CENTERVILLE CITY
STORMWATER MANAGEMENT PLAN

UPDES Permit Number UTR090000

General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)

Submitted to:

State of Utah
Department of Environmental Quality
Division of Water Quality

Submitted by:

Centerville City, Public Works Department
Drainage Utility Division
655 North 1250 West
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PURPOSE

The purpose of the Stormwater Management Plan (SWMP) for Centerville City is to provide direction to satisfy Federal and State water quality requirements as set forth under the National Pollutant Discharge Elimination System (NPDES) and Utah Pollutant Discharge Elimination System (UPDES) permits. The purpose of the SWMP is to establish a program that effectively limits the discharge of pollutants from Centerville City's storm drainage system.

The SWMP for Centerville City outlines the implementation of controls in specific areas with the intention to prevent harmful pollutants from being carried by stormwater runoff into local water bodies. The six minimum control measures addressed under the UPDES permit are:

1. Public Education and Outreach on Stormwater Impacts
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination (IDDE)
4. Construction Site Stormwater Runoff Control
5. Post-Construction Site Stormwater Runoff Control
6. Pollution Prevention and Good Housekeeping for Municipal Operations

The SWMP for Centerville City includes the following information for each of the six minimum control measures:

- The Best Management Practices (BMPs) to be implemented
- The measurable goals for each of the BMPs
- The positions responsible for implementing the BMPs
- The funding required to implement the BMPs

CENTERVILLE CITY, UTAH

STORMWATER MANAGEMENT PLAN

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SECTION 1 – INTRODUCTION

1.1. Overview of the Stormwater Management Plan

This Stormwater Management Plan (SWMP) provides an overview of integrated stormwater management, floodplain management, and technologies utilized by Centerville City for implementing the Stormwater Management Program. Additionally, this plan is designed to provide guidance for developers, contractors, and the general public based on the basic principles of effective urban stormwater management in the State of Utah. The Stormwater Management Plan will be implemented to limit the discharge of pollutants from Centerville City's storm drain system to the Maximum Extent Practicable (MEP).

1.2. Stormwater Management Plan Coordination

Agency: Centerville City – Public Works Department – Drainage Utility Division

Division Contacts: Cameron Woodbury – Drainage Utility Supervisor
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Michael Carlson – Interim Public Works Director
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1.2.1 Davis County Storm Water Coalition

The Davis County Storm Water Coalition (DCSWC or coalition) consists of representatives from 15 cities and Davis County, whose purpose is to minimize pollutants entering the storm drain systems and receiving water bodies, to comply with stormwater regulations, and to receive input from stakeholders. Representatives from other entities such as Hill Air Force Base, consultants, vendors, and contractors are also invited to participate. The Coalition meets regularly and plans to continue regular meetings during the coming years to discuss stormwater issues and coordinate activities.

The Coalition member entities initially entered into an interlocal agreement to jointly implement a portion of the SWMP in 2002. Coalition members have continued to perform coalition activities, and have committed to continue conducting and supporting ongoing Coalition activities. As a member of the Coalition, Centerville City will continue to work with other municipalities in Davis County for Coalition purposes. It is anticipated that the entities will jointly perform the following responsibilities:

1. Purchase educational and training materials, as determined by the Coalition, for distribution to:
    a. Residents
    b. Businesses
    c. Developers/Contractors
    d. Municipal Separate Storm Sewer System (MS4) Industrial facilities

2. Use the Coalition as a county-wide committee to:
    a. Train personnel
    b. Create partnerships
    c. Obtain input and feedback from special interest groups
3. Annually contribute updated storm drain system information for county-wide mapping purposes.
4. Jointly prepare and promote a model ordinance that addresses:
    a. Illicit discharges
    b. Construction site stormwater runoff
    c. Long-term stormwater management
5. Jointly arrange for and provide education about hydrologic methods and criteria for sizing post-construction BMPs.
6. Jointly participate to develop Standard Operating Procedures (SOPs).

1.3. Stormwater Management Plan Purpose and Goals

The purpose of this Stormwater Management Plan (SWMP or Plan) is to facilitate and improve the management of stormwater in Centerville City with the intent of improving water quality. The goals for the SWMP are as follows:

1. Comply with the six minimum control measures as identified by the EPA NPDES Phase II requirements and UPDES permit, which include:
    a. Public education and outreach activities to increase public participation in addressing stormwater issues and Best Management Practices (BMPs).
    b. Minimizing illicit discharges through education and implementing a detection program.
    c. Minimizing construction site runoff by education contractors and implementing practical institutional controls.
    d. Improve and promote pollution prevention and good housekeeping practices.
    e. Improve and promote practical and achievable BMPs and measurable goals.
    f. Improve stormwater quality and comply with applicable local public notice requirements.
2. Increase protection from flooding through better floodplain management practices.

1.4. Staffing and Resource Allocations

Management and oversight of the Stormwater Management Plan is funded by Centerville City through the City's Drainage Utility Fund. The revenue source of this fund is a utility fee assessed City-wide.

Much of the implementation of the Stormwater Management Plan is performed by the Drainage Utility Division. Some parts of the Plan will be implemented by other departments within the City as outlined in the Plan.

1.5. Creation of the Drainage Utility Division

In 1997, the City Council appointed a citizen advisory committee to review the City's drainage problems and recommend solutions. The committee initially focused on subsurface drainage problems but concluded that the City needed to address both surface (i.e. stormwater) and subsurface drainage in a comprehensive and integrated manner. The committee recommended a regular maintenance program for publicly owned drainage facilities and recommended the creation of a drainage utility enterprise funded by monthly user fees.

In 1999, Centerville City, assisted by a consultant with a nationwide experience established a Drainage Utility. As a result of the establishment of the utility, the City created the Drainage Utility Division of the Department of Public Works. The purpose of the Drainage Utility Division is to manage the operation and maintenance of the City's drainage infrastructure and to achieve compliance with the Environmental Protection Agency NPDES Phase II regulations.

The Drainage Utility Division provides Centerville City with a financial mechanism from which to address both water quantity and water quality issues associated with Phase II requirements and permitting process. Centerville City considers the utility to be a viable nonstructural BMP that will enable the City to generate revenues for stormwater-related improvements. The implementation of the utility is an integral part of an effective Stormwater Management Program. The Drainage Utility will be instrumental in meeting the requirements of the Phase II permitting process and in developing BMPs for stormwater management to address non-point source pollution and flood control management.

1.6. Drainage Utility Mission Statement

The mission of Centerville City's Drainage Utility and Stormwater Management Plan is to develop, implement, operate, and fund stormwater and subsurface water drainage systems. This includes the acquisition, construction, operation, maintenance, and regulation of the systems. The program is intended to safely and efficiently control drainage runoff, enhance public health and safety, facilitate mobility and access to homes and businesses during and after storm events, protect lives and property, complement and support other City programs and priorities, reduce the discharge of pollutants to receiving waters, and enhance the natural resources of the community.

1.7. Stakeholders

The success of any plan depends on the support and involvement of the stormwater plan stakeholders. Stakeholders should be cognizant of their involvement and how they can play an important role in the Stormwater Management Plan's success.

See **Table 1** for lists of the stakeholders and their interest in the SWMP.

1.8. Overall Environmental Concerns

1.8.1 General

The overall program goal is to implement the stormwater program according to the SWMP and permit requirements. Annually reviewing the status of each program implemented, according to the goals, will provide a way to measure the effectiveness of the program in general.

Stormwater runoff from Centerville City is received by five creeks: Lone Pine Creek, Ricks Creek, Barnard Creek, Parrish Creek, and Deuel Creek. Each of these creeks ultimately discharge to the Great Salt Lake. None of the portions of these streams receiving the city's stormwater discharge are listed as impaired (per the Clean Water Act Section 303(d) list of approved TMDLs on the Utah Division of Water Quality website) or as "high quality" streams (per Utah Administrative Code R317-2-12 and R317-2-13.7(b)). Oversight and maintenance of these streams fall under the jurisdiction of the Davis County Public Works Department (with the exception of Lone Pine Creek).

1.8.2 Threatened and/or Endangered Species

Based upon information from the US Fish and Wildlife Services website, there are no official listings of threatened or endangered species in Centerville City.

1.8.3 Historic Properties

Centerville City will comply with current law as it pertains to stormwater construction activities adjacent to historic properties. City projects supported by federal, state, or Redevelopment Agency funds which impact a Historic Property (listed on the National Register of Historic Properties or at least 50 years old) will allow a 30-day advance evaluation period of the project and affected site by the State Historic Properties Officer prior to any modification being made. The City will notify the State Historic Preservation Officer in writing. Further information regarding Centerville City's historic properties ordinances can be found in CZC 12.61 (Historic Buildings and Sites).

Table 1. Stakeholders Involved in the Stormwater Management Plan

Stakeholder	Interest
Centerville City Community Development Department	Prepares and develops ordinances related to land use and construction of stormwater controls on new and redeveloped properties. Building inspectors will be involved in the enforcement and compliance of ordinances. Construction permits are issued through this department.
Centerville City Public Works Department	Oversees the operations of the Drainage Utility Division in preparing and implementing the Stormwater Management Plan. Coordinates with Street and Water Divisions on stormwater-related issues, as well as, participation in pollution prevention and good housekeeping activities.
Centerville City Parks and Recreation Department	Manages and maintains City-owned open space. Uses BMPs and participates in pollution prevention and good housekeeping activities.
Business Owners	Minimizes the impacts to stormwater by employing BMPs and participates in pollution prevention and good housekeeping activities. Pay fees associated with the Drainage Utility.
Contractors and Builders	Minimizes the impacts to stormwater by employing BMPs and participates in pollution prevention and good housekeeping activities. Obtains stormwater permits from Centerville City.
Centerville City Residents	Minimizes the impacts to stormwater by employing BMPs and participates in pollution prevention and good housekeeping activities. Pays fees associated with the Drainage Utility. Identifies stormwater management issues and develops new ideas.
Davis County	Coordinates stormwater management activities, such as public education and monitoring of creeks. Partners in protecting the watershed and water resources of the community. Identifies stormwater management issues and develops new ideas.
Davis County Storm Water Coalition (DCSWC)	Coordinates stormwater management activities, such as public and municipal education. Identifies stormwater management issues and develops new ideas.

SECTION 2 – AUTHORITY & BACKGROUND

Centerville City's policies must be consistent with the regulatory requirements of local, county, state, and federal entities. Several of the entities and the requirements they impose are described in the following sections.

2.1 Federal

2.1.1 Clean Water Act – 33 U.S.C. Chapter 26

In 1972, Congress enacted the first comprehensive national clean water legislation in response to growing public concern for serious and widespread water pollution. The Clean Water Act (CWA) is the primary federal law that protects our nation's waters, including lakes, rivers, aquifers, and coastal areas. The CWA provides the backbone for the national approach to water quality policy and action.

The objective of this federal law is the total elimination of the discharge of pollutants into the nation's navigable waters and to restore and maintain the integrity of the nation's waters. This objective translates into two fundamental national goals:

1. Eliminate the discharge of pollutants in the nation's waters.
2. Achieve water quality levels that are fishable and swimmable.

The CWA focuses on improving the quality of the nation's waters. It provides a comprehensive framework of standards, technical tools, and financial assistance to address the many causes of pollution and poor water quality, including municipal and industrial wastewater discharges, polluted runoff from urban and rural areas, and habitat destruction. For example, the CWA:

1. Requires major industries, to meet performance standards to ensure pollution control.
2. Charges states and tribes with setting specific water quality criteria appropriate for their waters and developing pollution control programs to meet them.
3. Provides funding to states and communities to help them meet their clean water infrastructure needs.
4. Protects wetlands and other aquatic habitats through a permitting process that ensures development and other activities are conducted in an environmentally sound manner.

Point and non-point source discharges are the two types of discharges defined in the CWA. The CWA has three main requirements:

1. Municipalities are required to effectively prohibit non-stormwater discharges into the publicly owned or operated storm drain system.
2. Municipalities are required to control the discharge of pollution into the storm drain system to the maximum extent practicable.

3. Municipalities are required to have one system-wide permit rather than individual discharge permits for each point.

Although pollutants entering the storm and surface water systems are primarily non-point in nature, discharges from the storm and surface water systems have been defined as point sources (40 CFR Section 122.45). As a result, storm and surface water systems are subject to the permitting process of the CWA's National Pollutant Discharge Elimination System (NPDES).

2.1.2 NPDES Phase II Stormwater Permit

The NPDES Phase II Stormwater Permit focuses on small municipalities and is issued by the Environmental Protection Agency (EPA). The program's main objective is to control non-point source pollution of waterways in urban areas to the maximum extent practicable (MEP). The application deadline for Phase II municipalities was March 2003. The Phase II permit required the community to prepare a Notice of Intent (NOI) which describes the BMPs to be implemented to fulfill EPA's goal of public education and outreach on stormwater impacts, public involvement and participation, illicit discharge detection and elimination, construction site runoff control, post-construction stormwater management in development and re-development, and pollution prevention and good housekeeping of municipal operations.

2.1.3 Federal Emergency Management Agency (FEMA)

FEMA was created to provide accountability for all federal emergency preparedness, mitigation, and response activities. FEMA is organized to strengthen the multiple uses of emergency preparedness and response resources at the federal, state, and local levels of government in preparing for and responding to the full range of emergencies and to integrate into a comprehensive framework activity concerned with hazard mitigation, preparedness planning, relief operations, and recovery assistance.

FEMA oversees the National Flood Insurance Program (NFIP). The NFIP is a federal program enabling property owners in participating communities to purchase insurance protection against flooding.

The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Act of 1994, signed into law on September 23, 1994. The NFIP is administered by the Federal Insurance Administration and the Mitigation Directorate (MT), which are components of FEMA. The full requirements of the NFIP can be found in 44 CFR Parts 59, 60, 65, and 70.

Participation is based on an agreement between local communities and the federal government that states if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas,

the federal government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

Centerville City participates in the National Flood Insurance Program (NFIP). Further information regarding Centerville City's flood hazard and prevention ordinances can be found in CMC 9.08 (Flood Damage Prevention).

2.1.4 Protection of U.S. Waters

The United States Army Corps of Engineers (ACE) of the Department of Defense manages and constructs civil works programs which include research and development, planning, design, construction, operation and maintenance, and real estate activities related to rivers, harbors, and other bodies of waters. ACE administers laws for protection and preservation of navigable waters and related resources such as wetlands. ACE's authority for the protection of navigable waters falls under Section 404 of the U.S. Rivers and Harbors Act of 1899. Section 10 of the Rivers and Harbors Act prohibits any obstruction or alteration of navigable waters without an ACE permit. The term navigable waters has a broad definition which states that wetlands are included along with streams having average annual flows greater than 5 cubic feet per second. ACE also assists in recovery from natural disasters.

2.2 State

The State of Utah has a Department of Environmental Quality (DEQ) whose mission is to *"protect, maintain and enhance the quality of Utah's surface and underground waters for appropriate beneficial uses; and to protect the public health through elimination and preventing water related health hazards which can occur as a result of improper disposal of human, animal or industrial wastes while giving reasonable consideration to the economic impact."*

The State Department of Environmental Quality is responsible to oversee the EPA NPDES Phase I and Phase II stormwater regulations and issue Utah Pollutant Discharge Elimination Systems (UPDES) permits in the State of Utah. The Utah Administrative Code Title R317 – Environmental Quality, Water Quality sets forth the requirements and procedures needed for compliance with state law. Utah Administrative Code R317-8.3.9 specifically lists the requirements for municipalities to obtain a UPDES permit from the State of Utah. The UPDES permit will be issued in compliance with the provision of the Utah Water Quality Act, set forth in Title 19 Chapter 5, of the Utah Code.

2.3 County

Davis County is responsible for flood control and maintenance of the creeks that transverse through Centerville City. Davis County Ordinance 01-87 and 02-98 sets forth the policy and procedures used by the County to provide this service. Coordination must

be made with the county on projects that affect any of the creeks or right-of-way issues related to them.

2.4 Local

Currently, Centerville City has several ordinances that pertain to various aspects of stormwater management. Some of these ordinances have been modified to meet compliance with the new federal and state laws associated with the NPDES and UPDES permit requirements and to be more effective in improving the quality of stormwater runoff. With the implementation of this updated SWMP, additional ordinances may be required.

The following is intended as a brief overview of the ordinances currently enacted by Centerville City. A more detailed analysis and application of these ordinances will be included when needed to describe their application to the Stormwater Management Plan.

2.4.1 TITLE 16 Stormwater

2.4.2 TITLE 7 Public Health and Safety

2.4.2.1 Chapter 7.08

Chapter 7.08 (Solid Waste and Recycling) addresses garbage and litter issues such as collection, transportation, and proper disposal of hazardous materials and other wastes.

2.4.3 TITLE 11 Streets

2.4.3.1 Chapter 11.01

Chapter 11.01 (Streets and Public Ways) prohibits placing trash or other obstruction in streets, gutters, or sidewalks. Section 11.01.080 prohibits placing or mixing sand or gravel on a paved street or sidewalk. Such restrictions can help avoid adding large amounts of sediments to stormwater during storm events.

2.4.4 TITLE 12 Zoning

2.4.4.1 Chapters 12.01, 12.23, 12.42, 12.50

These chapters set forth the planning and zoning ordinances of the City. The ordinances found in these regulations include provisions for hillside development, general land use, sediment and erosion controls, construction standards and specifications, zoning issues and provides for inspection and enforcement of these activities.

2.4.5 TITLE 15 Subdivisions

Title 15 is also known as the Centerville Subdivision Ordinance. It provides rules, regulations, standards, and specifications which regulate subdivision growth and development in the City. The Community Development Department is the primary overseer of the majority of the requirements found in Title 15 (Subdivisions) as well as those in Title 12 (Zoning).

SECTION 3 – NPDES PHASE II REQUIREMENTS

3.1 Public Education and Outreach

3.1.1 Requirements

REQUIRED: Implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff.

An informed and knowledgeable community is crucial to the success of the stormwater management program since it helps to ensure the following:

1. Greater support for the program as the public gains a greater understanding of the reasons why it is necessary and important.
2. Greater compliance with the program as the public becomes aware of the personal responsibilities expected of them and others in the community, including the individual actions they can take to protect or improve the quality of area waters.

The basic requirement of the public education and outreach control measure is to communicate the impacts of stormwater discharges and the steps to reduce stormwater pollution. The EPA requires that a public education program be implemented to distribute education materials to the community or to conduct equivalent outreach activities about the impacts of stormwater discharges on local water bodies and the steps that can be taken to reduce stormwater pollution. The EPA also requires that appropriate BMPs and measurable goals be included as a part of the program.

Based on recommendations from the EPA and requirements of the State of Utah the following goals have been considered when determining which BMPs Centerville City will implement as part of the Stormwater Management Plan.

3.1.2 Goals

1. Inform the public of the need for stormwater management and their critical role.
2. Develop a program that promotes, publicizes, and facilitates public reporting of the presence of illicit discharges or improper disposal of materials.
3. Develop a program that promotes, publicizes, and facilitates the proper management and disposal of used oil and household hazardous wastes.
4. Inform public employees, businesses, and the general public about the hazards associated with the illegal discharges and disposal of wastes.
5. Encourage the proper use, application, and disposal of pesticides, herbicides, and fertilizers by commercial and private applicators and distributors.

The BMPs that Centerville City has elected to implement are based on recommendations by the EPA and the State of Utah. Many NPDES Phase I communities have instituted similar activities with much success. The three main areas that Centerville City will implement public education and outreach activities include:

1. Forming partnerships.
2. Using appropriate educational materials and strategies.
3. Reaching diverse audiences.

3.1.3 Forming Partnerships

It would be cost-prohibitive for Centerville City to create an education and outreach program on its own. With this restriction in mind, Centerville City will continue partnerships with other communities and entities where possible and practicable. There is already an existing program in Davis County that reaches residents in our community known as the Davis County Stormwater Coalition.

3.1.4 Proposed BMPs

1. Continue participation with the Davis County Storm Water Coalition (DCSWC).
    a. DCSWC provides the opportunity to meet with Utah State officials who monitor and regulate construction sites, industrial sites, and Municipal Separate Storm Sewer Systems (MS4s). Participation and collaboration allow Centerville City to remain aware of current stormwater concerns.
    b. Participate with the Davis County Storm Water Coalition. Centerville pays an annual fee to the Davis County Storm Water Coalition to pay a portion of the costs associated with their program. In return, Centerville City receives materials to use in its community. This partnership eliminates duplication of services and provides opportunities that the City could not otherwise afford. Davis County Storm Water Coalition consists of representatives from 15 cities including Davis County and Hill Air Force Base. The Coalition's purpose is to reduce the load of pollutants entering the storm drains and receiving water bodies and to comply with stormwater regulations. The coalition meets monthly and coordinates the

purchase of educational material, school program presentations, municipal and construction site training opportunities, and compliance with state stormwater regulations.

2. Continue purchasing brochures and TV advertisements. Part of the fees paid to the Davis County Storm Water Coalition is applied to the purchase of brochures and TV advertisements. Brochures are used to tag doors in neighborhoods where stormwater pollution is found. Brochures are also used when service projects apply storm drain stencils to catch basins
3. Continue public information presentations. The Davis County Storm Water Coalition pays for one teacher to educate all of the fourth-grade students within Davis County concerning stormwater. The Coalition also participates in Water Fairs and each year provides an educational booth at the Davis County Water Fair. The Coalition has also conducted both construction site stormwater training for contractors and municipal site stormwater training for municipal employees.
4. Create economic incentives for businesses and new development. Centerville is considering offering a drainage utility discount for businesses that participate in stormwater educational opportunities or who install specific stormwater treatment devices and structural or nonstructural BMPs.
5. Target commercial businesses. Commercial businesses contribute to stormwater pollution through the use of bad housekeeping procedures. The City plans on inspecting commercial businesses and then providing them with options for structural and nonstructural BMPs.
6. Develop annual stormwater insert for City Newsletter. The Centerville City newsletter is an effective way of reaching the public. Each year a stormwater insert will be included in the newsletter informing the public about stormwater concerns and what they can do to prevent stormwater pollution.
7. Promote low-impact development. Low impact development techniques help to reduce stormwater pollution. Low impact development depends on coordination with the Community Development Department.

See **Table 2** for Status of Measurable Goals for Public Education and Outreach.

3.1.5 Funding

Funding to participate with existing coalitions will be an expense of the City's Drainage Utility Fund. Coalition funding has varied per year depending on the activities and participation of other cities.

3.2 Educational Materials and Strategies

There are many outside sources where the City can obtain existing educational materials. Many of these materials can be used as-is or can be modified to meet our specific local needs. Participation with other organizations, such as the Davis County Stormwater Coalition, reduces the cost of some materials due to the scale of the economy.

3.2.1 Proposed BMPs

1. Develop and maintain a library of educational materials for the community and school groups. This collection of information will be used to prepare brochures, handouts, the website, and other materials used in promoting the Stormwater Management Plan (SWMP).
2. Develop brochures and/or fact sheets for the general public that provide information on the City's storm drain system, flood control activities, and other stormwater-related issues. These brochures should emphasize the impact of stormwater discharges on our local water bodies and steps that can be taken to reduce or eliminate pollutants from entering stormwater runoff.
3. Develop and maintain a website related to our stormwater program and stormwater issues.
4. Continue publication of the stormwater hotline that is used to answer questions and concerns from the public as well as providing information. The stormwater hotline also facilitates reporting the presence of illicit discharges or the improper disposal of materials into the storm drain system.
5. Continue the storm drain stenciling program.
6. Continue the educational program for school-age children (fourth graders) as managed by the Davis County Storm Water Coalition (DCSWC).
7. Develop alternative information sources, such as bumper stickers, refrigerator magnets, posters, key chains, etc. which will promote public awareness and participation.

3.2.2 Funding

Funding for the proposed BMPs in Section 3.2.1 will be an expense of the City's Drainage Utility Fund. The associated costs to participate have yet to be determined as some of these activities will be dependent upon the City's participation in the Davis County Storm Water Coalition.

See **Table 3** for Status of Measurable Goals for Education Materials and Strategies.

Table 2. Status of Measurable Goals for Public Education and Outreach

Target Date	Activity/Goal/BMP	Responsible Entity	Cost	Funding Source	Status	Implementation Date	Assessment
Year 1	Prepare agreements to participate with the existing Davis County Stormwater Coalition	Drainage Utility	Unknown	Drainage Utility Fund	Active	2003	Agreements are active and reoccur annually.
Year 1	Develop a Centerville Stormwater Committee	Drainage Utility, Mayor/City Manager	Volunteers	None	Dropped	n/a	Interest for this committee never materialized. Will reconsider at a later date.
Year 2-5	Participation with DCSWC	Drainage Utility Supervisor	Averaged cost approximately $4,500/ year	Drainage Utility Fund	Active	2003	Active participation has allowed the City to gain valuable knowledge regarding local, state, and federal Stormwater Regulations.
Year 2-5	Stormwater Committee reviews the Stormwater Management Plan and other activities and suggests appropriate changes and modifications annually	Drainage Utility Supervisor	Unknown	Drainage Utility Fund	Dropped	n/a	Interest for this committee never materialized.

Table 3. Status of Measurable Goals for Education Materials and Strategies

Target Date	Activity/Goal/BMP	Responsible Entity	Cost	Funding Source	Status	Implementation Date	Assessment
Yearly	Mail one brochure with information on stormwater-related issues through the City newsletter. The newsletter is distributed to all postal customers in the city	Drainage Utility Supervisor	Unknown	Drainage Utility Fund	Active	2007	Completed in Year 5 of 2003-2008. Included in 2015-2020 SWMP.
Year 3	Implement a stormwater hotline for information and reporting	Drainage Utility Supervisor	Unknown	Drainage Utility Fund	Active	2003	Completed. Included in the 2008-2013 SWMP under Illicit Discharge Detection and Elimination.
Year 3-5	Start a storm drain stenciling program	Drainage Utility Supervisor	To be determined	Drainage Utility Fund	Active	2003	Storm drain stenciling continues.
Year 3-5	Develop or participate in an educational program for school-age children	Drainage Utility Supervisor	To be determined	Drainage Utility Fund	Active	2003	Ongoing through the Davis County Storm Water Coalition.
							(continued)

Year 3-5	Distribute specific pollution prevention information to target groups such as businesses, churches, schools, etc.	Drainage Utility Supervisor	$50-$150	Drainage Utility Fund	Active	2007	Ongoing
Year 3-5 (or as available by the Coalition)	Development of alternative information sources, such as bumper stickers, refrigerator magnets, posters, key chains, etc.	Drainage Utility Supervisor	To be determined	Drainage Utility Fund	Active	n/a	Some materials distributed through the Davis County Stormwater Coalition.

3.3 Reaching Diverse Audiences

To be the most effective, our outreach program must address the viewpoints and concerns of a variety of audiences, including minority and disadvantaged communities, as well as children.

3.3.1 Proposed BMPs

1. Diversify the materials and strategies used.
2. Specifically, target different audiences with appropriate brochures or activities. This includes focusing on specific business types such as gas stations, greenhouses, car washes, etc., and other groups or entities which may impact stormwater runoff in the community.
3. Distribute the materials through individual letters, the City newsletter, local schools, the Neighborhood Network, and other civic groups.

3.3.2 BMPs/Activities being implemented by Davis County and the Davis County Storm Water Coalition

CURB MARKERS
Davis County has coordinated the purchase of curb markers with both a common countywide logo and each City logo on the stencil. The markers are available for community groups, such as civic, PTA, service organizations, and scouts to place them on curb inlets throughout each City.

TEACHING AT PUBLIC SCHOOLS
The Davis County Storm Water Coalition has contracted with an independent teacher to give presentations to all fourth-grade classes in all of the elementary schools within Davis County.

Materials used in the school demonstration have been jointly purchased and are owned by the cities and the County. The materials and supplies are stored in the County Public Works office and are made available to each city on a reservation basis.

COORDINATION WITH UTAH STATE UNIVERSITY EXTENSION SERVICE
Representatives from the Davis County Storm Water Coalition will:

1. Demonstrate the stormwater model at Extension school agriculture field day in April or May to over 1,000 elementary school students.
2. Display stormwater pamphlets at the Utah House and pavilion at Utah Botanical Center in Kaysville.
3. Promote educational tours for groups to visit the botanical center ponds, which are fed by stormwater.
4. Provide articles on stormwater in the USU Extensions newsletter which goes out every month to over 1,000 people.

5. Add stormwater bulletins to the Extension bulletin display in the courthouse.

DEMONSTRATION DETENTION POND
Davis County has constructed a small detention pond and grass swales at the Public Works facilities in Fruit Heights. This facility demonstrates how water from shops and parking lots can be treated before it leaves the site.

NEWSPAPER ARTICLES
At least annually, County personnel will prepare news articles to be published in the regional newspapers. The articles will relate current activities in the County, which demonstrate the progress being made to reduce the pollution of our streams.

Suggestions will be given concerning lawn fertilization, excess lawn watering, and dumping toxic waste and sand into the gutter systems. Instruction will be given as to how to properly dispose of used oil, antifreeze, and paints.

COMMUNITY AND RESIDENTIAL PROGRAMS
Promote public reporting of illegal dumping and illicit discharges. The purpose of public reporting is to enable the County or the Davis County Health Department to respond to citizen complaints regarding water quality. Reports may be called at phone number 801-451-3296. Procedures for formal complaints are in place. As necessary, Davis County Public Works will assist the Health Department to investigate the source of the pollution. Investigations and enforcement measures will be documented by the County.

Information booths will be on display at each city and County office building. The booth display will include the model used in the schools illustrating the hydrologic cycle in an urban setting and is accompanied by a series of pamphlets or other educational materials that explain how the public can help reduce pollutants exposed to rainfall. The materials that are handed out at the booths primarily consist of the current information developed by the Davis County Storm Water Coalition.

3.3.3 Funding

Funding for the proposed BMPs in Section 3.3.1 will be an expense of the City's Drainage Utility Fund. The associated costs to participate have yet to be determined as some of these activities will be dependent upon the City's participation in the Davis County Storm Water Coalition.

See **Table 4** for Status of Measurable Goals for Reaching Diverse Audiences.

Table 4. Status of Measurable Goals for Reaching Diverse Audiences

Target Date	Activity/Goal/BMP	Responsible Entity	Cost	Funding Source	Status	Implementation Date	Assessment
Year 1	Identify different target groups and appropriate materials to be used with each group	Drainage Utility Supervisor	~ $150	Drainage Utility Fund	Active	2008	Prepare a list of various target groups and outlines of plans to address related issues developed.
Year 2-5	Develop brochures and/or fact sheets for the general public that provide specific information on stormwater-related issues for each target group.	Drainage Utility Supervisor	~ $250	Drainage Utility Fund	Active	2007	Develop one brochure or fact sheet each year. Mailed in City Newsletter addressing stormwater issues for residents.
Year 2-5	Mail one brochure with information on stormwater-related issues to each target group.	Davis County Storm Water Coalition	~ $200	Drainage Utility Fund	Active	2007	Mail one brochure to every target group identified. Mailed informational letter to targeted businesses in 2020.

3.4 Public Involvement/Participation

3.4.1 Requirements

REQUIRED: Comply with state and local public notice requirements when implementing a public involvement/participation program. Public involvement/participation programs should include steps to foster and include public input in developing, implanting, and reviewing stormwater management programs.

An active and involved community is crucial to the success of the stormwater management program because it allows for:

1. Broader public support since citizens who participate in the development and decision-making process are partially responsible for the program and, therefore, may be less likely to raise legal challenges to the program and more likely to take an active role in its implantation.
2. Shorter implementation schedules due to fewer obstacles in the form of public and legal challenges and increased sources in the form of citizen volunteers.
3. A broader base of expertise and economic benefits since the community can be a valuable, and free, intellectual resource.
4. A conduit to other programs as citizens involved in a stormwater program development process provides important cross-connections and relationships with other community and government programs. This benefit is particularly valuable when trying to implement a stormwater program on a watershed basis, as encouraged by the EPA.

The basic requirement of the public participation/involvement is to be in compliance with all applicable state and local public notice requirements. The EPA also requires that appropriate BMPs and measurable goals be included as a part of the program. The EPA recommends that the municipality provide opportunities for the public to participate in activities such as a local stormwater management panel or committee, volunteer monitoring, stream clean-up days, etc.

Based on recommendations from the EPA and requirements of the State of Utah the following goals have been considered when determining which BMPs Centerville City will implement as part of the Stormwater Management Plan.

3.4.2 Goals

1. Make efforts to reach out and engage all economic and ethnic groups in the community.
2. Provide opportunities for members of the public to participate in the development and implementation including serving as a citizen representative on a local stormwater management panel, attending public hearings, working as citizen volunteers to educate other individuals about the program, assisting in program

coordination with pre-existing programs, or participating in volunteer monitoring efforts.
3. Promote, publicize, and facilitate other information community and industrial help projects like stream watch programs, workshops, speaking engagements, inlet stenciling programs, brochures, public service announcements, and/or other outreach measures (surveys, counts, or other feedback may measure the success of these programs).

The BMPs that Centerville City has elected to implement are based on recommendations by the EPA and the State of Utah.

3.4.3 Proposed BMPs

1. Full compliance with state and local laws regarding the advertisement and notification of public hearings and other related meetings regarding the development and implementation of the stormwater management plan.
2. Develop and implant a Centerville Stormwater Committee to give input, feedback, and recommendations to the implementation of the stormwater management plan.
3. Use the Centerville Stormwater Committee to develop and promote the BMPs associated with the Public Information and Outreach part of the Stormwater Management Plan.
4. Continue the storm drain stenciling program.
5. Involve the community in community clean-ups along local creeks, ditches, swales, and other drainage areas.
6. Develop a citizen watch group and/or adopt a storm drain program to encourage individuals or groups to keep storm drains free from debris and aid local officials in identifying polluters and monitor what is entering the local waterways through the storm drain system.

3.4.4 Funding

Funding for the proposed BMPs in Section 3.4.3 will be an expense of the City's Drainage Utility Fund.

See **Table 5** for Status of Measurable Goals for Public Involvement/Participation.

Table 5. Status of Measurable Goals for Public Involvement/Participation

Target Date	Activity/Goal/BMP	Responsible Entity	Cost	Funding Source	Status	Implementation Date	Assessment
Year 1	Establish guidance for full compliance with State and local laws regarding the advertisement and notification of public hearings	Drainage Utility Supervisor City Recorder	~ $100	Drainage Utility Fund	Active	2007	Document all public hearings held regarding stormwater.
Year 1	Develop a Centerville Stormwater Committee	Drainage Utility Supervisor, Mayor, City Manager	Volunteers	None	Dropped	n/a	Dropped from the plan due to lack of participation. Will reconsider in the future.
Year 2-5	Schedule at least one community clean-up day or other volunteer projects to clean up local drainage ways	Drainage Utility Supervisor Centerville Stormwater Committee	Unknown	Drainage Utility Fund	Planned	To be determined	Document the date and activity held.
							(continued)

Year 3-5	Implement a citizen's watch group.	Drainage Utility Supervisor Centerville Stormwater Committee	Unknown	Drainage Utility Fund Centerville City	Dropped	n/a	Dropped from the plan due to lack of participation. Will reconsider in the future.
Year 4-5	Implement an adopt-a-storm drain program.	Drainage Utility Supervisor Centerville Stormwater Committee	Unknown	Drainage Utility Fund	Planned	To be determined	Track the number of Storm drains adopted and track the maintenance performed.

3.5 Illicit Discharge Detection and Elimination

3.5.1 Requirements

REQUIRED: Develop, implement, and enforce a program to detect and eliminate illicit discharges and improper dumping into the MS4 (as defined in 40 CFR 122.26(b)(2).

1. Develop a stormwater system map, showing the location of all outfalls and the names and location of all waters of the State that receive discharges from those outfalls;
2. To the maximum extent allowable under State or local law, effectively prohibit, through an ordinance, or other regulatory mechanisms, non-stormwater discharges into the system and implement appropriate enforcement procedures and actions;
3. Develop and implement a plan to detect and address non-stormwater discharges including illegal dumping into the system;
4. Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste;
5. Promote, publicize and coordinate or assist in the coordination of the establishment or availability of programs to collect used motor vehicle fluids (including oil and antifreeze) and to collect household hazardous waste materials (including paint, pesticides, herbicides, and other hazardous wastes) for recycling and reuse;
6. Unless identified by the permittee or the Executive Secretary as a significant source of pollutants to waters of the State, the following non-stormwater discharges need not be prohibited from entering the MS4, provided appropriate control measures, (if needed) to minimize the impacts, are developed and implemented under the SWMP:
    a. Waterline flushing or other potable water sources.
    b. Landscape irrigation or lawn watering.
    c. Approved diverted stream flows.
    d. Groundwater infiltration to storm drains.
    e. Air conditioning condensation.
    f. Natural riparian habitat or wetland flows.
    g. Emergency firefighting activities,
    h. Swimming pools (only if de-chlorinated in accordance with federal regulations to less than 0.4 PPM chlorine).
    i. Discharges specified in writing by the Public Works Director as being necessary to protect public health and safety.
    j. Promote and publicize a hotline for reporting illicit discharges.

Certain discharges are considered illicit because MS4s are not designed to accept, process, or discharge non-stormwater wastes. Illicit discharges enter the system through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g., infiltration from cracked sanitary systems, spills collected by drain outlets, or other contaminants dumped directly into a storm drain). The result is untreated discharges that contribute to high levels of

pollutants, including heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria into receiving water bodies. These increased pollutant levels can be high enough to significantly degrade receiving water quality and threaten aquatic, wildlife, and human health.

Based on recommendations from the EPA and requirements of the State of Utah the following goals have been considered when determining which BMPs Centerville City will implement as part of the Stormwater Management Plan.

3.5.2 Goals

1. Develop a stormwater system map, showing the location of all outfalls and the names and locations of all waters of the State that receive discharges from those outfalls.
2. Develop ordinance language that prohibits non-stormwater discharges into the storm drain system and provides for appropriate enforcement procedures and actions.
3. Develop a plan to detect and address non-stormwater discharges, including illegal dumping.
4. Educate public employees, businesses, and the general public about the hazards associated with illegal discharges and improper disposal of waste.

3.5.3 Proposed BMPs

1. Centerville City's storm drainage system is mapped and includes storm drains, sub drains, ditches, swales, culverts, creeks, catch basins, and manholes. Future plans include continuing to update storm drainage maps to include new development as well as improving the accuracy of existing infrastructure. The mapping system should be utilized to record illicit connections, cleanings, and video inspections and to track problem areas or systems that need to be re-inspected at the end of warranty periods.
2. Centerville City's Title 16 Storm Water Ordinance was adopted on July 1, 2007. Chapter 16.04 (Prohibited Actions) and Chapter 16.05 (Violations and Enforcement) regulate and identify non-stormwater discharges and enforcement options. Future plans include applying the ordinance in the field and presenting improvements and/or modifications to increase its effectiveness and enforceability.
3. Developing a plan to detect and address non-stormwater discharges will consist of four parts:
    a. Locating Problem Areas – Centerville City will continue to video inspect its piped portion of the storm drain system to identify illicit or illegal connections. The City also plans to work with appropriate agencies, such as the Davis County Department of Health to identify other sources of illegal discharges. This may include sampling and monitoring of manholes, creeks, and/or other drainage ways, dye testing, and/or smoke testing.

b. Finding the Source – Where applicable the City will perform testing or other investigations to determine the source of illicit discharges or dumping into the storm drain system.
c. Removing/Correcting Illicit Connections – If illegal connections are identified, the offenders will be notified and directed to correct the problem. Education efforts will also be used to train and resolve problems before taking legal action.
d. Documentation of the Actions Taken – All actions associated with identifying and correcting illegal discharges will be documented, including information such as the number of outfalls screened; complaints received and corrected; the number of discharges and quantity of flows eliminated; the number of tests performed, etc.

4. The City has begun both commercial and construction site inspections to identify non-stormwater discharges. The City also video inspects storm drain lines in existing and new development to ensure illicit connections have not been made. Building inspectors and the City Engineers have been informed about illicit roof drain to sub-drain connections. Future goals include improving the inspection and reporting process by increasing the regularity and number of inspections and recording inspections utilizing software that allows tracking and queries.
5. Educational outreach will be implemented under activities in Section 3.1 of this SWMP. City employees receive annual safety training in regards to stormwater pollution and types of illicit discharges. Some commercial businesses have been sent a BMP educational brochure that reviews stormwater pollution and various types of illicit discharges. The general public receives an annual City Newsletter that also reviews stormwater pollution and various types of illicit discharges. Future goals include reaching out to all of the businesses within Centerville by purchasing and mailing a stormwater brochure that specifically targets commercial sites.
6. The City newsletter publicizes the phone number for the Solid Waste District which accepts many common household hazardous wastes. Future goals include researching the feasibility of an annual City-wide cleanup day for hazardous waste to include the collection of paint, oil, antifreeze pesticides, herbicides, and other hazardous wastes.
7. Centerville City's Title 16 Stormwater Ordinance identifies non-stormwater discharges that are allowed. Future goals include monitoring discharges and adjusting the list of non-stormwater discharges as needed.

The BMPs that Centerville City has elected to implement are based on recommendations by the EPA and the State of Utah.

3.5.4 Funding

Funding for the proposed BMPs in Section 3.5.3 will be an expense of the City's Drainage Utility Fund.

See **Table 6** for Status of Measurable Goals for Illicit Discharge and Elimination

Table 6. Status of Measurable Goals for Illicit Discharge and Elimination

Target Date	Activity/Goal/BMP	Responsible Entity	Cost	Funding Source	Status	Implementation Date	Assessment
Year 1	Map development	Drainage Utility Supervisor GIS Specialist	Unknown	Drainage Utility Fund	Active	2003	Map development continues as new systems are installed and old systems are cleaned and verified.
Year 2-3	Video inspections of problem areas	Drainage Utility Supervisor	Unknown	Drainage Utility Fund	Planned	2021	Inspect the entire system.
Year 2-4	Review ordinances	Drainage Utility Supervisor City Council	~ $1,000	Drainage Utility Fund	Planned	2022	Ordinance adopted by City Council.
Year 4-5	Promotion of proper Hazardous Waste Disposal and hotline to report dumping violations.	Drainage Utility Supervisor	Unknown	Drainage Utility Fund	Active	2007	Hotline established.

3.5.5 Spill Incident Response and Reporting

The following spill incident reporting chart will be used to respond to spills and report them to appropriate agencies:

- A spill is observed or a Report of Spill comes in
  - Does the incident pose an immediate threat to life or health?
    - Yes – Call 911 (describe the material, amount, and extent)
      - describe the incident in the spill log
    - No – move to next step
  - Are you able to safely contain the spill with tools and/or material at hand?
    - Yes – Contain the spill and secure the area, then ensure clean-up is done
      - report according to the reporting list below; and
      - describe the incident in the spill log
    - No – move to next step
  - Is it during regular working hours?
    - No – Call 911 (describe the material, amount, and extent)
      - describe the incident in the spill log; and
      - on next working day report according to reporting list below
    - Yes – report according to reporting list below
      - describe the incident in the spill log

Pollutant Description	**Report to:**
Pollutant releases to water (surface or groundwater)	Davis Co., UDEQ, & NRC
Hydrocarbons (fuel, oil), release of 25 gallons or more	Davis Co. and UDEQ
Radiological Materials, any spill or release	Davis Co. and UDEQ
Extremely Hazardous chemicals, 2.2 lb. or more (e.g. Cyanides, Arsenic, Chlorine)	Davis Co. and UDEQ
Other Hazardous chemicals, 220 lb. or more	Davis Co. and UDEQ
Underground Storage Tank, any leaking or release	UDEQ

Other spills, particularly those contained and cleaned up, do not need to be reported

Phone Contact List:

Emergency	911
Davis County Environmental Health	801-525-5100
National Response Center (NRC)	800-424-8820 (24 hour)
Utah Dept. of Environmental Quality (UDEQ)	801-536-4123 (24 hour)
Utah Division of Solid and Hazardous Waste	801-538-6170
Utah Hazmat Response Officer	801-538-3745 (24 hour)

3.6 Construction Site Runoff Control

3.6.1 Requirements

REQUIRED: Develop, implement, and enforce a program to reduce pollutants in stormwater runoff from construction activities, including residential construction that result in a land disturbance. Reduction of stormwater discharges from construction activity disturbing less than one acre must be included in the program if that construction is part of a larger common plan of development that would disturb one acre or more. Minimum requirements include:

1. An ordinance or other regulatory mechanism requiring the implementation of proper erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law.
2. An ordinance or other regulatory mechanism shall, at a minimum, require construction operators to prepare a Stormwater Pollution Prevention Plan (SWPPP).
3. Requirements for construction site operators to implement appropriate erosion and sediment control best management practices.
4. Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.
5. Procedures for site plan review which incorporate consideration of potential water quality impacts.
6. Procedures for information submitted by the public.
7. Procedures for site inspection and enforcement of control measures.
8. The development of a written enforcement strategy and implement the enforcement provisions of the ordinance or other regulatory mechanism which shall include procedures and sanctions.

3.6.2 Goals

The BMPs that Centerville City has elected to implement are based on recommendations by the EPA and the State of Utah.

The Construction Site Stormwater Runoff Control Program Section of the SWMP addresses water quality concerns for construction sites greater than or equal to one acre. Polluted stormwater runoff from construction sites often flow to storm drains and into receiving waters. This runoff can contribute more sediment to receiving waters than can be deposited naturally during several decades. The resulting siltation can cause physical, chemical, and biological harm to receiving waters. The BMPs described in this Section of the SWMP includes the development of a construction site program designed to reduce pollutants in stormwater runoff from construction activities. This program will include procedures for construction site plan review, site inspections, public reporting, contractor education, and notification of permit requirements to all construction site owners/operators.

This program will also be integrated with other facts of the SWMP to provide information and up-to-date BMPs to the end-user. The following BMPs describe implementation tasks to be completed by Centerville City for the Construction Site Stormwater Runoff Control Program.

3.6.3 Proposed BMPs

Centerville City has developed an ordinance with requirements for construction operators to use erosion and sediment controls and maintain appropriate structural and non-structural BMPs to reduce pollutants discharged during times of soil disturbances or excavation activities, along with penalties to enforce and ensure compliance. In addition, requirements have been developed for operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the site that may cause adverse impacts to water quality.

A construction site permit will be required for construction activities in accordance with the proposed ordinance. For the purpose of this permit, construction activities are defined as activities that change the volume or peak flow discharge rate of rainfall runoff from the land surface. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation, or any activity which bares soil or rock or involves the diversion or piping of any natural or man-made watercourse.

An erosion control plan must be submitted for review and approval prior to commencing grading operations. The erosion control plan is intended to prevent erosion during the construction phase by implementing various erosion control measures as appropriate. Such measures may include temporary silt or sediment fences, sediment traps, and detention ponds, temporary and permanent vegetation, or other approved BMPs.

In addition, the permit requires operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter and sanitary waste, and other construction-related pollutants at the site that may cause adverse impacts to water quality.

CONSTRUCTION SITE PERMIT APPLICATION
A Stormwater Pollution Prevention Plan (SWPPP) must be submitted with the Permit Application. The SWPPP shall include the following information:

A. <u>General Information</u>

1. A site description which includes a description of the nature and location of the construction activity, a description of the intended sequence of major activities which will disturb soils for major portions of the site (e.g. grubbing, excavation, grading, utilities, and infrastructure installation, etc.), and estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities;

2. A description of the proposed measures and controls that will be implemented during construction activity and/or while the site is not stable. The SWPPP must clearly describe the times during the construction process that the measures will be implemented for each major activity identified pursuant to Subsection (1). The SWPPP shall also state the name and phone number of the persons or entity responsible for the implementation of each control measure.

B. Goals and Criteria

1. The proposed measures and controls shall be designed to prevent or minimize, to the maximum extent practicable (MEP) the discharge of sediment, debris, and other construction-related pollutants from the construction site by stormwater runoff into the storm drain system.

2. The proposed measures and controls shall be designed to prevent or minimize, to the MEP, the deposit, discharge, tracking by construction vehicles, or dropping of mud, sediment, debris, or other potential pollutants onto public streets and rights-of-way. Any such discharge shall be cleaned up and removed immediately upon notification to the Permittee or when it otherwise comes to the attention of the Permittee. At a minimum, the deposit or discharge shall be cleaned and removed at the end of the work shift in which the deposit occurred, or at the end of the workday, whichever comes first.

3. The proposed measures and controls shall consist of BMPs available at the time that the SWPPP is submitted. BMPs may include, but shall not be limited to, temporary silt or sediment fences, sediment traps and detention ponds, gravel construction entrances and wash down pads to reduce or eliminate off-site tracking, straw bale sediment barriers, establishment of temporary grasses, and permanent vegetative cover, use of straw mulch as a temporary ground cover, erosion control blankets, temporary interceptor dikes and swales, storm drain inlet protection, check dams, subsurface drains, pipe slope drains, level spreaders, rock outlet protection, reinforced soil retaining systems, and gabions.

4. The proposed measures and controls shall be designed to preserve existing vegetation, where possible. Disturbed portions of the site shall be stabilized. Stabilization practices may include temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. The use of impervious surfaces for stabilization should be avoided. Stabilization measures shall be initiated as soon as practicable in disturbed portions of the site where construction activities have temporarily or permanently ceased, but in no case, more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased, except under the following circumstances:

a. If the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceases is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable; or
b. If construction activity on a portion of the site is temporarily ceased, and earth disturbing will resume within 21 days, temporary stabilization measures need not be initiated on that portion of the site.

5. The proposed measures and controls shall be employed to minimize the risk of discharge of construction-related pollutants (such as paint, thinners, solvents, and other chemicals) from the construction site. Such measures may include the implementation of storage practices to minimize exposure of the material to stormwater as well as spill prevention and response.

SITE PLAN REVIEW

Centerville City will develop a procedure for site plan review, which incorporates considerations for potential short and long-term water quality impacts and minimizes these impacts, to the MEP. The site plan review shall include requirements for operators to control other wastes such as discarded building materials, concrete truck washout chemicals, litter, and sanitary waste that may adversely impact water quality.

Centerville City's Stormwater Ordinance supplies the framework for the Construction Site Stormwater program as well as the regulatory jurisdiction for enforcement. Site plan review and approval procedures have been developed.

Site plans will incorporate specific BMPs for erosion and sediment control purposes and other waste control measures. Consideration for proper operation and maintenance of control measures will be incorporated into the site plan review process.

Centerville City personnel who currently review site plans will evaluate stormwater controls. Guidelines for appropriate erosion and sediment control measures are part of the personnel training.

SITE INSPECTIONS

Centerville City has developed procedures for site inspection and enforcement of erosion control measures at construction sites to deter infractions. Procedures include steps to identify priority sites for inspection and enforcement based on the nature and extent of the construction activity, topography, and the characteristics of soils and receiving water quality.

Centerville City's Stormwater Ordinance supplies the framework for the Construction Site Stormwater program as well as the regulatory jurisdiction for enforcement. Regular inspections by qualified personnel will help to ensure erosion and sediment controls are operating properly and to identify problem areas. Procedures for site inspections and follow-up activities will be developed.

PUBLIC REPORTING

The public can play a crucial role in identifying an instance of noncompliance. Public reporting can provide important assistance in preventing stormwater pollution during construction activities. Maintaining procedures for the receipt and consideration of public inquiries, concerns, and information submitted regarding stormwater runoff from local construction activities are key in preventing pollution.

As noted in the education section of the SWMP, Davis County will promote public reporting of illegal dumping and illicit discharges. The purpose of public reporting is to enable the County or the Davis County Health Department to respond to citizen complaints regarding water quality. Reports may be called at phone number 801-451-3296. Procedures for formal complaints are in place. As necessary, Davis County Public Works will assist the Davis County Health Department to investigate the source of the pollution. Davis County will document all investigations and enforcement measures, including any fee penalties.

CONTRACTOR EDUCATION

Develop and distribute appropriate education and training materials for construction site operators. Contractor education on stormwater issues will be crucial in minimizing stormwater pollution during construction activities.

> Guidance Document for Storm Water Management: The Davis County Storm Water Coalition has created a guidance document of BMPs for construction sites: *A Guide to Storm Water Best Management Practices* is available on the Centerville City website.
>
> Additional Guidance Documents: EPA's *A Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices* and other appropriate publications will be made available.

UPDES CONSTRUCTION PERMIT NOTIFICATION

Notify all construction permit applicants of their potential responsibilities under the UPDES permitting program for construction site runoff. Procedures for notification of UPDES permit requirements have been developed. Making construction permit applicants aware of UPDES permit requirements for construction activities is beneficial in minimizing stormwater pollutant runoff from such sites.

The table below represents measurable goals that are to be implemented and assessed during the permit term. The purpose of measurable goals is to gauge permit compliance and program effectiveness.

3.6.4 Funding

Funding for the proposed BMPs in Section 3.6.3 will be an expense of the City's Drainage Utility Fund. Other sources of funding may include fees imposed on contractors, builders, developers, or costs incurred by them while implementing the selected BMPs in conjunction with their permits.

See **Table 7** for Status of Measurable Goals for Construction Site Runoff Control.

Table 7. Status of Measurable Goals for Construction Site Runoff Control

Target Date	Activity/Goal/BMP	Responsible Entity	Cost	Funding Source	Status	Implementation Date	Assessment
Year 1	Review existing ordinances	Drainage Utility Supervisor, City Attorney, City Council	$1,000	Drainage Utility Fund	Planned	To be determined	
Year 1-2	Modify existing ordinances or develop new ordinances regarding pollution prevention on construction sites	Drainage Utility Supervisor, City Attorney, City Council	Unknown	Drainage Utility Fund	Completed		
Year 2	Review selection of approved BMPs to be used by the City and contractors	Drainage Utility Supervisor	$0	Drainage Utility Fund	Planned	To be determined	
Year 3	Train personnel and contractors/develop an education program	Drainage Utility Supervisor	Unknown	Drainage Utility Fund	Active	2007	
Year 4-5	Enforcement of ordinance	Drainage Utility Supervisor	Unknown	Drainage Utility Fund	Active	2007	

3.7 Post Construction Runoff Control

3.7.1 Requirements

REQUIRED: The permittee must:

1. Develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that is part of a larger common plan of development or sale or that has been designated to protect water quality, that discharge into the MS4. The program must ensure that controls are in place that will protect water quality that discharges into the MS4. The program must ensure that controls are in place that will protect water quality and reduce the discharge of pollutants to the maximum extent practicable.
2. Develop and implement strategies which include a combination of structural and/or nonstructural BMPs.
3. Develop and define a specific hydrologic method or for calculating runoff volumes and flow rates to ensure consistent sizing of structural BMPs and that include a plan review process.
4. Develop a program that includes a process that requires the evaluation of a Low Impact Development (LID) approach.
5. Develop and adopt an ordinance or other regulatory mechanism that requires long-term post-construction stormwater controls at new development and redevelopment sites. The permittee's ordinance or other regulatory mechanisms must include an appeals process and include enforcement provisions, including specific processes and sanctions.
6. Develop provisions for post-construction access for Permittees to inspect stormwater control measures on private properties that discharge to the MS4 to ensure that adequate maintenance is being performed.

Pollution Prevention/Good Housekeeping

REQUIRED: The permittee must:

1. Develop and implement an operation and maintenance program that includes a training component and is designed to reduce the discharge of pollutants to the maximum extent practicable, and
2. Include employee training to prevent and reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance.

The Pollution Prevention/Good Housekeeping portion of the Stormwater Management Plan addresses routine activities in the operation and maintenance for drainage systems, roadways, parks, and open spaces, and other municipal operations to help ensure a reduction in pollutants entering

the storm drain systems. The program will implement BMPs to address specific roadway practices which include snow removal, deicing, salt pile management, and road crew training. This program will also focus on storm drainage system maintenance, structural floatable controls, maintenance yard practices, flood control projects, litter ordinance development, pesticide, herbicide, and fertilizer program, and spill prevention and response.

This program will also be integrated with the Public Education and Outreach, Public Involvement/Participation, and Illicit Discharges and Improper Disposal Programs to promote awareness of water quality concerns in performing routine roadway maintenance and operation, and other practices. The following BMPs describe implementation tasks and assessment tasks to be completed by Davis County for the Pollution Prevention/Good Housekeeping Program.

3.7.2 Goals

The BMPs that the City of Centerville has elected to implement are based on recommendations by the EPA and the State of Utah.

3.7.3 Proposed BMPs

STORM DRAIN SYSTEM MAINTENANCE
Maintain existing drainage system operation, maintenance, and cleaning procedures to reduce pollutants in stormwater runoff. Identify areas of chronic problems and develop and implement corrective actions for these areas. Personnel training is a component of this program. Proper system maintenance and employee training will help to reduce stormwater impacts from such activities as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance.

SNOW REMOVAL
Review and assess current snow removal and disposal procedures for prevention and reduction in stormwater pollution. Centerville City has a policy to keep all roads open and free of snow or ice pack during every storm. The salt application rate is based on the temperature and snowpack conditions on the road surface accordingly. It is the objective of the City to operate snow removal procedures in a manner to reduce the discharge of pollutants to the MEP, without compromising motorist's safety.

STORM DRAIN SYSTEM WASTE DISPOSAL
Review and assess current disposal procedures for waste removed from the storm drain system. Such wastes include dredge spoil, accumulated sediments, floatables, and other debris. Controls for reducing or eliminating the discharge of pollutants from areas such as roads and parking lots, maintenance and storage yards, and waste transfer stations will help to reduce the discharge of pollutants to receiving water bodies.

It is the intention of Davis County to work with communities to create a countywide disposal system for the proper removal and disposal of waste from the storm drain system to reduce the discharge of pollutants to the MEP. This site could also provide disposal for household hazardous materials like paint, pesticides, and oils as stated on page 14, concerning illicit discharges.

ROAD CREW TRAINING

Educate public employees regarding pollutants that may be discharged to storm drain systems and potential impacts. Proper training can reduce pollutants from such activities as tack oil application, excess concrete, concrete truck washout, and spill clean-up. Road crew training will occur at a minimum of once per permit term as part of a City-wide stormwater training program. The purpose of the training is to update public employees on stormwater issues and to provide a platform for a roundtable discussion on current practices and procedures and how they impact stormwater quality.

POLLUTION PREVENTION PRACTICES FOR MAINTENANCE YARDS

Pollution prevention measures at equipment yards and maintenance facilities. Proper controls and procedures at these locations will help to control polluted runoff. The shops and washing bays will drain into an oil and grease separator before flowing into the detention pond. Alternative BMPs will be implemented as appropriate to minimize pollutants entering the storm drain system from these facilities.

FLOOD CONTROL PROJECTS

Assess new and existing flood control projects with respect to water quality concerns and modify capital improvement projects as necessary. In order to accomplish this, the flood control permit checklist will contain a section for water quality review. Incorporate additional BMPs to reduce stormwater pollutants as appropriate. Personnel training will be a component of this program.

PESTICIDE, HERBICIDE, AND FERTILIZER PROGRAM

Maintain current inventory, evaluate pesticide, herbicide, and fertilizer usage on Centerville City properties by municipal employees. Current BMPs will be evaluated and implemented as appropriate to reduce the discharge of pollutants related to the application of pesticides, herbicides, and fertilizers applied by municipal employees or contractors to public right-of-ways, parks, and other municipal facilities.

Centerville City will assess and evaluate application procedures, rates, and implement BMPs to reduce the discharge of pollutants related to these activities. Potential alternative PHFs will be evaluated to minimize the discharge of pollutants to stormwater from PHF procedures and practices.

SPILL PREVENTION AND RESPONSE PROGRAM

Maintain the current Emergency Response Program. Maintain personnel on call to respond to reports of spills or discharges and the MEP, identify and investigate the source of the discharge and use the regulatory authority to take enforcement actions against violators to correct the illicit discharge activity. Local fire departments are also equipped

to respond to spills, to mitigate spills, and to eliminate the danger to human health. The current program will be evaluated for effectiveness and will be modified as necessary. Personnel training is an important component of this program.

MONITORING, RECORD KEEPING, AND REPORTING
The streams and channels located in David County do not have TMDL approved limits. Davis County Environment Health Department in cooperation with Weber Basin Water Quality Laboratory currently monitors sixteen streams or discharge points on a quarterly schedule. The sampling points are described as follows:

Lower Millcreek
Lower Farmington Creek
Lower Kays Creek near Hill Field Drain
North Davis Sewer Discharge Canal
Upper Holmes Creek
Upper Stone Creek
Upper Barnard Creek
Storet #49901
Lower Stone Creek
Lower Kays Creek
North Davis Sewer Plant
West Gentile Drain
Upper Millcreek
Upper Deuel Creek
Upper Farmington Creek
Storet #49902

The samples are analyzed for Total Dissolved and Suspended Solids, turbidity, Total Organic Carbon, Nitrate-Nitrite, Dissolved Orthophosphate, and Total Phosphorus.

The County has archived the sampling results, which provides a baseline reference for future investigations. As the stormwater management plans are implemented the sampling results may be reviewed and water quality trends established.

The Davis County Health staff will conduct periodic visual water quality monitoring and if obvious illicit discharges are noted, further investigation measures will be implemented to locate the source.

The sampling records are kept in the offices of the Davis County Environmental Health Department, located at 99 South Main, Farmington, Utah 84025.

3.7.4 Funding

Funding for the proposed BMPs in Section 3.7.3 will be an expense of the City of Centerville's Drainage Utility Fund.

See **Table 8** for Status of Measurable Goals for Post Construction Site Runoff Control.

Table 8. Status of Measurable Goals for Post Construction Site Runoff Control

Target Date	Activity/Goal/BMP	Responsible Entity	Cost	Funding Source	Status	Implementation Date	Assessment
Year 1	Review existing ordinances	Drainage Utility Supervisor City Attorney	$0		Completed	2007	
Year 1-2	Review existing ordinances or develop new ordinances regarding pollution prevention on construction sites	Drainage Utility Supervisor, City Attorney, City Council	$1,000	Drainage Utility Fund	Planned	To be determined	
Year 2	Review selection of approved BMPs to be used by the city and contractors	Drainage Utility Supervisor	$0	Drainage Utility Fund	Ongoing	2008	
Year 3	Train personnel and contractors/develop an education program	Drainage Utility Supervisor	Unknown	Drainage Utility Fund	Active	2007	
Year 1-5	Enforcement of ordinance	Drainage Utility Supervisor	Unknown		Active	2007	

SECTION 4 – LOW IMPACT DEVELOPMENT

4.1 Low Impact Development (LID) Standards

4.1.1 LID Purpose for Centerville City

The purpose of LID is to improve the quality of Centerville City's water resources and the water resources' beneficial use. The principal behind the LID regulation is to imitate natural hydraulic and geologic processes as much as reasonably possible. Water resources can be significantly impacted by developments of all types, especially modern urban developments. A significant portion of precipitation infiltrates back into the ground prior to development with much of the excess runoff being filtered by plants, these plants essentially pre-treat the runoff before reaching surface drainage ways. Urban developments and their drainage systems are more polluted and largely bypass the natural processes that were once present, this results in increased flooding and polluted waterways. Low Impact Development (LID) Standards assist in reducing potential flooding and the pollution of drainage systems. The City has elected to allow the following LID options:

4.1.2 Options of LID Standards

1. BIORETENTION CELLS

A Bioretention Cell is a stormwater Best Management Practice (BMP) designed to capture and treat runoff from impermeable surfaces. Stormwater flows over impervious surfaces and is conveyed as sheet flow down a vegetated slope, which slows the incoming runoff velocity and provides initial filtration of particulates from the runoff. The runoff continues to a ponding area where it is filtered by plants, an organic or mulch layer, and native or engineered soils. Many natural and biological processes, such as absorption and decomposition, occur during filtration. These processes remove pollutants and improve water quality. The filtered runoff can then be collected in an underdrain and returned to a stormwater system.

In addition to providing stormwater management benefits, such as runoff quantity control and pollutant removal, Bioretention Cells often result in cost savings by decreasing the need for traditional stormwater structures, such as inlets and pipes. Bioretention areas can also improve the aesthetics of areas such as parking lots or curbsides.

2. BIOSWALES

A Bioswale is a stormwater BMP that provides an aesthetically-pleasing alternative to concrete gutters and storm sewers, utilizing vegetated low-lying areas or troughs that use plant materials and specialized soil mixes to treat, absorb, and convey stormwater runoff. They convey stormwater runoff from a roadway or parking lot into a storm sewer system or other retention areas. Bioswales are able to absorb runoff from small rain events and treat larger amounts of runoff which are then directed to the larger stormwater management system. These can also reduce the overall runoff volume and flow rate which is received by the larger stormwater system.

3. VEGETATED STRIPS

Vegetated strips are vegetated surfaces that are designed to treat sheet flow from adjacent surfaces. They function by slowing runoff velocities and allowing sediment and other pollutants to settle and provide some infiltration into underlying soils.

Vegetated Strips are commonly operated as a pre-treatment stormwater BMP located upstream of other BMPs capable of greater pollutant removal rates. As a stand-alone BMP, vegetated strips can only treat the lowest intensity rainfall events.

4. INFILTRATION BASINS

Infiltration basins are shallow depressions created by excavation or berming that capture stormwater and stores the runoff until it can infiltrate into the soils. Infiltration basins provide the majority of treatment by processes related to soil infiltration, which include absorption, precipitation, trapping, straining, and bacterial degradation. The slowed, cleaned water is allowed to infiltrate native soils or directed to nearby stormwater drains or receiving waters.

Infiltration basins eliminate or dramatically reduce stormwater flow rates and volumes. They improve water quality by settling and filtering out pollutants, they recharge groundwater, and they can provide stormwater storage capacity in a large drainage area. Some of the advantages of this BMP are infiltration basins can be aesthetically pleasing if properly designed and maintained, they reduce the amount of runoff from drainage areas, they are effective at the removal of sediment loads and other pollutants, and they allow for flexibility of design layout to be able to fit most landscapes.

5. INFILTRATION TRENCHES

Infiltration trenches are shallow excavations that are lined with filter fabric and filled with stone to create underground reservoirs for stormwater runoff. The runoff gradually percolates through the bottom and sides of the trench into the surrounding subsoil over time. Infiltration trenches are typically implemented at the ground surface to intercept overland flows. Runoff can be captured by depressing the trench surface or by placing a berm at the downgradient side of the trench.

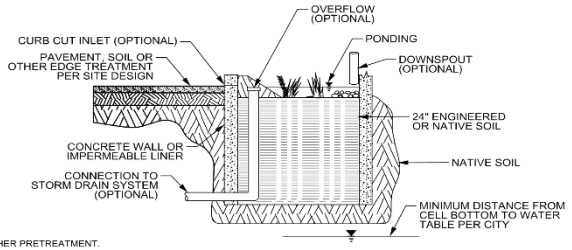
6. UNDERGROUND INFILTRATION GALLERY

An underground infiltration gallery is a BMP system that temporarily stores stormwater runoff below ground as part of a treatment process. The gallery includes an infiltration chamber system that consists of proprietary manufactured modular structures installed underground that create large void spaces for temporary storage of stormwater. Structures may be plastic or concrete and typically have an open bottom and are wrapped with stone and filter fabric. They can be installed individually or in series in trench or bed configurations. Stormwater is delivered to the system through inlets such as curb-cuts or other concrete structures and pipes connected to other stormwater conveyances such as catch basins.

See **Figure 1** for Centerville City's Low Impact Development (LID) Standard Detail

Figure 1. Centerville City's Low Impact Development (LID) Standard Details

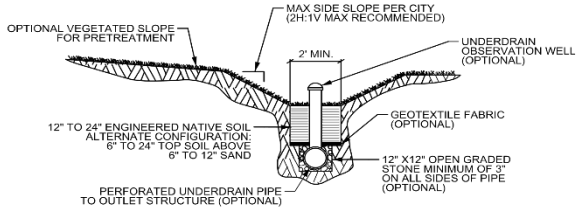
BIORETENTION CELL DESIGN PARAMETERS			
PARAMETER	MIN. VALUE	MAX. VALUE	NOTES
DEPTH TO GROUNDWATER	2-FT	NO MAX	-
PONDING DEPTH	NO MIN.	18-IN	-
DRAWDOWN TIME	12-HOURS	72 HOURS	24 TO 48 HOURS PREFERRED; DRAWDOWN TIME MAY ALSO DEPEND ON LOCAL MOSQUITO ABATEMENT REGULATIONS
INFILTRATION RATE	0.25-IN/HR	6-IN/HR	FIELD TESTING REQUIRED FOR FINAL DESIGN; INFILTRATION RATE SHALL BE LOW TO ALLOW BIOFILTRATION PROCESSES TO OCCUR
FREEBOARD	NO MIN.	NO MAX	FREEBOARD PER CITY; FOR PUBLIC SAFETY, A MIN. OF 6-IN REQ'D EMBANKMENT WHEN PONDING DEPTH GREATER THAN 6-IN



NOTES:
1. CONSIDER FOREBAY OR OTHER PRETREATMENT.
2. CONSIDER UPSTREAM BYPASS FOR LARGE STORM EVENTS.

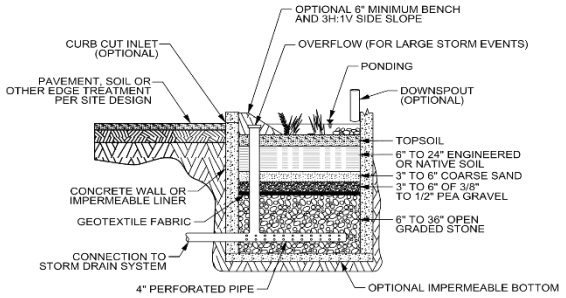
BIORETENTION CELL - IN NATIVE OR ENGINEERED SOILS

BIOSWALE DESIGN PARAMETERS			
PARAMETER	MIN. VALUE	MAX. VALUE	NOTES
LENGTH	HYDRAULIC RESIDENCE TIME	NO MAX	-
LONGITUDINAL SLOPE	0.50%	5%	UNDERDRAIN RECOMMENDED BELOW MINIMUM SLOPE
BOTTOM WIDTH	2-FT	NO MAX	-
SIDE SLOPE	NO MIN.	3H:1V	PER CITY REQUIREMENTS
FLOW VELOCITY	NO MIN.	1.0-FT/S	MAXIMUM PERMISSIBLE SHEAR STRESS MAY ALSO DICTATE MAX. FLOW VELOCITY
FLOW DEPTH	NO MIN.	2/3 VEGETATION HEIGHT	FLOW DEPTHS GREATER THAN VEGETATION HEIGHT WILL BYPASS BIOFILTRATION
FREEBOARD	NO MIN.	NO MAX	PER CITY REQUIREMENTS
VEGETATION COVERAGE	> 65%		REQUIRED FOR BIOFILTRATION SUCCESS
HYDRAULIC RESISTANCE TIME	5 MIN.	NO MAX	-



NOTES:
1. ENGINEERED SOIL MAY IMPROVE FILTRATION.
2. UNDERDRAIN RECOMMENDED FOR LONGITUDINAL SLOPES < 1%.
3. (OPTIONAL) ITEMS SHOWN FOR USE WITH UNDERDRAIN.
4. DIMENSIONS SHOWN MAY VARY BASED ON SITE CONDITIONS.

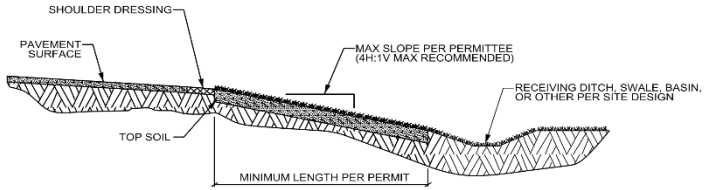
BIOSWALE



NOTES:
1. OVERFLOW ELEVATION MUST BE BELOW ELEVATION OF INLET (CURB CUT, DOWNSPOUT, OR OTHER PER SITE DESIGN).
2. DIMENSIONS SHOWN MAY VARY BASED ON SITE CONDITIONS.
3. CONSIDER FOREBAY OR OTHER PRETREATMENT.

BIORETENTION CELL - WITH UNDERDRAIN SYSTEM

VEGETATED STRIP DESIGN PARAMETERS			
PARAMETER	MIN. VALUE	MAX. VALUE	NOTES
LENGTH (FLOW DIRECTION)	15-FT	NO MAX	-
LONGITUDINAL SLOPE	NO MIN.	4H:1V	PER CITY REQUIREMENTS
FLOW VELOCITY	NO MIN.	1.0-FT/S	MAXIMUM PERMISSIBLE SHEAR STRESS MAY ALSO DICTATE MAX. FLOW VELOCITY
FLOW DEPTH	NO MIN.	2/3 VEGETATION HEIGHT	FLOW DEPTHS GREATER THAN VEGETATION HEIGHT WILL BYPASS BIOFILTRATION
FREEBOARD	NO MIN.	NO MAX	PER CITY REQUIREMENTS
VEGETATION COVERAGE	> 65%		REQUIRED FOR BIOFILTRATION SUCCESS



NOTES:
1. DIMENSIONS SHOWN MAY VARY BASED ON SITE CONDITIONS.

VEGETATED STRIP

REVISION	DATE	BY	DESCRIPTION
1	12-14	MLR	2014 Update
2	02-20	PSB	2020 UPDATE

DESIGN KLC
DRAWN PSB
CHECKED CDP
DATE 02-21-2020

WATER RETENTION AND VEGETATION

CENTERVILLE CITY STANDARD DETAILS

ESI ENGINEERING
CONSULTING ENGINEERS AND LAND SURVEYORS
3500 SOUTH MAIN STREET SUITE 206
SALT LAKE CITY, UTAH 84115
TEL:(801)263-1752

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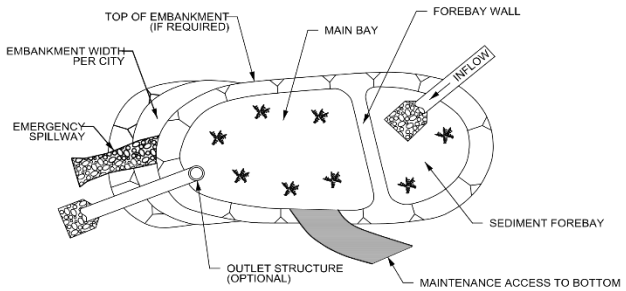
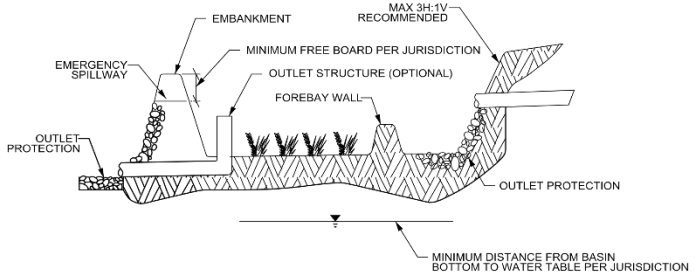
INFILTRATION BASIN DESIGN PARAMETERS			
PARAMETER	MIN. VALUE	MAX. VALUE	NOTES
WATER QUALITY VOLUME	0.1-AC-FT (4356 CF)	NO MAX	-
FREEBOARD	1-FT		-
OVERFLOW SPILLWAY LENGTH	3-FT		-
INVERT SLOPE	0% (FLAT BASIN BOTTOM		-
INTERIOR SIDE SLOPES	NO MIN.	3H:1V	-
DRAWDOWN TIME	24-HOURS	72-HOURS	48-HOURS RECOMMENDED
DESIGN INFILTRATION RATE	0.25-IN/HR	6-IN/HR	FIELD TESTING REQUIRED FOR FINAL DESIGN
DEPTH TO GROUNDWATER	2-FT	NO MAX	PER CITY REQUIREMENTS



PLAN VIEW

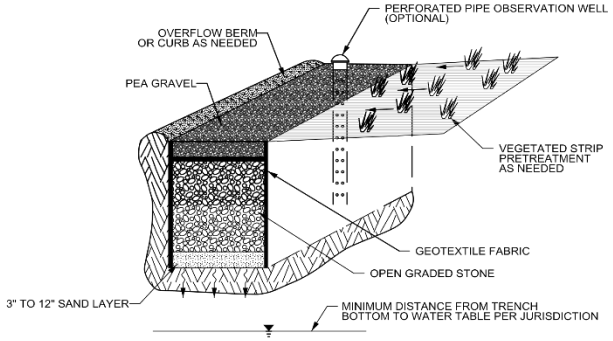


SECTION VIEW

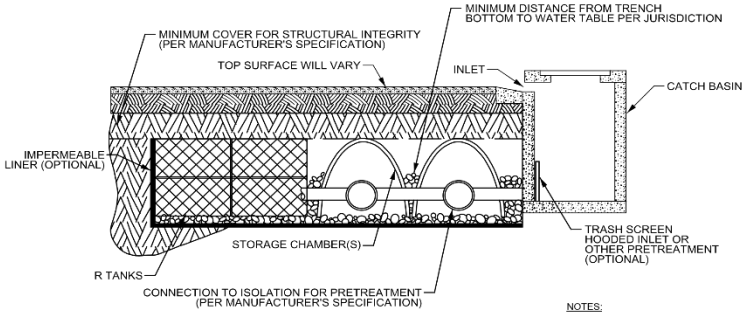
NOTES:
1. DIMENSIONS SHOWN MAY VARY BASED ON SITE CONDITIONS.
2. FOREBAY CONNECTION TYPE TO MAIN BAY WILL VARY: OUTLET PIPE, GABION WALL, NOTCHED CONCRETE WALL, AND OTHERS ARE ACCEPTABLE.
3. CONSIDER UPSTREAM BYPASS FOR LARGE STORM EVENTS.

INFILTRATION BASIN

INFILTRATION BASIN DESIGN PARAMETERS			
PARAMETER	MIN. VALUE	MAX. VALUE	NOTES
DEPTH OF TRENCH	2-FT	NO MAX	MAX. DEPTH DETERMINED BY CITY
LONGITUDINAL TRENCH SLOPE	0%	1%	-
WIDTH	2-FT	NO MAX	-
DRAWDOWN TIME	12-HOURS	72-HOURS	-
DESIGN INFILTRATION RATE	0.25-IN/HR	6-IN/HR	FIELD TESTING REQUIRED FOR FINAL DESIGN
DEPTH TO GROUNDWATER	2-FT	NO MAX	-



INFILTRATION TRENCH



NOTES:
1. CONFIGURATION WILL VARY.
2. IMPERMEABLE LINER AROUND UNDER GROUND SYSTEM IF GROUND WATER CONCERNS EXIST.
3. IF IMPERMEABLE LINER IS USED, PROVIDE OUTLET TO PREVENT STANDING WATER.

UNDERGROUND INFILTRATION GALLERY

REVISION	DATE	BY	DESCRIPTION
1	12-14	MLR	2014 Update
2	02-20	PSB	2020 UPDATE

DESIGN KLC
DRAWN PSB
CHECKED CDP
DATE 02-21-2020

WATER INFILTRATION DETAIL

CENTERVILLE CITY
STANDARD DETAILS

ESI ENGINEERING
CONSULTING ENGINEERS AND LAND SURVEYORS
3500 SOUTH MAIN STREET SUITE 206
SALT LAKE CITY, UTAH 84115
TEL:(801)263-1752

SHEET 21
OF 21
PROJECT NO. 20-027

SECTION 5 – FLOOD CONTROL STORAGE DESIGN

5.1 Detention/Retention Systems

5.1.1 New Developments

New Development projects that disturb land greater than or equal to one acre must manage rainfall runoff on-site. The precipitation from all rainfall events less than or equal to the 80th percentile rainfall event shall be prevented from off-site discharge. This objective must be accomplished by the use of practices that are designed, constructed, and maintained to infiltrate, evapotranspire, and/or harvest and reuse rainwater. The 80th percentile rainfall event is the event whose precipitation total is greater than or equal to 80 percent of all storm events over a given period of record.

Detention/Retention systems shall capture project basin peak flow rates and be designed with the following:

1. New Developments shall retain the 80th percentile storm event. Along the Wasatch front this is approximately 0.5 inches over a 24 hour period. This runoff shall not be discharged from the system unless it is determined that it is not technically feasible.
2. Use Low Impact Development (LID) treatment standards.
3. Determine the percolation rate at the floor of each above ground and below ground retention systems using a downhole percolation test or approved equal.

5.1.2 Residential Systems

Residential systems include surface ponds, swales, tanks, offline upsized pipes, and dry wells, and shall be designed with the following:

1. Public systems shall conform to the Centerville City Standards.
2. Residential detention/retention systems shall be near and in view of public and private ROW or driveways. This includes not putting a system in back yards or side yards that are behind fences of single-family residential properties.

5.1.3 Redevelopments / Amendment to Site Plans

Detention/Retention systems shall be evaluated for potential capacity increases when 10% or more of additional impervious surfaces (buildings, roads, parking lots, and other structures) are constructed as part of a redevelopment or if a site plan requires an amendment.

SECTION 6 - APPENDICES

6.1 List of Acronyms

ACOE	United States Army Corps of Engineers
BMP	Best Management Practices
CRS	Community Rating System
CWA	Clean Water Act
DCSWC	Davis County Storm Water Coalition
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
IDDE	Illicit Discharge Detection and Elimination
LID	Low Impact Development
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NFIP	National Flood Insurance Program
NPDES	National Pollutant Discharge Elimination System
SOP	Standard Operating Procedure
SWMP	Stormwater Management Plan
TMDLs	Total Maximum Daily Loads
UPDES	Utah Pollutant Discharge Elimination System

6.2 Glossary of Terms

BEST MANAGEMENT PRACTICES (BMPs): BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment, requirements, operating procedures, and practices to control facility site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage and good housekeeping solutions that include the proper handling, storage, and disposal of toxic materials to prevent stormwater pollution.

CATCH BASINS: Curbside opening that collects rainwater from streets and serves as an entry point to the storm drain system.

FIRST FLUSH: The first big rain after an extended dry period, which flushes out the accumulated pollutants in the storm drain system.

FLOOD CONTROL CHANNEL: The open portions (often concrete-lined) of the storm drain system.

GUTTER: The edge of a street (below the curb) designed to drain water runoff from streets, driveways, and parking lots into catch basins.

HOUSEHOLD HAZARDOUS WASTE: Common everyday products that people use in and around their homes including paint, paint thinner, herbicides, and pesticides that due to their chemical nature, can be hazardous if not properly disposed.

LOW IMPACT DEVELOPMENT (LID): LID refers to engineered systems, either structural or natural, that use or mimic natural processes to promote infiltration, evapotranspiration, and/or reuse of stormwater as close to its source as possible to protect water quality and aquatic habitat.

ILLICIT CONNECTION: Any man-made conveyance connecting to the storm drain system that is not permitted and/or allows an illicit discharge directly to a municipal separate storm sewer, or any legitimate connection that is used for illegal discharge.

ILLICIT DISCHARGE: Any discharge to a municipal separate storm sewer system that is not composed entirely of stormwater except discharges pursuant to a UPDES permit and discharges related to firefighting activities.

MAXIMUM EXTENT PRACTICABLE (MEP): Technology-based discharge standard for Municipal Separate Storm Sewer Systems established by the Clean Water Act.

MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4): MS4 refers to a collection of structures designed to gather stormwater and discharge it into local streams and rivers.

NON-POINT SOURCE POLLUTION: Pollution that does not come from a single, identifiable source; includes materials that wash from roofs, streets, yards, driveways, sidewalks, and other land areas. Collectively, this is the largest source of stormwater pollution.

OUTFALL: A flow of water from one drainage system into a larger system or into a body of water like a bay or lake.

POINT SOURCE POLLUTION: Pollution from a single identifiable source such as a factory or a sewage-treatment plant. Most of this pollution is highly regulated at the state and local levels.

SOURCE CONTROL: Action to prevent pollution from where it originates.

STORM DRAIN SYSTEM: A vast network of underground pipes and open channels designed for flood control.

STORMWATER: Rain runoff, snowmelt runoff, and other surface runoff and drainage that enters the storm drain system and empties into lakes, rivers, or streams.

STORMWATER POLLUTION: Water from rain, irrigation, garden hoses, or other activities that picks up pollutants (cigarette butts, trash, automotive fluids, used oil, paint, fertilizers and pesticides, lawn and garden clippings, and pet waste) from streets, parking lots driveways, and yards and carries them through the storm drain system.

TOTAL MAXIMUM DAILY LOADS (TMDLs): A TMDL is the calculation of the maximum amount of a pollutant allowed to enter a water body so that the waterbody will meet and continue to meet water quality standards for that particular pollutant. A TMDL determines a pollutant reduction target and allocates load reductions necessary to the source(s) of the pollutant.

WATERSHED: A watershed is land that collects water and drains it into a river system or lake.