FY 22 HMA – Grant Application Review Summary

Subapplication Number	EMA-2022-BR-001-0001		
Project Title	Hominy Swamp Stormwater Park		
Applicant Name	North Carolina Department of Public Safety		
Subapplicant Name	City of Wilson		
Project Type	Flood Risk Reduction		
Recommendation	Yes with Conditions		
Federal Cost (FEMA GO)	$6,387,362	**Phased Project**	Yes
BCR (subapplication)	1.77	**Duplicate Project**	No
BCR (reanalysis)	1.15	**Benefits (reanalysis)**	$10,434,957

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 the demolition of a 44-acre property (including an abandoned mall, commercial buildings, and parking lots), and the construction of 26 acres of open park space to include a 14-acre stormwater detention pond. The subapplication states that the remaining 18 acres of the property may be redeveloped with a multifamily residential land use, but this redevelopment is not a part of the project scope.

Technical Feasibility

Project Schedule

The schedule duration is 24 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. Under Phase 1, line items include demolition for the entire 44-acre property, design, and permitting. Under Phase 2, line items include construction administration and construction of the stormwater control measure. The cost estimate includes maintenance cost for the stormwater control measure and the trees over the course of the project useful life. The cost estimate included a contingency cost of 25 percent, which is greater than the contingency cost range (1–5 percent; up to 7 percent for historical structures) recommended by the HMA Guidance.

Technical Design Information

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

Item	Documentation	Evaluation
Proposed Level of Protection	Preliminary H&H Analysis and	The project proposes to protect 30 structures during the 2-year event.

Item	Documentation	Evaluation
	Subapplication Narrative	The preliminary H&H analysis was completed using PondPack Version V8i and PCSWMM. Modeling results demonstrate no structures impacted by flooding during the 2-year event post mitigation, and significant reductions to water surface elevations for impacted structures in events larger than the 2-year event.
Flood Risk Data	Preliminary H&H Analysis	The proposed project is not in the Special Flood Hazard Area. The provided documentation does show how the proposed project will reduce risk. Existing flood risk is documented in the preliminary H&H analysis. The preliminary H&H analysis demonstrates that conversion of the mall property into open green space and stormwater detention will result in a reduction of flow and reduced water surface elevations at structures downstream. The subapplication does not clarify whether the potential future 18-acre multifamily residential development is accounted for in the H&H analysis. The subapplication does not provide an indication of how the model was calibrated to reflect historic flooding in the project area.
Residual Risk	Preliminary H&H Analysis	Residual risks were identified as flooding impacts from storms larger than the planned 2-year level of protection.
Design and Performance Standards	No documentation was provided to support this item	Subapplication does not indicate whether the project will comply with the necessary codes and standards.
Design Drawings, Maps, Photographs	Conceptual drawings, project maps, and a preliminary H&H report	Documentation was provided to support the project. The subapplication includes conceptual design drawings and preliminary H&H analysis. The subapplication states that final design drawings and H&H analysis will be developed under Phase 1.
Upstream and Downstream Impacts	Scope of work narrative	The documentation does not indicate whether the proposed project will have adverse upstream or downstream impacts. The subapplication does not clarify whether the potential future 18-acre multifamily residential development is accounted for in the H&H analysis and whether that development would cause adverse upstream or downstream impacts.

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:

- Verify the eligibility of line items for demolition of the 18-acre portion of the property that may be redeveloped as a multifamily residential area, planting of shrubs and native grasses, and maintenance costs for the stormwater control measure and tree plantings within the cost estimate.
- Provide documentation to support that the stormwater park 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 and confirm that the potential multi-family residential development is included in the analysis to determine upstream and downstream impacts and support the proposed level of protection.
- Provide documentation to confirm how the model development ensured the model accurately reflects historical flooding in the project area.

Provide the following Phase 1 deliverables needed to determine technical feasibility prior to Phase 2:

- Hydrologic and hydraulic data/modeling completed in compliance with all applicable federal and local standards
- 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 professional expected damages.

The following was found during review of the submitted BCA:

Cost Estimation

Input	Value	Evaluation
Project Useful Life (PUL)	25, 30 years	This value is consistent with the FEMA standard value for urban trees and flood diversion and storage, respectively.
BCA Toolkit Initial Project Cost	$8,701,680.79	This amount is consistent with the subapplication project cost estimate.
Annual Maintenance Cost	$20,000	This amount is reasonable.
BCA Toolkit Total Project Cost	$8,942,307	This amount is calculated based on the initial project cost, the annual maintenance costs, and the PUL.

Flood Module

Input	Value	Evaluation
Lowest Floor Elevations (LFEs)	0–2.5 ft	No documentation was provided to support these inputs. However, the subapplication states that values were estimated based on structure information available through the North Carolina Flood Risk Information System (NCFRIS). The subapplicant determined the foundation type for the structures and assumed a relative elevation above the ground surface for each structure type. For example, a structure with a crawl space was assumed to be 2.5 ft above the ground surface elevation. However, some structures did not appear to use the proper assumption based on the foundation type.
Flood Hazard Data	Water Surface Elevations (in feet)	Preliminary H&H study results were provided to support this input. The values used in the BCA are consistent with the supporting documentation. However, no legend was provided for the flood maps developed through PCSWMM, so the water surface elevations used in the BCA could not be verified. The subapplication was unclear whether reported flood depths were measured from the ground surface or the LFE.
Depth-Damage Function (DDF)	U.S. Army Corps of Engineers (USACE) New Orleans District Curves	These curves are not consistent with the structure types and mitigation action. The curves used were developed by USACE for use in New Orleans, Louisiana, and are not applicable to structures in a different geographic area.
Building Size	N/A	Building sizes were not used in the BCA to calculate the Building Replacement Value (BRV).
Building Replacement Value (BRV)	$51,140–$2,598,242	The BRV used in the BCA is supported by information from NCFRIS. However, the BRVs were based on the structure fair market values (FMVs), instead of the building replacement values.
Building Occupancy	N/A	Displacement and social benefits were not included in the BCA.
Contents Value	43%–367% of the BRV	Nondefault values were used, based on content to structure ratios developed by USACE for use in New Orleans, Louisiana. These values are not applicable to structures in a different geographic area.

Professional Expected Damages

Input	Evaluation
Facility Type	The facility type of other was used in the BCA. This input is consistent with the proposed project in the subapplication.
Before-Mitigation Damages	Before-mitigation damages were calculated based on the information listed above in the Flood Module table for the 1-year, 2-year, 5-year, and 10-year recurrence intervals. Water surface elevations from the preliminary H&H analysis, basic structure information, and USACE DDFs developed for New Orleans, Louisiana were used to calculate the expected building and contents damages for each residential and nonresidential structure. This overall approach is reasonable; however, some of the assumptions and inputs are not reasonable, as noted above. Three of the structures included in the subapplicant BCA as "single-family residences" appear to be detached garages based on publicly available information. One structure included in the subapplicant BCA as a "single-family residence" has been demolished.
After-Mitigation Damages	After-mitigation damages were calculated in the same manner as before-mitigation damages for each structure included in the BCA.

Additional Benefits

Input	Documentation	Evaluation
Environmental Benefits	Conceptual site plan and narrative	The project used 26 acres of urban green open space. The total project area and percentage of land use of the project area is consistent with the project description and supporting documentation.
Green Infrastructure Values	Conceptual site plans and detailed cost estimate	Benefits from urban trees were included in the project. The values used are consistent with the project narrative. However, the subapplication narrative indicates that the trees will be planted in the green open park space to be created during project implementation. Trees planted in green open park space do not match the description of green infrastructure, which specifies that trees should be planted in urban areas.

Reanalysis BCA

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

Input	Value	Explanation
Lowest Floor Elevations (LFEs)	0–2.5 ft	LFEs were updated to properly reflect the structure foundation types.

Input	Value	Explanation
Flood Hazard Data	Water Surface Elevations (in feet)	The flood depth for each structure was updated to reflect the corrections to the structure LFEs.
Depth-Damage Function	USACE Generic, Office One-Story, Retail – Electronics, and Recreation	The curves used to develop the building and contents damages for each recurrence interval were updated to match the USACE Generic curves or the curve best matching the building use (for nonresidential structures).
Building Size	648–19,760 sq ft	Building sizes were updated based on tax assessor documentation or estimates of building size based on aerial photography and structure photographs.
Building Replacement Value (BRV)	$125/sq ft	The BRV was updated based on estimates from a national cost-estimating resource. Building sizes were used with the BRV instead of using structure FMVs.
Contents Value	14%–100% of the BRV	Contents values were updated based on FEMA standard contents to structure ratios for each building type. The USACE generic, office one-story, retail-electronics, and recreation curves were used to calculate contents damages for each recurrence interval.
Displacement Costs	$98/ night lodging and $96/ day meals	Displacement costs were added to the BCA for residential structures using FEMA default values.
Environmental Benefits	26.9 acres, 100% urban green open space	The number of acres for the environmental benefits was updated to include 5% of the portion of the project site for which the post-demolition plans have not been finalized, as a conservative assumption.
Green Infrastructure Values	$0	Green infrastructure benefits were removed from the BCA. The project description for tree planting does not match the benefits included in the BCA Toolkit for urban trees.
Social Benefits	$595,224	Social benefits were incorporated assuming three people per household (72) and two workers per household (48) for the 24 residential structures.

The subapplication qualified for the Alternative Cost-Effectiveness Methodology, as noted in the "Alternative Cost-Effectiveness Methodology for Fiscal Year 2022 BRIC and FMA Application Cycle" Memorandum. The project primarily benefits an area at the census tract level with a Social Vulnerability Index (SVI) score greater than or equal to 0.6, based on Centers for Disease Control and Prevention (CDC) data.

The BCR generated at the 7% discount rate was 0.76, and the BCR generated at the 3% discount rate was 1.15. The total benefits associated with this project (at a 3% discount rate), $10,434,957, are greater than the total project cost of $9,093,689, producing a BCR of 1.15.

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

- Provide documentation to verify the water surface elevation for each structure included in the BCA. Clarify the process and assumptions used to develop the flood inundation maps from the H&H modeling results and to determine the flood depth for each impacted structure. Provide a legend for any flood maps included in the supporting documentation.
- Provide documentation to support the lowest floor elevation. Documentation can include elevation certificates, survey data from qualified professionals, or topographic maps with a maximum contour increment of 2 feet.
- Provide documentation to verify the assumptions used in the reanalysis BCA including the number of acres for environmental benefits.

Provide the following Phase 1 deliverables needed to determine cost-effectiveness prior to Phase 2:

- 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:

- Verify the eligibility of line items for demolition of the 18-acre portion of the property that may be redeveloped as a multifamily residential area, planting of shrubs and native grasses, and maintenance costs for the stormwater control measure and tree plantings within the cost estimate.
- Provide documentation to support that the stormwater park 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 and confirm that the potential multifamily residential development is included in the analysis to determine upstream and downstream impacts and support the proposed level of protection.
- Provide documentation to confirm how the model development ensured the model accurately reflects historical flooding in the project area.
- Provide documentation to verify the water surface elevation for each structure included in the BCA. Clarify the process and assumptions used to develop the flood inundation maps from the H&H modeling results and to determine the flood depth for each impacted structure. Provide a legend for any flood maps included in the supporting documentation.
- Provide documentation to support the lowest floor elevation. Documentation can include elevation certificates, survey data from qualified professionals, or topographic maps with a maximum contour increment of 2 feet.
- Provide documentation to verify the assumptions used in the reanalysis BCA including the number of acres for environmental benefits.

Provide the following Phase 1 deliverables needed to determine technical feasibility and cost-effectiveness prior to Phase 2:

- Hydrologic and hydraulic data/modeling completed in compliance with all applicable federal and local standards
- 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.