



US Army Corps
of Engineers
Philadelphia District

Tookany Creek Flood Damage Reduction Feasibility Study

Plan Formulation Workshop Report

Prepared for US Army Corps of Engineers, Philadelphia District

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February 14, 2013

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Purpose

The purpose of the Tookany Creek Flood Damage Reduction Feasibility Study is to identify and evaluate technically feasible and financially prudent flood damage reduction measures within the identified study area. The Plan Formulation Workshop was held as part of the first phase of the two-phased Corps of Engineers' plan formulation process.

Project Background

The study area focuses on flooding issues within Cheltenham Township, Montgomery County, relying on the development of a watershed based hydrologic analysis. This includes evaluating the contributing flows from Abington, Jenkintown, Rockledge and Springfield. Cheltenham is part of the first ring of suburban development outside of the City of Philadelphia and is largely at maximum development capacity. Tookany Creek itself is an urbanized tributary of Tacony Creek in the Tacony-Frankford Creek watershed and ultimately part of the Delaware River drainage system. In Cheltenham Township, Tookany Creek is 98% open channel flowing through residential and park lands for more than 95% of its length.

Major flooding in this area may occur during any season of the year. During the summer and fall, floods are usually associated with tropical storms moving up the Atlantic coastline. Spring floods are generally the results of a combination of heavy rains on frozen ground augmented by melting snow. Summer and fall floods are generally the result of widespread heavy rainfall. For smaller tributaries, heavy rainfalls of short duration, particularly summer thunderstorms, cause most of the flooding problems by inundating low-lying areas. This type of flash flooding is characterized by floodwaters that rise and fall very quickly and usually have high flow velocities.

Workshop Attendance

The following is a list of workshop participants and their respective Breakout Group assignments. Additional information about Breakout Groups including description and assignment methodology is provided below under the *Potential Flood Solutions Exercise* section. The workshop sign-in sheet along with other workshop documentation is available in the *Workshop Documentation Annex*. A total of 30 participants attended the workshop representing 13 agencies and organizations and serving multiple disciplines and programs.



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Workshop Attendance List		
Name	Agency/Organization	Breakout Group
Mike Bartles	USACE - Hydrology	B
David Burke	PADEP	B
Jim DeAngelo	Michael Baker Jr., Inc.	Float
Deb Forman	Cheltenham Township EAC	D
Michael Flemming	Cheltenham Township Public Works Coordinator	B
Joy Gillespie	EPA Region III	B
Glen Stevens	USACE	D
Bryan Havir	Cheltenham Township Manager	E
Art Haywood	Cheltenham Township Commissioner	C
Lisa Hollingsworth-Segedy	American Rivers	D
Kevin Magerr	EPA Region III	E
Micah Kirkpatrick	USACE – Economics	E
Kim Kirschner	Cheltenham Township Deputy Emergency Management Director	C
Kristina Henderson	Montgomery County Conservation District	E
Doug Leatherman	USACE – Civil Design	A
Mark Malach	PADEP	D
John Metrick	NRCS	D
Amy Montgomery	Cheltenham Township Interim Engineer	D
Bob Moore	USACE – Hydraulics	C
Taryn Murray	Michael Baker Jr., Inc.	Float
Abdel Nassani	PADEP	A
Joe O'Neill	Cheltenham Township Fire Marshall	E
Bob Pierson	FEMA	A
David Rider	EPA Region III	A
Erik Rourke	USACE – Project Manager	Float
Drew Sharkey	Cheltenham Township Commissioner	A
Drew Shaw	Montgomery County Planning Commission	B
Julie Slavet	Tookany/Tacony-Frankford Watershed Partnership	C
Greg Wacik	USACE – Environmental	D
Alexis Williams	Michael Baker Jr., Inc.	Float
Julie Yu	PEMA	C



Presentation Summary

The USACE Project Manager, Erik Rourke, began the workshop by presenting the following goals and objectives of the Plan Formulation Workshop:

Goal

Conduct an iteration of the plan formulation process for the Tookany Creek Flood Damage Reduction Feasibility Study.

Objectives

- Develop a range of alternatives to address the goals and objectives of the study
- Utilize the expertise of multiple Federal, State and Local agencies responsible for, or that have an interest in flood mitigation
- Maximize the use of existing alternative plans

A copy of the workshop agenda is provided in the *Workshop Documentation Annex*. A **measure** was defined for the group as features or activities (structural or non-structural) that can be implemented to address one or more planning objectives. A **plan** is a combination of one or more measures functioning together to address one or more objectives.

The formulation criteria that will be used to evaluate the plan(s) are completeness, effectiveness, efficiency, and acceptability which are described below.

Completeness – The extent to which an alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of all planned effects.

Effectiveness– The extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities, as established in the planning objectives.

Efficiency – The extent to which an alternative plan is the most cost effective means of alleviating the specified problems and realizing the specified opportunities as established in the planning objectives, consistent with protecting the nation’s environment.

Acceptability – The workability and viability of the alternative plan with respect to acceptance by state and local entities and the public and compatibility with existing laws, regulations, and public policies.



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An overview of the study and a description of the study area were presented to the group. Read ahead materials were sent to all attendees so that those less familiar with the study and study area could better prepare for the workshop.

The USACE 6 step planning process was reviewed and an estimated project schedule was covered.

Next, Mike Bartles, USACE Hydraulic Engineer, presented an overview of the existing hydrology and hydraulic conditions. Cheltenham Township's Fire Marshall, Joe O'Neill, summarized flood related damages that have occurred in the Township and Taryn Murray of Michael Baker



Jr., reviewed flood damage reduction measures which included an explanation of structural versus non-structural measures.

After the brainstorming session (see *Brainstorming Session* for a detailed description) Greg Wacik, USACE Biologist provided the workshop attendees information on the NEPA Scoping Process as it relates to the Tookany Creek Flood Damage Reduction Feasibility Study. The attendees then began the alternatives development exercise in their breakout groups (see *Potential Flood Solutions Exercise* section for a detailed description) and ended the workshop by presenting their findings. Conclusions and findings presented at the workshop are summarized in the *Flood Damage Reduction Measures Evaluation Findings* section below.

Potential Flood Solutions Exercise

As participants arrived at the workshop they were given a Breakout Group assignment (A through E) and asked to sit at a designated, color-coded, group table. Groups were pre-determined by the Project Manager and Facilitator. Each group was assigned at least one representative from both the USACE and the Township so that each group had adequate local knowledge available. Other participants were assigned to groups based on agency/organization capabilities and individual skillsets.

The stakeholders with local knowledge of the project and study area were asked to call out specific problem areas and issues in or around the study area in order to provide a summary for the group prior to brainstorming potential flood damage reduction measures. The identified areas included:

- Rockcreek – flash flooding, culvert, sanitary sewer
- Brookdale Levee
- Shoemaker Creek – overflows, channelized, Brookside Church



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- Harrison Avenue – channelized, sewer overwhelmed
- High School Road – overland water and stream
- Bickley Road – culvert, overland flow
- Mill Road – downstream, bridge
- Central Avenue bridge
- Greenwood Avenue
- Elkins – channelized, runoff
- North Avenue, SEPTA
- New Second Street

The above list of identified areas is not all-inclusive. Other problem areas are known to exist and will be taken into consideration during the USACE iterative planning process.

Stakeholders also listed the following overall challenges, to be taken into consideration during the brainstorming session, which consistently came up in regard to flooding within the study area:

- Percentage of impervious cover
- Stream crossings and enclosures
- Private property located in high risk areas
- Coordination across municipal boundaries
- Undersized channel
- SEPTA infrastructure
- PECO substation
- PennDOT road project
- Encroachments
- Timing and volume of stormwater
- General misconceptions about human impact

Attendees spent approximately 30 minutes brainstorming various types of flood damage reduction measures that may be applicable in Cheltenham Township. All ideas have been listed and summarized below. There are two main categories of flood damage reduction measures: **Structural** and **Non-Structural**. Non-Structural measures have been divided into 3 sub-categories: **1) Prevention**, which includes administrative, regulatory, and planning activities; **2) Property Protection** or actions that may involve modifying or removing existing buildings and/or natural resource protection; and **3) Community Initiatives** that involve community and stakeholder coordination and education.

STRUCTURAL

- Levees/Vertical barriers
- Local water retention
- Treatment Train (*The sequencing of structural Best Management Practices to achieve optimal flow management and pollutant removal from urban stormwater*)
- Floodway and floodplain reclamation
- Stormwater runoff control
- Underground storage



NON-STRUCTURAL

Prevention

- Incorporate/coordinate existing mitigation plans
- Community Rating System (CRS)
- Flood risk reduction education
- Flood warning system
- Maintenance
- Debris and sediment bar removal

Property Protection

- Elevation
- Buyouts/Acquisition
- Floodproofing
- Riparian buffers
- Reconnect to floodplain (Room for Rivers)

Community Initiatives

- Nurture Nature (*A science-based organization that combines science, art, and community dialogue to get people talking and thinking critically about environmental issues in their communities*)
- Municipal coordination (upstream)
- Stakeholder coordination
- Identify areas affected by small/large rain events
- Identify/evaluate existing constrictions
- Incorporate Glenside flood control project

Once all ideas were gathered and recorded, the group began the evaluation process so that brainstorming ideas could be narrowed down and combined as needed. Nine dots were handed out to each attendee (three each of red, green, and yellow dots). Using the USACE formulation criteria, each color was assigned an evaluation category. Red dots represented the **Effectiveness** of the measure while green dots were valued as **Efficiency**. Attendees use yellow dots to communicate the **Acceptability** of a project. These three formulation criteria are defined above in the *Presentation Summary*. Attendees placed dots on the various measures recorded during the brainstorming session to make a preliminary determination as to which measures would be most feasible for the community.



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Through this exercise five main categories of flood damage control measures were derived and assigned to each group as listed below. Each group was individually briefed on their assignment and instructed to fill out an alternatives worksheet for each proposed project. Completed alternatives worksheets are included in the *Workshop Documentation Annex*.

- Group A.** Dams and levees (structural)
- Group B.** Retention/detention (structural)
- Group C.** Property protection (non-structural)
- Group D.** Green stormwater (structural)
- Group E.** Prevention (non-structural)

Flood Damage Reduction Measures Evaluation Findings

Each group completed one or more Alternatives Worksheets for specific projects that were identified after the brainstorming session. Projects were based on all of the information provided during the workshop including project goals, existing conditions, damage history, and problem and solution identification. To conclude the workshop each group designated a speaker and presented their findings. Each project is summarized below and separated by group/concentration area. Details and type of information provided for each project varies. Preliminary and detailed screening and reporting **will not** be limited to measures identified during the Plan Formulation Workshop and described below.



Workshop participants evaluate flood damage reduction measures during breakout session.



Group A: Dams and Levees

#1

Project Description:

Low floodwall or levee at the confluence of Tookany Creek. Construct on west side of School Road at Tookany Creek along athletic field to prevent overtopping.

#2

Project Description:

Brookdale. Construct concrete floodwall with retention area excavation, upstream of Rice's Mill Bridge to downstream of Brookdale crossing. Construct floodgate to tie into Rice's Mill Road embankment and Brookdale Road. Wall would be approximately 15' tall. Remove existing levee on left bank. Retain Tookany Creek channel for low flow.

Group B: Retention/Detention

Project Description:

Dry dam, retention/detention, in-channel flood storage at 13 identified locations.

Pros: Stormwater volume reduction

Cons: Stability, aesthetics, undermining, O&M, sedimentation, need several small projects to obtain significant reductions.

Constraints: Environmental, public perception and acceptance, acquisition rights



Group C: Prevention

Project Description:

Community Rating System (CRS) implementation. By implementing CRS, the Township can accomplish multiple goals and measures identified during the brainstorming and evaluation process including zoning, warnings, and outreach. Specific recommendations include home retrofitting, Ready Notify promotion, stream/rain sensors, utilize social media, educational materials for homeowners, flood education at library, flood warning system.

Pros: More stringent stormwater regulations within watershed (retention) will reduce flooding, community education

Cons: Little flood reduction, enforcing additional regulations is costly

Overall Feasibility Rating: 7

Group D: Green Stormwater

#1

Project Description:

Treatment Trains along streams. Multiple small projects along stretches of stream which are repeatedly impacted by storms that would reduce the volume and velocity of stormwater. Includes measures such as rain gardens, streambank stabilization, swales, small dams, cisterns, and rain barrels.

#2

Project Description:

Canopy Enhancement for local water retention. Preserve and enhance the tree canopy throughout the watershed.

Pros: Improves water quality, reduces sedimentation, builds upon Township's newly adopted riparian buffer ordinance

Cons: Several years for trees to grow and mature, potential for root systems to damage roads and sidewalks

Constraints: Limited to trees that are capable of surviving in urban environments

Overall Feasibility Rating: 9



#3

Project Description:

Installation of porous pavement. For new or improved construction projects replace or install porous pavement where applicable. Focus should be directed towards large parking lots or other areas with large impervious cover such as SEPTA lots, schools, shopping centers, etc.

Pros: Reduces runoff, groundwater recharge

Cons: Special maintenance, approximately 20% more expensive than traditional pavement, not suitable for high volume traffic areas.

Overall Feasibility Rating: 7

#4

Project Description:

Bioswales.

Pros: Reduction of impervious cover, slows discharge, improves water quality, cost effective

Cons: Maintenance and amendments needed

Constraints: Soil type

Overall Feasibility Rating: 8.2

#5

Project Description:

Rain Barrel/Cisterns Township wide. Collect runoff from rooftops and parking lots/driveways. Aim to reach every home and business and size to hold a 1-2 year storm event.

Pros: Reduces volume, improves water quality, educational/awareness

Cons: Need strong participation to have noticeable reductions

Overall Feasibility Rating: 6.3



Group E: Property Protection

#1

Project Description:

Two home buyout along Rock Creek to open the floodplain and remove previously flooded structures from the floodway.

Pros: Improves safety, removes structure from floodway, provides opportunity for floodplain reclamation.

Cons: Little impact on system because of location, Township revenue loss

Constraints: Cost

Overall Feasibility Rating: 8.3

#2

Project Description:

Buyout and reclamation involving 40 homes. Priority area which was the focus of previous buyout.

Pros: Potential to alleviate flooding in other areas, removes repetitive loss properties from floodplain, improves safety, floodplain reclamation.

Cons: Township revenue loss

Constraints: Homeowner participation

Overall Feasibility Rating: 9



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Next Steps

The next step in the study process will be to conduct a preliminary screening of alternatives. This will be followed by a detailed screening of alternatives which is scheduled to take place in July 2013 as shown in the project schedule below. The USACE team will convert individual measures into plans that will be evaluated for potential implementation.

It is important to note that through the iterative USACE planning process, other projects, measures, and actions, in addition to those identified during the Plan Formulation Workshop, will be taken into consideration and included in the screening process. The summary of potential flood damage reduction measures captured in the *Flood Damage Reduction Measures Evaluation Findings* section is not all-inclusive and does not prohibit other measures from being examined and evaluated.

Project Schedule		
Major Project Milestones	Estimated Start Date	Actual Completion Date
Submit FCSA and PMP to NAD	April 2012	April 2012
FCSA Execution	May 2012	June 2012
Community Block Visits	September 2012	September 2012
Existing Conditions Modeling (H&H)	December 2012	December 2012
Public Meeting (Project Update)	January 2013	January 2013
Preliminary Screening of Alternative Plans	February 2013	February 2013
Detailed Screening of Alternative Plans	July 2013	
Submit Draft Feasibility Report to Division	December 2013	
Public Notice/ Public Review	February 2014	
District Engineer Signs Feasibility Report	May 2014	
Division Engineer Approves Feasibility Report	June 2014	