

# **City of Wichita, Kansas**

## **Storm Water Management Program 2007-2012**



**Kansas Permit No. M-AR94-S001**

**Federal Permit No. KS0091049**

**September 2008**

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### **City of Wichita, Kansas**

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The City of Wichita (City or Permittee), Kansas has prepared this Storm Water Management Program (SWMP, SMP or Program) to outline the measures it will take to reduce the discharge of pollutants from the Municipal Separate Storm Sewer System (MS4) to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements and goals of the Clean Water Act, and the City's National Pollutant Discharge Elimination System (NPDES) Permit.

This Program has been submitted in compliance with the requirements of both the Kansas Water Pollution Control MS4 Permit No. M-AR94-S001 and Federal Permit No. KS0091049 that is required for the term beginning October 1, 2007, and expiring September 30, 2012. This Program also operates using the legal authority as set forth in City Ordinance Chapter 16.32, and subsequent revisions.

Changes to this plan may be made as allowed by the Permit and approved by the Kansas Department of Health and Environment (KDHE). This Program is implemented within areas of the City's legal jurisdiction, boundaries and on its properties.

This Program provides a list of stormwater Best Management Practices (BMPs) that the City of Wichita agrees to implement as required by the KDHE NPDES Permit. Each BMP will have goals and measurements to demonstrate compliance with the goals. There are three sections of this Program as follows:

- Section I - BMPs for Six Minimum Control Measures as required by KDHE NPDES Permit Part V;
- Section II – BMPs for Principal Pollutants of Concern (PPoC) as required by KDHE NPDES Permit Part IV that lists identified principal pollutants of concern; and
- Section III – BMPs for Total Maximum Daily Load (TMDL) Parameters as required by KDHE NPDES Permit Part III for specifically listed associated streams.

Section I and II will be implemented within all legal boundaries of the City and Section III will be implemented to comply with requirements for associated streams as specified in the current KDHE NPDES Permit and as identified in this Program.

Other agencies and organizations may contribute to the implementation of these measures. Also, actions and measures utilized but not documented in the SMP may be implanted throughout the permit years. Each of the contributions made by others as well as additional City actions will be documented in the Annual Report and will be counted towards goal attainment. All education programs and actions taken throughout 2008 shall count as activities towards compliance with this Program. Each year thereafter will follow the Program as identified in this document.

## **Section I - BMPs for Six Minimum Control Measures (MCM)**

### **Minimum Control Measure No. 1: Public Education and Outreach**

The City will implement a public education program which includes distribution of materials to the community or conducting equivalent outreach activities which address the impacts of stormwater discharges on water bodies and the steps the public can take to reduce pollutants in stormwater runoff. Each BMP listed below will describe a part of the City's public education program and will list how its completion will be measured.

- A. Video messages and graphics will be developed by the City for use on the City's Cable Channel 7 or other video outlets for community distribution. This activity will take the form of periodic repeating video presentations or graphics informing citizens of the importance of preventing stormwater pollution and individual actions citizens can take to reduce their impact on stormwater.

Measurable Goal: A repeating video or graphic designed to inform the public on stormwater pollution prevention will be run at least twice per year on the City's Cable Channel 7, beginning in October 2008, and continue each year thereafter. Presentations/messages and graphics will be documented along with the media used and its duration.

- B. An informational brochure on stormwater quality for residents will be developed by the City. This brochure will be used as a Wichita Water Utility bill insert.

Measurable Goal: A brochure will be developed and approximately 130,000 will be distributed beginning in October 2008. Each year thereafter the City will develop an annual brochure and distribute these via Wichita Water Utility bill inserts.

- C. The City will distribute stormwater education materials through the City of Wichita website ("[www.wichita.gov](http://www.wichita.gov)"). Materials will be distributed through City web pages and/or appropriate links to local, regional, and national websites.

Measurable Goal: Website will be developed and in operation after October 1, 2008, and continue throughout the permit term. At least one informational document or website link will be added to the website for stormwater education and will be reported and documented in the Annual Report.

- D. Stormwater pollution prevention, water conservation and water quality education programs have been and will continue to be developed and provided to public and private schools. These may be provided at the City's W.A.T.E.R. Center as well as at public school facilities or other locations. Such programs and assistance may be provided in cooperation with educational, non-profit, or other governmental groups.

Measurable Goal: City will continue contact with interested teachers and appropriate school officials. Programs and assistance will continue to be provided through several ongoing programs and will reach a minimum of 500 students or participants each permit year and will be documented.

- E. Stormwater pollution prevention, water conservation and water quality education programs have been and will continue to be developed and provided to neighborhood groups, homeowner's associations, business and trade associations, community organizations, youth groups, and other groups and organizations. These may be provided at the City's

W.A.T.E.R. Center as well as at other locations. Such programs and assistance may be provided in cooperation with educational, non-profit, or other governmental groups.

Measurable Goal: There will be at least 20 programs presented annually of each permit year. The programs will be documented and a summary of the programs provided will be identified in the annual report.

- F. Annually each BMP and corresponding measurable goal provided in this SMP will be evaluated and progress or actions will be reported in the Annual Report as required by the KDHE NPDES permit.

Measurable Goal: As required by the KDHE NPDES permit, an Annual Report will be submitted to KDHE by April 1 of each year for the previous calendar year. The Annual Report will be provided to the City Manager and posted on the City's stormwater website.

## **Minimum Control Measure #2: Public Involvement and Participation**

The City will implement a public involvement and participation program to solicit public comment and recommendations regarding the BMPs and measurable goals utilized in this Program to comply with this permit.

- A. Public comments and recommendations for this plan and recommended changes to this plan will be solicited by the City regarding the BMPs and measurable goals that will be utilized to achieve the goals of this permit. Public input will be considered and utilized, if applicable, in the annual evaluation of this SMP.

Measurable Goal: Public comment periods will be established and announced via press releases and posted on the City website. Public comments will be documented and considered in finalizing all documents. Comments made via any method, (i.e., web site, phone, mail, etc.,) will be evaluated and, if appropriate, incorporated into this SMP. This will begin in October 2008.

- B. The City will conduct at least one volunteer river clean up day with citizen and group volunteers and participants will be surveyed for their suggestions for stormwater pollution prevention measures.

Measurable Goal: An Arkansas River (and/or tributaries) Cleanup will be held at least once each year of the permit. Stream miles cleaned, number of volunteers, tons of trash collected and survey responses will be documented. Results will be contained in the annual evaluation of this SMP.

- C. The City will convene a Task Force for the purpose of reviewing stormwater best management practices and making recommendations to the City for implementation.

Measurable Goal: The City has already initiated this Task Force (August 2008) and will seek its input regarding this Program and individual best management practices as determined by the City. Comments will be evaluated and, if appropriate, incorporated into this SMP. This will begin in September 2008.

### Minimum Control Measure #3: Illicit Discharge Detection and Elimination

The City agrees to:

- Develop, implement, and enforce a program to detect and eliminate illicit discharges into the MS4;
- Develop a storm sewer system map of the Permittee's MS4, showing the location of all outfalls, either pipes or open channel drainage, showing the names and location of all streams or lakes that receive discharges from those outfalls;
- Enact an ordinance to prohibit non-stormwater discharges into the storm sewer system as required by the current KDHE permit and implement appropriate enforcement procedures and actions (a copy of the most recently adopted ordinance shall be submitted to KDHE with the subsequent Annual Report);
- Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste; and
- Develop and implement a plan to detect and address prohibited non-stormwater discharges as required by the current KDHE NPDES permit.

- A. The City has already passed an ordinance to prohibit non-stormwater discharges into the storm sewer system as required by the current KDHE permit and has implemented appropriate enforcement procedures and actions.

Measurable Goal: An ordinance prohibiting non-stormwater discharges is currently in place, Chapter 16.32, and will be maintained and updated as necessary throughout the effective dates of this permit. A copy of the implemented ordinance will be provided in the next Annual Report.

- B. The City will continue to televise storm sewer pipe to identify illicit connections or discharges.

Measurable Goal: Each permit year the City will televise 45,000 linear feet of storm sewer pipe in an effort to find illicit connections or discharges. Any illicit discharges found will be investigated with actions documented. The amount of storm sewer televised will be reported in the Annual Report with a summary of results included.

- C. Permittee will continue the program of televising sanitary sewer lines.

Measurable Goal: A minimum of 400,000 linear feet of sanitary sewer line will be televised in each of the remaining years of the permit and reported in the Annual Report.

- D. A City program of systematic inlet inspections and cleaning, including visual observations for illicit discharges will be continued.

Measurable Goals: Permittee will perform at least 30,000 catch basin cleanings each year. This effort is currently underway and inspection frequency will be reviewed each permit year for planning of the next year's cleaning schedule. In the third quarter of the 3rd year of permit coverage a new plan will be established for years 4 and 5 to take any new factors including new equipment into consideration.

- E. The City has already prepared a current and complete storm sewer collection system map in accordance with the KDHE NPDES permit requirements. An updated GIS storm sewer

system map is currently being prepared.

Measurable Goal: Permittee has contracted for the development of an electronic geo-database of the storm sewer collection system. Due to the City's large system, this program will need to be implemented in phases. The system will include specifications identified by the current KDHE NPDES Permit. Phase 1 of this program is planned to be completed in the fall of 2008. Public Works plans to contract for the remaining program in 2008, with the entire geo-database stormwater system planned to be completed by 2011.

- F. A restaurant inspection program will continue to be utilized to verify that grease is not being discharged to the municipal storm drains. These inspections are incorporated into the Water Utilities regular inspection program and accomplished by City inspectors.

Measurable Goal: Inspections of restaurant grease handling is an existing program within the Wichita Water Utility Department. There will be a minimum of 160 inspections performed each permit year and the results will be reported in the Annual Report. If changes are necessary with this program, KDHE will be informed.

- G. Regulate septic system installation and usage, via the existing Ordinance, and respond to complaints regarding improper discharges related to septic systems. Septic system regulation is an ongoing program of the City. The City will seek City Council approval to "order in" municipal services as a result of failed septic systems.

Measurable Goal: Continue regulation of septic systems in accordance with City Code Chapter 16.12 during the entire permit term. Records will be maintained to document the number of complaints received and disposition of problems found will be reported in the Annual Report. Activities associated with "order in" requests to Council will be documented in the Annual Report. The number of "order in" requests is demand driven.

- H. The City will either provide training for or work in conjunction with organizations to ensure businesses and industries are trained in stormwater pollution prevention best management practices and local, state and federal stormwater regulations and ordinances.

Measurable Goal: In the past, the City has provided periodic training and BMP discussions to area businesses regarding stormwater pollution prevention and BMPs. Beginning in January 2009, the city will conduct one annual training program for area businesses to ensure compliance with this Program. Results will be reported in the Annual Report.

#### **Minimum Control Measure #4: Construction Site Runoff Control**

The City has developed and agrees to continue implementation and enforcement of a program to reduce pollutants in stormwater runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of stormwater discharges from construction activities disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. The City will ensure that the program for construction site runoff control continues to include at a minimum the following:

- An ordinance to govern sediment and erosion control along with sanctions for compliance;
- Requirements for construction site owners or operators to implement BMPs for erosion

- and sediment control;
- Requirements for owners or operators to control waste materials during construction that may cause adverse impacts to water quality;
- Procedures for site plan review which incorporates consideration of potential water quality impacts;
- Procedures for receipt and consideration of information submitted by the public; and
- Procedures for site inspection and enforcement of control measures.

- A. The City has implemented an ordinance requiring erosion and sediment control measures at construction sites.

Measurable Goal: An ordinance is currently in place, Chapter 16.32.050, and will be maintained and updated as necessary throughout the effective dates of this permit.

- B. The City has developed and implemented a program to reduce pollutants in stormwater runoff to the MS4 from construction activities as required by the City's permit.

Measurable Goal: This is an existing program, which will continue regulation of construction activities in accordance with City Code, Chapter 16.32.050. Permittee will perform at least 600 inspections in each year of the permit, and violations/citations will be written as necessary. A copy of program instructions will be included in the next Annual Report.

**Minimum Control Measure #5: Post-Construction Stormwater Management in New Development and Redevelopment**

The City agrees to develop a post-construction stormwater management program to address post-construction stormwater runoff from new develop and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the MS4. This program will include at a minimum the following:

- BMPs to prevent or minimize adverse water quality impacts;
- Strategies which include a combination of structural and/or non-structural BMPS appropriate for the municipality;
- Enact an ordinance to address post-construction runoff from new development and redevelopment projects to the extend allowable under State and local law; and
- Ensure adequate long-term operation and maintenance of BMPs.

- A. The City will develop, implement, and enforce a program to address post-construction stormwater runoff from new development and redevelopment projects as required by the permit. To obtain the best information and technical input from national and area resources, the City has implemented a Task Force to develop the BMPs required for post-construction operations and maintenance.

Measurable Goal: Structural and/or non-structural BMPs will be selected and identified as determined by the City Task Force by October 2009 and implemented by January 2010.

- B. The City will enact an ordinance to address post-construction runoff from new development and redevelopment projects.

Measurable Goal: The City currently has provisions in its stormwater ordinance to address protection of MS4 and waters of the U.S. from development as provided in Chapter 16.32. Updates to the current ordinances will be provided by October 2009 and shall be reviewed, and updated as needed, each year of the permit.

### **Minimum Control Measure #6: Pollution Prevention/Good Housekeeping for Municipal Operations**

The City agrees to develop and implement an operation and maintenance program for its municipal operations as required by the permit.

- A. The City will develop and implement an operation and maintenance program that includes employee training, BMP's, and Stormwater Pollution Prevention Plans (SWP3's), to reduce or prevent stormwater pollution from municipal industrial operations including park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance.

Measurable Goal: Many programs are currently in place for stormwater pollution prevention at municipal facilities although not necessarily documented for this program. Current programs will be documented beginning in the fall of 2008. All municipal facilities will be evaluated and will have programs designed, implemented and completed by September 2009. A summary of these efforts will be provided in the Annual Report.

- B. Stormwater pollution inspections of all municipal industrial facilities, noting potential sources of exposures and opportunities for improvements, will be conducted in coordination with identifying needed stormwater pollution prevention programs and training at municipal facilities.

Measurable Goals: All municipal industrial facilities with a Stormwater NPDES permit will be inspected on a calendar year basis beginning in October 2009.

- C. City will continue the existing street sweeping program to reduce pollutant loadings to the storm sewer.

Measurable Goals: Two rounds of residential street sweeping, eight rounds of arterial street sweeping, and two rounds per week of downtown street sweeping will be completed annually by the City. This effort is currently underway, and will continue throughout the permit term.

- D. The City has a program to ensure proper application of pesticides and herbicides are applied at municipal parks and properties. Some parks will be designated as a "Pesticide Free" property.

Measurable Goals: The City will continue the existing program that requires all City employed applicators of pesticides and/or herbicides to be licensed or directly supervised by licensed personnel. Records shall be maintained as required by local, state and federal laws for pesticide/herbicide application events and licensed personnel shall be trained periodically to ensure proper management and application of the pesticides and/or herbicides. A "Pesticide Free" Parks program shall be maintained for some parks and

identified to the public through the City's website.

- E. Stormwater control structures will continue to be adequately identified, operated and maintained through a coordinated operations and maintenance program.

Measurable Goal: Control structures are already maintained in an ongoing maintenance program although not necessarily documented for this SMP. Current programs will be documented beginning in the fall of 2008. A summary of the annual maintenance efforts will be provided in the Annual Report.

- F. The City will respond to spills of hazardous materials and solid wastes on to public roadways and private and public properties. City staff will ensure that discharged materials are cleaned up by the responsible parties and reported to local, state and federal officials as required by law and regulations.

Measurable Goal: All roadway and property spills of hazardous materials or solid wastes will be monitored and cleaned up by responsible parties. Spill notifications, cleanup actions and environmental impacts will be documented and provided in each Annual Report throughout the permit period.

## **Section II - BMPs for Primary Pollutants of Concern (PPoC)**

The City agrees to implement BMPs for Principal Pollutants of Concern (PPoC) as identified by the City's NPDES permit. The listed PPoC parameters are biochemical oxygen demand, E. coli, total recoverable cadmium, total recoverable copper, and total recoverable zinc. At a minimum, one BMP as required in Part IV of the permit shall be implemented for each of the PPoC, and these BMP's shall generally be implemented throughout the City's jurisdiction. Also, high concentrations of PPoC are often caused by similar sources. Therefore, each of the following BMPs listed below will help to address each of the PPoC.

### **BMPs for Five Principal Pollutants of Concern: Supplemental Control Measures**

- A. The City will implement a public education program for the Principal Pollutants of Concern (PPoC) that will include development of a message and distribution in the community. This message will be disseminated by use of the City's Cable Channel 7. This activity may take the form of a periodic repeating video presentation or graphic informing citizens of the importance of their activities regarding pollution prevention measures. Such information will highlight the PPoC.

Measurable Goals: A repeating video or graphic designed to inform the public on the PPoC and stormwater pollution prevention will be once each year on the City's Cable Channel 7, beginning in October 2009.

Affected Parameters: Biochemical oxygen demand, E. coli, total recoverable cadmium, total recoverable copper, and total recoverable zinc.

- B. An informational brochure will be developed focusing on the five PPoC and stormwater quality for residents. This brochure will be used as a Water Utility bill insert.

Measurable Goal: A PPoC-focused brochure will be developed and provided to Water Utility users to reflect the increased priority of PPoC and actions to prevent PPoC into stormwater.

Brochure will be mailed annually, beginning summer 2009.

Affected Parameters: Biochemical oxygen demand, E. coli, total recoverable cadmium, total recoverable copper, and total recoverable zinc.

- C. Permittee will distribute stormwater education materials that will highlight PPOC through the City of Wichita website ("[www.wichita.gov](http://www.wichita.gov)"). Such distribution may include direct distribution on the City web pages and/or may direct user to appropriate links to local, regional, and national websites.

Measurable Goal: Web pages will be designed and available highlighting the PPOC during the second year of the permit (2009) and continuing throughout the permit term. Web pages will be updated at least annually and will be copied and provided as attachments in the Annual Report. At least one informational document or website link will be added to the website for stormwater education and will be reported and documented in the Annual Report.

Affected Parameters: Biochemical oxygen demand, E. coli, total recoverable cadmium, total recoverable copper, and total recoverable zinc.

- D. The City will continue the existing street sweeping program to reduce pollutant loadings to the storm sewer.

Measurable Goals: Two rounds of residential street sweeping, eight rounds of arterial street sweeping, and two rounds per week of downtown street sweeping will be completed annually by the City. This effort is currently underway, and will continue throughout the permit term.

Affected Parameters: Biochemical oxygen demand, E. coli, total recoverable cadmium, total recoverable copper, and total recoverable zinc.

- E. An informational brochure for businesses and industries that have stormwater NPDES permits will be developed focusing on the five PPOC and stormwater quality. This brochure will be provided as mailer to the identified businesses and industries.

Measurable Goal: A PPOC-focused brochure will be developed and provided to local businesses and industries to reflect the increased priority of PPOC and actions to prevent PPOC into stormwater. Brochures will be mailed annually, beginning spring 2009.

Affected Parameters: Biochemical oxygen demand, E. coli, total recoverable cadmium, total recoverable copper, and total recoverable zinc.

- F. In an effort to ameliorate discharges of Primary Pollutants of Concern, the City will continue its industrial inspection program. Industries will be formally inspected each year to determine if NPDES permitted industrial activities are contributing to, or causing, illicit connections or pollutant discharges of PPOC or other contaminants to be discharged into the stormwater.

Measurable Goal: Ten industrial facilities will be inspected each year and a summary of the results will be included in the Annual Report.

Affected Parameters: Biochemical oxygen demand, E. coli, total recoverable cadmium, total recoverable copper, and total recoverable zinc.

### **Section III - BMPs for Total Maximum Daily Load (TMDL)**

The listed TMDL regulated parameters are total phosphorus, total nitrogen, biochemical oxygen demand pollutants, suspended solids (sediment), and bacteria (E. coli). There are two listed associated streams for all of the City's TMDL regulated parameters, the Little Arkansas River and the Cowskin Creek. One TMDL is also required for the Big Arkansas River and the Whitewater River. Each BMP has a Measurable Goal, and the affected regulated parameters, as applied to the impacted watersheds. At a minimum there will be at least one BMP for each TMDL regulated parameter. These BMPs will be implemented at a minimum within the permit area wherever stormwater drains to the associated impaired stream.

#### **BMPs for Five Listed TMDL Parameters: Minimum Control Measures**

- A. A pet waste brochure will be developed for public education and dissemination. This brochure will encourage pet owners to pick up the waste as well as other pollution prevention tips for pet owners.

Measurable Goal: The brochure will be posted on the City Stormwater Website and printed and placed in various buildings and City Hall for citizen use. This brochure will be provided to neighborhood associations for printing in their newsletters and for distribution at neighborhood meetings. This brochure will address the TMDL regulated parameters and actions that citizens and particularly pet owners can do to ameliorate the discharge. The brochure will be developed prior to May 1, 2009. Each subsequent year, pet waste will be addressed in an education program or printed informational handout.

Affected Parameters: Total nitrogen, biochemical oxygen demand pollutants, suspended solids, and bacteria.

- B. A "Don't discharge grass clippings or leaves into the street" brochure was developed and is disseminated to individuals when a complaint about grass clippings or leaves in the street has been observed.

Measurable Goal: Brochures and citations presented to those that violate the ordinance requiring grass clippings and leaves to be kept out of the street and associated storm drains will be documented and reported in the City's Annual Report.

Affected Parameters: Total phosphorus, total nitrogen, biochemical oxygen demand pollutants, suspended solids, and bacteria.

- C. A display for the five regulated TMDL parameters will be designed and installed at the City's W.A.T.E.R. Center addressing each of the regulated parameters and their associated river or creek. This will be a static self-explanatory informational display available for all visitors to view.

Measurable Goals: The display will be designed and installed prior to August 1, 2009. The annual number of W.A.T.E.R. Center visitors will be reported in the Annual Report.

Affected Parameters: Total phosphorus, total nitrogen, biochemical oxygen demand pollutants, suspended solids, and bacteria.

- D. The Little Arkansas and the Cowskin Creek watersheds contain several operations involved in the caring, feeding, and raising of livestock and other animals. These operations are not

large enough to require adherence to Confined Animal Feeding Operations (CAFO) regulations. The City or other organization on the City's behalf will seek and contact these operations to discuss types of assistance to reduce the listed pollutants in their discharge. Assistance could take the form of education, or, advising the operation of availability of grants/loans, or, obtaining/installing BMP's, such as grass buffers, silt fence, hay bales, etc,

Measurable Goal: At least two CAFO operations will be contacted each year and the results of those contacts will be reported annually. These efforts will begin in July 2009.

Affected Parameters: Total phosphorus, total nitrogen, biochemical oxygen demand pollutants, suspended solids, and bacteria.

- E. In all four of the targeted watersheds, priority attention is currently given to regulated septic system installation and usage. Response to complaints received regarding improper discharges or surfacing sewage related to septic systems failures will be given top priority for complaint investigation and response.

Measurable Goal: Continue regulation of septic systems in accordance with City Code during the entire permit term. Records will be maintained of complaints, and their disposition, and reported in the Annual Report.

Affected Parameters: Total phosphorus, total nitrogen, biochemical oxygen demand pollutants, and bacteria.

- F. The City will use the current program of construction site inspections to target construction activities within the four listed watersheds.

Measurable Goal: Beginning October 2008, the City will identify and target those construction or redevelopment projects having BMPs that are within close proximity to one of the four associated designated streams or rivers. The City will initially inspect within 30 days of the project start date. This effort will continue throughout the permit term.

Affected Parameters: Total phosphorus, total nitrogen, biochemical oxygen demand pollutants, suspended solids, and bacteria.

- G. Stormwater demonstration projects will be implemented in each permit year as funding sources are made available. Each project will be publicized for the community to view, evaluate and discuss. The City will evaluate each project for effectiveness and will report its findings to the general public through its website or other communication avenue and in the Annual Report.

Measurable Goal: Beginning October 2008, the City will identify at least one demonstration project for design, construction and implementation. The demonstration project will be in close proximity to one of the four associated designated streams or rivers. The City will periodically inspect, evaluate and maintain each project and report on its effectiveness in the Annual Report.

Affected Parameters: Total phosphorus, total nitrogen, biochemical oxygen demand pollutants, suspended solids, and bacteria.