Planning SMART(ly): The Sweetwater Creek Approach

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Outline

• Sweetwater Creek Flood Risk Management Feasibility Study

• SMART Planning and 3*3*3 Rule Compliance

• HEC-WAT Background
  • Watershed Risk Analysis Approach

• HEC-WAT Features

• Flood Risk Alternatives & Tentatively Selected Plan
Sweetwater Creek Location
2009 Flood
USACE SMART Planning

• 3x3x3 rule for feasibility studies:
  • To be completed in a target goal of 18 months but no more than three years
  • Cost no greater than $3M
  • Requires three levels of vertical coordination

• Balances the level of uncertainty and risk with the level of detail of the study

• Pushes detailed design to pre-construction phase
Sweetwater Creek Flood Risk Management Study

- One of the first implementations of HEC-WAT
- Quantify flood risks in the Sweetwater Creek Watershed and to evaluate potential alternatives to reduce that risk
- Planning level HEC-HMS and locally leveraged HEC-RAS
- Collaboration between Dewberry, USACE, & local stakeholders
HEC-WAT Background

• “HEC-WAT is an integrated system of software, designed for interactive use in a multi-disciplinary environment” (USACE 2017)
Flood Risk Alternatives

- WAT provided framework for combining and evaluating various alternatives in a comprehensive system-wide approach linking multiple hydrologic and hydraulic models
  - Retention basins
  - Diversions
  - Dredging
  - Channelization
Alternative Constraints

• Limited undeveloped land with large storage potential
• No adverse downstream impacts
• No adverse impacts or structural measures to impact historical Sweetwater Creek Mill
• Environmental & Cultural Resource Protection
• Evaluated 16 different combinations of structural and non-structural measures including new or rehabilitated detention structures, channel modifications, creek diversions and structure relocations.
Existing Pine Valley Lake Dam

- Partially breached private dam
- Cobb/Paulding County Border
- 1,100 ac-ft available storage
SC1 Detention Structure

1. Initially located at Baker’s Bridge Road providing 1,800 ac-ft of potential storage.

2. Revised location just 1 mile upstream provided a total potential storage of 7,600 ac-ft.

3. Working on its own, this measure reduced the 100YR WSEL in Austell by 3.3’.
Aerial View of Site SC1
3D Rendering of Structure SC1
Sweetwater Creek Channelization

- 14.2 miles of channelization through Austell, GA
- Estimated excavation volume of 2.5 million cubic yards
Sweetwater Creek Diversion

• 1.5 mile diversion

• Open channel, cut and cover tunneling, and bored tunnel sections

• Would require at least five 12’ RCP crossing 165’ of vertical elevation change

• Resulted in increased flows and water surface elevations downstream of Austell

• On request of city investigated 18 mile diversion to the Chattahoochee River
Tentatively Selected Plan (TSP)

- Non-Structural Approach - Relocation/Buyout alternative for 20 structures
Summary

• Leveraging existing data is key to meeting SMART planning requirements

• Challenging to find structural project locations in developed watersheds
  • Real estate constraints are challenging
  • Multiple jurisdictions increases challenge

• Acquisitions are the only true long term solution to removing risk

• Cost of structural approaches is very high and challenging to meet benefit cost
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Questions

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