# PROJECT IDENTIFICATION

## BATH COUNTY

## HOT SPRINGS AND MAIN STREET FLOODING ALONG HOT SPRINGS RUN

**Location Description**

38.00040, -79.83167

The village center along Main Street in Hot Springs. Hot Springs Run, a small stream, flows through the village center (**Figure 1**), collecting runoff and stormwater from multiple sources along the commercial and residential area. The stream runs parallel to Main Street.

**Project Issue**

Recurrent flash flooding — Multiple drainage areas meet in the village center, emptying into Hot Springs Run (**Figure 1**). Buildings and other infrastructure have been developed around the stream, preventing the natural floodplain function and constraining the stream (**Figure 2**). During high flow events, water will overtop the banks of the stream; floodwater enters the street and adjacent buildings in more severe events. Most adjacent land is privately owned or developed, leaving little room for upstream control measures.

**Project Purpose**

Assess the feasibility of intervention measures, including upsizing stormwater or upstream peak reduction structures, to address flooding along Hot Springs Run

**Identified Constraints**

a. Nearby infrastructure and buildings
b. Easements and/or property acquisition
c. Agency coordination (VDOT-maintained infrastructure)

**Additional Information Needed**

a. Stormwater infrastructure locations and capacities
b. Existing utility locations

**Project Proposal and Planning-Level Cost Estimate**

Before any formal design or development of engineering solutions, a stormwater utility survey and inspection and an H&H study should be performed on the corridor. The County has identified multiple drainage pathways throughout this area that converge into Hot Springs Run: runoff enters from Route 220, a small tributary flows from the Homestead golf course, and multiple stormwater pipes run under the road and drain into the creek. However, the drainage path, flow volumes, and outlet locations into the stream are largely unknown. This study would map existing stormwater conveyances, calculate the current capacity, and identify any obstructions or constrictions within

the system. It is possible that development has increased over time, without corresponding improvements to the existing stormwater conveyances. A comprehensive survey and H&H study will enable identification of sections of the stormwater system that may be undersized or have deteriorated. The County has also identified that stormwater pipes that run under Main Street often become clogged, likely worsening flood severity throughout the area. The H&H study could identify the locations that experience the worst sediment and debris buildup. A maintenance schedule could then be developed for the stormwater system to clear out these conveyances and remove obstructions. This maintenance would be in coordination with VDOT, as they are responsible for much of the infrastructure along Main Street, including bridges and culverts (**Figure 3**).

The study should also evaluate the utility and plausibility of stormwater attenuation structures in the watershed to decrease flood severity. Potential structures could include dry swales, regenerative stormwater channels, permeable pavement, or other practices that increase infiltration.

| ITEM/DESCRIPTION | QTY | UNIT | UNIT COST | ITEM SUB-TOTAL | EXTENDED SUB-TOTAL |
|---|---|---|---|---|---|
| **Design and Survey** | | | | | **$75,000.00** |
| Existing Conditions Survey | 1 | LS | $35,000.00 | $35,000.00 | |
| H&H Study | 1 | LS | $40,000.00 | $40,000.00 | |
| **Contingency (30%)** | | | | | **$22,500.00** |
| **TOTAL ESTIMATED BUDGET** | | | | | **$97,500.00** |

Estimation of costs associated with construction-phase efforts will require additional study and scoping.

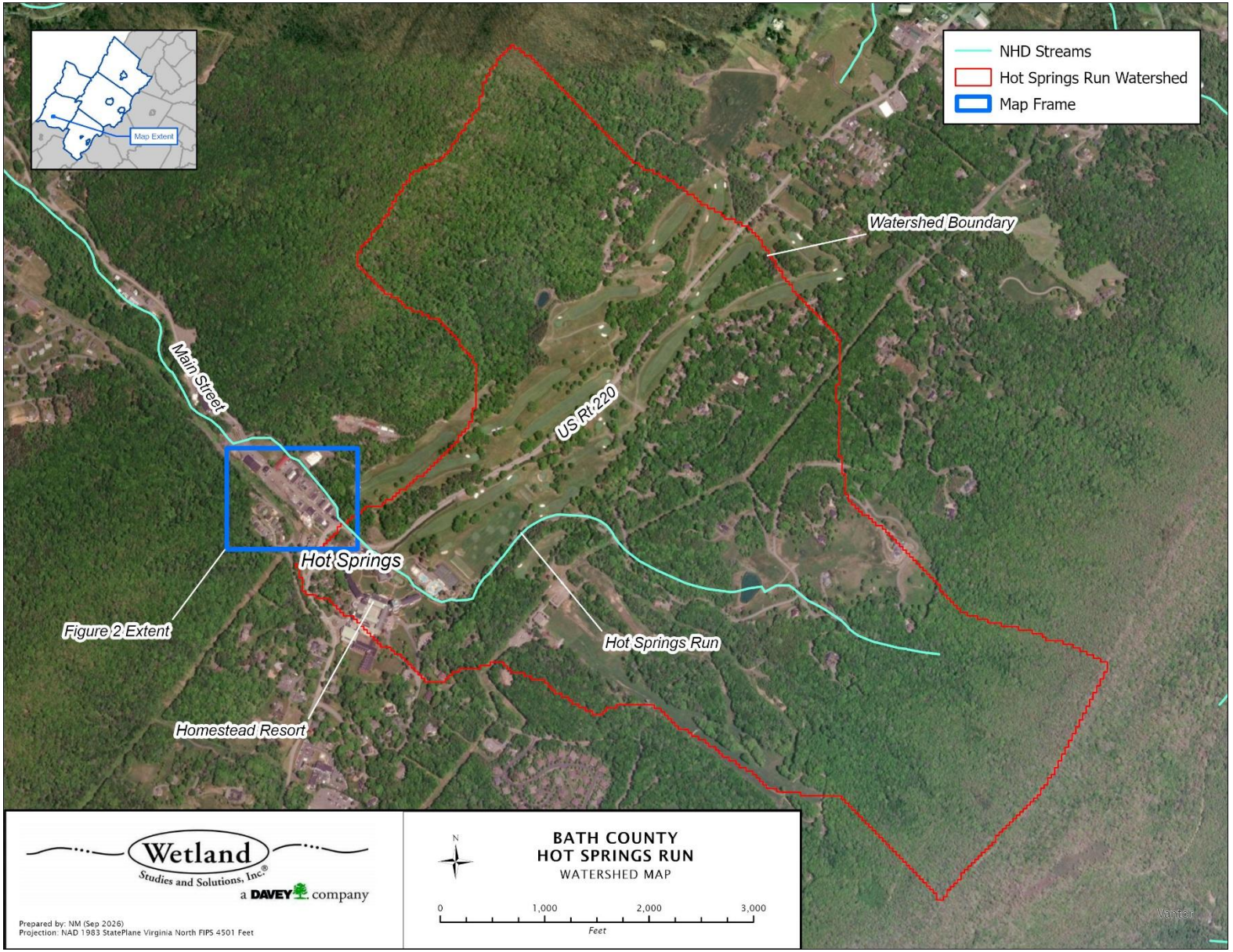


**Figure 1. Hot Springs Run watershed showing the upstream land practices and notable roads.**

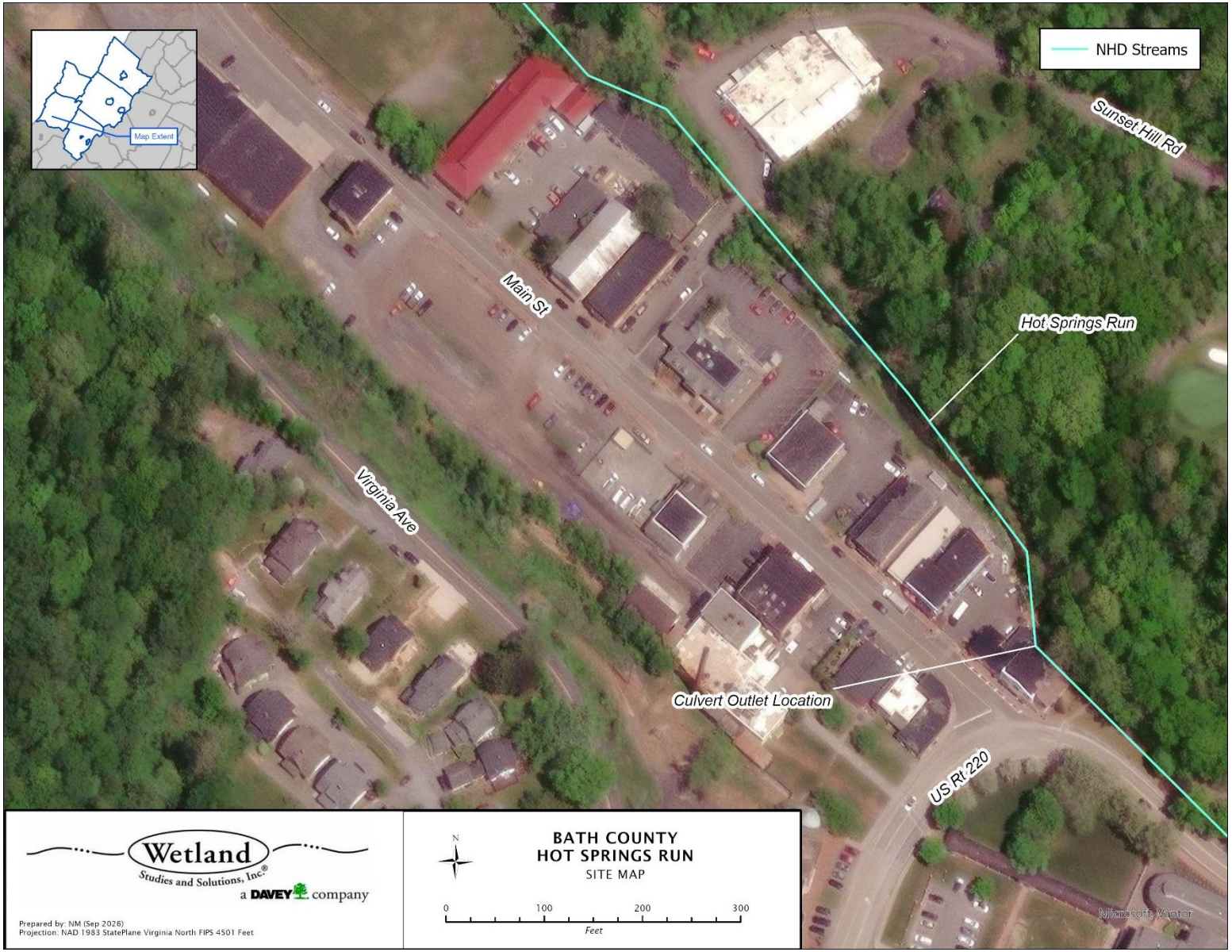


**Figure 2. Location of frequent flooding along Hot Springs Run. Path of stream and notable streets are marked.**



**Figure 3. Hot Springs Run at left flowing adjacent to a building and parking lot in the village center. Photograph taken facing upstream, approximately southeast.**

## Possible Alternatives and Additional Considerations

Due to the limited area for construction of stormwater attenuation features, residents in the area can be encouraged to install residential-scale stormwater management practices to enhance the flooding reduction efforts, such as rain gardens (micro-bioretention) and rain barrels. These would increase infiltration and storage of rainwater, decreasing the overall volume of floodwater. The Mountain Soil and Water Conservation District (MSWCD) administers the Virginia Conservation Assistance Program (VCAP), which can be another source of funding for these sorts of residential projects.

County officials have also noted that commercial and residential buildings have experienced interior flooding in more substantial rain events, which could be mitigated with the use of deployable flood barriers that can be installed prior to severe storms. This would not address the source of flooding or reduce severity but would protect these properties from flood damage.

Improved early warnings can greatly reduce risk to life and property, and the County has already begun planning and seeking funding for expanding and advancing its early flood warning system. Continued advancements in monitoring and assessing risk and conveying timely information should be pursued.

Regulatory Changes

Additional development in the contributing watershed could further exacerbate flooding issues, supporting the need to consider regulatory changes regarding future development. Bath County can require new development in the Hot Springs Run watershed to manage its runoff through stormwater and floodplain ordinances, conditions on subdivision and site plan approvals, through proffers when land is rezoned, and, if it adopts a pro rata share ordinance, through developer contributions toward off-site drainage improvements.

TMDL/MS4 Considerations

There are currently no localities in Bath County that hold an MS4 permit, so the pollutant removal benefits to support stormwater program requirements were not factored. Hot Springs Run does not have a TMDL, but it is within the Jackson River watershed, which does have an approved benthic TMDL. Total nitrogen and phosphorous were listed as the most probable stressors of the benthic macroinvertebrate community. The Jackson River also has a TMDL developed for PCBs found in fish tissue. Stormwater infrastructure improvements would likely provide no benefits towards achieving goals related to these TMDLs. Implementation of the upstream BMPs or stormwater attenuation structures could help in nutrient reductions, depending on the type of BMP.

**Assumptions**

Watershed (via StreamStats 9/1/2026) is 1 square mile, taken from coordinate location

**Recommended Next Steps**

Pursue survey/mapping of existing infrastructure to ease maintenance and enable a desktop analysis of likely constrictions.

**References**

The Louis Berger Group, Inc. 2010. Benthic TMDL Development for the Jackson River, Virginia.

USGS. StreamStats v4.33.0. Accessed online 1 September 2026.

Virginia Tech Department of Biological Systems Engineering. 2025. PCB Total Maximum Daily Load Development for the Middle and Upper James River, Maury River, and Jackson River Watersheds.

# PROJECT IDENTIFICATION
## BATH COUNTY
## LOWER YARD ROAD AND CABIN CREEK FLOODING

**Location Description**
37.97514, -79.60069
Lower Yard Road, Village of Millboro — across from the General Store where Cabin Creek runs alongside and then under the railroad tracks.

**Project Issue**
Stream channel flooding — County staff note that Cabin Creek has filled with sediment over time, significantly reducing channel capacity and that during heavy rain events, reduced capacity causes water to overtop banks and flood adjacent low-lying areas along Lower Yard Road.

**Project Purpose**
Restore Cabin Creek channel capacity to reduce flood risk along Lower Yard Road in Millboro

**Identified Constraints**
a. Potential James spinymussel (*Parvaspina collina*) habitat, federal & VA state endangered species
b. Railroad trestle crossing and coordination with Buckingham Branch Railroad
c. Need for easements and/or property acquisition

**Additional Information Needed**
Hydraulic study and sediment transport analysis, estimate of extent and rate of sedimentation

**Project Proposal and Planning-Level Cost Estimate**
The potential presence of the endangered mussel species could limit the designs and potential work that could be done in the channel. However, it is possible that a mutually beneficial solution exists for both addressing flooding and improving habitat for the mussel, as they do not thrive in silty substrates and many of their host fishes require cobble-bottom streams with healthy macroinvertebrate populations. A hydraulic analysis and sediment transport calculations should be conducted, along with an assessment of sediment load and sourcing. If there is excess sediment being deposited in the channel, it may be possible to address at the source, perhaps with targeted BMP implementation or streambank stabilization. If sediment deposition is occurring due to an existing structure, it is possible that work could be completed as a permitted maintenance effort, and if mussel habitat is improved in the process, agency coordination may result in the restrictions of work being limited to a time of year restriction.

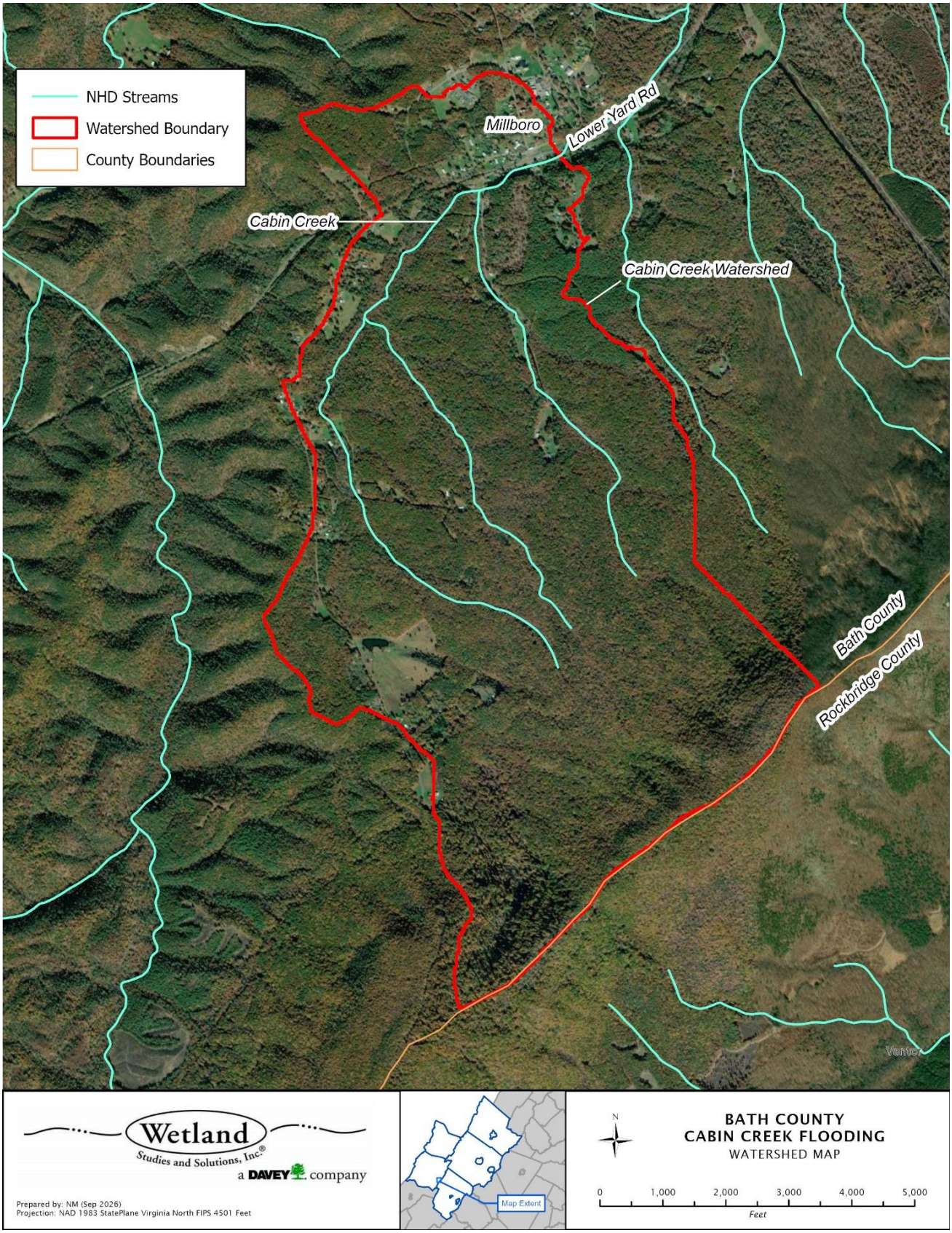


**Figure 1. Watershed of Cabin Creek in Millboro, marking flow paths and notable roads.**

If there is excess sediment load in the stream, the reach is likely no longer suitable habitat for the spinymussel and a restoration effort could improve habitat quality. This opens the possibility of additional funding sources and partnership opportunities for solutions that can reduce flood impacts while improving aquatic habitat. An assessment of habitat quality should be included in the preliminary studies. Until more information is available and documented on the site, a formal design or engineered solution would not be feasible.

| ITEM/DESCRIPTION | QTY | UNIT | UNIT COST | ITEM SUB-TOTAL | EXTENDED SUB-TOTAL |
|---|---|---|---|---|---|
| **Design and Survey** | | | | | **$65,000.00** |
| Stream Channel Survey, Habitat and Sediment Assessment | 1 | LS | $35,000.00 | $35,000.00 | |
| H&H Study | 1 | LS | $30,000.00 | $30,000.00 | |
| **Contingency (30%)** | | | | | **$19,500.00** |
| **TOTAL ESTIMATED BUDGET** | | | | | **$84,500.00** |

Estimation of costs associated with construction-phase efforts will require additional study and scoping.

**Possible Alternatives and Additional Considerations**

The alternative designs are also greatly constrained by the presence of the endangered mussel in Cabin Creek. Officials noted that floodplain grading could be done in this area, which would allow flows to more frequently access the floodplain and decrease the volume of flooding along Lower Yard Road. This would also benefit the local ecology, providing habitat for wildlife. Floodplain grading would require extensive erosion control measures to prevent more sedimentation and protect the mussels. Locations that are identified throughout the watershed that are leading to the high volume of sediment in Cabin Creek should be addressed. Temporary areas of bare earth should be controlled with silt fences or filter socks and seeded to secure the soil. In more severe areas, detention ponds or other BMPs could be installed to slow runoff and allow sediment to settle out of the water. It is also possible to enhance the riparian buffer throughout this corridor, widening the existing strip or filling gaps with a variety of native vegetation.

TMDL/MS4 Considerations

There are currently no towns or communities within Bath County that hold an MS4 permit. Cabin Creek is a tributary of the Maury River, which has an approved TMDL for bacteria. The Maury River also has an approved TMDL for PCBs. The proposed actions within this report would not assist in achieving TMDL goals for bacteria or PCBs.

**Assumptions**

Watershed (via StreamStats 9/2/2026) is 2.46 square miles from the coordinates.

**Recommended Next Steps**

Begin outreach with VA DWR and US FWS to pursue habitat assessment to determine if suitable for James spinymussel. Outreach to the James River Association could result in their assistance, and they have worked on projects specific to mussel habitat restoration in the past.

**References**

USFWS. ECOSphere: James spinymussel (*Parvaspina collina*). https://ecos.fws.gov/ecp/species/2212 Accessed online 8 September 2026.

USGS. StreamStats v4.33.0. Accessed online 2 September 2026.

Virginia Department of Biological Systems Engineering. 2013. Bacteria Total Maximum Daily Load Development for Colliers Creek, North Fork Buffalo Creek, South Fork Buffalo Creek, Buffalo Creek, Maury River and Cedar Creek and a Sediment Total Maximum Daily Load Development for Colliers Creek.

Virginia Department of Biological Systems Engineering. 2025. PCB Total Maximum Daily Load Development for the Middle and Upper James River, Maury River, and Jackson River Watersheds

VADWR. James Spinymussel. https://dwr.virginia.gov/wildlife/information/james-spinymussel/ Accesssed online 8 September 2026.

# PROJECT IDENTIFICATION
## BATH COUNTY
## ROUTE 220 AND ROSELOE LANE DRAINAGE CONVERGENCE

**Location Description**
38.0326, -79.79998
US Highway 220 (Sam Snead Highway) at Roseloe Lane where runoff from Roseloe Hill and Roseloe Lane flows through a roadside ditch and crosses Route 220.

**Project Issue**
Roadway drainage/stormwater sheet flow — runoff from Roseloe Hill and Roseloe Lane converges in a roadside ditch and crosses Route 220 (**Figure 1**), temporarily flooding the roadway during rain events. County staff noted that water typically recedes within 15 minutes and does not pose a serious threat to structures under typical conditions.

**Project Purpose**
Improve drainage conveyance at Roseloe Lane/Route 220 crossing to eliminate temporary road flooding and reduce vehicle safety risk during heavy storm events

**Identified Constraints**
a. Nearby infrastructure
b. VDOT coordination and design approval

**Additional Information Needed**
a. Presence of utilities
b. Culvert capacity
c. Culvert condition

**Project Proposal and Planning-Level Cost Estimate**
Sediment and other debris have built up in the ditch along US 220 (**Figure 2**), partially blocking the culverts conveying water into and out of the ditch (**Figure 3**; **Figure 4**). The ditch should be excavated to remove this sediment buildup and ensure positive drainage along its length and then re-stabilized with permanent vegetation.

A preliminary analysis could also be completed to verify that the existing culverts and ditches are adequately sized, particularly if flooding continues to occur after the initial ditch re-establishment. Additionally, the likely source of the accumulated sediment should be evaluated, via both analysis of the removed sediment and an assessment of the drainage area and past changes, to determine the likelihood and plausible timescale of the ditch needing maintenance again.




**Figure 1. Proposed ditch improvement location along US 220. Important infrastructure and roads are marked.**

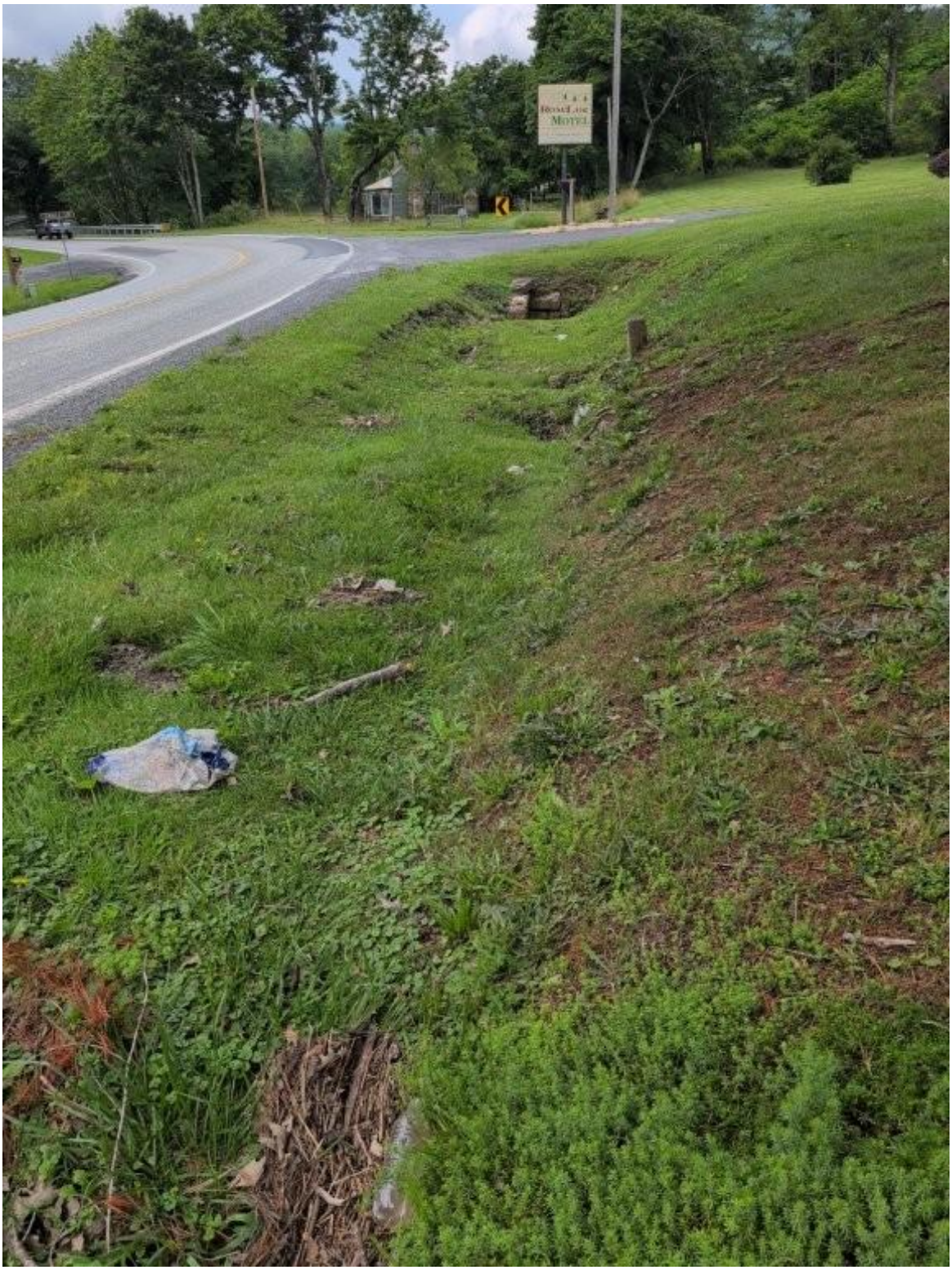

**Figure 2. Drainage ditch that has been largely filled in with sediment. Photograph taken facing the direction of flow (approximately southwest).**



**Figure 3. Inlet of downstream culvert along the ditch that conveys water under US 220. Debris can be seen partially obstructing the culvert inlet and erosion noted along the channel.**



**Figure 4. Outlet of upstream culvert along the ditch, almost entirely obscured/buried.**

| ITEM/DESCRIPTION | QTY | UNIT | UNIT COST | ITEM SUB-TOTAL | EXTENDED SUB-TOTAL |
|---|---|---|---|---|---|
| **Survey and PER** | | | | | **$35,000.00** |
| **Access and Erosion/Sediment Control** | | | | | **$3,800.00** |
| **Ditch Re-establishment** | | | | | **$7,600.00** |
| Mobilization | 1 | LS | $5,000.00 | $5,000.00 | |
| Ditch Excavation | 65 | LF | $40.00 | $2,600.00 | |
| **Contingency (30%)** | | | | | **$13,920.00** |
| **TOTAL ESTIMATED BUDGET** | | | | | **$60,320.00** |

The table above presents estimate costs for both a survey and PER development as well as ditch re-establishment. Ditch re-establishment could be pursued separately and prior to development of a PER for immediate improvement.

**Possible Alternatives and Additional Considerations**

A narrow grass swale BMP could be installed along the roadway in this location to provide more pollutant removal and peak reduction benefits than a traditional ditch, but it would require an increased budget, more excavation, and cooperation from neighboring private properties. Space is also limited in this area, so this design might prove infeasible upon further evaluation.

TMDL/MS4 Considerations

There are currently no localities in Bath County that hold an MS4 permit, so the pollutant removal benefits to support stormwater program requirements were not factored. This site is situated in the Jackson River watershed, which has approved TMDLs for nitrogen, phosphorous, and PCBs. Ditch improvements in this area would likely provide no benefits towards pollutant reductions or other TMDL goals.

**Assumptions**

- Watershed (via StreamStats 9/2/2026) is 0.18 square miles, taken from the channel between Redemption Rd and Cahill Ln
- Approximately 65 lf length and 1 ft depth for ditch excavation

**Recommended Next Steps**

Excavate to restore the ditch to design dimensions and re-vegetate.

**References**

The Louis Berger Group, Inc. 2010. Benthic TMDL Development for the Jackson River, Virginia.

USGS. StreamStats v4.33.0. Accessed online 2 September 2026.

Virginia Tech Department of Biological Systems Engineering. 2025. PCB Total Maximum Daily Load Development for the Middle and Upper James River, Maury River, and Jackson River Watersheds.