the wetland delineation flags using a handheld GPS unit.

2.2 Topographic Survey of Potential Locations of Green Infrastructure

The Project Team will look at specific site features and survey the topography, physical components, and dimensionality for locations location deemed desirable for construction of nature-based solutions. The survey will document the following:

- Property boundaries
- Topography at 1-foot contours

- Existing utilities. Utility information will be based upon utility company mapping and mark outs, visible surface features and information provided by the Consultant and Town.
- Surface conditions such as existing ground cover, existing vegetation, curbs and curb cuts, existing structures, etc.

2.3 Sub-surface exploration

The Project Team will conduct sub-surface explorations to verify the viability of the green infrastructure concepts and advance design. As a first step, the project team will assess soil types via desktop analysis. Hydrologic Soil Type A and B have high infiltration rates and are ideal for green infrastructure relying on infiltration. Type C or better is acceptable for infiltration. If other soil types are present with lower infiltration rates, infiltration could still be possible but soil amendments or the use of gravel layers would likely be necessary.

Following this desktop analysis, the project team will select up to four (4) locations for test pits. Test pits are conducted to better understand subsurface soil conditions such as soil type, consistency, and the depth to water table.

Task 3 – Schematic Design of Priority Nature-Based Solutions

3.1 Design of Nature-Based Solutions for Stormwater Flooding

Project Team members will advance the design of four (4) green infrastructure opportunities identified in Phase 1 of the CFPF work. These designs will be informed by the work completed under Phase I (e.g., preliminary sizing and H&H modeling) and documentation of existing conditions. Project Team members will develop the designs based on guidance from the most recent DEQ Stormwater Management handbook, as well as relevant sections from the Chesapeake Bay Local Assistance Manual and VDOT Drainage Manual. Designs will consider water quantity reduction and water quality improvements consistent with state requirements and Chesapeake Bay goals.

Task 4 – Community Engagement

4.1 Coordination with Abutters

Project Team members will contact and coordinate with property abutter of proposed green infrastructure locations. Project Team member will make stakeholder outreach with abutters and may include one-on-one interviews about preference and willingness to coordinate.

4.2 Green Infrastructure Education

Project Team members will develop temporary educational signage about the function and benefits of green infrastructure. They will also develop interactive materials that can be used either at Town Hall or other locations to show how green infrastructure helps slow stormwater and infiltrate water.

PROJECT TIMELINE

PROJECT SCHEDULE														
		2024										2025		
TASK DESCRIPTION	Start date is dependent on grant award date and contracting	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Task 1 – Project Kickoff														
1.1 Project Kickoff Meeting														
1.2 Project Management														
Task 2 – Development of Base Mapping to Support Implementable Nature-Based Solutions														
2.1 Environmental Receptors Mapping														
2.2 Topographic Survey of Potential Locations of Green Infrastructure														
2.3 Sub-surface exploration														
Task 3 – Schematic Design of Priority Nature-Based Solutions														
3.1 Design of Nature-Based Solutions for Stormwater Flooding														
Task 4 – Community Engagement														
4.1 Coordination with Abutters														
4.2 Green Infrastructure Education														

TOWN OF OCCOQUAN

Circa 1734 ● Chartered 1804 ● Incorporated 1874
314 Mill Street ● PO Box 195 ● Occoquan, Virginia 22125
www.occoquanva.gov

Approach, Milestones and Deliverables

These are more fully explained in the Scope of Work. However, below is the milestones and deliverables for each Task-

PROJECT TIMELINE

PROJECT SCHEDULE														
		2024										2025		
TASK DESCRIPTION	Start date is dependent on grant award date and contracting	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Task 1 – Project Kickoff														
1.1 Project Kickoff Meeting		■												
1.2 Project Management		■	■	■	■	■	■	■	■	■	■	■	■	■
Task 2 – Development of Base Mapping to Support Implementable Nature-Based Solutions														
2.1 Environmental Receptors Mapping			■	■										
2.2 Topographic Survey of Potential Locations of Green Infrastructure				■	■									
2.3 Sub-surface exploration					■	■								
Task 3 – Schematic Design of Priority Nature-Based Solutions														
3.1 Design of Nature-Based Solutions for Stormwater Flooding							■	■	■	■	■			
Task 4 – Community Engagement														
4.1 Coordination with Abutters									■			■		
4.2 Green Infrastructure Education													■	■

Milestones and Deliverables

Task 1 – Project Kickoff

1.1 Project Kickoff Meeting
Deliverables: Meeting agenda, list of attendees, meeting notes

1.2 Project Management
Deliverables: Quarterly progress reports using DCR template.

Task 2 – Development of Base Mapping to Support Implementable Nature-Based Solutions

2.1 Environmental Receptors Mapping
Deliverables:

- Existing information will be included in Sub-task 2.2 deliverables on existing conditions plans.

- Wetlands report

2.2 Topographic Survey of Potential Locations of Green Infrastructure

Deliverables: Existing conditions plan (with topography survey of 4 green infrastructure concepts)

2.3 Sub-surface exploration

Deliverables: Memorandum summarizing results of sub-surface explorations with figures.

Task 3 – Schematic Design of Priority Nature-Based Solutions

3.1 Design of Nature-Based Solutions for Stormwater Flooding

Deliverables:

- Schematic Design (35-50% level design) drawing set for four (4) green infrastructure opportunities in HCA. Schematic Design will include existing conditions and proposed conditions site plans, demolition information, one prototypical cross section for each location, and prototypical landscape details. The set will also include a preliminary planting list for discussion with permitting agencies.
- Calculations supporting design

Task 4 – Community Engagement

4.1 Coordination with Abutters

Deliverables: Notes from conversations with up to six (6) abutters.

4.2 Green Infrastructure Education

Deliverables: Temporary educational sign for (1) project site, interactive materials on GI functioning.

Maintenance Plan for Project

This project is for up to four (4) green infrastructure solutions to 50% design and to conduct sub-surface explorations and survey to verify the viability of these designs. Maintenance plan is not applicable.

Benefit-Cost Analysis

The proposed project is to design several high priority green infrastructure projects (nature-based solutions) to mitigate stormwater flooding. The Town's consultant in its CFPF Round 3 Grant is in the process of creating an implementation plan to inform the timeline and funding mechanisms of high priority green and grey infrastructure upgrades and projects. The implementation plan includes opinions of probable costs and a ranking based on the projects that have the most benefit for their cost. According to the EPA, "Green infrastructure can be a cost-effective approach to improve water quality and help communities stretch their infrastructure investments further by providing multiple environmental, economic and community benefits also known as the triple bottom line." https://www.epa.gov/green-infrastructure/green-infrastructure-cost-benefit-resources

No Adverse Impact

The proposed project is to design several high priority green infrastructure projects (nature-based solutions) to mitigate stormwater flooding. The implementation of nature-based solutions in flood problem areas will also contribute to better water quality, shading and reduction of urban heat island, and greening of the historic downtown. The survey and designs proposed will demonstrate no adverse impact. Since this is a study and design, adverse impact is not applicable.

Ability to Provide Share of Cost

The Town of Occoquan has a Capital Improvement Program Budget for FY2024 that has Stormwater studies and improvements approved in the amount of 1,809,073. The local match would be taken from this line item.

Attached in the Supporting documentation is the Town Council Resolution supporting the grant project and pledge to use the Capital Improvement Program funds to provide the local match of $45,000.

CAPITAL IMPROVEMENT PROGRAM
FY 2024 - FY 2028

FY2024 Adopted Budget Capital Improvement Program	Activity	FY24	FY25	FY26	FY27	FY28	Project Total
Street and Parking Improvements	Public Works	10,000	-	25,000	-	-	**35,000**
Sidewalk Improvements	Public Works	-	-	-	-	40,000	**40,000**
Riverwalk Improvements	Public Works	26,204	127,507	-	-	-	**153,711**
Building and Parks Improvements	Public Works	62,000	-	-	8,000	-	**70,000**
Vehicles and Equipment	Public Safety	65,725	34,350	39,350	20,000	13,000	**172,425**
Stormwater Improvements	Public Works	1,806,073	-	-	-	-	**1,806,073**
Streetscape & Infrastructure Improvements	Public Works	45,000	-	-	-	-	**45,000**
Information Technology Improvements	Administration	5,500	5,500	20,500	-	-	**31,500**
		$2,020,502	**$167,357**	**$ 84,850**	**$28,000**	**$53,000**	**$2,353,709**
Fund Source Summary							
	CIP Funds	18,363	16,675	75,175	21,500	46,500	
	SLFRF Spending	538,079	141,007	-	-	-	**215,000**
	599 Funding	9,000	9,000	9,000	6,500	6,500	**27,407**
	Other Grants	1,455,060	675	675	-	-	**1,400,000**
	Funding Totals	**$2,020,502**	**$167,357**	**$84,450**	**$28,000**	**$53,000**	**$2,353,709**
Adopted Budget by Activity							
	Administration	5,500	5,500	20,500	-	-	**31,500**
	Public Safety	65,725	26,350	39,350	20,000	13,000	**164,425**
	Public Works	239,500	135,507	25,000	8,000	40,000	**2,157,784**
	Totals	**$2,020,502**	**$167,357**	**$84,850**	**$28,000**	**$53,000**	**$2,353,709**

FY 2024-2028 CIP Project List

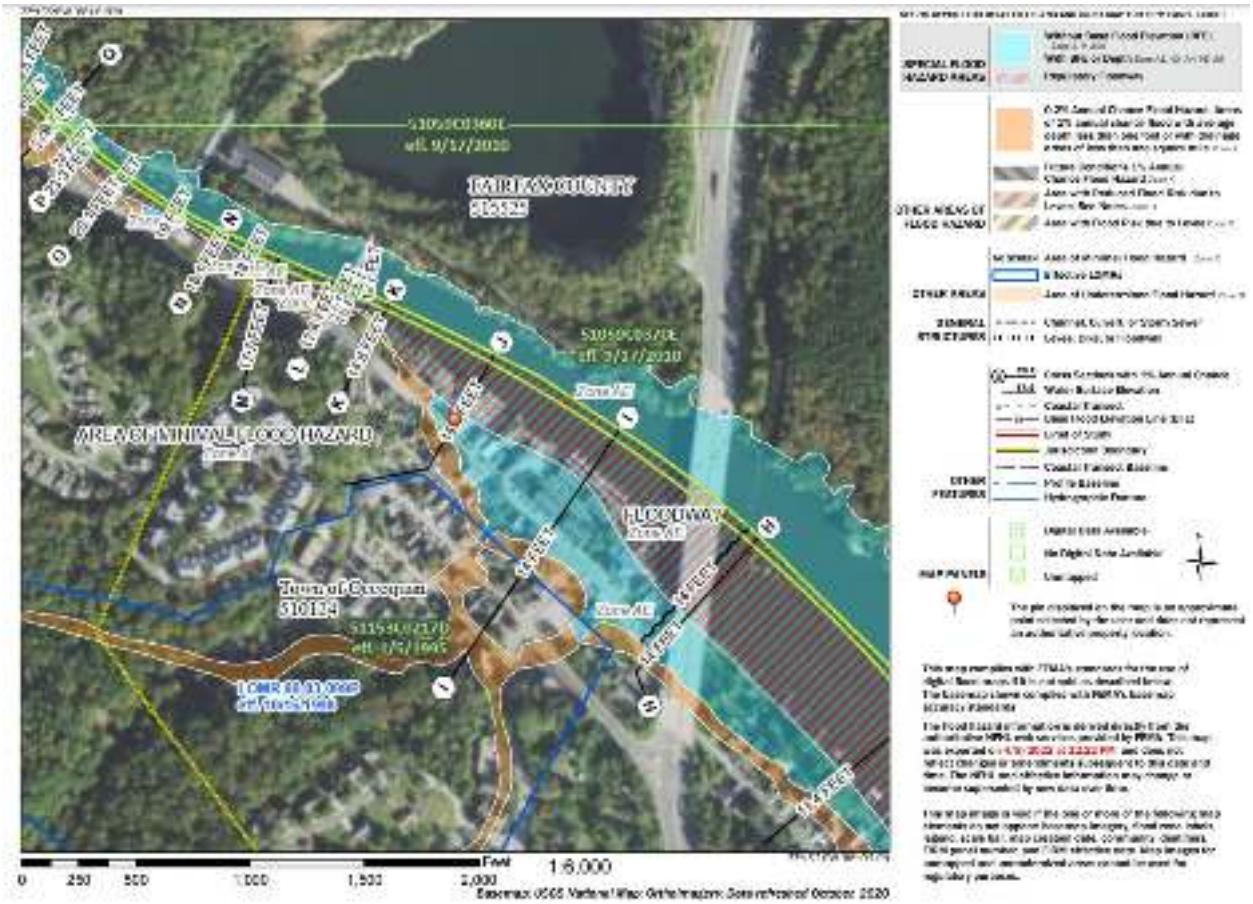
Category	Project	Fiscal Year
Street and Parking Improvements	Parking Facility/Alternative	FY2024
Street and Parking Improvements	Poplar Alley Paving	FY2026
Sidewalk Improvements	Historic District Sidewalk/ Intersection Improvements	FY2028
Riverwalk Improvements	Riverwalk Overlook Extension Project	FY2024
Riverwalk Improvements	Riverwalk Planning	FY2024
Riverwalk Improvements	Million Mussel Cage	FY2024
Riverwalk Improvements	Riverwalk Extensions	FY2025
Building and Park Improvements	River Mill Park Playground/Seating Area	FY2024
Building and Park Improvements	River Mill Park Utility Updates	FY2024
Building and Park Improvements	Mill House Museum - Roof	FY2027
Vehicle/Equipment Replacement	Public Safety - Replacement Vehicles	FY2024 –

		FY2028
Vehicle/Equipment Replacement	Public Safety – Body Worn Camera System	FY2024-2027
Vehicle/Equipment Replacement	Public Works – Replace Utility Cart	FY2025
Vehicle/Equipment Replacement	Public Safety - Body Armor	FY2024 - FY2026
Vehicle/Equipment Replacement	Public Safety Radios	FY2024
Stormwater Improvements	Stormwater – Flood Protection Study	FY2024
Stormwater Improvements	Stormwater Upgrades	FY2024
Stormwater Improvements	Stormwater Safety Projects	FY2024
Streetscape & Infrastructure Improvements	Signage and Gateway Beautification	FY2024
Information Technology	Computer Upgrades	FY2026
Information Technology	Timed Parking Equipment	FY2024-FY2026

For questions on the Adopted Budget or the town budget process, contact the Town of Occoquan at info@occoquanva.gov or call (703) 491-1918. Visit www.occoquanva.gov for general information about the Town of Occoquan.

Historic Flooding data and Hydrologic Studies

The project area is within a mapped floodplain zone. The current FIRM is shown on panel 510240217D (shown below). However, FEMA is updating the FIRMs and the panel numbers that have been preliminary published for review (2020) are 51153C0209E and 511530217E, as seen here: https://www.pwcva.gov/department/environmental-services/fema-preliminary-map-changes



As can be seen, the Town and the proposed project fall within flood zones X, A, and AE.

The Town is currently completing a Hydraulic and Hydrologic (H/H) model which shows the functioning of the town stormwater infrastructure under current and future climate conditions. To develop this H/H model, the Town's consultants reviewed historical flood events – including extents and depths of flooding. The following historical events were used to calibrate the H/H model.

Agnes 1972

14 inches in 24 hours

20 feet plus over river height

Wayward boats bob up and down on Occoquan's flooded Main Street

Eloise 1975

6.77 inches of rain in 24 hours

Schools, roads closed in worst flood since Agnes

Potomac News

You-pump gas may cost jobs

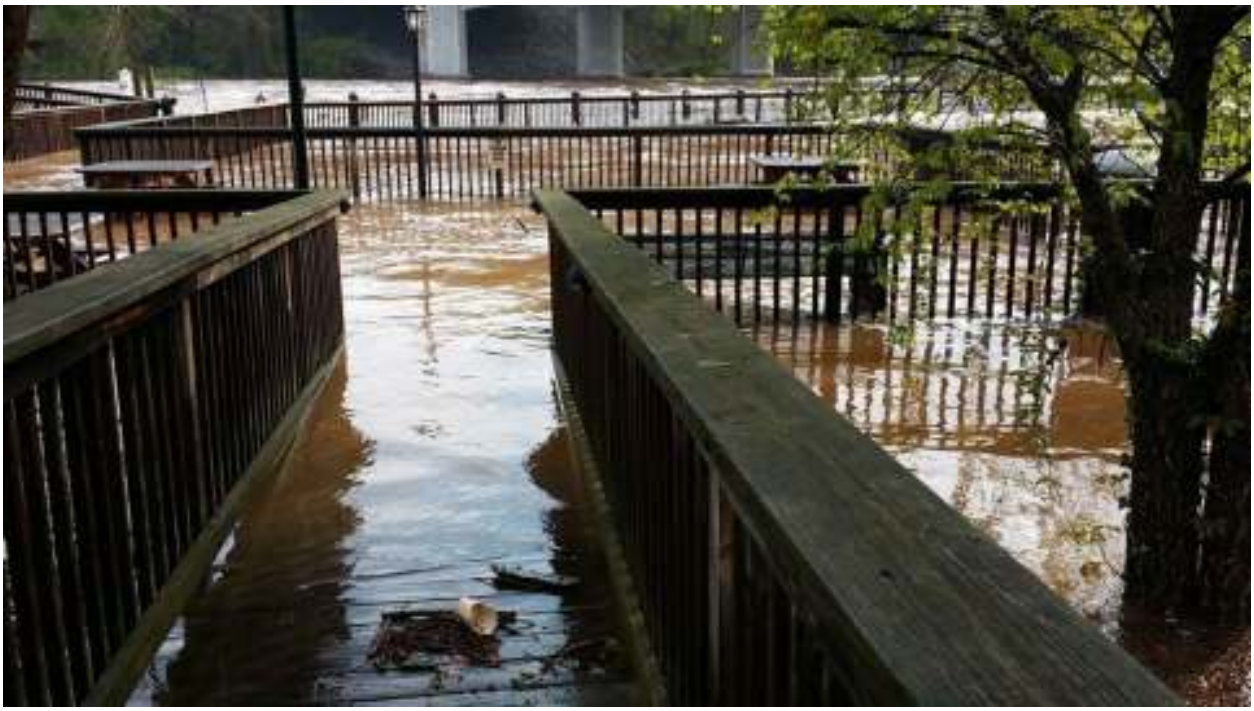
Church to mark 125th year

Dumfries race lacking in animosity

May 2008

September 2011 - Lee

May 2014



Studies

The following studies were reviewed to develop the H/H model and identify high priority actions, including the green infrastructure opportunities that the Town is seeking funding to design.

- Comprehensive Plan Vision 2026 (2021 Update) (Link https://www.occoquanva.gov/wp-content/uploads/2022/03/Comprehensive-Plan-Update-2021-FINAL-FULL-2.pdf
- Town of Occoquan Storm Water Management Program Review (2020)
- Town Ordinance Title XV: Land Usage (2004)
- Floodplain Study and Proposed Structures (2019)

The Town is using the Hydraulic and Hydrologic (H/H) model currently being developed (2023) to test the effectiveness of various green infrastructure locations to reduce flood impacts and mitigate stormwater. These locations have been verified against historical flood data as well, and designs are targeted at "flooding hot spots" or problem areas.

Repetitive Loss and/or Sever Repetitive Loss Properties

As discussed in the Scope of Work and in Background, the entire Occoquan historic district has had repetitive loss. The properties in the historic district are both commercial, residential, and mixed use. In addition, several properties along Ballywhack Creek regularly receive flash flooding and property loss.