

FY 22 HMA – Grant Application Review Summary

Subapplication Number	EMA-2022-BR-001-0011		
Project Title	Town of Benson Driving Branch Stream Restoration Project		
Applicant Name	North Carolina Department of Public Safety		
Subapplicant Name	Town of Benson		
Project Type	Flood Risk Reduction		
Recommendation	Yes with Conditions		
Federal Cost (FEMA GO)	\$2,181,202	Phased Project	Yes
BCR (subapplication)	1.28	Duplicate Project	No
BCR (reanalysis)	1.06	Benefits (reanalysis)	\$3,236,245

Summary

This is a technical feasibility and cost-effectiveness review in support of the National Technical Review process. Additional Environmental Planning and Historic Preservation (EHP), eligibility and completeness, and funding limitation considerations may affect the selection of this subapplication for further consideration and funding. No contact was made with the applicant or subapplicant; this review is solely based on information provided in the subapplication.

Scope of Work

The scope of work is well-defined and clearly explains the activities necessary to complete the work. The subapplicant has submitted a subapplication for a proposed project that incorporates a combination of “green” and “gray” infrastructure enhancements—including floodplain and stream restoration as well as culvert, roadway, and utility improvements—to reduce flood-related impacts and damages experienced during Hurricane Matthew in 2016. The project includes the following elements:

- Use nature-based approaches to daylight and rehabilitate 375 feet of Driving Branch Creek (currently enclosed in a 60-inch underground pipe beneath the town’s public utilities maintenance yard upstream of North Market Street), and to stabilize and rehabilitate the creek upstream of the North Johnson Street crossing.
- Improve protection for a potable water line, a wastewater pipe, and electrical poles at the North Johnson Street crossing to reduce the risk of loss of utility services to town citizens.
- Replace the existing culverts at the North Market Street and North Johnson Street crossings to increase flow capacity.
- Improve 700 feet of the North Market Street roadway at the Driving Branch crossing, from East Holmes Street to the new public works facility, to reduce risk of loss of access to the town’s public works department maintenance yard. Access is needed to deliver emergency services during large storm events.

Site survey, additional hydrologic and hydraulic modeling, geomorphic assessment, design development, environmental documentation, project management, and permitting will be completed during Phase 1. Construction, preparation of an Operations and Maintenance Plan, project management, and project closeout will occur during Phase 2.

Technical Feasibility

Project Schedule

The schedule duration is 36 months. The schedule includes all items in the scope of work and is reasonable.

Cost Estimate

The cost estimate includes sufficient line items consistent with the scope of work.

Technical Design Information

The following information and documentation were provided to support the project:

Item	Documentation	Evaluation
Proposed Level of Protection	Scope of work	<p>The project does not indicate a proposed level of protection.</p> <p>Supporting documentation states that flood risk will be reduced but does not include details.</p> <p>The subapplication indicates that improvements will reduce the risk of loss of access to the town's public works facility and equipment, and will reduce the risk of loss of function to potable water, wastewater, and electrical services.</p>
Flood Risk Data	H&H Analysis	<p>The proposed project is not in the Special Flood Hazard Area.</p> <p>Level of protection prior to mitigation is less than a 10-year recurrence interval (RI) storm event at the North Market Street culvert, as described in the hydraulics and hydrology (H&H) report.</p> <p>Frequent flooding occurs during heavy precipitation events, including during Hurricane Matthew in 2016, which was considered a 100-year RI event.</p> <p>The provided documentation does show how the proposed project will reduce risk.</p>
Residual Risk	H&H report	<p>The proposed project does identify residual risk.</p> <p>H&H report noted that stream restoration, upsizing two culverts, and improving utilities will reduce but not eliminate residual risk.</p>
Design and Performance Standards	BRIC Technical Scoring Support and Scope of work narrative	<p>The subapplication provides documentation for state and county building code adoption; however, the subapplication does not specifically reference codes and standards.</p>
Design Drawings, Maps, Photographs	Project maps/photos, scope of work narrative	<p>The subapplication includes a project location map and photographs documenting previous damage as well as a narrative description of proposed improvements.</p>

Item	Documentation	Evaluation
		Design drawings will be prepared during Phase 1.
Upstream and Downstream Impacts	H&H Analysis	The documentation indicates that the proposed project will not have adverse upstream or downstream impacts, but that more modeling is needed to confirm this assumption.
Operation and Maintenance (O&M) Plans	Scope of work narrative	Subapplicant indicates that an O&M plan will be developed during Phase 2 of the project.

Based on the documentation provided, the project is technically feasible and effective at reducing risk to individuals and property from natural hazards. The following conditions were identified:

- Provide documentation to support that stream restoration, roadway improvements, and culvert upsizing will be designed and built in compliance with all applicable federal and local standards.
- Provide documentation to support that the proposed project will not have adverse upstream or downstream impacts.

Provide the following Phase 1 deliverables needed to determine technical feasibility:

- Hydrologic and hydraulic data/modeling (for flood risk reduction) and/or other relevant technical data (infrastructure).
- Engineering design (typically 30/60/90) and cost estimate.
- Technical body of information needed to support the desired level of effectiveness/protection or amount of risk reduction.

Cost-Effectiveness

The Benefit-Cost Analysis (BCA) was completed based on historical damages.

The following was found during review of the submitted BCA:

Cost Estimation

Input	Value	Evaluation
Project Useful Life (PUL)	50 years	This value is not consistent with the FEMA standard values. Stream restoration and culverts have 30-year PULs, according to the BCA help documentation.
BCA Toolkit Initial Project Cost	\$2,726,503.41	This amount is consistent with the subapplication project cost estimate.
Annual Maintenance Cost	\$26,022	This amount is less than 1 percent of total project cost and is reasonable.
BCA Toolkit Total Project Cost	\$3,085,626	This amount is calculated based on the initial project cost, the annual maintenance costs, and the PUL.

Historical Damages

Input	Evaluation
Facility Type	The facility types of 'Potable Water Services,' 'Wastewater Services,' 'Electrical Services,' and 'Roadway Closures' were used in the BCA. This input is consistent with the proposed project in the subapplication.
Loss of Function	<p>Loss of function values were based on BCA methodology documentation signed by the town manager and supported by information provided by the current public works superintendent and the former public works director.</p> <p>North Johnson Street loss of function damages were calculated using 1,100 one-way detour trips per day, 8 additional minutes per detour, and 2.3 additional miles, based on North Carolina Department of Transportation traffic data and a length and time estimation by the town manager using an online mapping platform and knowledge of town speed limits and stoplights.</p> <p>Electrical service loss of function damages were calculated using 3,196 customers served based on 1,158 metering connections at the Johnson Street substation and census data of 2.76 persons/household.</p> <p>Wastewater service loss of function damages were calculated using 179 customers served based on 65 connections, per town records and census data of 2.76 persons/household.</p> <p>Potable water service loss of function damages were calculated using 1,104 customers served based on 400 connections, per town records and census data of 2.76 persons/household.</p>
Before-Mitigation Damages	<p>Before-mitigation damages were calculated based on BCA methodology documentation signed by the town manager and supported by information provided by the current public works superintendent and the former public works director.</p> <p>The BCA documentation indicates that the former public works director confirmed that damages were sustained by Hurricane Matthew, estimated as a 100-year RI event. The subapplication did not include additional documentation to support the 100-year RI value.</p> <p>North Market Street roadway damages for a 7-day closure following the 100-year RI event included rebuilding the gravel road to the public works maintenance facility. Post-hurricane damages included cleanup time and materials, raw materials used to rebuild the road, and labor and equipment costs.</p> <p>The public works maintenance facility was damaged during the 100-year RI event. Access to the facility was blocked for 4 days, and the maintenance yard operated at partial capacity for months thereafter. Post-hurricane damages included repairing the 60-inch culvert under the public works yard that failed, repairs to the facility, equipment repairs and losses, and associated labor and materials.</p>

Input	Evaluation
	<p>North Market Street is a gravel road that requires annual maintenance until the proposed project is completed. The maintenance cost was detailed by labor, materials, and equipment costs, and was entered into the BCA using a 1-year RI, which is appropriate.</p> <p>North Johnson Street roadway damages and loss of function following the 100-year RI event included 24-hour traffic control for 14 days and cleanup efforts detailed by labor costs.</p> <p>North Johnson Street is a paved road that requires annual maintenance until the proposed project is completed. The maintenance cost was detailed by labor and equipment costs, and was entered into the BCA using a 1-year RI, which is appropriate.</p> <p>Electrical service was impacted for 1 day following the 10-year RI event. The 10-year RI does not match the 100-year RI used for other historical damages. Electrical damages included cleanup costs associated with debris clearing around the electrical poles.</p> <p>Wastewater service was impacted for 7 days following the 100-year RI event. Wastewater damages included cleanup costs associated with debris clearing in the channel around the pipeline.</p> <p>Potable water service was impacted for 7 days following the 100-year RI event. Potable water damages included cleanup costs associated with debris clearing in the channel around the pipeline.</p>
After-Mitigation Damages	After-mitigation damages are estimated to be 0.5 days of closure for each before-mitigation damage category during the 100-year RI event. This is a reasonable approach.

Additional Benefits

Input	Documentation	Evaluation
Environmental Benefits	Project narrative	The project included an increase in riparian ecosystem services of 0.86 acres at North Market Street and 0.57 acres at North Johnson Street, for a total of 1.43 acres. The total project area and percentage of land use of the project area is not consistent with supporting documentation, which indicates open space at North Market Street, as noted on the project extent conceptual figure.

Reanalysis BCA

A reanalysis BCA was performed, and the following edits were made:

Input	Value	Explanation
PUL	30 years	The PUL for stream restoration projects and culvert projects is 30 years rather than 50 years.
RI	50 years	Hurricane Matthew rainfall records from nearby Fort Bragg and USGS StreamStats for the Driving Branch watershed indicate that the event should be estimated as a 50-year RI rather than a 100-year RI.
Ecosystem Benefits	1.14 acres at North Market Street	Addition of urban open space at North Market Street that was indicated on the project extent conceptual figure.
Potable Water Damages	\$2,272	Removed water costs charged by the county, as fines are not an allowable damage in the BCA.

Based on the reanalysis BCA, the total benefits associated with this project, \$3,236,245, are greater than the total project cost of \$3,049,411, producing a BCR of 1.06.

Based on the documentation provided, the project is cost-effective. The following condition was identified:

- Confirm the additional ecosystem benefits used in the reanalysis.

Provide the following Phase 1 deliverable needed to determine cost-effectiveness:

- Refinement of the BCA.

Conclusion

Based on the information provided, the project is technically feasible and cost-effective; therefore, it is recommended for further consideration with the following conditions:

- Provide documentation to support that stream restoration, roadway improvements and culvert upsizing will be designed and built in compliance with all applicable federal and local standards.
- Provide documentation to support that the proposed project will not have adverse upstream or downstream impacts.
- Confirm the additional ecosystem benefits used in the reanalysis.

Provide the following Phase 1 deliverables needed to determine technical feasibility and cost-effectiveness:

- Hydrologic and hydraulic data/modeling (for flood risk reduction) and/or other relevant technical data (infrastructure).
- Engineering design (typically 30/60/90) and cost estimate.
- Technical body of information needed to support the desired level of effectiveness/protection or amount of risk reduction.

- Refinement of the BCA.
- Additional documentation required to support compliance with eligibility, technical feasibility, cost-effectiveness, and EHP requirements.

This review is an evaluation of the project's technical feasibility and cost-effectiveness. Additional EHP, eligibility and completeness, and funding limitation considerations may affect the selection of this subapplication for further consideration and funding.