



# City of Greensboro North Carolina

## City of Greensboro, North Carolina

### *Clean Water Management Trust Fund Application Narrative The South Buffalo Creek Habitat and Water Quality Improvement Project*

#### **CWMTF Funds Requested**

The City of Greensboro (the City) is applying for funding for design and construction of Phase IV of the South Buffalo Creek Water Quality and Habitat Enhancement Project for South Buffalo Creek between Farragut Street and Randleman Road in Guilford County, North Carolina (**Figure 3.1**). The City has previously applied for and received a grant from the Clean Water Management Trust Fund for design and permitting in the amount of \$325,000 under contract #2008-404, \$400,000 under contract #2012-434, \$375,000 under application reference #2013-405, and \$332,600 under contract #2014-403. The City matched those funds with \$353,423, \$571,620, \$651,000, and \$332,600, respectively, by acquiring the property that will be donated as permanent conservation easement and with a cash match from the Stormwater Utility. The initial grant funded the design and permitting of the project with the three following grants funding Phases I through III of construction. The total additional funds required for the design and construction of Phase IV is \$693,800 of which the City is requesting \$346,900. Construction cost was based on the latest version of the Preliminary Engineer's Opinion of Probable Construction Cost (**Uploaded in Section 8**).

#### **Matching Funds to be Contributed and source(s):**

The City plans to contribute a 50% match of CWMTF grant funds with \$346,900 in cash matching funds for Phase IV.

#### **Scope of Work:**

This project is divided into four (4) construction phases (see **Figure 3.2**). Phase I received funding from the CWMTF in 2012 and has been constructed. Phase II is currently under construction. The City has recently been notified that it will receive funding for construction of Phase III which is planned to be bid and constructed in 2015 (this year). Phase IV will be designed during the spring of 2016 and constructed the following summer if funded. Phase IV includes the level 1 enhancement of approximately 1,940 linear feet of South Buffalo Creek, which will include bank treatments, bedrock removal, and the addition of in-stream structures.

The City has photographed the existing condition of the stream and completed a concept plan for the proposed restoration (see [PhotoWalkthrough](#) and **Figure 3.7**). If funded, the City will first develop full construction documents based on the current concept plan. In addition, a 404/401 Permit, Jordan Buffer Approval, Water Quality Certification, Erosion and

Sedimentation Control Permit, and No Impact Certification will be required for the project to proceed. These approvals have been obtained for the previous three phases and it is anticipated that each will be received for Phase IV. The proposed restoration targets habitat improvements in South Buffalo Creek. While previous phases utilized the restoration of tributaries and the creation of wetland sloughs, this phase will focus on the restoration of habitat lost when South Buffalo Creek was channelized. Efforts will focus on creating habitat by the use of in-stream structures within South Buffalo Creek with the intent of creating habitat for aquatic fauna and directing flow away from unstable banks. Vertical bank sections along South Buffalo Creek will be stabilized by laying back vertical banks, removing existing spoil piles, and establishing native woody vegetation. The project includes a substantial amount of cut. Excess soil material has been and will continue to be spoiled on the eastern portion of the project area which is outside the floodplain. A geotechnical analysis of the existing soils on the spoil site indicates unsuitable material that is likely spoil from the nearby I-40 construction. The City excavated and hauled off site an amount of spoil material equivalent to the excess excavated soil produced by all previous phases of this project.

### **Project Description and Need:**

South Buffalo Creek is a targeted watershed for the NCEEP (Cape Fear Hydrologic Unit 03030002020050) and is listed on the 303(d) list for having impaired aquatic life, historically high turbidity, as well as Fair and Poor benthic and fish community ratings. The South Buffalo Creek classification was changed in 2012 from Class C, NSW to WS-V, NSW. In addition, South Buffalo Creek is part of the nutrient sensitive Jordan Lake watershed. Opportunities for water quality improvement throughout the watershed typically include restoration of smaller tributaries, wetland restoration and/or stormwater best management practices (BMPs).

The project area segment of South Buffalo Creek has been historically relocated and straightened as well as channelized. There is a broad floodplain associated with the stream which floods during large storm events; however, due to channelization the stream is incised with bank height to bankfull depth ratios of approximately 2:1. Additionally, the watershed of South Buffalo Creek is highly developed with an estimated 25-35% impervious cover. As a result, there are areas of moderate to high bank erosion. An onsite geomorphic assessment was performed over several weeks during the winter of 2011. During the assessment period, active erosion was seen through freeze-thaw on exposed banks. The proposed bank treatments will remove unstable sections of near vertical banks which will likely collapse into the stream if neglected over the next few years (see **Figure 3.8**). Several NCDENR water quality monitoring stations have identified turbidity as a stressor to water quality of the project reach.

The channel walkthrough conducted in the winter of 2014 (see [PhotoWalkthrough](#)) revealed a lack of habitat along the entire channel due to bank instability, poor bed substrate, and a lack of profile variability. In several areas the stream bed has a predominantly clay bottom likely created from the historic relocation of the channel. Clay channels provide poor substrate to most benthic species. Establishing the vanes, boulder clusters, and other features proposed in the concept plan will result in readily observable habitat improvements such as more pronounced riffle and pool complexes as well as improved substrate.

### **Water Quality Objectives and How They Would Be Achieved:**

The goal of Phase IV is to stabilize the banks and to improve bed substrate and create habitat with in-stream structures. The existing stream bed lacks habitat along much of its length.

Stabilizing the banks and constructing in-stream habitat and grade control structures, will result in readily observable substrate improvements such as boulder and log features, deep scour pools, and better sorting of bed materials resulting in localized areas with less fines. The concept plan includes the addition of habitat and grade control features such as vane structures in combination with boulder clusters or similar features. The cross vanes and boulder clusters will have a terraced face to provide grade control and habitat and establish a more diverse profile in the stream reach. These structures will create scour pools and redirect flow across the vanes into the thalweg of the stream, simultaneously improving fish habitat and bank stability. Boulder clusters have also been shown to provide some of the best habitat for macrobenthos (Boulder Clusters by Gischenich and Seal). Finally, stabilizing and re-vegetating the actively eroding banks will reduce the current sedimentation.

With its 15 square mile watershed, South Buffalo Creek is a much larger urban system than is typically restored. There are significant portions of South Buffalo Creek exhibiting stable stream banks with established vegetation; therefore, restoring the channel's natural dimension, pattern, and profile through relocation or extensive channel work is not considered the best alternative. The proposed project would stabilize specifically identified bank sections rather than re-aligning the entire system. The unstable bank sections identified during a field visit will be stabilized through the removal of spoil piles and varying degrees of bank grading. Removal of the soil spoil pile berm on top of the bank will allow high flows to spread into the floodplain rather than continuing to erode the channel. The proposed bank treatments will reduce the slope of the near vertical existing banks. These banks will also allow vegetation to be established along the banks. The vegetation and root networks will help hold the soil in place and prevent erosion.

The South Buffalo Creek watershed presents a multitude of water quality challenges typical in urbanized areas. Through the proposed project, previous, and future projects in the South Buffalo Creek watershed, Greensboro hopes to incrementally improve water quality, aquatic habitat, and riparian functions. This project is considered by the City as part of a larger effort that will include future improvements yet to be identified.

**Other Project Aspects:**

The City DOT has a future BiPed plan that shows a future trail running adjacent to South Buffalo Creek, which would provide recreational and educational opportunities (see **Figure 3.9**).

**Other Possible Funding Sources:**

No additional funding sources have been secured for this project. All additional construction funding for the construction of the project will be funded through the City's Capital Improvement Project (CIP) budget. The EEP is not interested in pursuing this project.

**Typed or printed name:** David Phlegar

**Title:** Stormwater Division Manager