

**Storm Water Coalition Minutes**  
**JULY 31, 2014**  
Utah County Public Works Conference Room  
2855 South State Street, Provo Utah 84606

1. Welcome and Roll
2. Storm Water Instructor update  
[www.google.com](http://www.google.com).  
Click on apps on the top right  
Click on calendar  
Log in by Username: [utahstormwater@gmail.com](mailto:utahstormwater@gmail.com).  
Password: Pollution  
Jenny Devlin has started booking the schools that will be shown the storm water presentation for the coming 2014-2015 school year. If you have any questions for her or would like to view the schedule, follow the directions above for the google calendar.
3. Sub-committees Updates – Nothing to Correlate.
  - A. Inspection Committee - Ryan Johnson (Orem City), Juan Garrido (Springville City), Don Overson (Vineyard City), Mark Atwood (Pleasant Grove City), Scott Allen (Provo City), Jeff Maag (Cedar Hills City)
  - B. Education committee - Steve Johnson (Orem City), Glen Tanner (Utah County Public Works), Paul Miller (Lindon City)
  - C. Discharge Committee - Nestor Gallo (American Fork City), Stan Orme (Orem City), Rustin Porter (Springville City), Don Renyolds (ACCENA Group)
  - D. Post Construction Committee – Jered Johnson (Spanish Fork City), Rick Sabey (Orem City), Curtis Chatwin (Lehi City), Juan Garrido (Springville City)
4. State Storm Water Meeting USWAC  
Paul Taylor from J.U.B. was awarded APWA member of the year.  
Tom from Logan City was awarded inspector of the year.  
Rhonda reported the EPA is working on the post construction runoff control measures.  
  
The Construction General permit is online and now being enforced. It has been noticed that old permits have been issued, even though the new permit has been completed and was online at the time of meeting. The SWPPP template is still the original. The Common Plan of Development is ready to be used. The NOI is ready to be used online. The NOI program will use the same numbering system as it has in the past. The next USWAC meeting will be conducted on August 13, 2014, the second Wednesday of each month. All coalition members are encouraged to attend the meetings. Their input can be very vital and helpful for all at the meetings.  
  
RSI and the RSR certification training classes will be conducted on the APWA USWAC meeting. USWAC is asking for two coalition members to volunteer to teach the inspector training. The two instructors can co-teach with State instructors. In time, they would be of greater assistance when it comes time to do the annual training that the Coalition conducts at the beginning of each year. It was noted that coalition members still like having the ACCENA Group teach the annual training. The EPA and the State of Utah are looking at increasing the inspections in the State so having the ability to train more inspectors and certify them when needed would be a good asset without having to pay more for an outside group doing the training. Having to do more training to certify inspectors could impact the budget of each coalition member making it more difficult for all to be in compliance.  
  
APWA USWAC conference will be held in Salt Lake City in October 2014. More information will be sent out regarding the conference. The theme will be MCM Post Construction Run Off.
5. “MCM Post Construction Run Off Control” was the title of the next presentation conducted by Nestor Gallo. This was a power point presentation. Attached is the screen print out of this presentation. Along with the presentation is a spreadsheet titled “Pollutant Removal Efficiencies for Best Management Practices for use in Pollutant Loading Analysis” . For more details regarding this information, contact Nestor Gallo.

6. Other Business

The 2014-2015 Used Oil & Antifreeze Recycle List has been update and posted on the Utah County web site.

A new contact list for coalition members is being generated. Please contact Glen to make changes to your contact information.

Two visitors were present: Ashley Thorman from Layton, 336-3700 athorman@laytoncity.org and Kevin Arnold from Davis County, karonld@laytoncity.org .

The next scheduled meeting will be on Thursday, September 25, 2014 10AM at the Utah County Public Works building at 2855 South State Street, Provo. Meeting Adjourned



## Post Construction Runoff Control Part 1 of 2

Utah County Stormwater Coalition

July 31 2014

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### Topics

- Main MCM Requirements
  - Drainage standards
  - SWPPP plan review
  - Post construction inspections
  - Which BMP should we recommend?
  - First flush ... myth or fact?
- Conventional Development
- Low Impact Development

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### Question 1: True or False?

- Post Construction Runoff Control applies to new development and redevelopment construction sites disturbing greater or equal to one acre?
- **TRUE ... Section 4.2.5**
- ... including project less than one acre that are part of a larger common plan of development

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### Why do we need to be concerned?

- Two forms of substantial impacts of post construction runoff:
- 1. Increase in the **type and quantity of pollutants** in storm water runoff
- 2. Increase in the **quantity of water** delivered to the water stream during storms

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### Post Construction Runoff Control

- 1. Increase in the **type and quantity of pollutants** in storm water runoff
- Stormwater pollutants
  - Sediments
  - Oil/ grease
  - Heavy metals
  - Nutrients
  - Floatables
  - Bacteria




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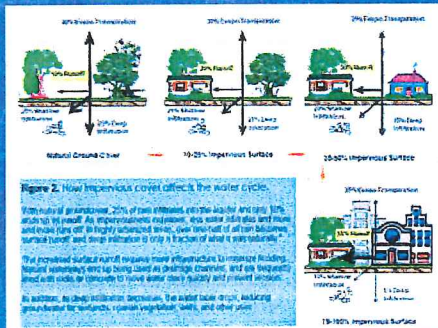
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### Greater Impervious area = Increase Runoff




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### Pollution Removal Efficiency

BMP Type	BMP	Notes	Lit. Ref.	Runoff Reduction Efficiency	Values Accepted for Loading Analysis		
					TSS	TN	TP
	Zet Pond		D, F, P	0%	100%	100%	85%
	Area 20 - Detention Pond		A, B, C, P	0%	100%	100%	85%
Stormwater Ponds	Manmade Extended Detention Pond	10A					
	Manmade Storm System	TBA					
	Transect Pond	TBA					
Stormwater Wetlands	Shallow Wetland		A, B, F, P	0%	80%	100%	85%
	Extended Detention Wetland		A, B, F, P	0%	80%	100%	85%
	Hard Wetland System	TBA					
	Clayey Wetland	14, 17, 22		60%	100%	100%	84%
Retention Ponds	Retention Ponds (75% from surface runoff)		B, D, L, P	60%	90%	100%	85%
	Retention Ponds (75% from surface runoff)		B, D, L, P	60%	90%	100%	85%
	Retention Ponds (75% from surface runoff)		B, D, L, P	60%	90%	100%	85%
	Retention Ponds (75% from surface runoff)		B, D, L, P	60%	90%	100%	85%
Practices	Retention Basins (75% from surface runoff)		A, F, D, L, P	60%	90%	100%	85%
	Deep Basins	11		50%	100%	100%	82%
	Deep Basins	4		50%	100%	100%	82%

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### Question 2: True or False?

- Each Permittee shall develop and define specific hydrologic method/s for calculating runoff volumes and flow rates to ensure consistent sizing of structural BMPs...
- TRUE ... Section 4.2.5.3.4**

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### Storm Drain Master Plan

- Location and sizing of:
  - Pipes
  - Catch Basins
  - Detention Ponds
  - Retention Ponds



(\*) Conventional Drainage System

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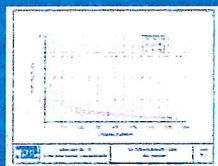
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## Storm Drain Master Plan

- Hydrologic data:
  - IDF curves
  - Allowable release rates
  - Soil type



(\*) Conventional Drainage Design

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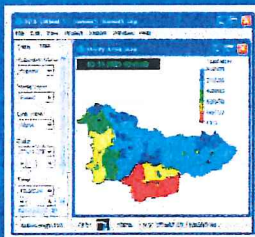
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## Storm Drain Master Plan

- SWMM Version 5.1
  - LID variables for:
    - Permeable pavement
    - Rain Gardens
    - Green Roofs
    - Street Planters
    - Rain Barrels
    - Infiltration Trenches
    - Vegetative Swales



- <http://www2.epa.gov/water-research/storm-water-management-model-swmm>

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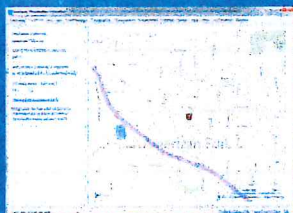
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## Storm Drain Master Plan

- EPA National Stormwater Calculator Variables:
  - Soil Type
  - Percolation rate
  - Ground slope
  - Precipitation data
  - Evaporation
  - Land Cover
  - LID Controls



- <http://www2.epa.gov/water-research/national-stormwater-calculator>

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### Question 3: True or False?

- Prior to construction, Permittees shall review SWPPPs to ensure that the plans include long term storm water management measures ...

- **TRUE ... Section 4.2.5.4.1**

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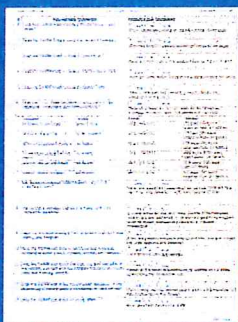
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### SWPPP Plan Review

- Plan Review:
  - Before Construction  
MCM #4
  - During Construction  
MCM #4
  - Post Construction  
MCM #5
  - Illicit Discharges  
MCM #3



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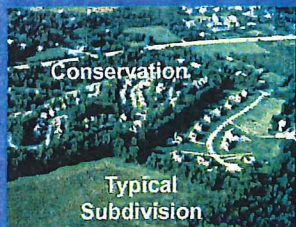
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### Plan Review Objectives



- Construction runoff pollution control
- Prevent Illicit Discharges
- Create a buffer from water sources
- Preserve existing trees / open space
- Avoid compacting soils

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### Question 4: True or False?

- The Permittee shall develop and implement an ordinance of regulatory mechanism shall include provisions for Permittees to inspect storm water control measures on private properties to ensure that adequate maintenance is being performed...

- **TRUE ... Section 4.2.5.5.1**

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### Type of Private Developments

Existing	Proposed
<ul style="list-style-type: none"><li>- Subdivision</li><li>- HOA</li><li>- No HOA</li></ul>	<ul style="list-style-type: none"><li>- Subdivision</li><li>- HOA</li><li>- No HOA</li></ul>
<ul style="list-style-type: none"><li>- Site plan</li><li>- Commercial</li><li>- Industrial</li><li>- Manufacturing</li></ul>	<ul style="list-style-type: none"><li>- Site Plan</li><li>- Commercial</li><li>- Industrial</li><li>- Manufacturing</li></ul>

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### Private Businesses

The image shows two forms side-by-side. The left form is a 'Business License' from the City of San Diego, Department of Public Works, with a large blue watermark 'Business License' overlaid. The right form is a 'Stormwater Maintenance Agreement' with a large blue watermark 'Stormwater Maintenance Agreement' overlaid.

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### Private Businesses

- At least once a year, Private Businesses need to renew their business license ...
  - Add some language to the business license and address the following:
    - Cleaning the storm drain system
    - Inspections
    - Right of Entry
    - Right to review inspection records
    - Right to assess a maintenance fee, etc.

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### Type of Private Residential Development

#### Existing

- Subdivision
- HOA
- No HOA



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### What is the problem?

1. Property Rights

- Right of Entry
- Right to inspect
- Right to demand maintenance
- Right to demand inspection records

(\*) Check with the City Attorney

Existing

- Subdivision
- HOA
- No HOA

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### New Subdivisions

- As part of the approval of a new Subdivision, require the recordation of a **Storm Drainage Maintenance Agreement**
- The agreement need to address the following:
  - Cleaning the storm drain system
  - Inspections
  - Right of Entry
  - Right to review inspection records
  - Right to assess a maintenance fee, etc.

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### Question 5: True or False?

- Permittees shall provide developers and contractors with preferred design specifications for different development types such as industrial parks, commercial strip malls, restaurants, automotive service facilities and projects discharging into sensitive areas
- **TRUE ... Section 4.2.5.4.2**

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### First Flush ... Fact or Fiction

- Salt Lake County
  - 6 stations
  - Different land uses
  - Water samples after a 0.20 inches storm
  - Samples were collected at 10 minutes intervals for 4 to 6 hours



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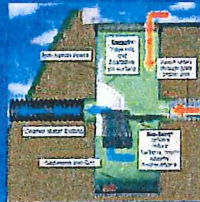
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### First Flush ...Fact or Fiction

- > How do we know which BMP recommend?
  - Type of land use
  - Type of conditional Land Use Permit
  - Type of pollutants
  - Estimated quantity
  - Adopted BMPs
  - Maintenance Schedule
  - Proximity to water bodies



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### First Flush ...Fact or Fiction

- > How do we know which BMP works?
  - Field inspections
  - Water samples
  - Collecting data
  - Evaluating data



A clean gutter means clean storm drain runoff.

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### Question 6: True or False?

- > The Permittee's new development / redevelopment program should include non-structural BMPs and structural BMPs...
- > **TRUE ... Section 4.2.5.3.1**

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### Non- Structural BMPs

- Non – structural BMPs
  - Planning Procedures
    - Local master plans
    - Zoning ordinances
  - Site Base BMPs
    - Buffer strips
    - Riparian zone preservation
    - Minimization of disturbance and imperviousness
    - Maximization of open space

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### Structural BMPs

- Structural BMPs
  - Stormwater Retention/ Detention BMPs
    - Storm Drain Master Plans
  - Infiltration BMPs
    - Infiltration trenches
    - Porous pavement
  - Vegetative BMPs
    - Grassy swales
    - Rain gardens

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### Question 7: True or False?

➤ ... the program shall include a process to evaluate and encourage a Low Impact Development approach ... that infiltrate, evapotranspire or harvest storm water ...

➤ **TRUE ... Section 4.2.5.3.2**

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### Post Construction Runoff Control

- The main goal of Post Construction BMPs:
- 1. Reduce in the **type and quantity of pollutants** in storm water runoff
- 2. Reduce in the **quantity of water** delivered to the water stream during storms

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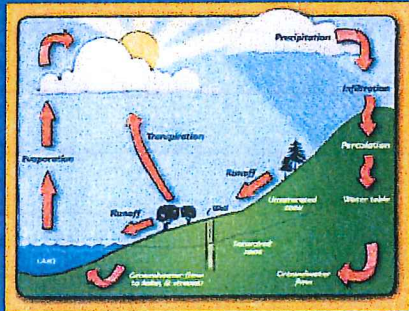
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### Watershed Before Development



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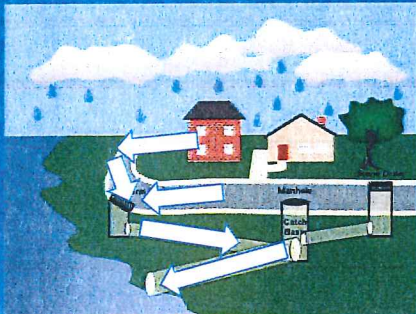
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## Conventional Drainage System




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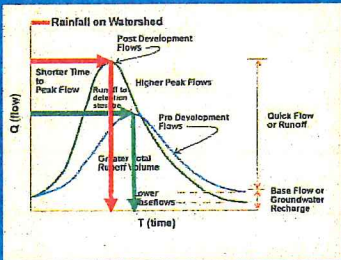
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## Effects of Urbanization

- Impervious surfaces produce higher runoff rates, volume and duration of large flows




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## Physical Impacts

- Changes in land use (e.g. impervious cover, removal of natural vegetation) alter natural water flow on and below the earth's surface.



Photo Courtesy of the Low Impact Development Center, Inc.

- This causes:

- stream bank erosion
- flooding
- reduced base flow in streams
- degradation of stream and river habitat

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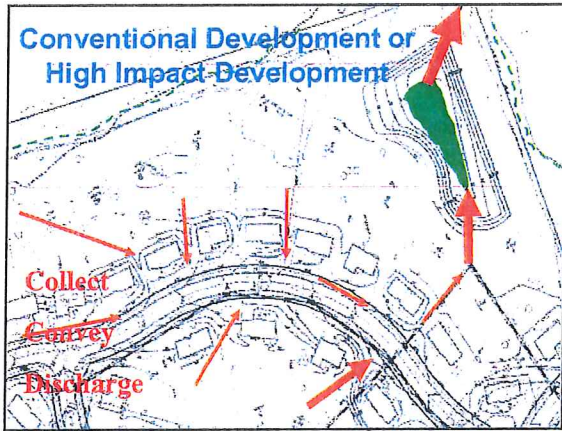
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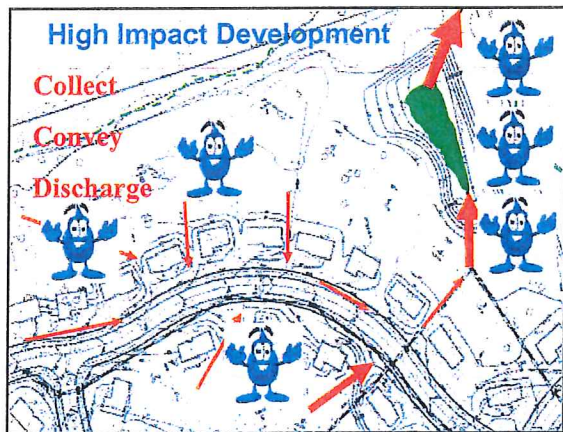
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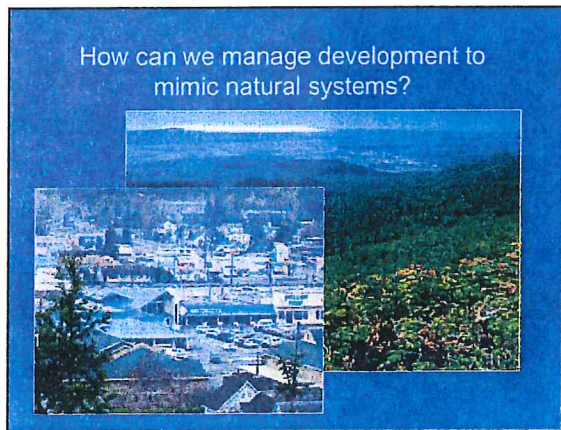
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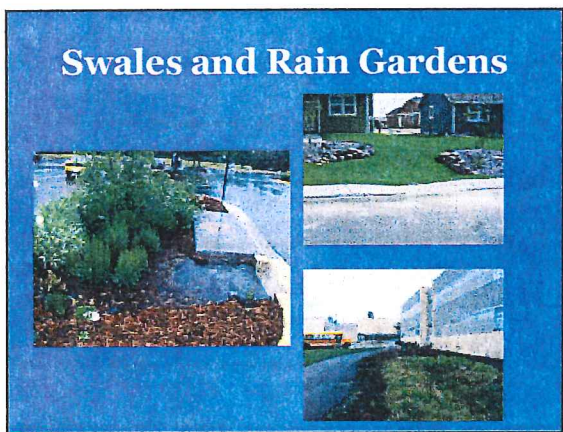
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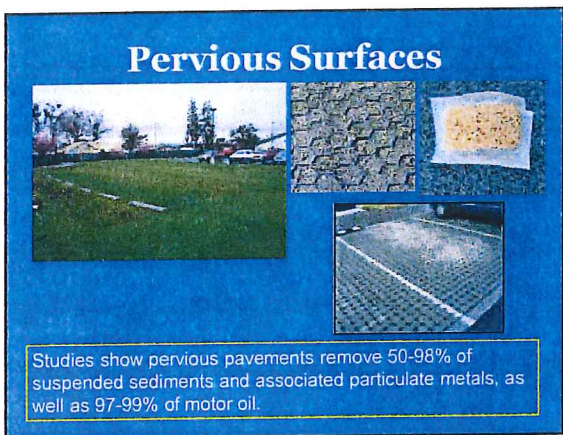
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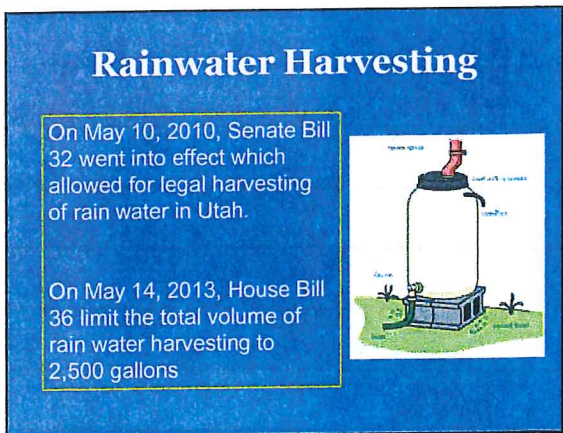
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**Post Construction Runoff Control Requirements – Check List**

- 1. Records of construction sites
- 2. Drainage and hydraulic standards
- 3. SWPPP plan review process/ checklists
- 4. Legal rights to inspect existing sites
- 5. BMP specification based on land use
- 6. Inspections of existing projects
- 7. Adopt and evaluate Structural and Non-Structural BMPs

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**Common Questions**

1. How will we maintain these facilities?
2. Does LID work in tight, clay soils?
3. Is LID more expensive?
4. How do we handle the zoning?
5. Which LID work for my area?

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**Questions**

- Thank you for attending this class

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Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis					Values Accepted for Loading Analyses		
BMP Type	BMP	Notes	Lit. Ref.	Runoff Reduction Efficiency	TSS	TN	TP
Stormwater Ponds	Wet Pond		B, F, P	0%	70%	35%	45%
	Wet Extended Detention Pond		A, B, P	0%	80%	55%	68%
	Micropool Extended Detention Pond	TBA					
	Multiple Pond System	TBA					
	Pocket Pond	TBA					
Stormwater Wetlands	Shallow Wetland		A, B, F, I, P	0%	80%	55%	45%
	Extended Detention Wetland		A, B, F, I, P	0%	80%	55%	45%
	Pond/Wetland System	TBA					
	Gravel Wetland		H, P, Q	90%	99%	85%	64%
Infiltration Practices	Infiltration Trench ( $\geq 75$ ft from surface water)		B, D, I, P	90%	90%	55%	60%
	Infiltration Trench ( $< 75$ ft from surface water)		B, D, I, P	90%	90%	10%	60%
	Infiltration Basin ( $\geq 75$ ft from surface water)		A, F, B, D, I, P	90%	90%	60%	65%
	Infiltration Basin ( $< 75$ ft from surface water)		A, F, B, D, I, P	90%	90%	10%	65%
	Dry Wells		P	90%	90%	55%	60%
	Drip Edges		P	90%	90%	55%	60%
Filtering Practices	Aboveground or Underground Sand Filter that infiltrates WQV ( $\geq 75$ ft from surface water)		A, F, B, D, I, P	0%	90%	60%	65%
	Aboveground or Underground Sand Filter that infiltrates WQV ( $< 75$ ft from surface water)		A, F, B, D, I, P	0%	90%	10%	65%
	Aboveground or Underground Sand Filter with underdrain		A, I, F, G, H, P, Q	0%	51%	10%	33%
	Tree Box Filter	TBA	P, Q	15%	99%		
	Bioretention System		I, G, H, P, Q	80%	99%	65%	65%
	Permeable Pavement that infiltrates WQV ( $\geq 75$ ft from surface water)		A, F, B, D, I, P	75%	90%	60%	65%
	Permeable Pavement that infiltrates WQV ( $< 75$ ft from surface water)		A, F, B, D, I, P	75%	90%	10%	65%
	Permeable Pavement with underdrain		Use TN and TP values for sand filter w/ underdrain and outlet pipe, P	45%	90%	10%	45%



Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis					Values Accepted for Loading Analyses		
BMP Type	BMP	Notes	Lit. Ref.	Runoff Reduction Efficiency	TSS	TN	TP
Treatment Swales	Flow Through Treatment Swale	TBA	P	60%			
Vegetated Buffers	Vegetated Buffers		A, B, I		73%	40%	45%
Pre-Treatment Practices	Sediment Forebay	TBA	P	0%			
	Vegetated Filter Strip		A, B, I, P	50%	73%	40%	45%
	Vegetated Swale		A, B, C, F, H, I, P	60%	65%	20%	25%
	Flow-Through Device - Hydrodynamic Separator		A, B, G, H, Q		27%	10%	42%
	Flow-Through Device - ADS Underground Multichamber Water Quality Unit (WQU)		G, H, Q		99%	10%	81%
	Other Flow-Through Devices	TBA					
	Off-line Deep Sump Catch Basin		J, K, L, M		15%	5%	5%

### Sources

Sources A - F are as reported in the EPA Region 5 Model

A	Appendix D Model Best Management Practice Selection Methodology & Lake County Decisions Making Dramework, NIPC. July 1994.
B	<a href="http://www.epa.gov/owow/wtr/NPS/MMGI/chapter4/table401.gif">www.epa.gov/owow/wtr/NPS/MMGI/chapter4/table401.gif</a>
C	<a href="http://ohioline.ag.ohio-state.edu/aex-fact/0467.html">http://ohioline.ag.ohio-state.edu/aex-fact/0467.html</a>
D	Athayde. 1983.
E	Schueler. 1987.
F	Model Stormwater Regulations. Duxbury, Marshfield, and Plymouth, MA. Horsley Witten Group. December 31, 2004. (suggested Average assumes no practice is greater than 90% efficient. Median values are shown in parentheses).
G	2005 Data Report. University of New Hampshire Stormwater Center. and personal communication with Dr. Robert Roseen.
H	Roseen, R., T. Ballesterio, J. Houle, P. Avelleneda, J. Briggs, G. Fowler, R. Wildey. Unpublished 2007 Draft Report. Seasonal Variations for Stormwater Management Systems in Cold Climate Conditions. University of New Hampshire.
I	<a href="http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm">http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm</a>

Sources J - M and P are as reported in Stormwater Center Website

J	Pitt, R., M. Libum, S. Nix, S. Durrans, and S. Burian. 1997. Guidance Manual for Integrated Wet Weather Flow Collection and Treatment Systems for New Urbanized Areas. USEPA. Office of Research and Development. Cincinnati, OH.
K	Aronson, F., D. Watson, and W. Pisaro. 1983. Evaluation of Catch Basin Performance for Urban Stormwater Control. EPA-600/2-83-043.
L	Pitt and Shawley, 1982.
M	Mineart, P. and S. Singh. 1994. Storm Inlet Pilot Study. Woodward Clyde Consultants. Alameda County Urban Runoff Clean Water Program. Oakland, CA.
P	Winer, Rebecca. 2000. National Pollutant Removal Performance Database for Stormwater Treatment Practices. 2nd Edition. Center for Watershed Protection. Elliot City, MD.

Source N is as reported in Low Impact Development Center Website

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