

FY 22 HMA – Grant Application Review Summary

Subapplication Number	EMA-2022-BR-001-0043		
Project Title	City of Gastonia Water Treatment Plant Resilient Power		
Applicant Name	North Carolina Department of Public Safety		
Subapplicant Name	City of Gastonia Town Hall		
Project Type	Backup Power - Generator		
Recommendation	Yes with Conditions		
Federal Cost (FEMA GO)	\$4,785,600	Phased Project	Yes
BCR (subapplication)	1.86	Duplicate Project	No
BCR (reanalysis)	2.49	Benefits (reanalysis)	\$16,455,849

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 City of Gastonia to construct two 1,500 kW diesel generators at the Two Rivers Utilities Water Treatment Plant. The proposed project will include the new generators and a new Master Control Switchgear. The new generators will be sized to have sufficient capacity to operate the entire facility. The subapplication does indicate that the generators will be installed at the City of Gastonia Water Treatment Plant and that this is a critical facility.

Technical Feasibility

Project Schedule

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

Cost Estimate

The cost estimate does include 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
Technical Information	Preliminary engineering report, design drawings	Sufficient documentation was not provided to describe the technical information necessary to formulate the proposed solution. No documentation was provided about the new fuel tank sizes and locations.

Item	Documentation	Evaluation
Backup Power Capacity	Preliminary engineering report	Documentation was provided to support the proposed capacity of the backup power systems.
Design Drawings, Maps, Photographs	Design drawings, conceptual drawings, project maps/photos	Documentation was provided to support the project.
Presence of Existing Generator	Photos of existing generator, record of generator failures since 2018	Documentation was provided to support conclusion that the existing generator is failing and has insufficient capacity to power critical functions.
Flood Hazard Elevation Requirements	FIRM	The site is not in the Special Flood Hazard Area.
Wind Hazard Protection Considerations	Documentation was not provided to support this item.	No documentation was provided to indicate how the proposed project will be protected against wind hazards and in accordance with local building codes.

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 information about related equipment purchased including the size of the fuel tanks and proposed locations.
- Provide documentation to demonstrate that the generator will be protected against natural hazards and wind-borne debris via a weather-protected enclosure or concrete wall, and that the generator will be appropriately anchored to resist design wind speed and/or design seismic event.

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

- Technical body of information needed to support the desired level of effectiveness/protection or amount of risk reduction (including load, drawings, calculations to support final generator capacity as well as related equipment purchases (e.g., generator hook-ups, transfer switch, fuel tank and piping)).

Cost-Effectiveness

The Benefit-Cost Analysis (BCA) was completed based on professional expected damages. The BCA evaluated the project as a utility.

The following was found during review of the submitted BCA:

Cost Estimation

Input	Value	Evaluation
Project Useful Life (PUL)	19 years	This value is consistent with the FEMA standard value.
BCA Toolkit Initial Project Cost	\$6,380,800	This amount is consistent with the subapplication project cost estimate.
Annual Maintenance Cost	\$21,048	This amount is reasonable.
BCA Toolkit Total Project Cost	\$6,598,346	This amount is calculated based on the initial project cost, the annual maintenance costs, and the PUL.

Professional Expected Damages

Input	Evaluation
Facility Type	The facility type of 'Potable Water' was used in the BCA. This input is consistent with the proposed project in the subapplication.
Loss of Function	Loss of function is based on the water treatment plant providing potable water to 120,237 customers, using the FEMA standard value of \$116/person/day, resulting in a per-day water service value of \$13,707,018.
Before-Mitigation Damages	The before-mitigation damages were input as a 0.04-day outage at a 1-year recurrence interval, 48-year recurrence interval with a 0.17-day outage, and a 106-year recurrence interval with a 1-day outage. These assumptions are based on a 100-, 33-, and 17-percent chance of a 1-, 4-, and 24-hour outage, respectively, over the estimated 19-year useful life of the proposed project.
After-Mitigation Damages	After-mitigation damages were input as a 1-day outage at a 107-year recurrence interval.

Reanalysis BCA

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

Input	Value	Explanation
Before-Mitigation Damages	4 impact days at 48-year recurrence interval 7 impact days at 181-year	The before-mitigation Loss of Function damages were based on the default assumptions in the BCA Toolkit, which are estimated to start at a 5-year recurrence interval with 1 impact day, a 48-year with 4 impact days, and 181-year with 7 impact days. The default assumption in the BCA Toolkit are based on a 99-, 33-, and 10-percent chance of a 1-, 4-, and 7-day outage, respectively, over the estimated 19-year useful life of the proposed project.

Input	Value	Explanation
	recurrence interval	As the water system has some water storage that can provide potable water in the event of a power outage at the water treatment plant, the 1-day outage was removed from the default value.
After-Mitigation Damages	1 impact day at 181-year recurrence interval	The after-mitigation Loss of Function damages were based on the default assumptions in the BCA Toolkit, which are estimated at a 181-year recurrence interval with 1-day outage duration based on the assumption that there is a 10-percent chance that during a power outage the backup might not operate.

Based on the reanalysis BCA, the total benefits associated with this project, \$16,455,849, are greater than the total project cost of \$6,598,344, producing a BCR of 2.49.

Based on the documentation provided, the project is cost-effective.

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 information about related equipment purchased including the size of the fuel tanks and proposed locations.
- Provide documentation to demonstrate that the generator will be protected against natural hazards and wind-borne debris via a weather-protected enclosure or concrete wall, and that the generator will be appropriately anchored to resist design wind speed and/or design seismic event.

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

- Technical body of information needed to support the desired level of effectiveness/protection or amount of risk reduction (including load, drawings, calculations to support final generator capacity as well as related equipment purchases (e.g., generator hook-ups, transfer switch, fuel piping)).
- 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.