

2019 WPPA Environmental Seminar

1

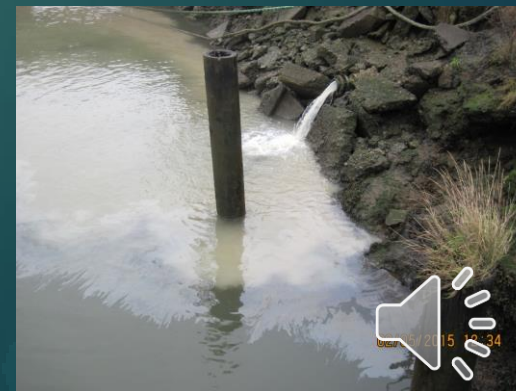
Patrick Hsieh, Senior Engineer
Dalton, Olmsted, & Fuglevand (DOF)

- ▶ Proposed Changes to the Industrial Stormwater General Permit
 - ▶ Changes in practical implementation of the ISGP
 - ▶ In relation to 3rd Party Law Suit Concern
- ▶ ITRC's Online Stormwater BMP Guidance Document
 - ▶ Centralized resource for information on stormwater BMP effectiveness and how to use and implement that information



2019 Draft Industrial Stormwater General Permit (ISGP)

- ▶ Comment Period was May 1st to June 29, 2019
 - ▶ Comments from over 20 entities including
 - ▶ Industry Groups
 - ▶ Companies
 - ▶ Environmental Groups
 - ▶ Regulators
 - ▶ Ports
- ▶ Decision on permit issuance in November 2019.
- ▶ Existing Permit Expires December 31, 2019.



Major Changes Proposed

- ▶ Changes in who is covered

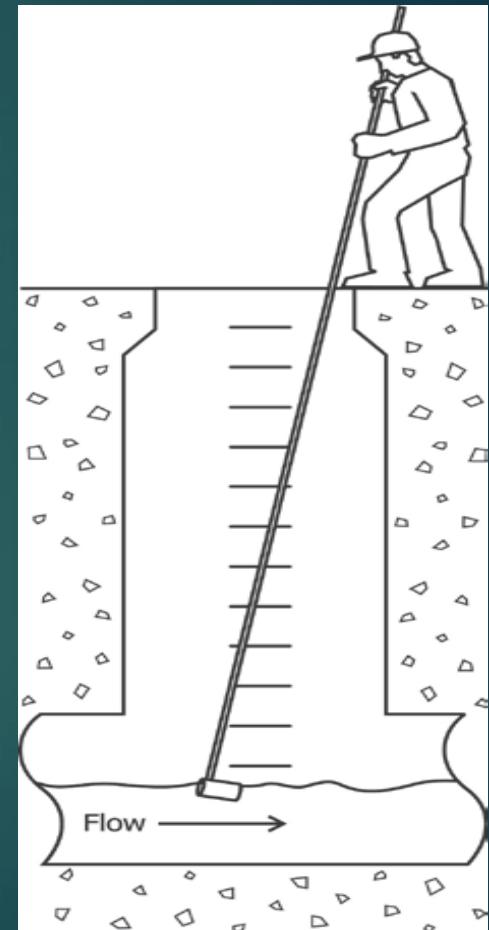
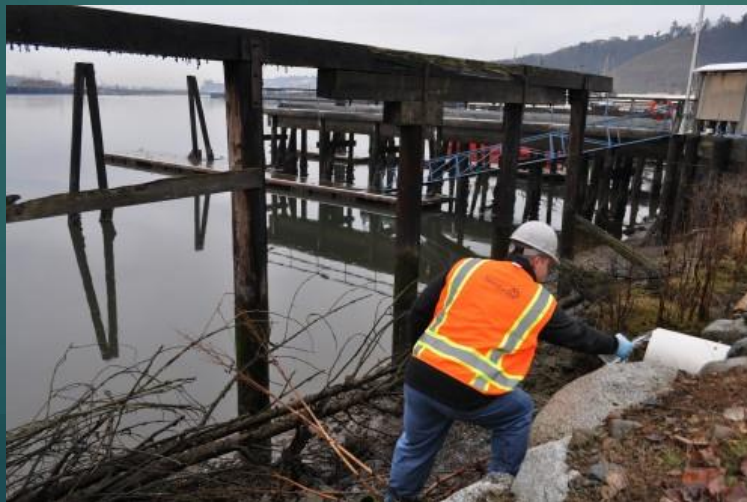
- ▶ New Industrial Categories Required to Seek Permit Coverage including
 - ▶ Marine Construction
 - ▶ Construction, Transportation, Mining, and Forestry Machinery and Equipment Rental and Leasing
- ▶ Switch from SIC codes to NAICS codes adds new business sectors
- ▶ The Conditional No Exposure Exemption language has been changed (with a focus on material handling and storage)



Major Changes Proposed

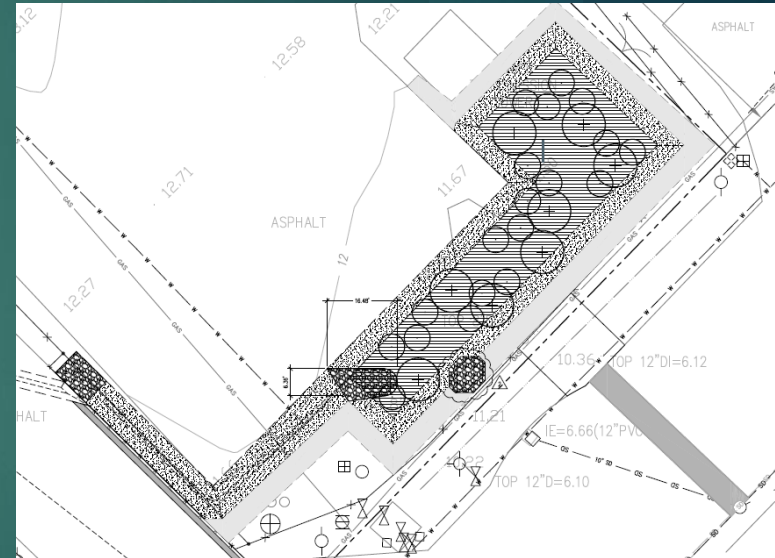
▶ Changes in sampling

- ▶ For sites that discharge to both stormwater and groundwater, discharges to groundwater will have to meet the terms of the ISGP
- ▶ First Flush sampling moved from after October 1st to after Sept 1st
- ▶ Annual sampling required even with consistent attainment



Major Changes Proposed

- ▶ Changes in benchmarks
 - ▶ Lead benchmark is lowered significantly (81.6 to 64.6 $\mu\text{g/L}$)
 - ▶ Marine Construction will have benchmarks for TSS and Petroleum Hydrocarbons. Additionally, this sector will also have “report only” monitoring for Arsenic, PAH Compounds, p-cresol, and Phenol
- ▶ Changes in recordkeeping requirements
 - ▶ Allowed to post SWPPP to a website for public review.



ITRC's Online Stormwater BMP Guidance Document



The screenshot shows the ITRC website interface. At the top left is the ITRC logo: "INTERSTATE TECHNOLOGY REGULATORY COUNCIL ITRC". Below it is a search bar with the text "Search this website". A navigation menu on the left includes "Home", "Navigating this Website", and numbered sections 1 through 5, plus "Additional Information". The main content area has a green header with the title "Stormwater Best Management Practices Performance Evaluation" and a "HOME" button. Below the header is a large banner with the text "Welcome Stormwater Best Management Practices Performance Evaluation (Stormwater-1)" and an illustration of a water drop containing a city skyline, a river, and a person fishing. Underneath the banner are four video thumbnails with titles: "Overview Video Welcome to the Guidance", "Introducing Chapter 1 Guidance Document Content", "Introducing Chapter 2 Data Resources and Intro to Screening Tool", and "Introducing Chapter 3 How to Use the Screening Tool". At the bottom, there is a paragraph of text and a video player with the ITRC logo and the text "Stormwater BMPs: Welcome to t...".

INTERSTATE TECHNOLOGY REGULATORY COUNCIL ITRC

Search this website

Home

Navigating this Website

- 1 Introduction
- 2 Data Applicability
- 3 BMP Screening Tool and Considerations
- 4 Installation
- 5 Operational Strategies
- Additional Information

Stormwater Best Management Practices Performance Evaluation

HOME

Welcome

Stormwater Best Management Practices Performance Evaluation (Stormwater-1)

Overview Video Welcome to the Guidance

Introducing Chapter 1 Guidance Document Content

Introducing Chapter 2 Data Resources and Intro to Screening Tool

Introducing Chapter 3 How to Use the Screening Tool


This guidance offers the user details on post construction BMP lifecycle processes including contracting, cost considerations, installation factors including construction

ITRC Stormwater BMPs: Welcome to t...



ITRC's Online Stormwater BMP Guidance Document

Centralized resource for information on stormwater BMP effectiveness and how to use and implement that information



Search this website

- Home
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- 1 Introduction
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- 4 Installation
- 5 Operational Strategies

This guidance offers the user details on post construction BMP lifecycle processes including contracting, cost considerations, installation factors including construction challenges, inspection checklists, quality control and record drawings. It goes on to address long-term technology- and performance-based operational strategies, including aspects such as routine and non-routine maintenance. Data and information from existing publicly available BMP performance programs has been incorporated into an online [BMP Screening Tool](#). Using site-specific pollutant treatment requirements and installation considerations, the Tool can assist the user by identifying a list of BMPs that may be appropriate for a given site. The Tool also provides users summarized information on the treatment efficiency, installation requirements and maintenance issues regarding the identified BMPs, with links to access more detailed information.

Publication Date: November 2018

 [Print this page/](#)



Overview Video
Welcome to the Guidance



Stormwater-1
web document



Stormwater-1
Glossary



Stormwater-1
References



Stormwater-1
Acronyms

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ITRC's Online Stormwater BMP Guidance Document

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- 2 Data Applicability
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- Additional Information
 - Appendix A. State and Local Survey results
 - Appendix B. BMP Installation Checklist
 - Appendix F. BMP Information Sheets
 - Acronyms
 - Glossary
 - Acknowledgments
 - Team Contacts
 - Document Feedback



Step 1: Choose Pollutants

ITRC Stormwater Post-Construction BMP Evaluation Tool

ITRC Stormwater Post-Construction B

Pollutant Removal Determinations

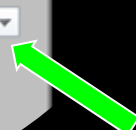
RESET

Pollutant Screening



Select pollutant(s):

Sediments		Y/N
Total Suspended Solids		N
Suspended Solid Concentration		N
Turbidity		N
Total Solids		N
Dissolved Arsenic		N
Nutrients		Y/N
Total Nitrogen		N
Kjeldahl Nitrogen		N
Nitrate/ Nitrite		N
Ammonia		N
Phosphorous		Y
Ortho-phosphorous		N
Other		Y/N
Radionuclides		N



Related Practices (BMP)



Step 2: Secondary Screening

Pollutant Removal Determinations

Pollutant

Select pollutant(s)

Sediments

Total Suspended S

Suspended Solid C

Turbidity

Total Solids

Total Dissolved So

Metals

Total Dissolved M

Total Copper

Dissolved Copper

Total Zinc

Dissolved Zinc

Total Lead

Dissolved Lead

Total Cadmi

DSSOIVED ARSENIC

Dissol

Related Practices (BMP)

Secondary Screening Criteria

Select applicable installation condition(s):

Installation Conditions	Y/N
Will the BMPs experience freezing conditions?	N
Will the BMPs experience arid conditions?	N
Is there limited space in which to install BMPs?	N
Are contaminated soils potentially present in the installation area?	Y
Will the BMPs be installed in an area with high groundwater?	N
Will the BMPs experience high TSS loads?	N

Nutrients

Total Nitrogen

Kjeldahl Nitrogen

Nitrate/ Nitrite

Ammonia

Phosphorous

Ortho-phosphorous

Other

Radionuclides

Nutrients	Y/N
Total Nitrogen	N
Kjeldahl Nitrogen	N
Nitrate/ Nitrite	N
Ammonia	N
Phosphorous	Y
Ortho-phosphorous	N
Other	Y/N
Radionuclides	N

wet pond / wet basin
Media Filters
Permeable Pavement
Infiltration Devices
Chemical Treatment



Step 3: Review Related Practices

Pollutant Removal Determinations

Pollutant Screening

Select pollutant(s):

Sediments

- Total Suspended Solids
- Suspended Solid Concentration
- Turbidity
- Total Solids
- Total Dissolved Solids

Metals

- Total Dissolved Metals
- Total Copper
- Dissolved Copper
- Total Zinc

Dissolved Zinc

N

Total Lead

N

Dissolved Lead

Total Dissolved Arsenic

N

Dissolved

Nutrients

Y/N

Total Nitrogen

N

Kjeldahl Nitrogen

N

Nitrate/ Nitrite

N

Ammonia

N

Phosphorous

Y

Ortho-phosphorous

N

Other

Y/N

Radionuclides

N

Secondary Screening

Select applicable installation condition(s)

Installation Conditions

Will the BMPs experience freezing conditions?

Will the BMPs experience arid conditions?

Is there limited space in which to install BMPs?

Are contaminated soils potentially present?

Will the BMPs be installed in an area with high TSS loads?

Will the BMPs experience high TSS loads?

Related Practices (BMP)

Soil Management and Soil Amendments

Tanks and Vaults

Media Filters

Permeable Pavement

Infiltration

Chemical

<https://stormwater-1.itrcweb.org/appendix-f-bmp-information-sheets/-f10> - Click once to follow. Click and hold to select this cell.



BMP Information Sheet

Description & Pollutant Summary

F.10 Permeable Pavement

December 2018

Description

Permeable or porous pavement has a higher than normal percentage of air voids to allow water to pass through it and infiltrate into the subsoil or collect in an underdrain system. [Massachusetts Stormwater Handbook and Stormwater Standards](#)

Pollutants of Concern Treated by Permeable Pavement

Permeable Pavement										
Solids	Solid Metals	Dissolved Metals	Hydro Carbons	Nutrients	Ammonia	PH	Bacteria Pathogens	Organics	Trash	Pesticides Herbicides
TSS	Cu		O/G	Phosphorus				PCB		
SSC	Zn	Zn	TPH					PAH		
Turbidity	Pb									
Total Solids	Ni	Ni								



BMP Information Sheet

Data Summary

International Stormwater BMP Database Performance Summary, 2016 – Porous Pavement [International Stormwater BMP Database](#). Prepared for City and County of Denver and Urban Drainage and Flood Control District, February 2017. Prepared by Wright Water Engineers and Geosyntec Consultants ([Consultants 2016](#))

	BMPs		EMCs		25th		Median				Difference	75th	
	In	Out	In	Out	In	Out	In		Out			In	Out
Kjeld													
Nitrogen, NO _x as N (mg/L)	7	7	388	220	0.34	0.85	0.59 (0.53, 0.62)		1.36 (1.22, 1.51)		◆◆◆	0.88	2.06
Nitrogen, Nitrite (NO ₂) + Nitrate (NO ₃) as N (mg/L)	7	7	388	220	0.34	0.85	0.59 (0.53, 0.62)		1.36 (1.22, 1.51)		◆◆◆	0.88	2.06
Phosphorus as P, Dissolved (mg/L)	4	4	244	119	0.03	0.04	0.05 (0.04, 0.05)		0.05 (0.05, 0.07)		◇◆◆	0.08	0.10
Phosphorus as P, Total (mg/L)	8	8	373	219	0.12	0.07	0.19 (0.16, 0.21)		0.11 (0.10, 0.11)		◆◆◆	0.36	0.20
Phosphorus, orthophosphate as P (mg/L)	6	6	174	114	0.03	0.03	0.05 (0.04, 0.06)		0.07 (0.05, 0.08)		◇◆◆	0.08	0.12
Phosphorus as P, Dissolved (mg/L)	16	15	676	531	0.07	0.03	0.16 (0.11, 0.11)		0.06 (0.05, 0.07)		◆◆◆	0.21	0.11
Phosphorus as P, Total (mg/L)	55	55	891	873	0.09	0.04	0.20 (0.18, 0.22)		0.09 (0.08, 0.10)		◆◆◆	0.42	0.20
Phosphorus, orthophosphate as P (mg/L)	22	22	526	508	0.03	0.01	0.06 (0.05, 0.07)		0.02 (0.02, 0.02)		◆◆◆	0.15	0.06
Chromium, Total (µg/L)	4	4	292	133	0.50	1.70	0.50 (0.50, 0.50)		2.70 (2.30, 2.80)		◆◆◆	0.50	3.80
Chromium, Dissolved (µg/L)	4	4	300	143	2.04	2.50	3.62 (3.40, 4.10)		4.28 (3.51, 5.06)		◇◇◇	6.60	7.23
Copper, Dissolved (µg/L)	7	7	381	216	2.80	3.00	5.00 (4.70, 5.50)		5.10 (4.40, 5.60)		◇◆◆	7.80	7.12
Copper, Total (µg/L)	11	11	439	262	7.50	4.00	12.00 (10.80, 12.50)		7.70 (6.70, 8.00)		◆◆◆	23.30	13.76



BMP Information Sheet

Design

[28] Certifications more commonly apply to products, or proprietary BMPs, which generally follow the demonstrative approach and must demonstrate they are effective. Most practices, or public domain BMPs such as permeable pavement, follow the presumptive approach and are presumed to be effective as long as they are built following the design criteria of the regulatory agency. Users should refer to their local regulatory agency for information on approved permeable pavement BMPs.

Structural Design

- The subgrade is the layer below the paving and the subbase. Where traditional pavement tries to reduce water from entering the subgrade, permeable pavement allows for water to enter the subgrade.
- The subbase is below the paving and provides vertical support, storage capacity and filtering ability.
- Pavement strength (i.e., concrete, paver, asphalt, etc.) is based on the material used and the design specifications for the area.
- Structural thickness can vary based on the local conditions, experience of using permeable pavements, and pavement mixture design.

Stormwater Management Design

- Determine permeable pavement type (i.e., porous concrete, pervious pavers, non-pervious interlocking pavers, etc.).
- Consider three specific design features: 1) reduced runoff volume, 2) reduced treatment volume, and 3) reduced impervious area.
- Determine if there is a stormwater treatment option considered and its effectiveness for the design considerations.



BMP Information Sheet

Additional Information

Example Submittals Checklist

- [American Concrete Institute \(ACI\) Specification for Pervious Concrete Pavement, ACI 522.1-13](#)

Timeframe

- Hold pre-construction meeting and construct test sections to address construction issues.
- Assemble materials on-site and ensure they meet design specifications.
- Follow erosion control measures according to an approved site plan (e.g., silt fence).
- Follow general pervious concrete construction guidelines such as subgrade preparation and layout.
- Place paving material as per site specifications and industry standards:
 - Porous Asphalt – see Jackson (2007)
 - Pervious Concrete – see American Concrete Institute (2008)
 - Interlocking Pavers – see Smith (2006)
- Consolidation
- Jointing
- Curing protection
 - Cold weather protection
 - Hot weather protection
- Protect permeable pavement from adjacent stormwater runoff areas to avoid introduction of sediment

Example Inspection Checklist

- [Virginia Department of Environmental Quality \(DEQ\) Design Specification No 7: Permeable Pavers, Version 2.0](#)



BMP Information Sheet

Sample Inspection Checklists

- Filter Layer and Underdrain Placement**
 - All aggregates, including, as required, the filter layer (choker stone & sand), the reservoir layer, and bedding layer are clean and washed and otherwise conform to specifications as certified by quarry.
 - Underdrain size and perforations meet the specifications.
 - Placement of filter layer and initial layer of reservoir layer aggregates (approximately 2 inches) spread (not dumped) to avoid aggregate segregation; or
 - Impermeable liner meets project specifications and is placed in accordance with manufacturers specifications.
 - Placement of underdrain, observation wells, and underdrain fittings (45 degree wyes, cap at upstream end, etc.) in accordance with the approved plans.
 - Invert elevations of underdrain and outlet structure and surface gradient in accordance with approved plans.
 - Certification of Filter Layer and Underdrain Placement Inspection:** Inspector certifies the successful completion of the filter layer and underdrain placement steps listed above.
- Stone Reservoir Aggregate Placement**
 - Sides of excavation covered with geotextile, when required, prior to placing stone reservoir aggregate; no tears or holes, or excessive wrinkles are present.
 - Thickness, placement, compaction and surface tolerances meet specifications and approved plans.
 - Certification of Stone Reservoir Aggregate Placement Inspection:** Inspector certifies the successful stone reservoir layer placement steps listed above.
- Bedding Layer and Pavement Installation**



BMP Information Sheet

O&M and More Information Sources

Operation and Maintenance Considerations

- Post signage to identify the porous pavement areas. Avoid typical measures for maintaining standard pavements including application of sand, salt and snow melting chemicals, seal coating and power washing.
- In winter, do not pile plowed snow on pavement to prevent concentrations of grit and nutrients from being deposited on pavement.
- Maintain stabilizing ground cover around pavement to prevent erosion and washing of sediment onto the permeable pavement surface.

References and Links

- [American Concrete Institute \(ACI\) Pervious Concrete, ACI 522R-06](#)
- [American Concrete Institute \(ACI\) Report on Pervious Concrete, ACI 522R-10](#)
- [American Concrete Institute \(ACI\) Specification for Pervious Concrete Pavement, ACI 522.1-08](#)
- [American Concrete Institute \(ACI\) Specification for Pervious Concrete Pavement, ACI 522.1-13](#)
- [California Department of Transportation – Pervious Pavement Guidance](#)
- Jackson, N. 2007. *Design, Construction and Maintenance Guide for Porous Asphalt Pavements*. National Asphalt Pavement Association. Information Series 131. Lanham, MD. ([Jackson 2007](#))
- [Minnesota Pollution Control Agency Stormwater Manual: Permeable Pavement](#)
- [New York State Stormwater Management Design Manual](#)
- [North Carolina Department of Environmental Quality Stormwater Design Manual Minimum Design Criteria and Recommendations for Stormwater Control Measures C-5: Permeable Pavement](#)
- [S. Department of Transportation Federal Highway Administration, Permeable Interlocking Concrete Pavement, TechBrief Publication Number FHWA-HIF-15-007](#)



Evaluating BMP's Reliability For Meeting Permit Limits

- **Question:** Existing site runoff at 50 ug/L copper, limit is 10 ug/L, how consistently will media filter meet this limit?
- **Answer:** 75% of effluent samples ≤ 10 ug/L, but at 17 ug/L influent (takeaway: select pretreatment BMP to meet ~ 17 [i.e., treatment train concept])
- **For more info:** Look at paired influent-effluent in BMP Database to match 50 ug/L influent, and review design info (e.g., media type, contact time)

International Stormwater BMP Database Performance Summary, 2016 – Media Filters

Prepared for City and County of Denver and Urban Drainage and Flood Control District, February 2017. Prepared by Wright Water Engineers and Geosyntec Consultants. (Wright Water Engineers and Geosyntec (Consultants 2016))

	BMPs ^[17]		EMCs ^[18]		25th		Median Concentration ^[19]		Difference ^[20]	75th	
	In	Out	In	Out	In	Out	In	Out		In	Out
Fecal Coliform (MPN/100 mL)	15	15	184	169	120	33	900 (400, 1,500)	400 (200, 800)	◇◆◆	10,000	5,600
Kjeldahl nitrogen (TKN) (mg/L)	21	20	323	312	0.56	0.29	0.94 (0.83, 1.02)	0.50 (0.43, 0.55)	◆◆◆	1.78	1.00
Nitrogen, NO _x as N (mg/L)	22	21	346	328	0.21	0.34	0.34 (0.31, 0.37)	0.57 (0.49, 0.63)	◆◆◆	0.58	0.94
Nitrogen, Nitrate (NO ₃) as N (mg/L)	12	12	178	174	0.20	0.30	0.32 (0.28, 0.35)	0.56 (0.46, 0.63)	◆◆◆	0.59	0.94
Nitrogen, Nitrite (NO ₂) + Nitrate (NO ₃) as N (mg/L)	10	9	168	154	0.24	0.38	0.35 (0.31, 0.40)	0.57 (0.48, 0.68)	◆◆◆	0.58	0.94
Nitrogen, Total (mg/L)	10	9	160	151	0.79	0.73	1.22 (1.03, 1.33)	1.05 (0.90, 1.16)	◇◆◆	2.10	1.72
Phosphorus as P, Dissolved (mg/L)	11	10	118	100	0.01	0.02	0.05 (0.03, 0.06)	0.04 (0.03, 0.06)	◇◆◆	0.09	0.10
Phosphorus as P, Total (mg/L)	23	22	372	349	0.07	0.04	0.15 (0.13, 0.15)	0.09 (0.07, 0.10)	◆◆◆	0.28	0.16
Phosphorus, orthophosphate as P (mg/L)	7	7	116	115	0.02	0.02	0.04 (0.03, 0.05)	0.03 (0.02, 0.04)	◇◆◆	0.09	0.07
Total suspended solids (mg/L)	25	25	400	377	22.0	3.9	56.4 (46.0, 61.9)	9.0 (6.4, 10.0)	◆◆◆	120.0	22.8
Copper, Dissolved (μg/L)	11	11	189	176	1.63	1.50	3.75 (2.70, 4.10)	3.25 (2.53, 3.90)	◇◆◆	7.60	6.90
Copper, Total (μg/L)	20	20	345	330	4.97	2.46	9.98 (8.60, 10.00)	5.53 (4.58, 6.30)	◆◆◆	16.87	10.00



ITRC SW BMP Panelists



Patrick Hsieh
Dalton, Olmsted, & Fuglevand
Seattle, WA
206-731-7550
phsieh@dofnw.com



Allison Dunaway
Virginia Dept. Environmental Quality
Richmond, VA
804-698-4174
allison.dunaway@deq.virginia.gov



Brandon Steets
Geosyntec Consultants
Santa Barbara, CA
805-979-9122
bsteets@geosyntec.com

Access bios at:
<https://clu-in.org/conf/itrc/storewaterBMP/>



Thank You



- ▶ **ITRC Next Online Panel Event**

12/5 from 10 AM to 11:15 AM (Pacific)

- ▶ <https://www.itrcweb.org/Training/ListEvents?TopicID=60&SubTopicID=62>

- ▶ **For more information**

- ▶ <http://www.clu-in.org/conf/itrc/stormwaterBMP/resource.cfm>

