

Storm Water Management Program



EAGLE
M O U N T A I N

Eagle Mountain City Engineering Department
Eagle Mountain City Storm Drain Department
Eagle Mountain City Building Department

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1 Introduction

A. About Us

The Storm Water department protects the health, safety and welfare of Eagle Mountain City, its inhabitants, and downstream entities by the safe removal of excess rainfall and snowmelt through the improvement of the storm drain portion of the city's storm water system by, protecting property, and preventing polluted water from entering the city storm water system. This includes maintaining 43.72 miles of storm drain pipe, 837 manholes, 1337 storm drain inlets and remove 20-40 tons of sediment from the system each year. Eagle Mountain City is comprised of two separate and distinct drainage basins. The northern portion of the City, known as the North Service Area (NSA) drains into a series of seasonal washes which eventually drain into the Tickville Wash. The Tickville Wash eventually drains into the Utah Lake drainage system. Much of the northern portion of the Cedar Valley drains into the Tickville Wash and its tributaries. The South Service Area (SSA) naturally drains into the center of the Cedar Valley to a naturally occur slough referred to as the sinks where runoff percolates into the ground.

B. Overview of Storm Water Management Program

This document comprises Eagle Mountain City's Storm Water Management Program (SWMP). This program was developed as a result of Phase II of the National Pollutant Discharge Elimination System (NPDES) Program ordered by the United States Environmental Protection Agency (EPA) and will be submitted to the Utah Division of Water Quality (DWQ) as part of the Utah Pollutant Discharge Elimination System (UPDES) Annual Report. The Eagle Mountain City Storm Water Management Program provides an overview of the Phase II requirements and outlines the City's efforts to plan, develop, implement, and enforce a SWMP that will satisfy Phase II requirements. The basic goals of the SWMP are to reduce the discharge of storm water pollutants to the maximum extent practicable, to protect downstream waters from adverse quality and quantity impacts, and to promote behavioral changes by the public to reduce water quality impacts associated with pollutants in storm water runoff and illicit discharges.

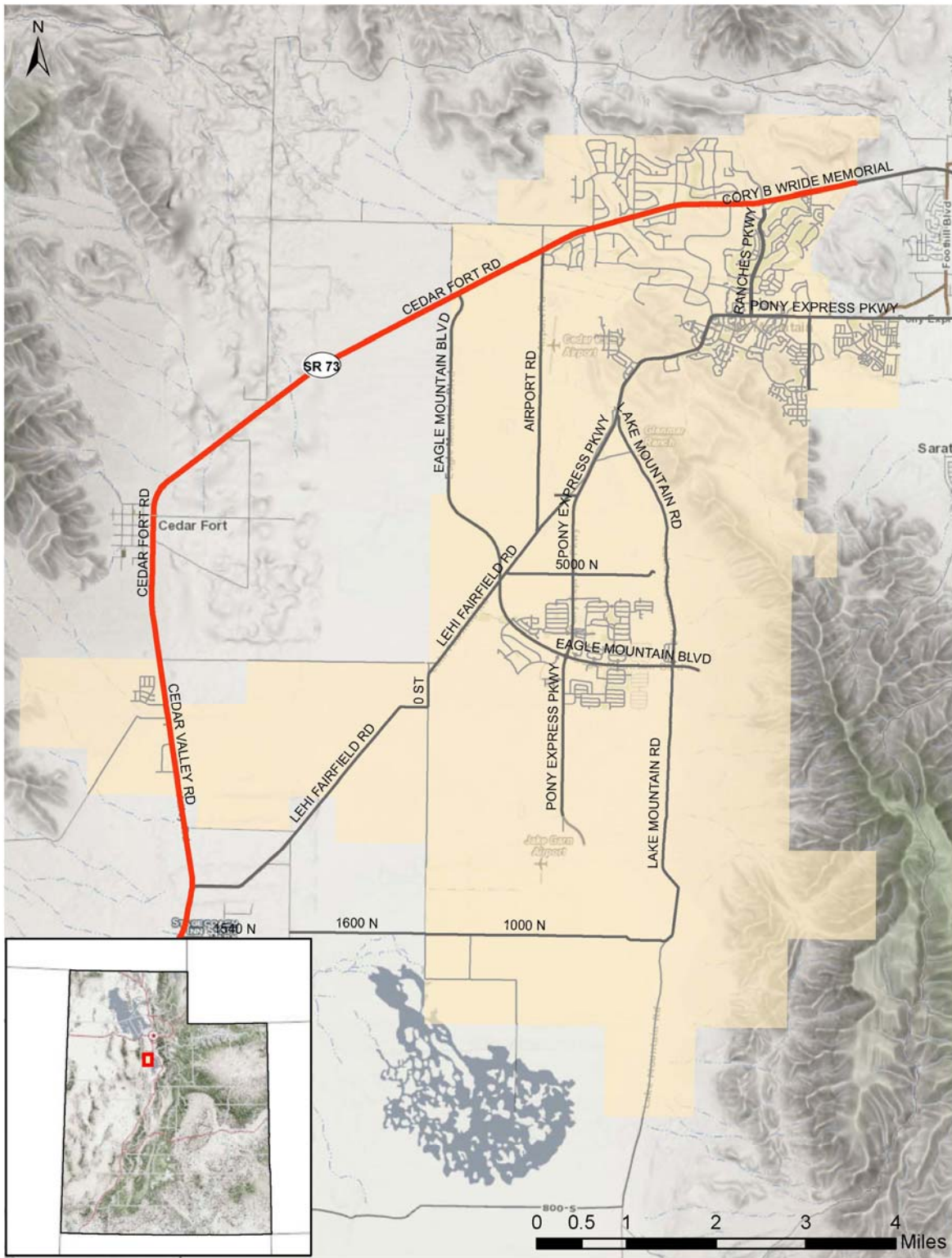


Figure 1 Eagle Mountain City

C. Brief Overview of Eagle Mountain City

Eagle Mountain City incorporates approximately 41.7 square miles and is bordered by Camp Williams to the North, The Lake Mountains and Saratoga Springs to the East and the city of Cedar Fort to northwest. Eagle Mountain City's population, according to the 2010 census, is 21,415.

Eagle Mountain elevation is 4,850 to 5,350 feet above sea level, with the average annual rain fall being 16 inches per year.

D. Existing Facilities

Eagle Mountain City operates a Municipal Separate Storm Sewer System (MS4). This system consists of gravity-flow conveyance facilities constructed within the rights-of-way of public streets that discharge in to Public and private retention and detention ponds, Drainage Swales and Tickville Wash. The steep mountain slopes in the Hidden Canyon area of the City create a potential for high debris flows during a storm event. Several large basins are planned to be constructed to capture these potential flows. Public and private retention and detention systems are installed throughout the City to minimize peak flows to the conveyance system by controlling discharges and infiltrating storm runoff into the ground.

Eagle Mountain City requires residential developers to install adequate storm drainage systems throughout their subdivisions. These include curb and gutter, curb inlets, storm drain piping, and retention/ detention facilities. All developments are currently required to size conveyance systems to accommodate a 25-year storm event. Developments are required to detain runoff onsite based on a 100 year storm event. In instances where development may not be within reasonable proximity to an existing storm drain trunk lines, developments are required to construct the system for future expansion, and provide a retention pond or sump to allow runoff to percolate into the groundwater until the system can be connected to the larger overall system.

Eagle Mountain is a bedroom community, with most of the developed areas consisting of residential units. Large portions of the city are comprised of large lot (1 acre plus) subdivisions, which have smaller impact to post developed site runoff. These subdivision typically have a swale system to convey storm runoff, and utilize the City's "rural" street cross section, which does not provide for curb and gutter. Most of the drainage in these swale areas collect and percolate within the swales. The swales also act as a natural filtration for runoff that flows through.

City facilities discharge controlled runoff into the Tickville Wash, or one of its tributaries at various points through the NSA. Runoff that is collected into the City system in the SSA is routed to a large regional retention pond where the runoff percolated into the ground.

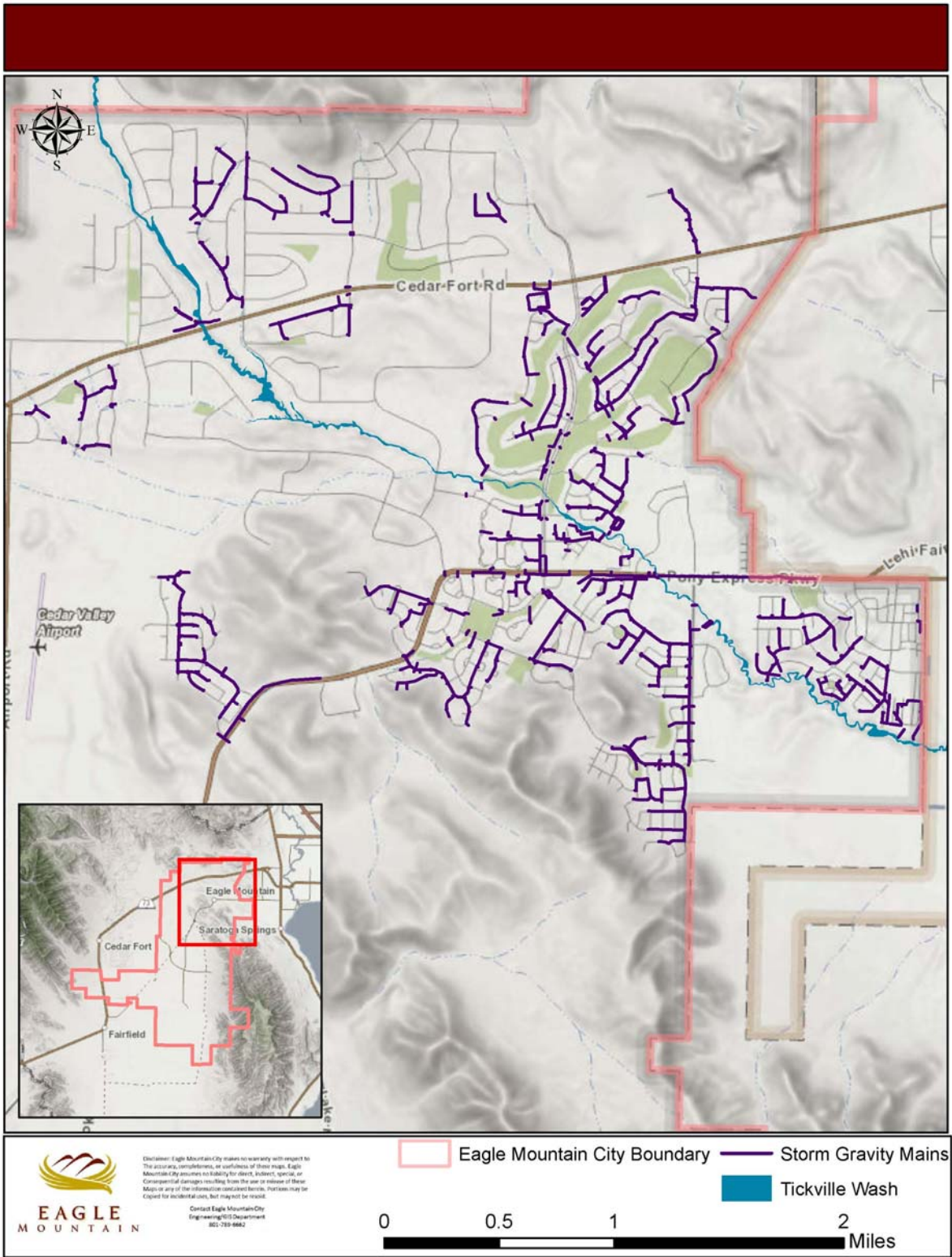


Figure 2 Eagle Mountain Drainage North

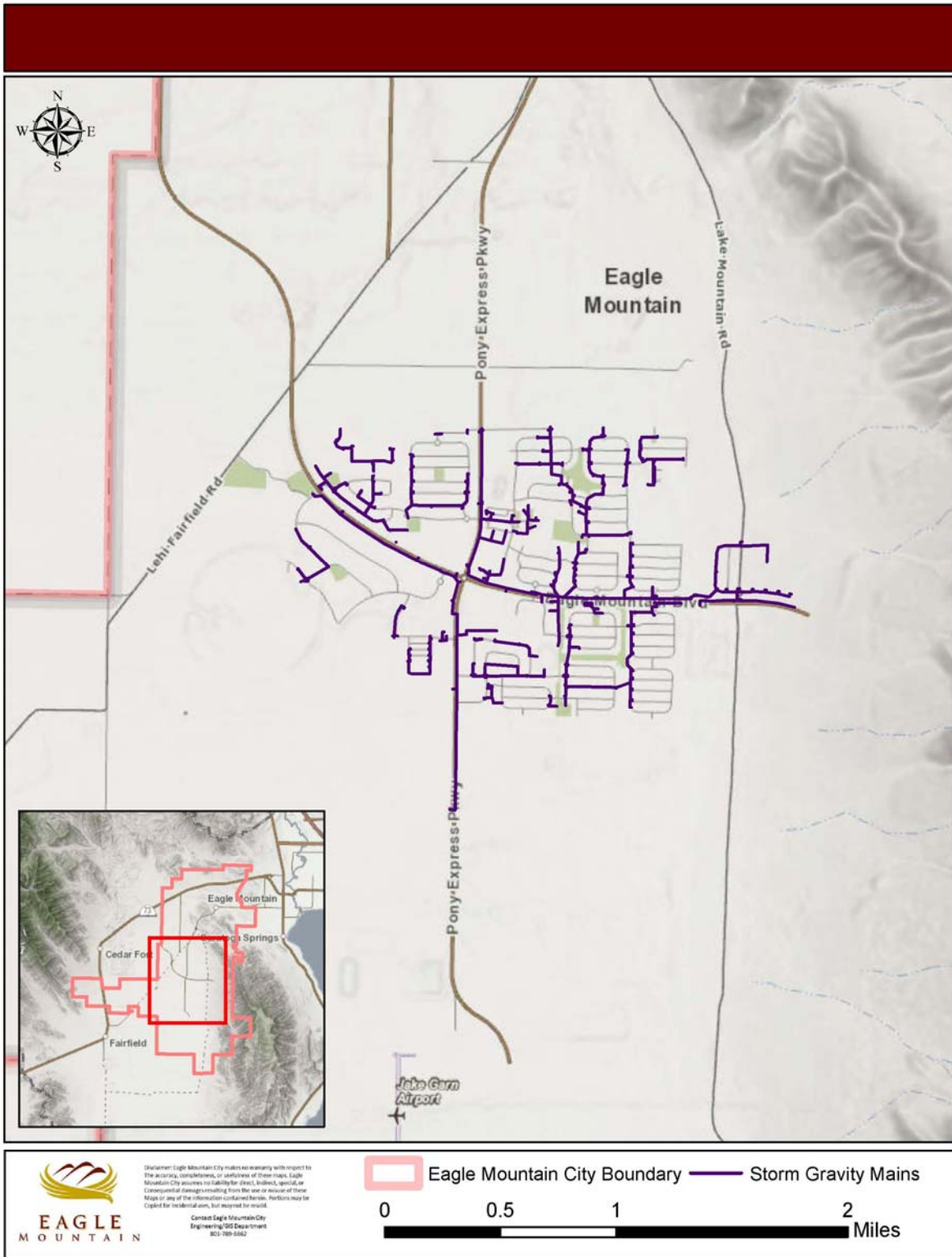


Figure 3 Eagle Mountain Drainage South

E. Water Quality Concerns

Storm water runoff from lands modified by urban development can harm water resources and, in turn, cause or contribute to a violation of water quality standards. Unregulated urban development may cause adverse effects by changing natural hydrologic patterns, accelerating stream flows, destroying aquatic habitat, and elevating pollutant concentration and loadings.

Urbanization alters the natural infiltration capability of the land and causes an increase in storm water runoff that may introduce various pollutants in the receiving water bodies. Urban development decreases the amount of pervious areas (farmland, orchards, forests, meadows, etc.) and replaces these areas with impervious surfaces (rooftops, driveways, sidewalks, roads, parking lots, etc.) that do not have the ability to absorb storm water. Storm water and snowmelt wash over these areas, pick up pollutants and deposit them into the receiving waters. Urbanization also concentrates runoff and causes a gain in flow volume and velocity, causing an increase in erosion and sedimentation for downstream systems.

Eagle Mountain City is concerned with sediment introduced into the storm drain system from undeveloped areas, contamination from roadways, and from construction sites. This can clog up the pipe system and reduce the capacity of the pipe, and be very difficult to maintain. The City is also concerned about the large, unregulated volumes of drainage which routinely flow through the Tickville Wash and its tributaries, particularly during snow melt and large storm events. The city instituted a program in 2012 to routinely maintain the washes that convey drainage through and out of the City. Debris and loose materials are removed, as overgrown vegetation is trimmed and removed. There is very little commercial or industrial facilities within the City, and contamination from these types of institutions is unlikely.

2 Program Overview

In 1990 the Environmental Protection Agency (EPA) passed federal storm water regulations that mandated municipalities to change their traditional storm water runoff management techniques. Historically, storm water management techniques have been comprised of facilities that would control the quantity of runoff to prevent flooding. The new regulation (Phase I) require certain municipalities, having populations greater than 100,000, to also address the impacts that storm water runoff would have on the water quality of the receiving waters..

In 1999 the EPA passed regulations to expand the 1990, Phase I, regulations to include municipalities having populations greater than 10,000. Phase II of the program requires regulated municipalities to include outreach programs that involve the public in planning and implementing storm water management systems. Phase II also provides regulations on construction sites that disturb areas of one acre and larger. Eagle Mountain City became a Phase II regulated City and is required to comply with all current Phase II regulations. These new requirements are outlined in the City's Storm Water Management Plan, which will become the document that outlines the methods the City will implement to achieve these goals.

To achieve these goals, the SWMP must address each of the six minimum control measures (MCM's) identified below:

1. Public Education and Outreach on Storm Water Impacts

Operators of small Municipal Separate Storm Sewer Systems (MS4s) must implement a public education and outreach program to promote behavior change by the public to reduce water quality impacts associated with pollutants in storm water runoff and illicit discharges. Outreach and educational efforts shall include a multimedia approach and shall be targeted and presented to specific audiences fore increased effectiveness. The education program must include documented education and outreach efforts for the following four audiences:

1. Residents,
2. Businesses, institutions, and commercial facilities,
3. Developers, contractors, and engineers,
4. Municipal facilities.

The public education portion of the program must also provide and document information and training given to municipal engineers, development and plan review staff, land use planners, and other applicable parties, to learn about Low Impact Development (LID) practices, green infrastructure

practices, and to communicate the specific requirements for post-construction control and the associated best Management Practices (BMP's) chosen to be implemented within the SWMP.

The public education program should inform individuals and households about the problems and the steps they can take to reduce or prevent storm water pollution by:

- Distributing brochures or fact sheets
- Providing public service announcements
- Implementing education programs targeted at school-age children
- Community-based projects such as storm drain stenciling and watershed clean-up

The public education program should inform individuals and households about steps they can take to reduce storm water pollution by:

- Ensuring the use and disposal of landscape and garden chemicals, fertilizers and pesticides
- Protecting and restoring riparian vegetation
- Properly disposing of used motor oil and household wastes
- Getting involved in local stream restoration activities

Materials and outreach programs should also be directed to commercial, industrial, and institutional entities likely to have significant storm water impacts. A list of the City's better management practices (BMP's) that will be implemented as part of this program are outlined below.

Public Education and Outreach on Storm Water Impacts			
Activity/ BMP	Measureable Goal/ Milestone	Implementation Date	Justification
Maintain membership in Utah County Storm Water Coalition	a. Document information and material distribution from coalition	Annually	The Utah County Storm Water Coalition implements BMP's on behalf of the City
Distribute water conservation material with City newsletter in early summer	a. Document newsletters and log usage	Annually no later than June 1	Educational materials promote public awareness of storm water issues
Provide copy of Storm Water Management Plan to interested parties	a. Maintain current version of SWMP on City website	Ongoing	This provides an opportunity for public input and review of the SWMP

2. Public Involvement/ Participation

Public involvement is an integral part of the storm water management program. Early and frequent public involvement can shorten implementation schedules and broaden public support for the program. Public participation is likely to ensure a more successful Storm Water Management Program by providing valuable expertise and can act as a conduit to promote other programs. Opportunities for the public to participate are as follows:

- Participating in the development of Best Management Practices (BMP's) and measurable goals in relation to storm water management
- Involvement in the storm drainage design, implementation, and maintenance processes
- Working as a citizen volunteer to educate other individuals about the program
- Participation in volunteer storm water quality monitoring efforts

A list of the City's better management practices (BMP's) that will be implemented as part of this program are outlined below.

Public Involvement/ Participation			
Activity/ BMP	Measureable Goal/ Milestone	Implementation Date	Justification
Provide information to contractors and developers regarding their responsibility in preventing storm water pollution	a. Document meeting and post comments and suggestions from affected parties	Ongoing	This facilitates involvement and compliance from stakeholders on the SWMP
Sponsor community cleanup along washes	a. Document the collection and removal of debris materials that might other contaminate the washes	Annually	During clean up project, volunteers collect and dispose of debris that might otherwise contaminate the storm water system
Conduct a Public Works Advisory Board meeting to discuss the implementation of the SWMP	a. Record the minutes from the meeting. These board act as a liaison between the City and the public.	March 2014	This board acts as a liaison between the City and residents and provides an opportunity for public involvement and input

3. Illicit Discharge Detection and Elimination

Illicit discharge is defined as any discharge to a municipal separate storm sewer that is not composed entirely of storm water such as, sanitary wastes, industrial process waste, and interior floor drains. Illicit discharges enter the system through either direct connections (direct piping to the storm sewer) or indirect connections (infiltration, spills collected by inlets, etc.).

Operators of regulated small MS4's are required to:

- Maintain a storm drainage system map showing the location of all outfalls, and names and location of all waters of the State that receive discharges from those outfalls
- Create, in writing, an Illicit Discharge Detection and Elimination (IDDE) Program to effectively prohibit, through ordinance, illicit discharges into the separate storm sewer system and implement a variety of appropriate enforcement procedures and actions in order to apply escalating enforcement options, as needed. The IDDE Program must have adequate legal authority to detect, investigate, eliminate and enforce against non-storm water discharges. All elements of the IDDE Program (public information, inspections, investigations, enforcement, etc.) must be thoroughly documented. The IDDE Program must include the following:

A. Develop written systematic procedures for locating and listing priority areas likely to have illicit discharges.

B. Develop structured field assessment activities, including written procedures and inspection forms, to perform routine dry weather screening of outfalls.

C. Develop and implement Standard Operation Procedures (SOP's) for tracing an illicit discharge to the source, including visual inspections, opening manholes, using mobile cameras, using chemical indicators, collecting and analyzing water samples, etc.

D. Develop and implement SOP's for characterizing the nature of, and the potential public or environmental threat posed by, any illicit discharge found or reported by the public.

E. Create and utilize a detailed inspection report used when illicit discharges are identified and confirmed.

F. Develop and implement SOP's for ceasing the illicit discharge, performing follow-up inspections, and performing escalating enforcement activities if the discharge is not eliminated.

G. Distribute information to public employees, businesses, and the general public of the hazards associated with illicit discharges and the improper disposal of waste.

H. Promote (or provide services) for the collection of hazardous household waste.

I. Publicly list and publicize a hotline for public reporting of spills or other illicit discharges and maintain a written record of all calls received and actions taken.

J. Develop a written spill/dumping response procedure, including a flow chart for internal use.

K. Develop and implement procedures for program evaluation and assessment.

L. Provide annual training to field and office personnel on how to identify, investigate, and report illicit discharges.

The illicit discharge and elimination program need only address the following categories of non- storm water discharges if the operator of the small MS4 identifies them as significant contributors of pollutants:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground waters
- Uncontaminated ground water infiltration
- Uncontaminated pumped ground water
- Discharges from potable water sources
- Footing / foundation drains
- Irrigation water
- Springs
- Water from crawl space pumps
- Lawn watering
- Residential car washing
- Flows from riparian habitats and wetlands
- Dechlorinated swimming pool discharges
- Street wash water (excluding fire fighting activities)

A list of the City's better management practices (BMP's) that will be implemented as part of this program are outlined below.

Illicit Discharge Detection and Elimination			
Activity/ BMP	Measureable Goal/ Milestone	Implementation Date	Justification
Storm Drainage System Mapping	<ul style="list-style-type: none"> a. Map entire in-place storm drainage system b. Identify and mark all inlets, detention/ retention basins and outfalls 	Ongoing	Mapping a system is essential to effectively managing it
Illicit Discharge Detection	<ul style="list-style-type: none"> a. Develop, implement and prepare in writing a plan to detect and eliminate non-storm water discharges b. Update hotline for reporting suspected discharges c. Join the Utah County storm water coalition d. Develop a written spill/ dumping response procedure 	Annually inspect discharges a minimum of once every 3 years	Inspection of outfalls and at regular intervals throughout the system will allow for the source of detection to be located and eliminated
Storm Water Ordinance	<ul style="list-style-type: none"> a. Review and update Storm Water Ordinance that prohibits illicit discharge into the storm drain system 	March 2014	An ordinance gives legislative authority to require that the quantity

	and include appropriate enforcement procedure and actions		and quality of storm water discharge be regulated
Employee Training	a. Provide training to all field staff, office personnel and other City employees that might come in contact or receive initial reports of illicit discharges, spills, connections and improper disposals to the MS4	Annually no later than July 1	Employees are the City's best source to identify potential illicit discharges if they are trained in what is considered illicit.

4. Construction Site Storm Water Runoff Control

Over a short period of time, storm water runoff from construction site activity can contribute more pollutants, including sediment, to a receiving stream that had been deposited over several decades. Storm water runoff from construction sites can include pollutants other than sediment, such as phosphorus and nitrogen, pesticides, petroleum products, construction chemicals, and solid wastes that may become mobilized when land surfaces are disturbed.

MS4 operators are required to develop, implement and enforce a pollutant control program to reduce pollutants in storm water runoff from construction activities that result in land disturbance of one or more acres. This must include an ordinance or another regulatory mechanism to require erosion and sediment controls to the extent practicable and allowable under State and local law. The program must include:

- An ordinance or other regulatory mechanism to require erosion and sediment controls for public or private projects that disturb one acre or greater. The ordinance must include sanctions to ensure compliance such as: non-monetary penalties, fines, bonding requirements, and / or permit denials for non-compliance. The ordinance must also include construction operators to prepare a Storm Water Pollution Prevention Plan (SWPPP) as well as provisions for access by qualified City personnel to inspect and enforce the elements of the SWPPP.

Develop a written enforcement strategy of the ordinance which includes:

- SOP's for SWPPP review (for all projects disturbing one acre or greater or those that disturb less than one acre that are part of a common plan of development) to ensure compliance with State and Local regulations. The SWPPP review shall also include the following:
- Review of pre-construction BMP's, BMP's used during the construction phase, and BMP's to be incorporated as post-construction permanent measures.
- Creating and follow a checklist that considers potential water quality impacts.
- Review procedures that evaluate and encourage Low Impact Development (LID) or green infrastructure design that may be incorporated into the overall project site design.
- Prioritize proposed construction sites of their potential to create adverse water quality impacts, particularly to the waters listed by the State as impaired.

Create a Construction Site Storm Water Runoff Inspection Program that includes the following:

- SOP's for construction site inspections and enforcement actions for non-compliance. The procedures must clearly define who is responsible for
- site inspections and who has the authority to impose sanctions to ensure compliance to the program.
- Usage of the most current Construction Site Inspection Form (Checklist) found on the State of Utah – Division of Water Quality website.

- Site Inspections performed at pre-construction, current construction, and post-construction phases of the project.

SOP's that include procedures for being notified by construction operators of their completion of active construction activities so that final stabilization of the project site can be verified and removal of temporary control measures can be conducted. Detailed documentation, tracking, and record-keeping of all inspection activities, corrective actions, and enforcement actions are to be kept and maintained by the City. SOP's that include specific processes and sanctions to minimize occurrences of, and obtain compliance from violators, which shall include appropriate, escalating enforcement actions and procedures will be implemented.

- Requirements to control other waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may adversely impact water quality
 - Procedures for receipt and consideration of information submitted by the public
 - Adequate training of all staff whose primary job duties are related to the implementation of the Construction Site Storm Water Program

A list of the City's better management practices (BMP's) that will be implemented as part of this program are outlined below.

Construction Site Storm Water Runoff Control			
Activity/ BMP	Measureable Goal/ Milestone	Implementation Date	Justification
Storm Water Ordinance	a. Review and update Storm Water Ordinance that prohibits illicit discharge into the storm drain system and include appropriate enforcement procedure and actions	March 2014	An ordinance gives legislative authority to require that storm water discharge be regulated
Develop program for detection and enforcement	a. Create SOP's for inspection and enforcement including escalating enforcement actions for non-compliance b. Create SOPs that outline how all inspections will be documented as well as how records of all inspections shall be maintained c. Create SOPs outlining how all enforcement actions taken will be documented and recorded	Ongoing	Inspection is often necessary to achieve successful storm water pollution prevention
Require SWPPP for all development > 1 acre	a. Require all SWPPPs to be submitted and approved by City staff and record inspections of SWPPP b. Include construction site SWPPP	Ongoing	Planning adequate measures to mitigate storm water pollution during the land development should

	<p>review a part of pre-construction meeting</p> <p>c. Keep record of changes made to the SWPPP during the construction process</p>		reduce pollution.
Training	<p>a. Implement annual training for personnel involved with SWPPP inspection</p> <p>b. Require inspection of approved SWPPPS weekly to ensure compliance</p>	Ongoing	Employees should understand the various components of the SWPPP and understand what they should accomplish so that they can analyze how effect the BMP's have been implemented

5. Post Construction Runoff Control

Increased human activity associated with development often results in increased pollutant loading from storm water discharges. If potential adverse water quality impacts are considered from the beginning stages of a project, new development and redevelopment provides more opportunities for a decrease in storm water runoff and an increase in water quality protection. The objective of this measure is for the hydrology associated with new development to resemble the pre-development hydrology or to improve the hydrology of a redeveloped site and reduce the discharge of storm water.

Operators of small MS4's will be required to develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that result in land disturbance of greater than or equal to one acre that discharge into the MS4, including projects less than one acre that are part of a larger common plan of development. Specifically:

- Develop and adopt an ordinance that requires long-term post-construction storm water controls at new development and redevelopment sites. The ordinance shall, at a minimum, be equivalent with the technical requirements set forth in the UPDES Storm Water General Permit for Construction Activities, UTR300000, which can be found at <http://www.waterquality.utah.gov/UPDES/stormwatercon.htm>.
- Development an enforcement strategy and implement the enforcement provisions in the ordinance including ongoing inspections and detection programs, sets penalties for violators, and addresses measures to correct violations.
- Procedures that include specific processes and sanctions to minimize the occurrence of, and obtain compliance from, chronic and recalcitrant violators which shall include appropriate, escalating enforcement procedures and actions. Documentation on how the requirements of the ordinance will protect water quality and reduce the discharge of pollutants to the MS4.

A list of the City's better management practices (BMP's) that will be implemented as part of this program are outlined below.

Post Construction Runoff Control			
Activity/ BMP	Measureable Goal/ Milestone	Implementation Date	Justification
Operation and Maintenance Plan	a. Train storm water maintenance employees on how to operate and maintain post-construction runoff BMP's. b. Create a list of BMP's that require scheduled inspections. c. Create a schedule for routine operation, maintenance, and	July 2014	Post construction BMPs are ineffective if they are not maintained regularly

	inspections.		
Storm Water Ordinance	a. Create a storm water ordinance to provide the legal authority to regulate and enforce illicit discharge activity.	March 2014	An ordinance gives legislative authority to require that storm water discharge be regulated
Inspection and Enforcement	a. Create a storm water ordinance to provide the legal authority to regulate and enforce illicit discharge activity.	March 2014	Inspection is often necessary to achieve successful storm water pollution prevention

6. Pollution Prevention and Good Housekeeping for Municipal Operations

Several facilities within Eagle Mountain City are owned or operated by Eagle Mountain. These facilities fall under general good housekeeping practices followed by the City. Stormwater from activities related to buildings can contaminate stormwater runoff with hydrocarbons, solvents, pesticides, or other material that may be dumped illegally or illicit discharge may occur. A list of SOP's to accomplish this includes:

- Keep parking lots clean and orderly. Remove and properly dispose of trash and other debris
- Provide an adequate number of trash receptacles for people to use
- Cover trash receptacles to prevent trash from leaving the receptacle unexpectedly during high winds and to prevent animals from entering the trash receptacles
- Routinely sweep streets
- Bag the leaf program to provide residents with adequate means to dispose of fallen leaves

A list of the City's better management practices (BMP's) that will be implemented as part of this program are outlined below.

Pollution Prevention and Good Housekeeping for Municipal Operations			
Activity/ BMP	Measureable Goal/ Milestone	Implementation Date	Justification
Employee Training	<ul style="list-style-type: none"> a. Create a training presentation for employees b. Schedule and complete sessions with individual employees 	Annually no later than July 1	Employees are the City's best source to identify potential illicit discharges if they are trained in what is considered illicit.
Inventory of City Owned Facilities	<ul style="list-style-type: none"> a. Create a written inventory of all city owned facilities b. Set Priority levels for City facilities and determine high priority c. Designate employee responsible for each facility 	Completed	An inventory of City owned facilities will help the city to maintain those site
Municipal Operations Waste Disposal	<ul style="list-style-type: none"> a. Locate suitable location for storm water waste material drying bed b. Build drying bed for collected storm water c. Train employees on use of drying beds and disposal 	September 2017	Proper disposal of debris removed from the City's storm drain system is vital to ensure that
Inspection of City Owned Facilities	<ul style="list-style-type: none"> a. Develop an inspection schedule for all city owned facilities b. Complete inspections of all city owned facilities 	July 1, 2016	Inspection of the facilities may help identify materials that should not be present

City Facilities Storm Drain System Maintenance Program	a. Take inventory of all drainage systems at city owned facilities b. Create a maintenance schedule for drainage systems	Ongoing	Routine maintenance helps to ensure that the facilities do not adversely affect the storm drainage system
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7. Revise Construction Standards

New developments will be required to detain the 90th percentile storm event on site. The general permit for MS4s, UPDES permit No. UTR090000 which was reissued March 1, 2016, requires new development or redevelopment projects to manage rainfall on-site and prevent the off-site discharge of the precipitation from all rainfall events less than or equal to the 90th percentile storm event.

To accomplish this goal, the City will add various new methods of storm water conveyance and detention. These may include more swales, bioretention areas, below grade detention, deep well injections, or other methods which may be found to work. Soils throughout much of the city are considered to be bio-collapsible, so the City will avoid instances where storm water runoff could undermine the supporting soils beneath city roads and infrastructure. Because of the relatively low average rainfall within the state, and in the Cedar Valley in particular, the City is very interested in trying to capture as much rainfall as possible without collecting and sending off existing bodies of water.

Changes to the City construction standards, and development requirements will be adopted no later than the August 16 City Council meeting, so that they can become effective September 1, 2016 to be within compliance of the standards issued by the State of Utah. All plans submitted after September 1 that consist of a project of 1 acre or more will be required to conform to this requirement.