

## FY 21 HMA – Grant Application Review Summary

<b>Subapplication Number</b>	EMA-2021-BR-005-0041		
<b>Project Title</b>	Town of Hillsborough NC - Resilient Regional Water Supply Project		
<b>Applicant Name</b>	North Carolina Department of Public Safety		
<b>Subapplicant Name</b>	Hillsborough Town		
<b>Project Type</b>	Drought		
<b>Recommendation</b>	Yes with Conditions		
<b>Federal Cost (FEMA GO)</b>	\$1,015,469.23	<b>Phased Project</b>	Yes
<b>BCR (subapplication)</b>	9.72	<b>Duplicate Project</b>	No
<b>BCR (reanalysis)</b>	9.41	<b>Benefits (reanalysis)</b>	\$13,690,129.00

### Summary

This is a technical feasibility and cost-effectiveness review in support of the National Technical Review process. No contact was made with the applicant or subapplicant; this review is solely based on information provided in the subapplication. The project was found to be technically feasible and cost-effective; therefore, it is recommended for further consideration with the conditions listed in the conclusion.

This review only constitutes an evaluation of the technical feasibility and cost-effectiveness of the proposed project. 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.

### Scope of Work

The scope of work is well-defined and clearly explains the activities necessary to complete the work. The Hillsborough Town (subapplicant) has submitted a subapplication for the construction of a drinking water booster pump station to facilitate interconnection with adjacent water supply system. The project includes assessment, design, permitting, and construction of the booster pump station. The proposed project is intended to reduce risk to the subapplicant's drinking water system by providing the necessary pressure differential to allow water transfers from adjacent drinking water system. A pipeline already exists; however, because of pressure conditions within the subapplicant's system, a pump station is needed to convey the water from the adjacent system. The subapplicant withdraws drinking water from the Eno River watershed, but the adjacent system withdraws water from a different watershed, so the interconnection will introduce an alternate drinking water source to the subapplicant's system during drought periods. The proposed project will also include an emergency generator.

### Technical Feasibility

#### *Project Schedule*

The schedule provided indicates the project would be completed in 30 months. The schedule does include all items in the scope of work and is reasonable.

#### *Cost Estimate*

The cost estimate includes sufficient line items. Line items included consist of pre-award costs, Phase 1 costs (assessment, permitting, design, and construction procurement), Phase 2 costs for construction, and grant management costs. The cost estimate is consistent with the scope of work. The source of the

cost estimate is not clear. No documentation was provided to support individual cost estimate line items. The total cost estimate provided in the subapplication for non-grant management costs differs slightly from the initial project cost provided in the BCA.

#### *Technical Design Information*

To achieve mitigation of drought risk to the subapplicant's drinking water system, the following information and documentation were provided to support the project:

- Maps and diagrams showing the subapplicant's system layout and pressure zones, the layout and pressure zones of the adjacent water system, and the location of the proposed project.
- 2013 technical memorandum summarizing an engineering analysis performed to preliminary size the booster pump station.
- Excerpt from a presentation discussing the results of an updated engineering analysis that revised the preliminary size of the booster pump station to account for increased demand in 2020. The updated analysis determined that a pumping capacity of 2.88 MGD was required to meet demand in the subapplicant's system.
- Mutual aid agreement from 1988 between subapplicant and the adjacent drinking water system, Orange Water and Sewer Authority (OWASA). The mutual aid agreement states that subapplicant is entitled to up to 2 MGD of water from OWASA.
- Design drawings for meter and bypass connections on the 16-inch water main connecting subapplicant to OWASA, which verify that the interconnection in the water main has already been installed.
- Level of protection prior to mitigation is not clearly stated. Based on the information provided in the BCA, historical documentation of water use restrictions, and the subapplication narrative, it is likely that the level of protection prior to mitigation is relatively low. The historical documentation provides evidence that the subapplicant needs to enter into water use restrictions frequently due to drought conditions, sometimes for extended periods of time.
- Proposed level of protection after mitigation is not clearly stated. The subapplication states that the proposed project will mitigate to the 500-year drought event; however, no documentation is provided to support this. Additionally, the benefit-cost analysis (BCA) evaluates pre- and post-mitigation risks associated to events with recurrence intervals up to 68 years.

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

- The cost estimate should contain sufficient detailed information such as a budget narrative, based on HMA Guidance, Part IV, Section H.1.

Phase 1 deliverables needed to determine full project eligibility, technical feasibility and effectiveness, and cost-effectiveness:

- Relevant technical (e.g., geotechnical) data for pump station siting.
- 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 BCA for this project was completed based on modeled damages using the aquifer storage recovery module of the FEMA BCA Tool. The BCA evaluated the drought mitigation of subapplicant's drinking water system.

The following was found during review of the submitted BCA:

- *Project Useful Life (PUL):* PUL utilized was 50 years, which is consistent with the FEMA standard value for a pump station.
- *Annual Maintenance Cost:* Annual maintenance cost is estimated at \$2,000, which appears reasonable. Subapplicant is responsible for all maintenance after the project is complete. Although the BCA and BCA methodology report state that the maintenance cost is \$2,000, the subapplication states that the maintenance cost is \$5,000. A detailed cost estimate was not provided; however, subapplication states that maintenance costs will include routine pump station testing and maintenance in accordance with activities performed for existing pump stations.
- *Total Mitigation Project Cost:* Total mitigation project cost (including maintenance) indicated in the BCA was \$1,407,975. The initial project cost in the BCA is not consistent with the project cost estimate. Supporting documentation was not provided to verify the initial project cost.
- *Recurrence Intervals (RIs):* Recurrence intervals used for the evaluated drought events were 6 years, 9 years, 24 years, 50 years, and 68 years. RIs were determined based on the Eno River Watershed Water Management Operations Plan (WMOP), prepared by the state's Division of Water Resources, and regionally specific drought station data. The WMOP identifies six stages of allowable surface water withdrawal maximums, with Stage 1 being the highest allowable withdrawal and Stage 6 the lowest. The United States Drought Monitor Classification System was used to match the WMOP stages to Palmer Drought Severity Index (PDSI) ranges. Finally, the recurrence intervals for the PDSI ranges were calculated using National Drought Mitigation Center Drought Risk Atlas data for the Durham, NC drought station. The RIs for each of the unique PDSI values were averaged to identify an RI for the PDSI range corresponding to each of the WMOP withdrawal stages.
- *Water Demand:* Water demand for all of the RIs was 1.46 MGD, which was based on the annual average demand in 2021. This was supported by documentation of daily demand from January 2021 through November 2021.
- *Pre-Mitigation System Supply Yield(s):* The pre-mitigation system supply yields are based on the surface water withdrawal limits specified in the WMOP. According to the supporting documentation from the WMOP, the highest supply yield is 1.51 MGD at Stage 1, and the lowest supply yield is 0.68 MGD at Stage 6. However, the supply yield for Stage 1 used in the BCA was 1.46.
- *Post-Mitigation System Supply Yield(s):* The post-mitigation system supply yields assume the same pre-mitigation system supply yields, plus 2 MGD based on the mutual aid agreement between subapplicant and OWASA. Therefore, according to the supporting documentation from the WMOP and mutual aid agreement, the highest post-mitigation supply yield is 3.51 MGD at Stage 1 and the lowest supply yield is 2.68 MGD at Stage 6. However, the supply yield for Stage 1 used in the BCA was 3.46.

- *Duration of Impact:* A duration of impact of 30 days was used for all events, both pre- and post-mitigation. The BCA methodology provided with the subapplication states this value was used because the National Drought Mitigation Center Drought Risk Atlas data used to determine the RIs is aggregated by month. Although post-mitigation events would likely be shorter in duration, and therefore using the same duration for pre- and post-mitigation is not reasonable, this approach results in conservative benefit estimates.
- *Population Served:* A population served of 15,990 was used in the BCA. According to the BCA methodology report, this represents the entire service area of the subapplicant's system. No supporting documentation was provided to verify the population served.

## Reanalysis BCA

A reanalysis BCA was performed for this subapplication and the following edits were made:

- Initial project cost was revised to reflect the highest cost stated in the subapplication.
- Maintenance cost was revised to reflect the highest cost stated in the subapplication.
- Pre- and post-mitigation system supply yields for the 6-year event were changed to 1.51 and 3.51, respectively, to align with the supporting documentation.

Based on the reanalysis BCA, the total benefits associated with this project, \$13,690,129, are greater than the total project cost of \$1,455,591, producing a BCR of 9.41.

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

- Provide documentation to support the population served by the subapplicant's water supply system.

Phase 1 deliverables needed to determine full project eligibility, technical feasibility and effectiveness, and cost-effectiveness:

- Refine the BCA, including documentation verifying the population of the service area.

## Conclusion

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

- Inconsistencies in the cost estimate should be resolved. Provide sufficient detailed information about the activities considered in the budget per HMA Guidance, Part IV, Section H.1. Including a budget narrative is recommended.
- Provide documentation to support the population served by the subapplicant's water supply system.

Phase 1 deliverables needed to determine full project eligibility, technical feasibility and effectiveness, and cost-effectiveness:

- Relevant technical data for pump station siting.
- 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 benefit-cost analysis, including documentation verifying the population of the service area.
- Additional documentation required to support compliance with eligibility, technical feasibility, cost-effectiveness, and EHP requirements.

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