Appendix D

Long Term (Post-Construction) Stormwater Management Program

5 LID BMP Practices

Post-Construction SOPs

Inspection Reporting SOP

Enforcement SOP & Response Guide

BMP Inventory

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Minimize Impervious Area

SD-1

Pollutant Removal Effectiveness

Pollutant removal will vary based on the development's land use category. Refer to *Table 7* to determine pollutants that are to be expected for residential, commercial, industrial, transportation, landscaped, and agricultural land uses.

Minimize the amount of impervious surface at a development by reducing the footprint of impervious features or replacing impervious material with pervious alternatives. When appropriate and as permitted by jurisdiction and development standards, consider the use of pervious materials such as pavers, pervious pavement, or porous concrete for roads, parking lots, sidewalks, driveways, and other design elements that typically account for large portions of a site's impervious surfaces. If reduction of impervious surfaces was not accounted for during the initial design phases, review the plans to identify opportunities to reduce impervious areas. If development standards do not currently allow for narrower roads or pervious materials, work with the appropriate agencies to discuss how to effectively integrate these practices while maintaining functionality of the site and public safety.

Strategies

- Minimize roadway width as much as jurisdictional standards will allow
- Reduce width of parking spots
- Reduce sidewalk widths
- Incorporate *Pervious Surfaces*
- Shared driveways
- One-way streets

Benefits

- Reduce pollutant runoff
- Improve development aesthetic
- Reduce retention volume requirement

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Vegetated Strip

BR-4

Pollutant Removal Effectiveness

Pollutant	Effectiveness[1]
Sediment	High
Nutrients	Medium
Metals	Medium
Bacteria	High
Oil/Grease	High

[1]Removal effectiveness is increased for all pollutants as retention increases.

Vegetated strips are designed to receive and treat sheet flow from adjacent surfaces. This is accomplished by slowing runoff velocity to allow for pollutants and sediments to settle and by filtering out pollutants in the vegetation before entering the storm sewer system. Vegetated strips are best utilized for storm water treatment from roads, parking lots, and other impervious surfaces.

Primary Functions	
Bioretention	Yes
Volume Retention	Some
Biofiltration	Yes

The primary functions of vegetated strips are bioretention and biofiltration. Bioretention within a vegetated strip occurs as runoff enters the soil and pollutants are removed through physical, chemical, and biological processes. Similar biofiltration processes occur to provide treatment when runoff passes through the strip's vegetation. Biofiltration is significantly reduced when vegetation coverage is less than 65%. In arid locations a gravel strip may be used as a substitute for the vegetated strip. The lack of vegetation will cause biofiltration and bioretention to be greatly reduced; however, the runoff velocity will still be decreased and allow for pollutants and sediments to settle out. Volume retention through infiltration will also occur as runoff enters the gravel's void spaces.

Design Criteria

Refer to *Design Criteria* in the *Preface to Fact Sheets* for discussion of design criteria parameters.

Parameter	Min. Value	Max. Value	Notes
Length (direction of flow travel)	15 ft	No maximum	-
Longitudinal Slope	No minimum	4H:1V	Per jurisdiction requirements
Flow Velocity	No minimum	1.0 ft/s	Maximum permissible shear stress may also dictate maximum flow velocity
Flow Depth	No minimum	2/3 vegetation height	Flow depths greater than vegetation height will bypass the biofiltration processes
Freeboard	No minimum	No maximum	Per jurisdiction requirements
Vegetation Coverage	≥ 65%		Biofiltration is significantly reduced when vegetation coverage is less than 65%

Calculation Methods

Vegetated strip design is governed by the water quality flow. The general design steps are:

1. Calculate the water quality flow.
2. Determine the flow depth.
3. Check flow velocity.

Sample Calculations

Refer to *Calculation Methods* in the *Preface to Fact Sheets* for discussion on the equations used.

A roadway project is proposing to widen a road that is near a canal. Due to high groundwater and poor soils, retention on-site is not feasible. Treatment is still an option, however, and the design team has decided to establish vegetation within the twenty feet between the edge of pavement and the canal. The city's storm water requirements state that the 2-yr, 2-hr intensity must be used in determining the water quality flow rate.

Given

Contributing drainage area: 0.25 ac

Imperviousness: 1.00

2-yr, 2-hr storm intensity: 0.318 in/hr

Design Goals

Determine that the flow depth will be less than 1 inch.

Calculations

Volumetric runoff coefficient, R_V (See *Sample Calculations*)

$R_{V\text{-}A} = 0.84i^{1.302}$ (R_V based on hydrologic soil group)

$R_V = 0.84(1.0)^{1.302}$

$R_V = 0.84$

Water Quality Flow, WQF

$WQF = R_V iA$

$WQF = (0.84)(0.318 \text{ in/hr})(0.25 \text{ ac})$

$WQF = 0.067 \text{ cfs}$

There is available right-of-way for a 300-foot long strip that is 20 feet wide. The embankment side slope is 10H:1V which corresponds to a 10% longitudinal slope for the vegetated strip.

Flow depth, y_d (See *Manning's Equation*)

Calculation of the flow depth is typically done using Manning's equation setting the equation equal to the water quality flow and solving for the flow depth.

$y_d = [(nQ)/1.49LS^{0.5}]^{0.6}$

$y_d = [(0.2)(0.071 \text{ cfs}) / (1.49)(300 \text{ ft})(0.02)^{0.5}]^{0.6}$

$y_d = 0.04 \text{ in}$

Velocity, v (See *Continuity Equation*)

The city requires that flows remain below 1 ft/s to prevent scouring of the strip bottom. With the flow depth known, the cross-sectional area is calculated to be 1.10 sf.

$v = Q/A$

$v = 0.067 \text{ cfs} / 1.10 \text{ sf}$

$v = 0.06 \text{ ft/s}$

Volume Reduction

Although methodologies have been developed to determine volume retention within a bioswale, the current body of research varies widely and jurisdictions are encouraged to exercise engineering judgment (See *Volume Reduction*).

Vegetated Strip Effectiveness

Vegetated strips are effective when they can accomplish their design goals of conveying sheet flow to the receiving area. Flows through the vegetated strip should be relatively steady and uniform during a rain event and should not create rilling or other visible signs of erosion. Established vegetation with adequate coverage is an indication of a healthy vegetated strip along with minimal sediment and lack of invasive vegetation.

Designer Checklist

If the answer to these questions corresponds to a response box that is red, the BMP should either not be used or additional measures need to be taken to address the issue.

	Yes	No
Is the vegetated strip length greater than or equal to the minimum required length?	☐	☐

Do flows result in a shear stress greater than the maximum permissible for selected vegetation?	☐	☐
Is the vegetated strip providing pretreatment for a downstream BMP?	☐	☐
Is the slope in the direction of flow less than or equal to the jurisdiction's standards?	☐	☐

Vegetation

Refer to *Vegetation Guidance by BMP Type*.

Installation

Vegetated strips can be installed as part of normal construction activities. An appropriate grass such as turf sod should be installed per specifications. If additional vegetation such as shrubs or bushes will be used within the strip, follow landscaping guidance to ensure that vegetation establishes after installation. To maximize infiltration performance, minimize use of heavy machinery.

Additional Guidance

- Require certificates of compliance to verify that construction items meet specification requirements.

Installation Costs

The following cost items are typically associated with bioswale construction.

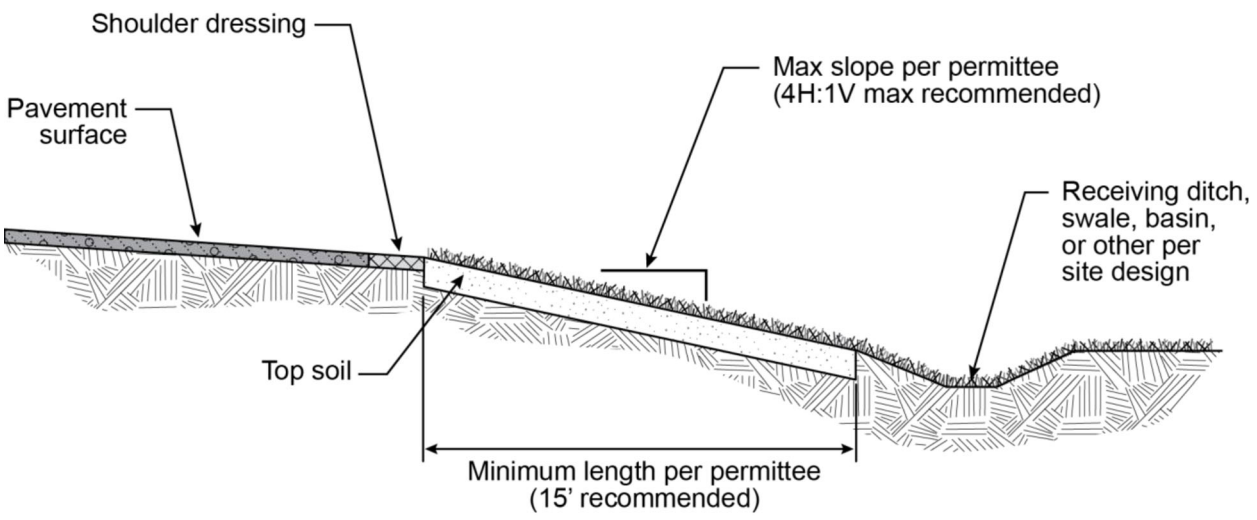
- Grading
- Landscaping and vegetation
- Topsoil
- Engineered soil
- Shoulder dressing upstream of vegetated strip

Maintenance

Refer to *Maintenance* and *Maintenance Costs* in the *Preface to Fact Sheets* for general information related to maintenance of bioretention BMPs.

Maintenance Activities

Inspection	Inspection/Maintenance Frequency	Maintenance Activity	Effort
Inspect upstream end of vegetated strip for sediment buildup that may be impeding sheet flow.	Semiannual (Spring, Fall) or as needed	Remove and dispose of sediment buildup.	Low
Inspect grass length.	As needed	Mow strip as needed.	Low
Inspect for erosion, rilling, and sloughing.	Semiannual (Spring, Fall)	Regrade side slope if slope stability is not affected by sloughing. Notify engineer if stability is affecting basin functionality.	Low
Inspect for adequate vegetative coverage, and impaired or failing vegetation.	Semiannual (Spring, Fall) or as needed	Reseed/replant barren areas. Notify engineer if issue persists.	Low



Notes:

- *Dimensions shown may vary based on site conditions*

Vegetated Strips

Not to scale

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Pervious Surfaces

PS-1

Pervious surfaces such as permeable pavement, concrete pavers, pervious concrete, modular open pavers, and other types of pervious surfaces provide structural support for light vehicle or pedestrian traffic while also providing open space for storm water infiltration.

The primary function of pervious surfaces is volume retention, but some filtration is possible depending on the type of paver and subsurface selected. A modular open paver that, when installed, provides a certain percentage of pervious area in the form of grass, will allow for filtration processes to occur. Another source of filtration is the choker layer directly beneath the pervious surface.

The subsections beneath the pervious surface are typically a choker layer composed of small gravel and a storage layer of larger rock beneath. Underdrains may be required if existing soils do not adequately infiltrate.

Pollutant Removal Effectiveness

Pollutant	Effectiveness[1]
Sediment	High
Nutrients	High
Metals	High
Bacteria	High
Oil/Grease	High

[1]Pollutant removal may occur in the pervious surface or the subsurface.

Primary Functions	
Bioretention	Yes[1]
Volume Retention	Yes
Biofiltration	Some

[1]Bioretention occurs in the subsurface and not within the pervious surface.

Design Criteria

Refer to *Design Criteria* in the *Preface to Fact Sheets* for discussion of design criteria parameters.

Parameter	Min. Value	Max. Value	Notes
Drain Time	12 hours	72 hours	-
Design Infiltration Rate	0.25 in/hr	6 in/hr	Field testing required for final design.
Depth to Historical High Groundwater	2 ft	No maximum	-

Calculation Methods

Pervious surface design is governed by the water quality volume. The general design steps are:

1. Calculate the water quality volume.
2. Determine the required thickness of the subsection layers given their porosity and the footprint of the pervious surface area.

Sample Calculations

Refer to *Calculation Methods* in the *Preface to Fact Sheets* for discussion on the equations used.

A development in the planning phase will have a 0.90-acre parking lot. It is proposed that the parking lot be graded so that runoff is conveyed towards stalls that will be constructed with permeable asphalt.

Given

Contributing drainage area: 0.90 ac

Imperviousness: 0.95

80th percentile storm event: 0.48 in

Design infiltration rate: 0.5 in/hr

Design Goals

Determine an acceptable area size and depth of the permeable asphalt section.

Calculations

Volumetric runoff coefficient, R_V (See *Sample Calculations*)

$R_V = 1.14i - 0.371$ (Granato method when i ≥ 0.55)

$R_V = 1.14(0.95) - 0.371$

$R_V = 0.71$

Water quality volume, WQV (See *Developing the 80th Percentile Volume*)

WQV = (0.71)(0.48 in)(0.90 ac)(43,560 sf/ac) / (12 in/ft)

WQV = 1,113 cf

A permeable asphalt area that is 15 ft x 140 ft (2,100 sf) with the following properties will retain the water quality volume and will have an acceptable drawdown time. See *Storage volume within a media with a known porosity* for guidance on determining storage within soils.

Layer	Thickness, in	Porosity	Storage Volume, cf
Permeable Asphalt	4	0.2	140
Choker Layer	4	0.4	280
Aggregate Storage	10	0.4	700
Total	18	0.36 (weighted)	1120

Drawdown time, t

t = Equivalent storage depth / Design infiltration rate

Weighted porosity, n_W = 0.36

Equivalent storage depth = (18 in)(0.37)

Equivalent storage depth = 6.4 in

t = (6.4 in) / (0.5 in/hr)

t = 12.80 hrs

Pervious Surface Effectiveness

Pervious surfaces are effective when runoff from the design storm depth can enter the porous spaces of the pervious surface and successfully infiltrate into the native soil or drain through an underdrain system. Visual inspection of the pervious surface can reveal reasons for failure: for example, sediment-laden sheet flows that are conveyed to the pervious surface, or a down drain might be introducing organic material. Both scenarios are likely to contribute to clogging within the porous spaces of the pervious surface or within the sublayers.

Designer Checklist

If the answer to these questions corresponds to a response box that is red, the BMP should either not be used or additional measures need to be taken to address the issue.

	Yes	No
Will an underdrain system be required?	☐	☐
If an underdrain is needed, is there sufficient head for the underdrain system to drain?	☐	☐
Has the proposed pervious surface performed successfully in similar climate conditions?	☐	☐

Installation

Excavation

Pervious surfaces will fail if proper care is not taken during excavation and construction. Excavators and heavy machinery should not be used if infiltration is expected to occur through the underlying soils beneath the pervious surface's subsection.

Activities During Construction

Avoid using heavy machinery on the revealed soil during construction. Crews should avoid unnecessarily walking on the underlying soils when possible. Compaction of native soils or backfill below the pervious surface subsoils is acceptable if doing so does not prevent infiltration from occurring.

Flows During Construction

Flows during construction should be diverted away from the exposed underlying soil to prevent erosion. Scheduling installation of the pervious surface within a short time span after excavation will minimize the impact of unnecessary storm water flows from entering the excavated area. The introduction of unwanted sediment and storm water flows can be prevented by placing fiber rolls or silt fences around the excavated perimeter during construction.

Additional Guidance

- Require certificates of compliance to verify that construction items meet specification requirements.

Installation Costs

The following cost items are typically associated with construction of pervious surfaces.

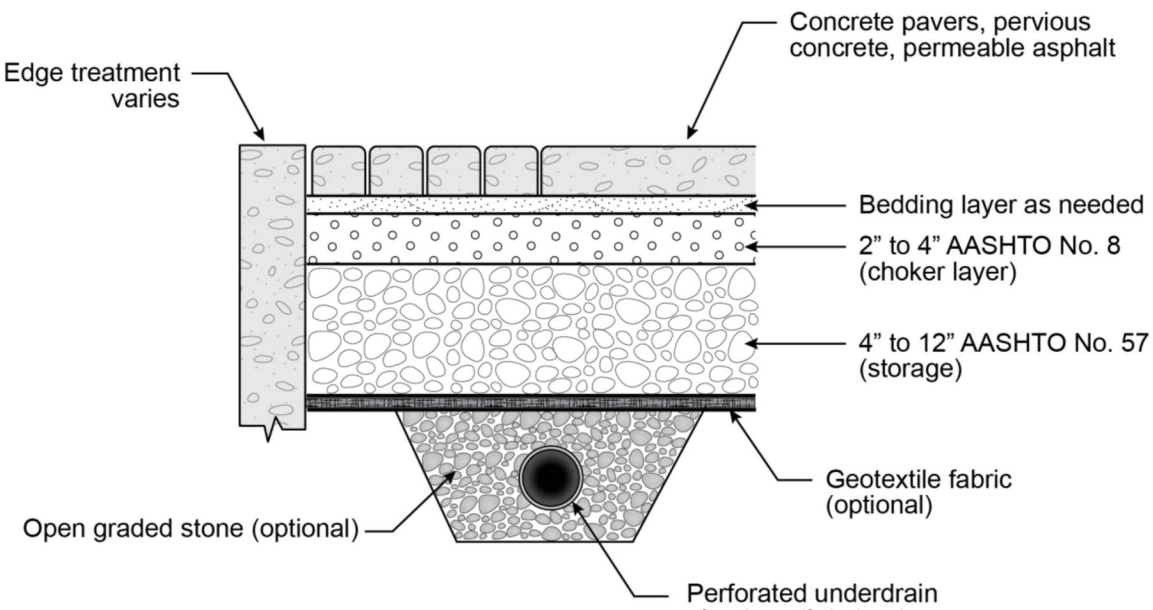
- Excavation
- Grading
- Fine grading
- Pervious surface
- Top layer
- Engineered soil
- Choker layer
- Open graded stone
- Geotextile fabric
- Impermeable liner
- Observation wells (if needed)
- Underdrain system (if needed)

Maintenance

Refer to *Maintenance* and *Maintenance Costs* in the *Preface to Fact Sheets* for general information related to maintenance of pervious surfaces.

Maintenance Activities

Inspection	Inspection/Maintenance Frequency	Maintenance Activity	Effort
Inspect for sediment accumulation.	Semiannual (Spring, Fall)	Use vacuum sweeper followed by pressure washing.	Medium
Inspect for weed growth.	Semiannual (Spring, Fall)	Remove weeds.	LOW
Inspect for standing water on surface or within observation well (if used).	Semiannual (Spring, Fall)	Notify engineer for further inspection.	LOW
Inspect surface for deterioration.	Annual	Notify engineer for further inspection.	LOW
Inspect exfiltration and drainage performance.	As needed, at least annually	Notify engineer for further inspection.	Medium



Notes:

- *Optional items shown for use of underdrain*
- *Dimensions shown may vary based on site conditions*
- *Use of underdrain system may be considered when infiltration is infeasible*

Pervious Surfaces

Not to scale

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Infiltration Basin

ID-1

Pollutant Removal Effectiveness

Pollutant	Effectiveness
Sediment	High
Nutrients	High
Metals	High
Bacteria	High
Oil/Grease	High

Infiltration basins are shallow depressions that use existing soils to retain and provide treatment for storm water runoff. Infiltration basins function by capturing and infiltrating runoff over a specified drawdown time.

The primary functions of infiltration basins are bioretention, volume retention, and filtration. The existing soils remove pollutants through physical, chemical, and biological processes before the storm water reaches the groundwater. Filtration occurs as runoff interacts with grass and other vegetation within the basin and as runoff infiltrates through the soil.

Infiltration basins are typically designed for larger drainage areas where it may be impractical for a BMP such as a bioretention area that requires more maintenance of specialized vegetation over a larger area.

Primary Functions	
Bioretention	Yes
Volume Retention	Yes
Biofiltration	Yes

Pretreatment of runoff may take place in a forebay that will allow for particulate settling. Forebays are typically sized for a percentage of the water quality volume; typically ranging from 10% to 25%.

Design Criteria

Refer to *Design Criteria* in the *Preface to Fact Sheets* for discussion of design criteria parameters.

Parameter	Min. Value	Max. Value	Notes
Water Quality Volume	0.1 ac-ft (4356 cf)	No maximum	-
Freeboard	1 ft		-
Overflow Spillway Length	3 ft spillway length		-
Invert Slope	0% (flat basin bottom)		-
Interior Side Slopes	No minimum	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 Historical High Groundwater	2 ft	No maximum	-

Calculation Methods

Infiltration basin design is governed by the water quality volume. The general design steps are:

1. Calculate the water quality volume.
2. Determine the geometry of the infiltration basin.
3. Based on the basin geometry, determine the ponding depth required to hold the water quality volume.
4. Calculate the drawdown time.

Calculate the water quality outlet elevation.

Sample Calculations

Refer to *Calculation Methods* in the *Preface to Fact Sheets* for discussion on the equations used.

A 13.50-acre highway development routes all of its storm water to a single infiltration basin. A safety factor of 1.50 is required for infiltration design within the jurisdiction. Adjacent soils are 'A' and are part of the drainage area.

Given

Contributing drainage area: 13.50 ac

Imperviousness: 0.65

80th percentile storm depth: 0.50 in

Soil infiltration rate: 1.35 in/hr

Design Goals

Determine the bottom footprint of the infiltration basin and the elevation of the water quality outlet above the basin bottom.

Calculations

Volumetric runoff coefficient, R_V (See *Sample Calculations*)

$R_{V\text{-}A} = 0.84i^{1.302}$ (R_V based on hydrologic soil group)

$R_{V\text{-}A} = 0.84(0.65)^{1.302}$

$R_V = 0.48$

Water quality volume, WQV (See *Developing the 80th Percentile Volume*)

WQV = (0.48)(0.50 in)(13.50 ac)(43,560 sf/ac) / (12 in/ft)

WQV = 11,761 cf

Minimum footprint, A_{min} (See *Minimum footprint area*)

A_{min} = (12)(1.50)(11,761 cf) / (1.35 in/hr)(48 hrs)

A_{min} = 3,267 sf

The water quality volume will infiltrate into the existing soil in 48 hours if the infiltration basin bottom is 3,267 square feet. However, this does not mean that the infiltration basin bottom is limited to 3,267 square feet.

Water quality elevation, Ele_{WQ}

The elevation of a water quality outlet above the basin bottom is determined by assuming that infiltration occurs only through the bottom of the basin and not through the sides.

Ele_{WQ} = WQV / A_{min}

Ele_{WQ} = 11,761 cf / 3,267 sf

Ele_{WQ} = 2.94 ft

Infiltration Basin Effectiveness

Effective infiltration basins take advantage of open spaces for retaining and treating storm water. Established vegetation with adequate coverage is an indication of a healthy infiltration basin along with minimal sediment and lack of invasive vegetation. Side slopes should be stable and show little to no signs of erosion or rilling. Slope sloughing is an indication that geotechnical remediation is needed.

During the design storm event, infiltration basins should, at most, pond up to the water quality outlet. After the rain event, runoff within the basin should infiltrate through the bottom soils within the design drawdown time.

Designer Checklist

If the answer to these questions corresponds to a response box that is red, the BMP should either not be used or additional measures need to be taken to address the issue.

	Yes	No
Does groundwater meet the jurisdiction's minimum separation requirement?	☐	☐
Is there available right-of-way, property, or easement for the infiltration basin?	☐	☐
Is contaminated groundwater present at the infiltration basin location?	☐	☐
Is the water quality volume above the 4,356 cf threshold?	☐	☐

Does the infiltration basin provide storage for 100% of the water quality volume? (If no, it may still be appropriate to construct the infiltration basin if it is technically infeasible to capture 100% of the water quality volume.)	☐	☐
Do utility conflicts make installation of the infiltration basin technically infeasible?	☐	☐
Do geotechnical conditions exist that compromise the stability of the infiltration basin or surrounding structures?	☐	☐
Does an overflow outlet structure or bypass mechanism exist?	☐	☐
Is a fence required?	☐	☐

Vegetation

Refer to *Vegetation Guidance by BMP Type*.

Installation

Excavation

Installation of infiltration basins is a relatively straightforward process of excavation and grading; however, the basin will fail if proper care is not taken during construction. Excavators and heavy machinery should not be used within the basin area to avoid soil compaction.

Activities During Construction

Avoid using heavy machinery within the infiltration basin footprint during construction as doing so will compact the soils and diminish their infiltrating capabilities. Installation of an outlet structure may require machinery.

Flows During Construction

Flows during construction should be diverted away from the infiltration basin to prevent construction site sediment from clogging soils. Seeding or laying turf sod should occur within a short time span after excavation to minimize the impact of unnecessary storm water flows from entering the basin area. The introduction of unwanted sediment can be prevented by placing fiber rolls or silt fences around the basin perimeter during construction.

Additional Guidance

- Require certificates of compliance to verify that construction items meet specification requirements.
- Follow landscaping guidance to ensure that vegetation establishes after installation.

Installation Costs

The following cost items are typically associated with infiltration basin construction.

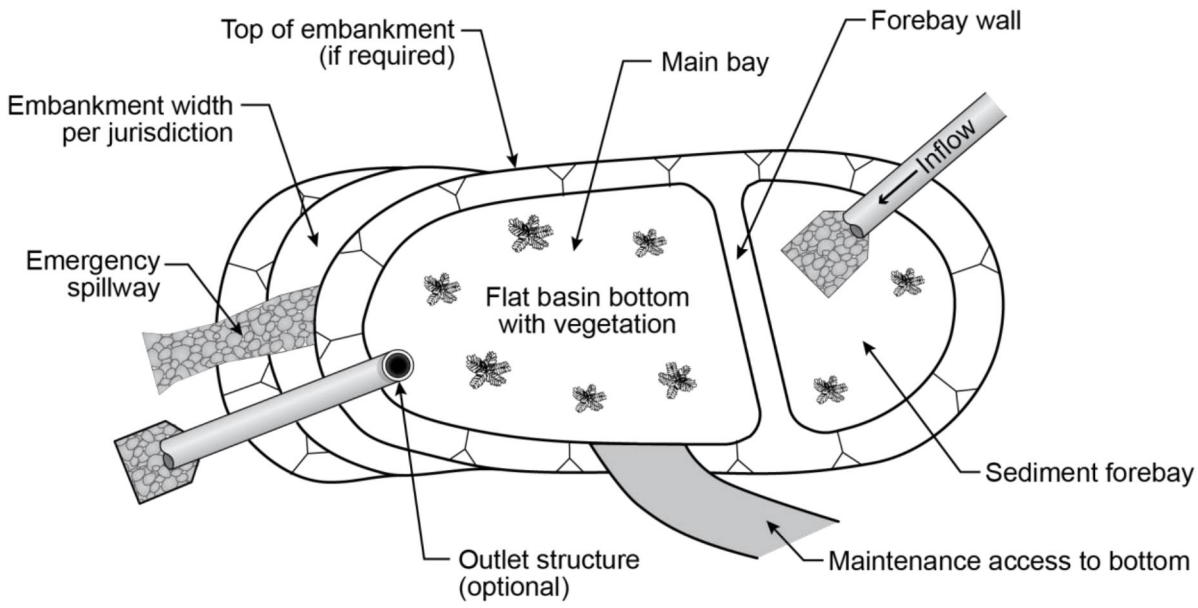
- Excavation
- Grading
- Outlet structure or upstream bypass structure (for larger storm events)
- Forebay and associated items: outlet protection, forebay wall, and connection between forebay and main bay.

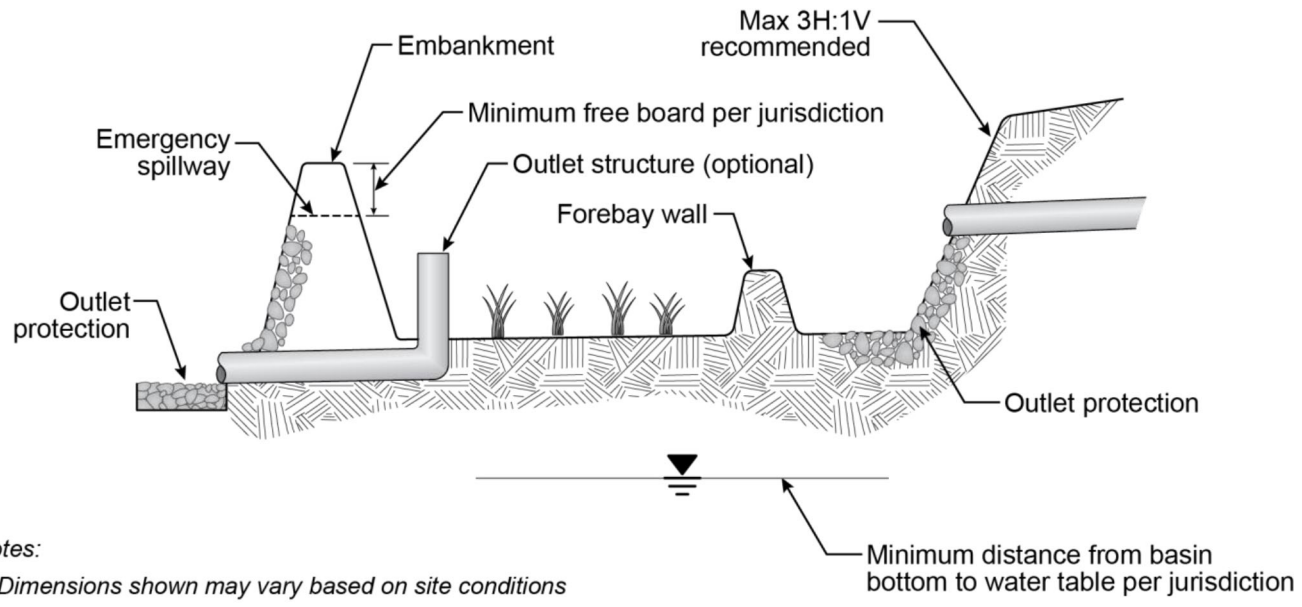
Maintenance

Refer to *Maintenance* and *Maintenance Costs* in the *Preface to Fact Sheets* for general information related to maintenance of infiltration BMPs.

Maintenance Activities

Inspection	Inspection/Maintenance Frequency	Maintenance Activity	Effort
Inspect for trash and debris at inlet and outlet structures.	Semiannual (Spring, Fall) or as needed	Remove and dispose of trash and debris.	LOW
Inspect grass length.	As needed	Mow basin grass.	LOW
Inspect pre-treatment diversion structures for sediment build-up.	Semiannual (Spring, Fall)	Remove and dispose of sediment buildup.	LOW
Inspect topsoil for sediment buildup.	Semiannual (Spring, Fall) or as needed	Remove sediment.	LOW
Inspect for standing water above trench or within observation well (if used).	Semiannual (Spring, Fall)	Notify engineer for further inspection.	LOW





Notes:

- *Dimensions shown may vary based on site conditions*
- *Forebay connection type to main bay will vary: outlet pipe, gabion wall, notched concrete wall, and others are acceptable*
- *Consider upstream bypass for large storm events*

Infiltration Basin

Not to scale

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Harvest and Reuse

HR-1

Pollutant Removal Effectiveness

Pollutant removal will vary based on the ultimate use of the harvested runoff.

Harvest and reuse refers to any type of runoff collection system that captures rainfall, stores it temporarily, and reuses it for irrigation, landscaping, or other non-potable uses. Harvest and reuse systems inherently retain the volume of runoff that it captures. Depending on the subsequent use after being captured, they also provide bioretention and filtration to the released runoff.

Harvest and reuse systems may be used in lieu of directly connecting rooftop drains to storm sewer systems; where downdrains discharge to impervious surfaces and the opportunity for irrigation or landscaping exists; as part of a home owner's irrigation plan; or for any other non-potable purpose where storm water is determined to be acceptable such as vehicle or machinery washing.

As of 2010, Utah's legislative code 73-3-1.5 requires that if more than 100 gallons of rainwater (13.4 cf) are captured, it must be registered through the Utah Division of Water Rights (https://waterrights.utah.gov/forms/rainwater.asp). The code also limits the total capture to 2,500 gallons (334.2 cubic feet). See the code for additional requirements.

Primary Functions	
Bioretention	Varies
Volume Retention	Yes
Biofiltration	Varies

Design Criteria

Design criteria for harvest and reuse devices or systems will vary widely. The governing principles of harvest and reuse are based on the system's function and capacity. For example, a rain barrel that provides occasional irrigation to a flower bed should be appropriately sized for the 80th percentile volume and be able to release the volume within an appropriate time that does not flood out the flower bed. A larger harvest and reuse system, such as an underground detention vault or above ground pond will be required to meet geotechnical or structural design criteria. The applications of harvest and reuse systems are endless; specific design criteria should be determined on a case-by-case basis with site-specific consideration.

Calculation Methods

Harvest and reuse systems are governed by the water quality volume. The general design steps are:

1. Calculate the water quality volume.
2. Size device for the water quality volume.

Sample Calculations

Refer to *Calculation Methods* in the *Preface to Fact Sheets* for discussion on the equations used.

A commercial development will have two buildings with roofs that are 2,500 square feet each. Rain barrels that will release to flower beds will be included as part of the design. Each roof is considered one drainage area.

Given

Contributing drainage area: 2,500 sf

Contributing drainage area: 0.057 ac

Imperviousness: 1.00

80th percentile storm depth: 0.55 in

Design Goals

Capture all runoff from the 80th percentile storm within rain barrels.

Calculations

Volumetric runoff coefficient, R_V (See *Sample Calculations*)

$R_V = 0.91i - 0.0204$ (Reese method)

$R_V = 0.91(1.0) - 0.0204$

$R_V = 0.89$

Water quality volume, WQV (See *Developing the 80th Percentile Volume*)

WQV = (0.89)(0.55 in)(0.057 ac)(43,560 sf/ac) / (12 in/ft)

WQV = 102 cf

WQV = 763 gallons

If 55-gallon rain barrels are used, 14 rain barrels will be needed for each roof and the capture will need to be registered with the Division of Water Rights.

Harvest and Reuse Effectiveness

The effectiveness of a harvest and reuse system is dependent on its use. Detention devices should be free of standing water to prevent stagnation and vector concerns. Systems that provide irrigation or that are part of landscaping features should be inspected regularly to ensure proper performance.

Designer Checklist

If the answer to these questions corresponds to a response box that is red, the BMP should either not be used or additional measures need to be taken to address the issue.

	Yes	No
Will stagnation of runoff be prevented by frequent release of the harvested runoff?	☐	☐
Does quantity of harvested runoff require registration with the Division of Water Rights?	☐	☐

Installation

Installation of harvest and reuse systems will vary depending on its use. Rain barrels can simply be connected to a down drain. More complicated systems require additional coordination.

Depending on the quantity of runoff being harvested, it will be necessary to register the detention device with the Division of Water Rights.

Installation Costs

The following cost items are typically associated with harvest and reuse systems.

-Detention device

-Upstream connection to detention device

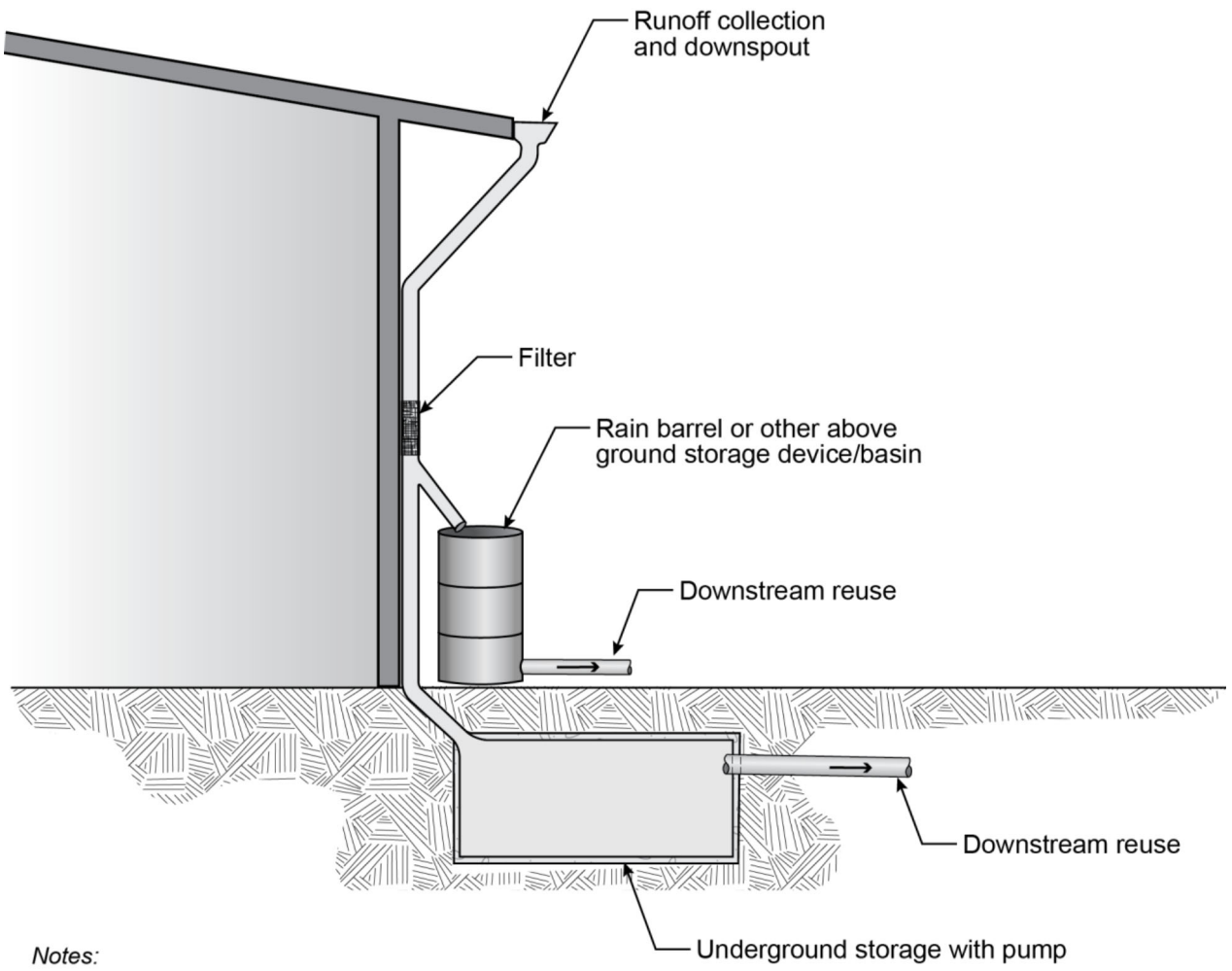
-Other items will be dependent on site-specific use

Maintenance

Refer to *Maintenance* and *Maintenance Costs* in the *Preface to Fact Sheets* for general information related to maintenance of harvest and reuse systems.

Maintenance Activities

Inspection	Inspection/Maintenance Frequency	Maintenance Activity	Effort
Inspect for mosquitos.	Semiannual (Spring, Fall)	Implement larvicide or other remediation.	LOW
Inspect harvesting device for leaking.	Semiannual (Spring, Fall)	Replace harvesting device.	LOW
Inspect condition of system components.	Semiannual (Spring, Fall)	Replace and repair components.	Medium



Notes:

- *Configurations and applications may vary*

Harvest and Reuse

Not to scale

Catch Basin Cleaning

Purpose:

To protect stormwater quality by maintaining catch basins that trap sediments, organic matter, and litter.

Frequency:

Salt Lake County performs routine maintenance, cleaning, and repairs of the storm drain system. Catch basins are cleaned as needed.

Preparation:

a. Visually inspect the outside of the grate and check for needed repairs.
b. Inspect the catch basin for structural integrity and evidence of illicit discharges.
c. If contamination is present (e.g., sewage or oil), stop cleaning, notify a supervisor, and call the Health Department at (385) 468-3862 (see SOP *IDDE Reporting and Response*).
d. When the drain needs service contact the Public Works Operations Manager.
e. Remove accumulated trash and sediment from the grate.

Process:

a. Remove standing water and sediment from the catch basin using a vacuum truck.
b. When a high-pressure washer is used to break up the remaining material in the catch basin, always capture the slurry with the vacuum truck (see SOP *Pressure Washing and Exterior Surface Cleaning*).
c. After the catch basin is clean, clean out any sediment that might have entered the storm drainpipe (see SOP *Storm Drainpipe Maintenance*).
d. Sweep the areas as needed (see SOP *Sweeping Roads and Parking Lots*).

Disposal:

a. Dispose of solids in a sealed waste container for transfer to a solid waste landfill or other solid waste treatment facility.
b. Discharge fluids collected to a sanitary sewer or buffered detention area.
c. When the cleaning operation is complete, or the vacuum truck is full take the sediment to the designated dewatering or drying area.

Documentation:

Document maintenance process.

Detention Pond Cleaning

Purpose:

To protect stormwater by removing trash and debris from detention ponds.

Preparation:

a. Schedule the pond cleaning work during dry weather.
b. Remove any sediment and trash from the grates, placing it in a truck for disposal.
c. Conduct a visual inspection to make sure any grates, structures, manholes, boxes, and pipes are in good working order. Remove manhole covers and grates as necessary.
d. Remove accumulated trash and sediment from the outlet.
e. If feasible, install outlet protection during the cleaning process.

Process:

a. Clean the basin using a backhoe or front-end loader to remove debris and sediment from the bottom.
b. Complete the structure cleaning by sweeping and shoveling as necessary.
c. Put all material removed from the pond into a dump truck.
d. Some structures may require the use of a vacuum truck (see SOP *Catch Basin Cleaning*).

Clean-up:

Clean off the concrete pads using dry methods (sweeping and shoveling).

Disposal:

a. Dispose of solids in a sealed waste container for transfer to a solid waste landfill or other solid waste treatment facility.
b. Discharge fluids collected during detention pond cleaning to a sanitary sewer or buffered detention area.

Creek Management

Purpose:

To protect creeks from sediment and pollution resulting from creek maintenance activities.

Notification:

If debris is interrupting the stream flow, notify SLCo Flood Control at (385)-468-6600.

Determinations and Maintenance:

a. Respond to service request problem areas identified in the stream.
b. Do not apply pesticides or fertilizers in riparian areas.
c. Do not disturb creeks, wetlands, or sensitive wildlife habitat areas.
d. When needed, install temporary erosion and sediment controls to prevent sediments, organic material, and debris from releasing downstream.
e. Determine the least damaging maintenance method regarding the channel and adjacent properties or utilities.
f. Clean the debris from channels and culverts.

Clean-up:

a. Stabilize any disturbed soils by seeding with native seed.
b. Remove all tracking from paved surfaces near the maintenance site, if applicable.
c. Haul all debris or sediment removed from the area to an approved dumping site.

Mowing and Trimming

Purpose:

To protect stormwater quality by properly sweeping, cleaning, and disposing of grass clippings.

Procedure:

a. Check the oil and fuel levels of the mowers and other equipment and fill if needed.
b. Protect catch basins where applicable.
c. Use eye and hearing protection.
d. Mow and trim the lawn.
e. Do not blow grass clippings, dirt, sand, or debris into storm drains or stormwater conveyance structures.

Clean-up:

a. Collect all clippings, trimmings, and waste to the designated area. Do not hose down the outside area.
b. Only wash equipment using an approved method in an approved area (see SOP *Cleaning Vehicles & Maintenance Equipment*).

Ditch and Irrigation Canal Management

Purpose:

To protect stormwater by removing trash and debris from ditches and canals.

Preparation:

a. Do not apply pesticides or fertilizers in drainage ditches.
b. Do not disturb creeks, wetlands, or sensitive wildlife habitat areas.
c. Respond to service request problem areas identified in the stream.
d. Identify access and easements to the area requiring maintenance.
e. Contact affected property owners, utility owners, and irrigation companies.

Maintenance:

a. Determine the least damaging maintenance method regarding the channel and adjacent properties or utilities.
b. Clean debris as necessary from channels and canals.

Clean-up:

a. Stabilize any disturbed soils by seeding with the appropriate native seed mix.
b. Remove all tracking from paved surfaces near the maintenance site, if applicable (see SOP *Sweeping Roads and Parking Lots*).
c. Haul removed debris and sediment to an approved dumping site.

Sweeping Roads and Parking Lots

Purpose:

To prevent stormwater pollution by properly sweeping roads and parking lots.

Frequency:

Annually, Salt Lake County conducts routine street sweeping. County facilities are swept as necessary.

Process:

a. Drive the street sweeper safely and pick up debris.
b. Drive to the approved cleaning station at the Public Works yard when the sweeper is full.

Clean-up:

a. Clean sweepers in a manner that does not allow debris to enter the storm drain system.
b. Street sweeping cleaning stations will separate the solids from the liquids (See SOP *Disposal Methods of Waste and Wastewater Removed from the MS4 System*).
c. Follow Department SOPs for hauling dried solids to the local landfill.
d. Collect decant water and route to an approved wastewater collection system area only.

Documentation:

Maintain records of sweeping activities.

Inspection Reporting SOP

Standard Operating Procedure

INSPECTION PROCEDURE:

These instructions and inspection report can serve as a Standard Operating Procedure (SOP) to comply with The Utah Department of Environmental Quality mandate that private stormwater facilities that discharge to Salt Lake County MS4 are properly inspected annually. At the discretion of the Public WorksEngineer, some sites will require additional site-specific SOPs in addition to the following:

1. **Dumping Evidence**: Evaluate catch basins, inlets, manholes, gutters etc. for the presence of stains from dumping or paints, thinners, oils, or other hazardous substances. Spill Evidence: Evaluate pavements and soils for spills, particularly for evidence of neglected spills.

2. **General Site Exposure**: Evaluate materials, devices, and operations that are exposed to weather. Inspect to verify that BMPs are in place or that there are practices that will contain or minimize pollutants and pollutant sources. Look for uncontained waste material, oil, antifreeze, cleansers and other materials and chemicals that could seep into the ground, enter the storm drain system, or affect water quality

3. **Other Pollution Sources**: Evaluate any activity or operations that are or may pollute the environment.

4. **Stormwater Storage**: Inspect for proper maintenance and condition of detention/retention ponds. Check for proper capacity, debris or sediment accumulation, and that overflow devices are in placeand in good condition, etc.

5. **Inlets and catch basins**: Inspect for proper maintenance and function of storm water inlets andcatch basins. Inspect for pollutants, debris, and excessive amounts of dirt and sediment. Inlets,basins, and covers should be in good working order.

6. **Conveyance Systems**: Inspect for proper maintenance, condition, and function of stormwater pipes,catch basins, swales, ditches and other conveyances.

7. **Manholes**: Inspect manholes for condition, debris, excessive amounts of sediment, propermaintenance, and function.

8. **Parking**: Inspect parking areas for proper maintenance and condition. Inspect for pollutants, spills,etc. Pavement areas should indicate regular sweeping activity and maintenance.

9. **Waste Collection**: Inspect for proper maintenance and function of waste collection facilities.Inspect for stains and leaks from containers. Ensure that lids

are kept closed.

10. **Landscaping**: Inspect for condition, maintenance, and function. Inspect for excessive debris. Ensure proper application of chemicals by looking for accumulation of excess fertilizers, herbicides, insecticides, etc.

11. **Pre-Treatment Devices**: Inspect pre-treatment devices for proper maintenance and condition. Pre-treatment devices are devices such as hooded outlet cover (Snout), grease/sand interceptors, or other devices designed to remove pollutants from stormwater.

12. **Sumps**: Inspect for proper maintenance and condition of Sumps, Class-V Injection Wells, and other similar underground devices designed to collect stormwater and percolate it to the ground.

13. **Flow Control Devices**: Inspect for proper maintenance and function of Weirs, orifice plates andother similar flow control devices.

14. **Site Specific SOP Items**: Certain land uses require site specific stormwater management SOPs toensure the quality of stormwater that is discharged from a site. Review site inspections for compliance with site SOPs. Evaluate the current SOP's and modify, update, or amend them as needed.

15. **Other**: Inspect other post construction stormwater items for proper function. This could include Pumps, Vaults, Backflow Devices, Bio-Filters, Bio-Retention Areas, Permeable Pavement, Green Roofs, etc.

SALT LAKE COUNTY

SMP OPERATION AND MAINTENANCE INSPECTION REPORT

POST CONSTRUCTION PRIVATE STORMWATER BMP MAINTENANCE

Site Name:	Date of Evaluation	
Site Address:		

Facility Contact Information

	NAME and MAILING ADDRESS	Phone	E-MAIL ADDRESS
SITE CONTACT:			
INSPECTOR CONTACT:			

BUSINESS TYPE: INSTITUTIONAL COMMERCIAL INDUSTRIAL OTHER_____

Circle Business type

Are SOP's for Stormwater Post Construction Inspections implemented and available for review? YES NO

Circle Answer

Orifice Required for site YES NO Orifice Size: Hooded outlet over (new) Required for site YES NO

Circle Answers

Item's Inspected	Checked		Maintenance Req'd?		Is there excessive accumulation of debris or sediment?		Observations and Remarks	Deadline for corrective action
	Yes	No	Yes	No	Yes	No		
1. Dumping Evidence								
2. Spill Evidence								
3. General Site Exposure								
4. Other Pollution Sources								
5. Stormwater Storage condition and capacity (detention/retention ponds)								
6. Inlets and catch basins								
7. Conveyance System								
8. Manholes								
9. Parking								
10. Waste Collection								
11. Landscaping								
12. Pre-Treatment devices								
13. Sumps								
14. Flow Control devices								
15. Site Specific SOP Items								
16. Other								

Notes:

Print Name:	Date:
Signature:	Title or Position

Enforcement SOP

ENFORCEMENT RESPONSE PLAN

PURPOSE:

Salt Lake County is required to implement State and Federal storm water regulations for construction activities in accordance with the requirements of the storm water discharge permit issued by the State of Utah Department of Environmental Quality. The regulations require the owners or operators of construction activities that disturb one acre or more of land (including activities on less than one acre if partof a larger project or located within the Salt Lake City Watershed) to obtain permits from both Salt Lake County and the UDEQ. A County grading permit is also required for construction activities of any size that may affect water quality. To ensure that construction activities are in compliance with the regulatory requirements, enforcement provisions are included in the Salt Lake County Ordinances. The County uses this Enforcement Response Plan and the attached Enforcement Response Guide to ensure enforcement actions are conducted in accordance with regulations and are applied in a consistent manner. The County objectives are to achieve compliance as quickly as possible and to make sure that violations do not continue.

LEGAL AUTHORITY:

The legal authority for enforcement of the storm water requirements is contained within the Salt Lake County Ordinances Chapter § 17.22, Storm Water Illicit Discharges and Permit Requirements, § 17.22.180 Enforcement and Penalties. The Ordinance describes the types of enforcement actions that can be applied toviolations of the requirements. The State of Utah, Federal Clean Water Act of 1987 and the Storm Water Phase I regulations (40CFR122) also provide legal authority for the Salt Lake County Storm Water QualityProgram.

RESPONSIBILITIES:

The Mayor or the Mayor's designee are the responsible officials for all enforcement actions outlined in theOrdinance. The Mayor's designees, for the purpose of construction activities, are the listed below, by title, for Salt Lake County:

- County Stormwater Construction Supervisor
- County Inspector
- County Industrial and Commercial Inspector
- County Grading Review Specialist
- County Stormwater Program Manager and County Stormwater Program Supervisor

- other positions that have enforcement authority with respect to Ordinance provisions are Code Enforcement Officers, the Chief Building Official, Building Code Inspectors, and the Salt Lake County Health Department.

If litigation is necessary, enforcement will become the responsibility of the Salt Lake County District Attorney's Office. Some or all of these positions may be involved in determining the gravity of the specific violations and the type of enforcement action to be taken given the appropriateness and timing of escalating enforcement.

ENFORCEMENT ACTIONS:

The Ordinance provides the authority for specific actions to deal with the enforcement of violations. The purpose of these enforcement actions is to bring the violator back into compliance as quickly as possible and minimize the negative impacts on the storm water system, surface waters and the general public.

1. THE TYPES OF ACTIONS INCLUDE:

   a. **COMPLIANCE ORDER**: This is a written notification served to the owner/operator directing them that there is work that is out of compliance with the approved Stormwater pollution prevention plans, or other Development approved plans. The notice is posted on the site, work is allowed to continue for the time limit identified on the order to correct the deficiencies identified. Failure to correct the identified deficiencies will result in a STOP WORK ORDER being issued. Copies of the Compliance Order are included in the project inspection files and the Process360 inspection reports or the latest computer software.

   b. **STOP WORK ORDER**: This is a written notification served to the owner/operator directing them to stop work immediately. The notice is also posted on the construction site. Work can only be resumed after the conditions and requirements of the stop work order have been met. Copies of the stop work order are included in the project inspection files and Process360 inspection records or the latest computer software.

   c. **NOTICE OF VIOLATION (NOV):** This is formal written notification of violation(s) and an official record of the violations, and any remedies required by Salt Lake County. The time frame for responding to an NOV will be

based on the seriousness of the violation and whether or not immediate actions are required to address imminent or ongoing violations. The NOV shall state the nature of the violation(s) and may refer to the specific section of the Ordinance or the Utah Clean Water Act that has been violated. The NOV is sent via certified mail or personal delivery.

d. **REFERRAL TO CODE ENFORECMENT -- PUBLIC NUISANCE**: This is an action that is taken in response to a threatened discharge or public nuisance conditions that are not specifically related to construction requirements.

e. **REFERRAL TO SALT LAKE COUNTY DISTRICT ATTORNEY:** This action is taken in response to conditions that are a threat to public health, safety or welfare and are not corrected immediately by the owner/operator.

f. **REVOCATION OF PERMIT:** Based on the seriousness of the violations and responsiveness of the permitted, Salt Lake County may revoke the stormwater permit and require that the permitted resubmit a permit application and revised SWPPP that addressesand remedies the cause of the violations.

g. **ABATEMENT:** Whenever a violation is identified which will result in an immediate danger to public health or safety and the violation is not immediately corrected by the responsible party, Salt Lake County and Salt Lake County Health Department can take whatever measures are necessary to abate the violation. The cost of the abatement shall be charged to the responsible party.

2. PENALTY AND FINES:

a. Whenever an Infraction is identified which violates Salt Lake County Ordinances §17.22, the **State of Utah Federal Clean Water Act of 1987** or the Storm Water Phase I regulations (40CFR122) for Salt Lake County Storm Water Quality Program, the Inspectors in the field shall determine whether to issue a penalty or fine in accordance withrequirements of the SWPPP or Common Plan of Development permit (when applicable) or in accordance with this document and/or to contact the **Salt Lake County Health Department Emergency IDDE hot line (801) 580-6681 for sampling and testing for egregious Acts.**

ENFORCEMENT RESPONSE GUIDE

ENFORCEMENT RESPONSE

Violations of the construction activities in the storm water requirements generally fall into the followingareas:

1. Administrative Violations:
    a. County or State permits not current,
    b. Working *without County* or State permit,
    c. SWPPP not on site, SWPPP not up to date,
    d. No designated or certified on-site erosion control specialist,
    e. Storm water inspection records missing, not completed according to requirements or not upto date,
    f. County and/or State Notice of Inactivation not submitted,
    g. County and/or State Transfer of Ownership not submitted.

2. Best Management Practices (BMPs) Violations with no discharge off site:
    a. BMPs not maintained in accordance with best practices or SWPPP,
    b. Improperly stored materials on site,
    c. BMPs in use on the site not shown/not covered in SWPPP,
    d. Site changes requiring new or modified BMPs not covered in SWPPP,
    e. Improperly maintained or located vehicle storage or maintenance areas.

3. Best Management Practices (BMPs) Violations with discharge from site:
    a. Sediment or other pollutants leaving site,
    b. Potential discharge to storm drain Sediment or other pollutants leaving site,
    c. Discharge to storm drain or channel.

Each of these violations may result in different enforcement actions, a series of enforcement actions, or acombination of enforcement actions, depending on the severity and duration of the violation. In addition, the following circumstances will be evaluated when determining appropriate actions or escalating enforcement for continued violations.

- Magnitude of the violation (type and severity);
- Duration of the violation;
- Effect of the violation on the environment and public health;
- Effect of the violation on surface waters;

- Economic benefit realized because of noncompliance

BMP Inventory

Salt Lake County UPDES Permit UTS000001 BMP Inventory			
ID	**Facility Name**	**BMPs**	**Post Construction**
1	Midvale Public Works Complex Operations	See SWPPP	5 Oil/Water Separators, detention pond
2	Midvale Public Works Complex Fleet	See SWPPP	6 Oil/Water Separators, detention pond
3	Midvale Public Works Complex Sanitation	See SWPPP	7 Oil/Water Separators, detention pond
5	Parks Operations West Jordan	See SWPPP	2 Oil Water Separators
4	Solid Waste Management (Landfill Salt Lake City)	See SWPPP	Retention Ponds
6	Transfer Station South Salt Lake City	See SWPPP	Oil/Water Separator, Detention Pond
MS4	**Salt Lake City**		
	Government Center Parking Structure	Spill Kit, Good Housekeeping, Sanitary se	N/A
	Salt Lake County Government Center	SOPs, Good Housekeeping	N/A
	Abravanel Hall	SOPs, Good Housekeeping	N/A
	Rose Wagner Performing Arts	SOPs, Good Housekeeping	N/A
	Capitol Theater	SOPs, Good Housekeeping	N/A
	Clark Planetarium	SOPs, Good Housekeeping	N/A
	Discovery Center	SOPs, Good Housekeeping	N/A
	Salt Palace Convention Center	Secondary Containment, Good Housekeeping	5 Oil Water Separators
	Liberty Park Pool	SOPs, Good Housekeeping	N/A
	Sugarhouse Park	SOPs, Good Housekeeping	N/A
	Tanner Park	SOPs, Good Housekeeping	N/A
	Northwest Recreation Center	SOPs, Good Housekeeping	N/A
	Central City Recreation Center	SOPs, Good Housekeeping	N/A
	Fairmont Aquatics Center	SOPs, Good Housekeeping	N/A
	Salt Lake City Public Health Center	SOPs, Good Housekeeping	N/A
	Rose Park Public Health Center	SOPs, Good Housekeeping	N/A
	Liberty Senior Center	SOPs, Good Housekeeping	N/A
	10th East Senior Center	SOPs, Good Housekeeping	N/A
	Sunday Anderson Westside Senior Center	SOPs, Good Housekeeping	N/A
	Friendly Neighborhood Senior Center	SOPs, Good Housekeeping	N/A
	Children's Justice Center	SOPs, Good Housekeeping	N/A
	Salt Lake County Probation Services	SOPs, Good Housekeeping	N/A
MS4	**South Salt Lake City**		
	James Madison Park	SOPs, Good Housekeeping	N/A
	General Holm Park	SOPs, Good Housekeeping	N/A
	Harmony Park	SOPs, Good Housekeeping	N/A
	Columbus Library	SOPs, Good Housekeeping	N/A
	South Main Health Clinic	SOPs, Good Housekeeping	N/A
	Columbus Senior Center	SOPs, Good Housekeeping	N/A
	Youth Services Center	SOPs, Good Housekeeping	N/A
	Christmas Box House	SOPs, Good Housekeeping	N/A
	Special Operations/Evidence Building	SOPs, Good Housekeeping	N/A
	ADC	SOPs, Good Housekeeping	Retention pond
	Sheriff's Office Building	SOPs, Good Housekeeping	N/A
	Oxbow Jail	SOPs, Good Housekeeping	N/A
MS4	**Magna**		
	Magna Fitness & Recreation Center	SOPs, Good Housekeeping	N/A
	Pleasant Green Park	SOPs, Good Housekeeping	N/A
	Magna Pool	SOPs, Good Housekeeping	N/A
	Hercules Park	SOPs, Good Housekeeping	N/A
	Magna Library	SOPs, Good Housekeeping	Detention Basin
	Magna Senior Center	SOPs, Good Housekeeping	N/A
	Magna Salt Pile	SOPs, Good Housekeeping	N/A
MS4	**West Valley City**		
	SLCO Records Management and Archives	SOPs, Good Housekeeping	N/A
	Acord Ice Center	SOPs, Good Housekeeping	N/A
	Redwood Recreation Center	SOPs, Good Housekeeping	Snout
	Redwood Park	SOPs, Good Housekeeping	N/A
	Decker Lake Park	SOPs, Good Housekeeping	N/A
	Hunter Park	SOPs, Good Housekeeping	N/A
	West Valley Library	SOPs, Good Housekeeping	N/A
	Hunter Library	SOPs, Good Housekeeping	N/A
	Ellis R. Shipp Public Health Center	SOPs, Good Housekeeping	N/A
	Harman Home Senior Center	SOPs, Good Housekeeping	N/A
MS4	**Taylorsville**		
	Meadowbrook Golf Storage	SOPs, Good Housekeeping	N/A
	Millrace Park	SOPs, Good Housekeeping	N/A
	Valley Regional Park	SOPs, Good Housekeeping	N/A
	Southridge Park	SOPs, Good Housekeeping	N/A
	Taylorsville Recreation Center	SOPs, Good Housekeeping	N/A
	Taylorsville Outdoor Pool	SOPs, Good Housekeeping	N/A
	Vista Softball Complex	SOPs, Good Housekeeping	N/A
	Valley Regional Softball Complex	SOPs, Good Housekeeping	N/A
	Taylorsville Library	SOPs, Good Housekeeping	N/A
	Taylorsville Senior Center	SOPs, Good Housekeeping	N/A

MS4	**Kearns**		
	Kearns Fitness and Recreation Center	SOPs, Good Housekeeping	N/A
	Oquirrh Park	SOPs, Good Housekeeping	N/A
	Lodestone Park	SOPs, Good Housekeeping	Detention Basin
	Library Maintenance	SOPs, Good Housekeeping	N/A
	Kearns Library	SOPs, Good Housekeeping	N/A
	Kearns Senior Center	SOPs, Good Housekeeping	N/A
MS4	**Millcreek**		
	East Mill Creek Recreation Center	SOPs, Good Housekeeping	Underground Storage basin
	Evergreen Park	SOPs, Good Housekeeping	N/A
	Millcreek Activity Center	SOPs, Good Housekeeping	N/A
	Cottonwood Park Softball Complex	SOPs, Good Housekeeping	N/A
	Ben Franklin Park	SOPs, Good Housekeeping	N/A
	Valley Center Park	SOPs, Good Housekeeping	N/A
	Big Cottonwood Regional Park	SOPs, Good Housekeeping	Detention Basin
	East Millcreek Library	SOPs, Good Housekeeping	N/A
	Calvin Smith Library	SOPs, Good Housekeeping	N/A
	39th South Salt Pile	SOPs, Good Housekeeping	N/A
MS4	**Murray**		
	Surplus Warehouse	SOPs, Good Housekeeping	N/A
	County Ice Center	SOPs, Good Housekeeping	N/A
	Mick Riley Golf Course Maintenance	SOPs, Good Housekeeping	N/A
	Wheeler Farm	SOPs, Good Housekeeping	N/A
	South Cottonwood Regional Park	SOPs, Good Housekeeping	N/A
	Riverview Park	SOPs, Good Housekeeping	N/A
	Woodstock Meadows Park	SOPs, Good Housekeeping	N/A
	Environmental Health Building	SOPs, Good Housekeeping	N/A
	Murray Heritage Senior Center	SOPs, Good Housekeeping	N/A
	Animal Shelter	SOPs, Good Housekeeping	N/A
MS4	**Holladay**		
	Old Mill Golf Course Maintenance Building	SOPs, Good Housekeeping	N/A
	Olympus Hills Park	SOPs, Good Housekeeping	N/A
	Creekside Park	SOPs, Good Housekeeping	Overflow Outfall
	Holladay Lions Rec Center	SOPs, Good Housekeeping	N/A
	Holladay Library	SOPs, Good Housekeeping	N/A
	Mount Olympus Senior Center	SOPs, Good Housekeeping	N/A
MS4	**Cottonwood Heights**		
	Crestwood Park	SOPs, Good Housekeeping	N/A
	Crestwood Pool	SOPs, Good Housekeeping	N/A
	Whitmore Library	SOPs, Good Housekeeping	N/A
	Granite Salt Pile	SOPs, Good Housekeeping	N/A
MS4	**West Jordan**		
	Mountain View Golf Storage	SOPs, Good Housekeeping	N/A
	West Jordan Pool	SOPs, Good Housekeeping	N/A
	Gene Fullmer Fitness & Recreation Center	SOPs, Good Housekeeping	N/A
	Cougar Park	SOPs, Good Housekeeping	Detention Basin
	Oquirrh Highland Park	SOPs, Good Housekeeping	Detention Basin
	Bingham Creek Library	SOPs, Good Housekeeping	N/A
	Viridian Center	SOPs, Good Housekeeping	N/A
	West Jordan Library	SOPs, Good Housekeeping	N/A
	West Jordan Senior Center	SOPs, Good Housekeeping	N/A
	South Valley Children's Justice	SOPs, Good Housekeeping	N/A
	84 Lumber Salt Pile	SOPs, Good Housekeeping	N/A
MS4	**Midvale**		
	Copperview Community Center	SOPs, Good Housekeeping	N/A
	Copperview Park	SOPs, Good Housekeeping	N/A
	Union Park	SOPs, Good Housekeeping	N/A
	Ruth Vine Tyler Library	SOPs, Good Housekeeping	N/A
	Midvale Senior Center	SOPs, Good Housekeeping	N/A
MS4	**Copperton**		
MS4	**South Jordan**		
	Salt Lake County Equestrian Park	SOPs, Good Housekeeping, Secondary	N/A
	South Jordan Library	SOPs, Good Housekeeping	Detention basin.
	South Jordan Senior Center	SOPs, Good Housekeeping	N/A
	Welby Pit	SOPs, Good Housekeeping	N/A
MS4	**Sandy**		
	Mountain America Expo Center	SOPs, Good Housekeeping	Detention Basin
	Granite Park	SOPs, Good Housekeeping	N/A
	Dimple Dell Park	SOPs, Good Housekeeping	N/A
	Dimple Dell Fitness and Recreation Center	SOPs, Good Housekeeping	N/A
	Geologic View Park	SOPs, Good Housekeeping	N/A
	Sandy Library	SOPs, Good Housekeeping	N/A
	South East Health Clinic	SOPs, Good Housekeeping	N/A
	Sandy Senior Center	SOPs, Good Housekeeping	N/A
MS4	**Draper**		
	South Mountain Golf Course Maintenance shops	SOPs, Good Housekeeping	N/A
	Flight Park	SOPs, Good Housekeeping	N/A
	South Mountain Park	SOPs, Good Housekeeping	N/A
	Draper Outdoor Pool	SOPs, Good Housekeeping	N/A
	Draper Library	SOPs, Good Housekeeping	N/A
	Draper Senior Center	SOPs, Good Housekeeping	N/A
MS4	**Riverton**		
	Riverbend Golf Course Maintenance shops	Secondary containment, indoor storage	N/A
	South County Pool	Good Housekeeping SOPs	N/A
	Riverton Library	Good Housekeeping SOPs	N/A
	Riverton Senior Center	Good Housekeeping SOPs	N/A
	Riverton Juvenile Receiving Center	Good Housekeeping SOPs	N/A
MS4	**Herriman**		
	J.L. Sorenson Recreation Center	Good Housekeeping SOPs	N/A
	Herriman Library	Good Housekeeping SOPs	N/A