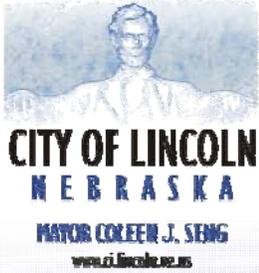


# Stevens Creek Watershed Master Plan



## Executive Summary March 2005



Lower Platte South  
Natural Resources District

# CDM

In Association With  
Intuition & Logic  
Heartland Center  
Kirkham Michael  
E&A Consulting



# Executive Summary

## Introduction

The City of Lincoln (City) and the Lower Platte South Natural Resources District (NRD) are in the process of developing a Comprehensive Watershed Management Plan for the City of Lincoln and its future growth areas. This comprehensive watershed plan is being developed basin by basin, through the completion of watershed master plans for individual basins. Watershed master plans are used as planning tools to be referenced in conjunction with proposed development and as a guide in the preparation of future capital improvement projects.

The City and NRD have previously adopted watershed master plans for the Beal Slough and Southeast Upper Salt Creek basins (Figure ES-1). The Stevens Creek Watershed Master Plan (Master Plan) is the third master planning effort to date and is summarized in this report, together with the study components that served as its foundation. The Master Plan for the Stevens Creek Watershed has been prepared because significant near-term growth within the basin is expected as identified in the Lincoln-Lancaster County Comprehensive Plan.

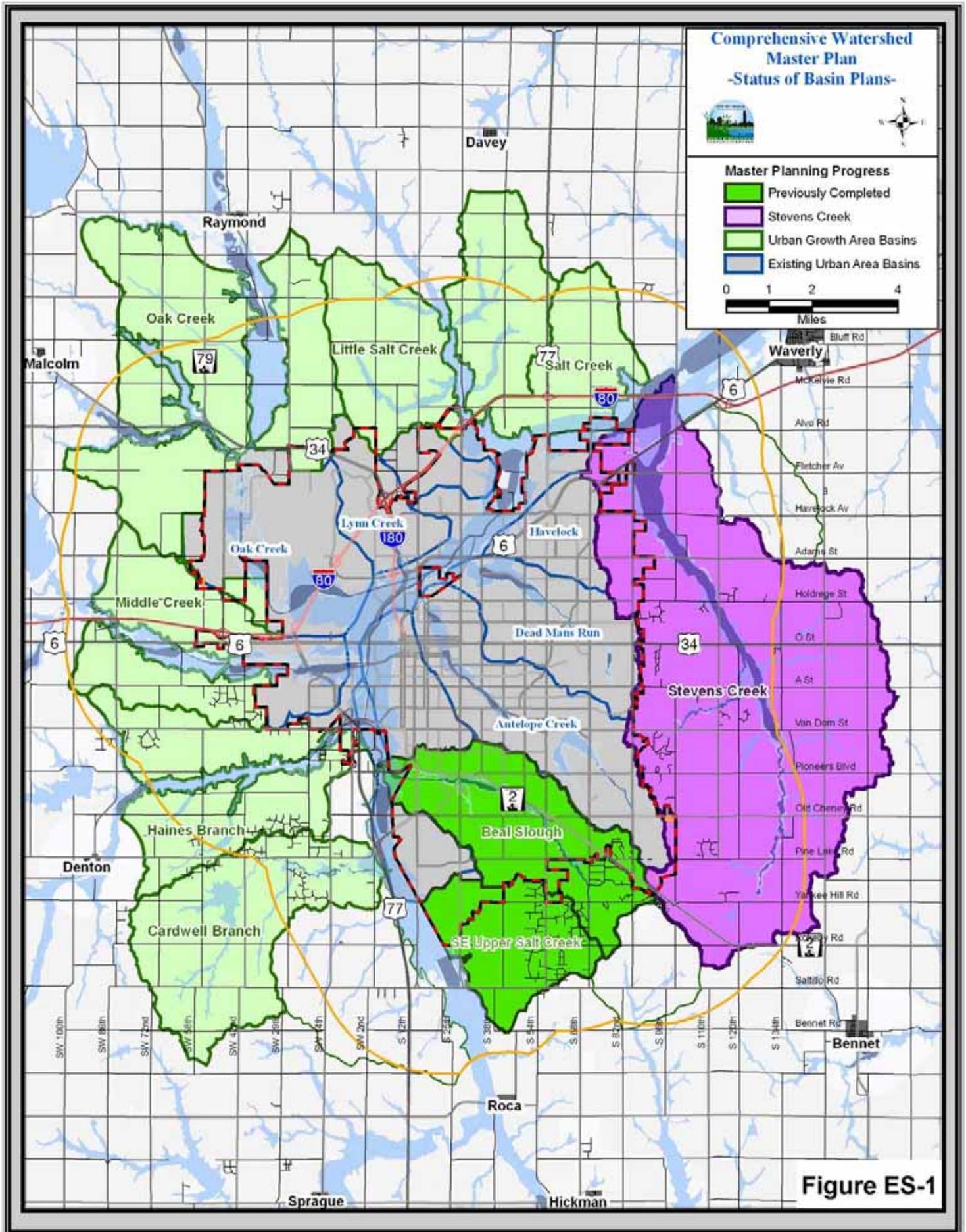
The Stevens Creek Watershed is located immediately east of the City's existing municipal limits (Figure ES-1). The watershed drains approximately 55 square miles from the headwaters near Highway 2 to its confluence with Salt Creek located just north of Highway 6. The watershed is approximately 15 miles in length with a maximum width of about 6 miles. The purpose of the Master Plan is to outline long-term planning tools and improvement projects to address water quality, flood management, and stream stability to provide guidance for sustainable urban growth in the watershed.

The project team was led by the City and NRD, in cooperation with Lancaster County (County). The City/NRD retained the consultant team of Camp Dresser & McKee Inc. (CDM), in association with Intuition & Logic (I&L), Heartland Center for Leadership Development (HC), Kirkham Michael Consulting Engineers (KM), and E&A Consulting Group, Inc. (E&A) to provide assistance with the master planning effort.

## Public Participation Process

As part of the master planning process, a comprehensive public participation process was used to solicit input from a broad range of stakeholder groups. The stakeholder groups included landowners, developers, realtors and other business interests, environmental groups, and neighborhood representatives. The public participation process included the following:

- A questionnaire sent to approximately 4,000 people early in the study process to gather input from a wide range of stakeholders.
- The involvement and input of a 25-member Citizen Advisory Committee representing a broad cross section of interests in the watershed, including elected officials, which met with the project team on a monthly basis. Committee members included Ann Bleed, Andrew Campbell, Robert Christiansen, Dick Dam, Mike Eckert, Peggy Fletcher, Beth Goble,



Rick Hodtwalker, Tony Koester, Marvin Lambie, Russell Miller, Kathy Newberg, Patte Newman, Brock Peters, Dean Petersen, Marleen Rickertsen, Jane Schroeder, Alan Slattery, Jason Smith, Steven Smith, Lyle Vannier, Jack Wagener, John Watson, Bob Wolf, and Bob Workman.

- A series of three open houses in September 2003, September 2004, and January 2005 that attracted over 500 people, and representation at four additional public information events.
- A series of six meetings with landowners regarding alternative management approaches.
- A series of three interest group meetings with a range of stakeholders to discuss alternative management approaches, attended by approximately 100 individuals.
- A series of eight newsletters mailed to over 700 individuals and organizations. In addition, a project website was used to post alternatives under consideration, upcoming events, and materials distributed to the Advisory Committee.
- Watershed bus tours for Advisory Committee members and elected officials.

The public input and feedback received during this process was used by the project team to formulate and refine its master plan recommendations. Section 1 of the Master Plan provides further details regarding the public participation process.

## Master Plan Elements

The Master Plan consists of four major elements: 1) Floodplain Management Tools, 2) Capital Improvement Projects, 3) Site-Specific Structural Best Management Practices (BMPs), and 4) Opportunity Areas. A brief summary of each major element follows:

### Floodplain Management Tools

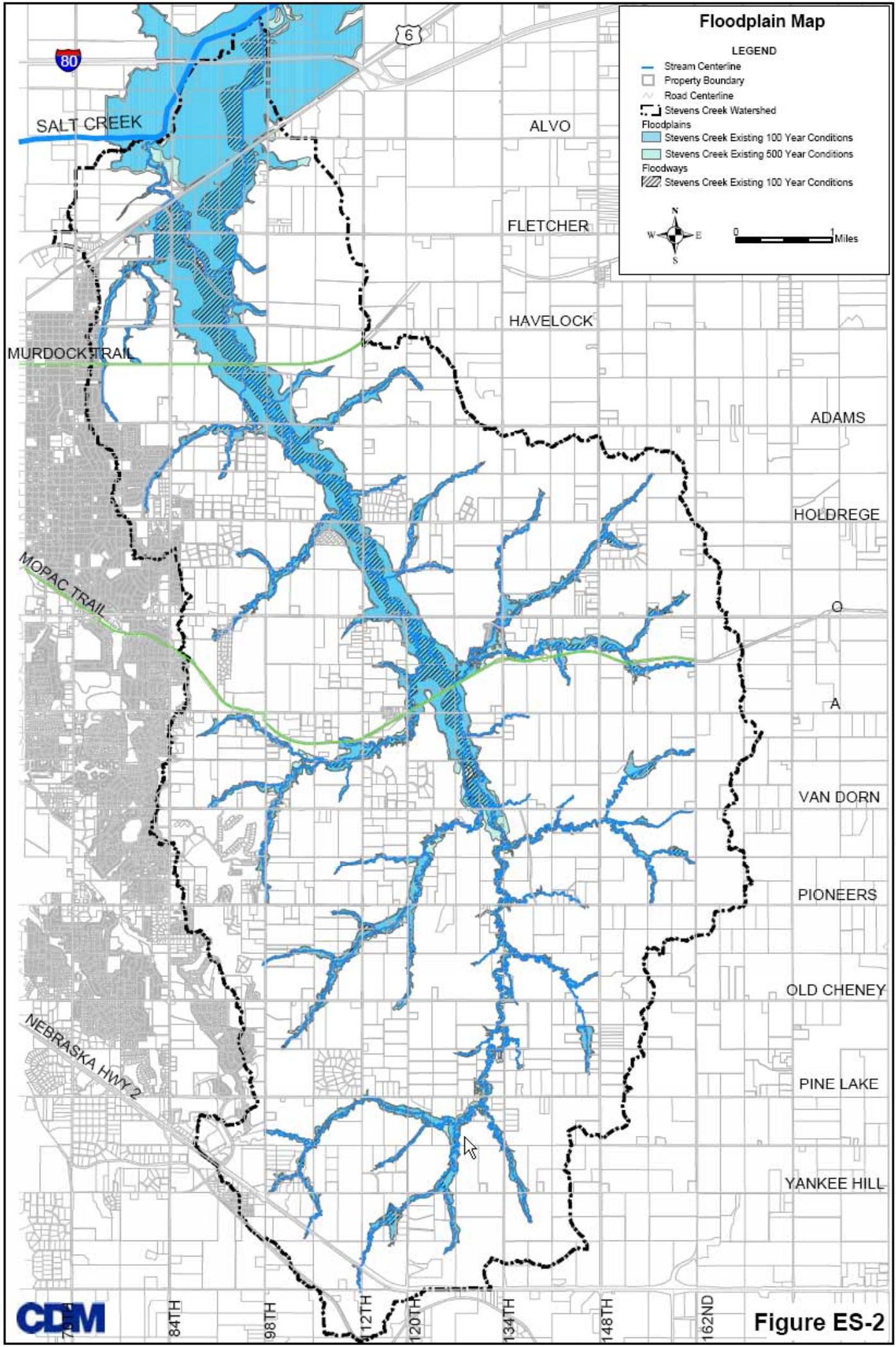
One of the major elements of the Master Plan is updated 100-year floodplain and floodway boundary maps. This information will provide a planning tool to protect future homes and businesses from flood hazards and provide guidance for sustainable urban growth in the watershed. The Master Plan reflects the floodprone areas shown on Figure ES-2 as adopted by the City Council in December of 2004 for local regulatory purposes. The Master Plan recognizes that these floodprone areas will be reflected on the Federal Emergency Management Agency (FEMA) floodplain maps at some time in the future when FEMA finalizes the Flood Insurance Rate Map Physical Map Revision.

The Master Plan also includes a strategy for adopting design standards needed to address stormwater volume and timing issues of individual detention basins within the larger watershed to avoid adverse downstream flooding impacts. As described in Section 6, this will involve using the computer models developed as part of the master planning process to design stormwater facilities for private development. In addition, the Master Plan assumes the goals and objectives of the Comprehensive Plan regarding floodplain management and the Flood Standards for New Growth Areas will be implemented. These

# Floodplain Map

## LEGEND

- Stream Centerline
- Property Boundary
- Road Centerline
- Stevens Creek Watershed
- Floodplains
  - Stevens Creek Existing 100 Year Conditions
  - Stevens Creek Existing 500 Year Conditions
- Floodways
  - Stevens Creek Existing 100 Year Conditions



include designating areas for future urban development generally outside of the floodplain and applying No Net Rise, Compensatory Storage, and preservation of Minimum Flood Corridors where development encroaches into the floodplain.

## Capital Improvement Projects

The process of formulating capital improvement projects required the identification of primary and secondary problem areas in relation to the public interest. Primary problems are those that pose a public safety concern with respect to building flooding, stream instability, or severe maintenance conditions. In addition, primary problems include systemic problems that create a clear influence elsewhere in the watershed and will be significantly more costly to address the longer they are delayed into the future.

Secondary problems include sites where stream degradation or instability exist but are not likely to propagate to other areas of the watershed. Secondary problems also include infrequent flooding of habitable buildings. Secondary problems are not considered as serious primary problems and should be addressed in conjunction with other infrastructure projects occurring in the watershed. For example, many secondary problems can be addressed at the same time roadways are improved and water and wastewater pipelines are installed if they are located in the same general vicinity. In addition, secondary problems can be combined with routine maintenance activities.

The Master Plan includes 11 capital improvement projects to address the 26 primary problem areas identified in the watershed. In this watershed, only stream instability problems met the criteria for primary classification. The primary problem areas were grouped and prioritized to form the basis for 11 capital improvement projects that are shown on Figure ES-3. The photographs shown below illustrate the typical type of improvements recommended for the Stevens Creek Watershed. The total capital cost for

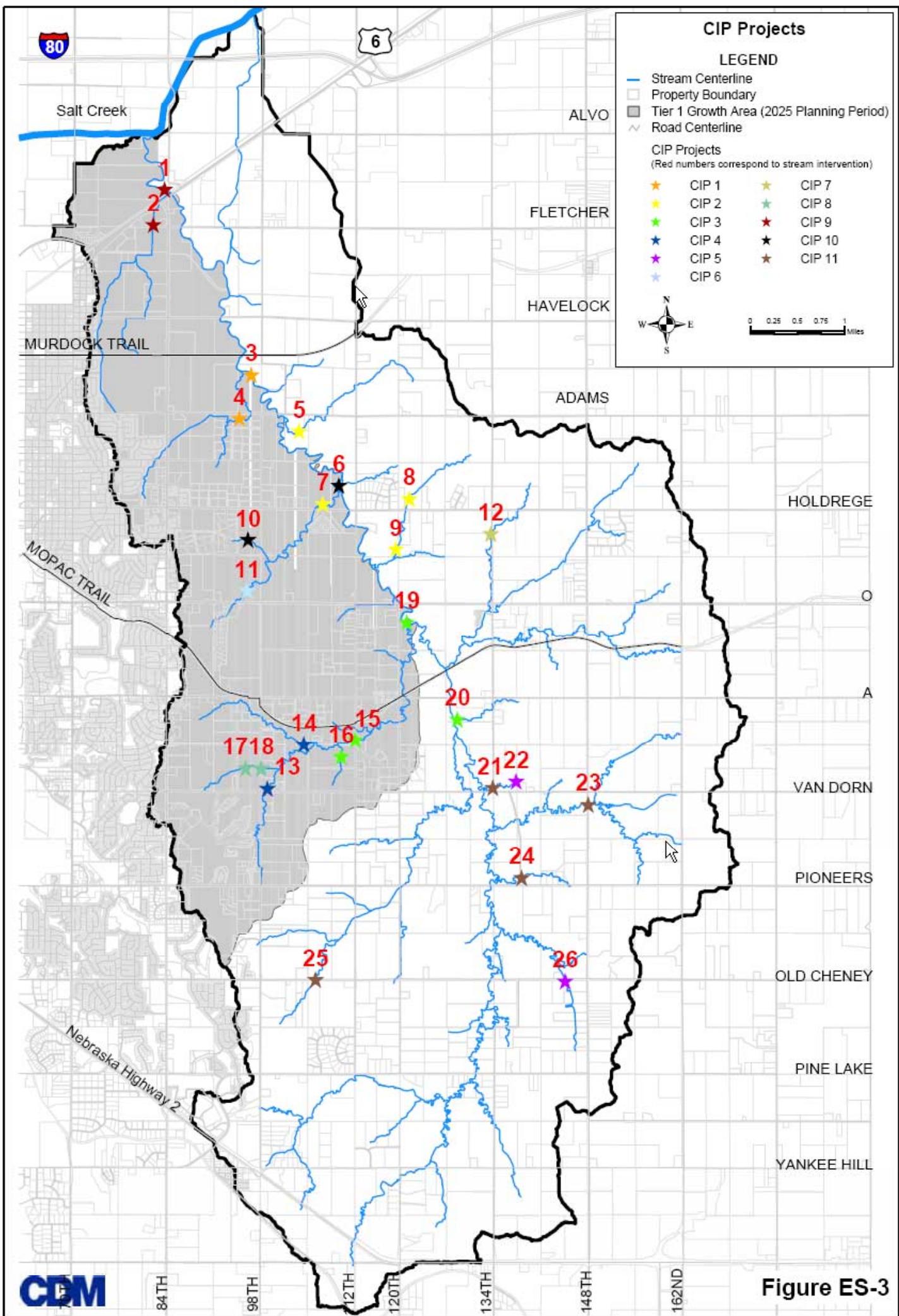


Typical stream improvement project recommended for Stevens Creek.

all 11 capital improvement projects is estimated to be approximately \$10.3 million as summarized in Table ES-1. Section 9 of the Master Plan provides further detail regarding the classification process and conceptual improvements for the 26 primary problem areas.



6 months after construction



**Table ES-1  
Capital Improvement Project List**

<i>Capital Improvement Project</i>	<i>Stream Intervention Number</i>	<i>Construction Sequence</i>	<i>Project Cost</i>
1	3	1	\$1,256,000
	4	1	
2	5	1	\$1,336,000
	7	1	
	9	1	
	8	1	
3	19	1	\$1,201,000
	15	1	
	16	1	
	20	1	
4	14	2	\$776,000
	13	2	
5	22	2	\$725,000
	26	2	
6	11	3	\$863,000
7	12	3	\$1,118,000
8	17	3	\$1,006,000
	18	4	
9	1	3	\$657,000
	2	4	
10	6	4	\$748,000
	10	4	
11	21	4	\$594,000
	23	4	
	24	4	
	25	4	
<b>Total</b>			<b>\$10,280,000</b>

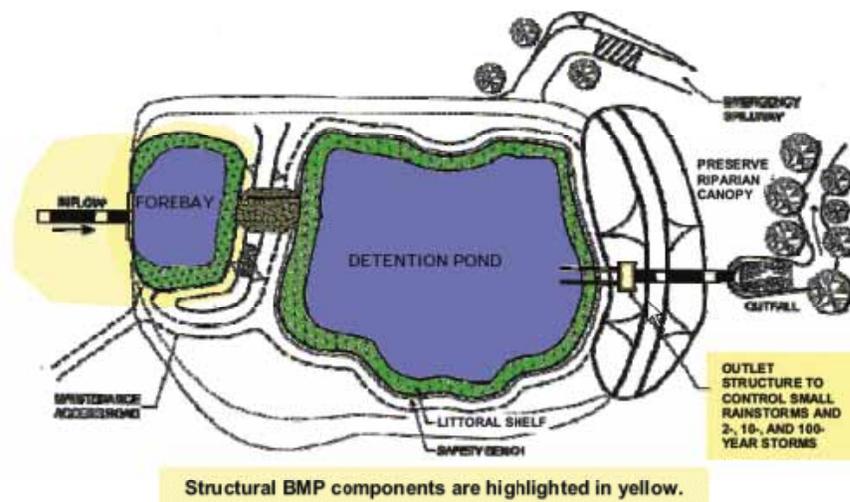
The City, County, and NRD should use this Master Plan as a reference and guide for the implementation of improvement projects in the Stevens Creek Watershed through the City and County Capital Improvement Programs and NRD's Long Range Implementation Plan. The agencies should use cooperative efforts to address project timing, prioritization between basins, and the sharing of responsibility.

### **Site-Specific Structural Best Management Practices**

The Master Plan includes using structural BMPs to offset the impacts from urban development on stream stability and water quality. The urbanization process significantly alters the hydrologic characteristics of a watershed, increasing flow rate, volume, and velocity of stormwater runoff, which causes long-term erosion problems. In addition, the impervious surface area collects pollutants such as oil and grease that leak from automobiles, which are eventually washed away by the stormwater runoff into natural streams and lakes. Structural BMPs are constructed facilities designed to remove pollutants and slow down the runoff before the stormwater enters the receiving stream. Structural BMPs are designed to address the smaller, more frequent rainstorms that carry the majority of pollutants and are believed to cause the greatest amount of erosion and sediment deposition.

Two alternative methods were generated to install BMPs in the watershed based on a range of approaches discussed with the Citizen Advisory Committee. The methods included 1) Regional Structural BMPs, and 2) Site-Specific Structural BMPs. Advantages and disadvantages for each method were evaluated, which included an analysis of cost and effectiveness. The evaluation is described in Section 6 of the Master Plan and resulted in selecting site-specific structural BMPs as the recommended alternative. This method provides a cost-effective approach to maintain the integrity of the natural streams, preserve water quality, and can be efficiently integrated in the City's current development standards. The Master Plan includes guidance for revisions to the City's design standards for site-specific BMPs, which would be applied consistently to all new developments. Section 7 of the Master Plan provides further details on how to integrate structural BMPs into new development sites. When revised design standards are drafted, all low cost options providing the same or greater water quality benefits should be considered and included as options for the developer.

Currently, City standards for new developments require detention basins designed to control the 2-, 10-, and 100-year storm events. Structural BMPs can be efficiently integrated with detention basins as shown on Figure ES-4. This includes adding a sediment forebay and designing the outlet structure to control the smaller, more frequent rainstorms. This integrated facility will provide both water quantity (flooding) and quality (pollutant removal and stream stability) benefits. Structural BMPs can also be integrated into the site using alternative approaches independent from the stormwater detention basin.



**Figure ES-4**  
**Integrated Detention Pond and Structural BMP**

The estimated cost to integrate a structural BMP into the City's current detention basin design requirements is \$210 per acre of drainage area. The additional cost for maintenance is estimated to be \$500 per year per facility.

One of the key concerns expressed during the public participation process was the question of who should bear the cost for offsetting the impacts to water quality and stream stability caused by future urbanization. In response to this input, the cost-share concept embodied in this Master Plan assumes that there is both private and public responsibility relative to how structural BMPs function together as a system to address water quality and stream stability throughout the watershed. The following concepts are embodied as part of this Master Plan element that outline public/private roles and responsibilities:

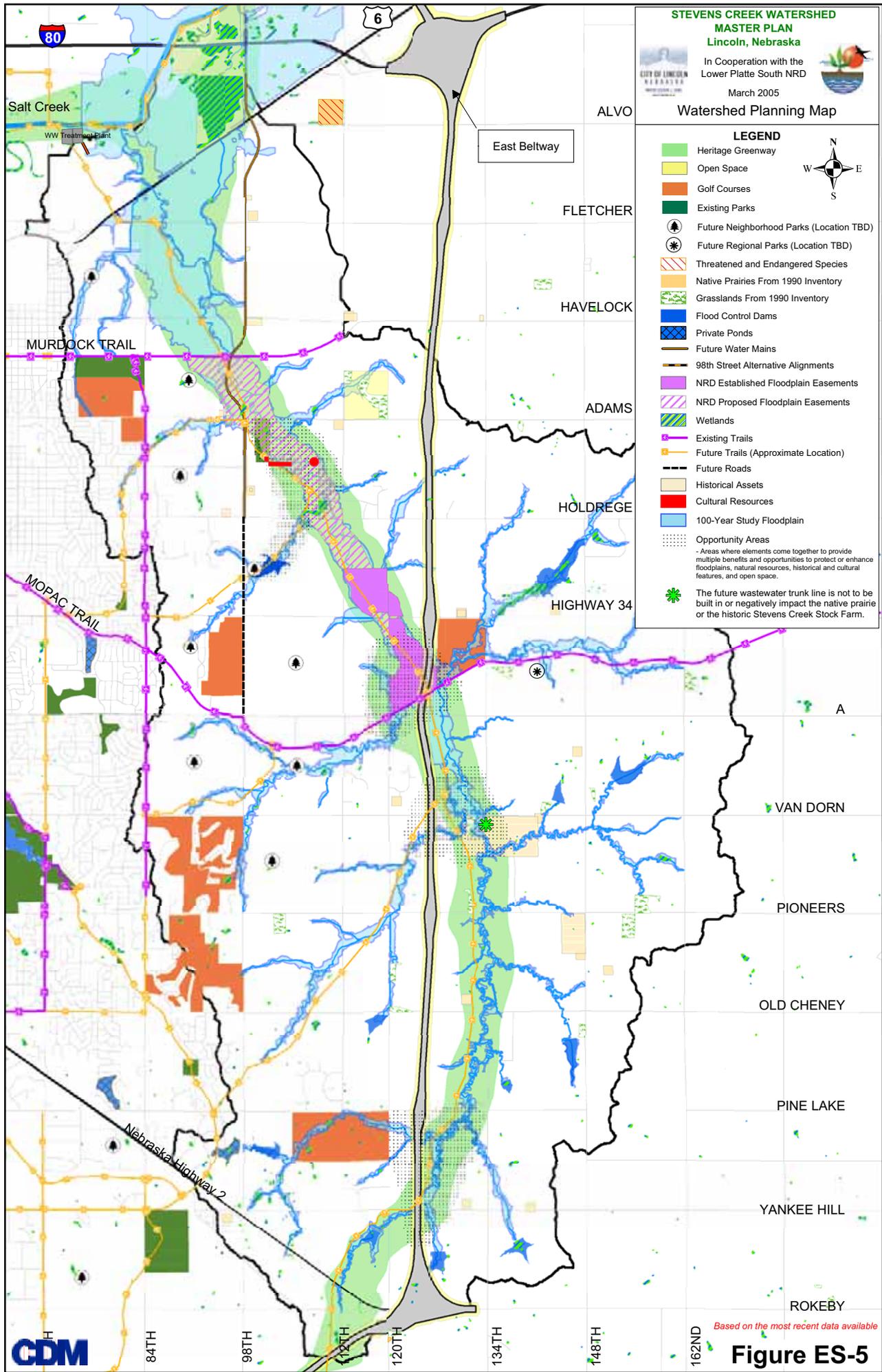
- A public-private cost share concept where the City and NRD share in the cost of constructing the BMP portion of the facility, jointly providing funding for \$100 of the \$210 cost estimated per acre of drainage area. City/NRD funding is anticipated to be provided on a first-come, first-serve basis and be contingent upon City/NRD approval of the proposed cost share program. In addition, the cost share program would be subject to yearly budget approvals, voter approval of general obligation bonds, and NRD board approval.
- Revisions to the subdivision standards to require a \$2,500 escrow for the first 5 years of maintenance (\$500/year).
- Revisions to the drainage standards to establish uniform criteria for the development of a maintenance plan to be submitted with the preliminary plat and referenced in the subdivision agreement. A good maintenance plan will not only provide a guide for future property owners but will help ensure that maintenance responsibilities are clear when ownership is transferred from the developer.
- The development of a proactive education program by the City/NRD.
- The improvement/refinement of the City/NRD partnership to share in the responsibility of inspections on a regular rotation basis.

## Opportunity Areas

Figure ES-5 is a Watershed Planning Map that overlays a wide variety of natural and built elements to support an integrated approach to watershed planning in Stevens Creek. Opportunity Areas are very general planning locations within the watershed that highlight where natural elements and/or existing or future infrastructure come together. These are areas with the potential for multiple benefits and opportunities to protect or enhance features like floodplains, natural resources, historical and cultural features, and open space.

Four Opportunity Areas are highlighted on the map along the Salt Valley Heritage Greenway, which follows the main channel of Stevens Creek. These highlighted areas generally recognize where natural features like the floodplain and drainage corridors overlap or are in the vicinity of other elements such as the East Beltway corridor, existing or future trails, NRD conservation easements, or historical and cultural resources.

As future planning continues for Stevens Creek, these areas should be referenced as a guide by City and County departments and the NRD, particularly with regard to opportunities to integrate parks, open space, and stormwater or floodplain benefits.



*Based on the most recent data available*

**Figure ES-5**



## Summary

The Stevens Creek Watershed Master Plan provides the City and NRD with the necessary planning tools and capital improvement projects to address flood management, water quality, and stream stability for achieving sustainable urban growth in the watershed. By using the detailed study information and applying the Master Plan elements described above, multiple goals will be achieved including:

- Protection of future homes and businesses from flood hazards
- Reduction of future impacts to water quality and stream stability due to urbanization
- Preservation of aquatic and riparian habitat
- Long-term stream stability that protects public infrastructure
- Development guidelines that address stormwater quantity and quality
- Opportunities for multiple benefits through an integrated approach to watershed planning