Background

Mill Creek is a stream system which is impaired and degraded within various corridors and along certain tributaries throughout Auburn, Alabama. This design proposal includes the streambank restoration of approximately 1,075 linear feet of an unnamed tributary that empties into Mill Creek and Biggio Mill Creek and encompasses an estimated 1.75 acres and begins slightly west of the northwest corner of the parking deck near the Wellness Kitchen off of South Donahue Drive.

Site Location

Design Proposal

Component Compositions:
- Multi-Use Path
  - 5' pedestrian path, 6' cross-flow bike path
  - 6' - Portland cement concrete
  - 4'/- No. 57 coarse aggregate
  - 2'/- compacted soil
- Infiltration Trench
  - 3'/- riprap
  - 6'/- coarse aggregate
  - 4'/- sand filter
  - Riprap Revetment
    - Layer 1 – 30 mm gravel filter (0.7” thickness)
    - Layer 2 – 60 mm gravel filter (0.7” thickness)
    - Layer 3 – stone overlay at varying thickness (as indicated on diagram)

Design Considerations

The objectives of this project include:
1. Improve streambank stability by reducing the impacts of scouring and slumping.
2. Grade the streambank to reduce the transport of sediments into the stream by stormwater runoff.
3. Remove excessive vegetation from the upland area between the riparian zone and proposed MUP.

Constraints:
- The football practice facility fields must remain concealed by vegetation cover from Biggio Drive.
- The proposal must remain within the $350,000 construction budget.
- The proposal must be completed by the end of the spring 2019 semester.

Design Objectives

Confer Pope, Roger Smith, Cami Shangio

Client: Auburn University (Facilities) and Office of the University Architect (OUA)

Advisor: Mr. Jonathan Davis

Acknowledgements

We would like to thank Mr. Jonathan Davis and Dr. Mark Dougherty for advising our team throughout the design process for this project.

Design Components

Infiltration trenches are excavated trenches filled with stone. Stormwater runoff is captured and temporarily stored in the coarse aggregate layer before exfiltrating through an outflow pipe near the lowest site elevation point. It is sized to retain the runoff volume of the 2-year storm event.

Multi-use paths are a form of infrastructure that support multiple recreation and transportation activities, such as walking and bicycling. This multi-use concrete path consists of a 5-foot wide crossflow pedestrian walkway adjacent to a 6-foot wide crossflow bike path.

Hydraulic Analysis

A 10-year storm hydraulic analysis was performed on the reach of interest using HECS. The analysis incorporated runoff peak flow rates for the 2-, 5-, 10-, 25-, 50-, and 100-year storm events in order to determine the water level behind the concrete dike in the channel and runoff flow energy. This section is sized based on the 25-year storm event.

Cost Estimate

Component | Cost
--- | ---
Total Cost | $331,623
Contingency (7.5%) | $23,136
Miscellaneous (Signage & Crosswalks) | $1,625
Infiltration Trench | $77,537
Riprap Revetment | $109,566
Erosion & Sedimentation Control | $41,509
Pedestrian Light Poles | $21,000
Multi-Use Path | $66,850

Figure 1 – Cross-section view of section A-A of the project site and design components.

Figure 2 – Plan view of the project site and design components with section A-A matchlines.