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of Port Authorities  
Alliance of the Ports of Canada, the Caribbean,  
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**WorleyParsons**  
*Infrastructure &  
Environment Division  
Ports, Coastal and Maritime  
Group*

**StormWater Best  
Management Practices  
for Ports and Marine  
Terminal  
Facilities/Operations**

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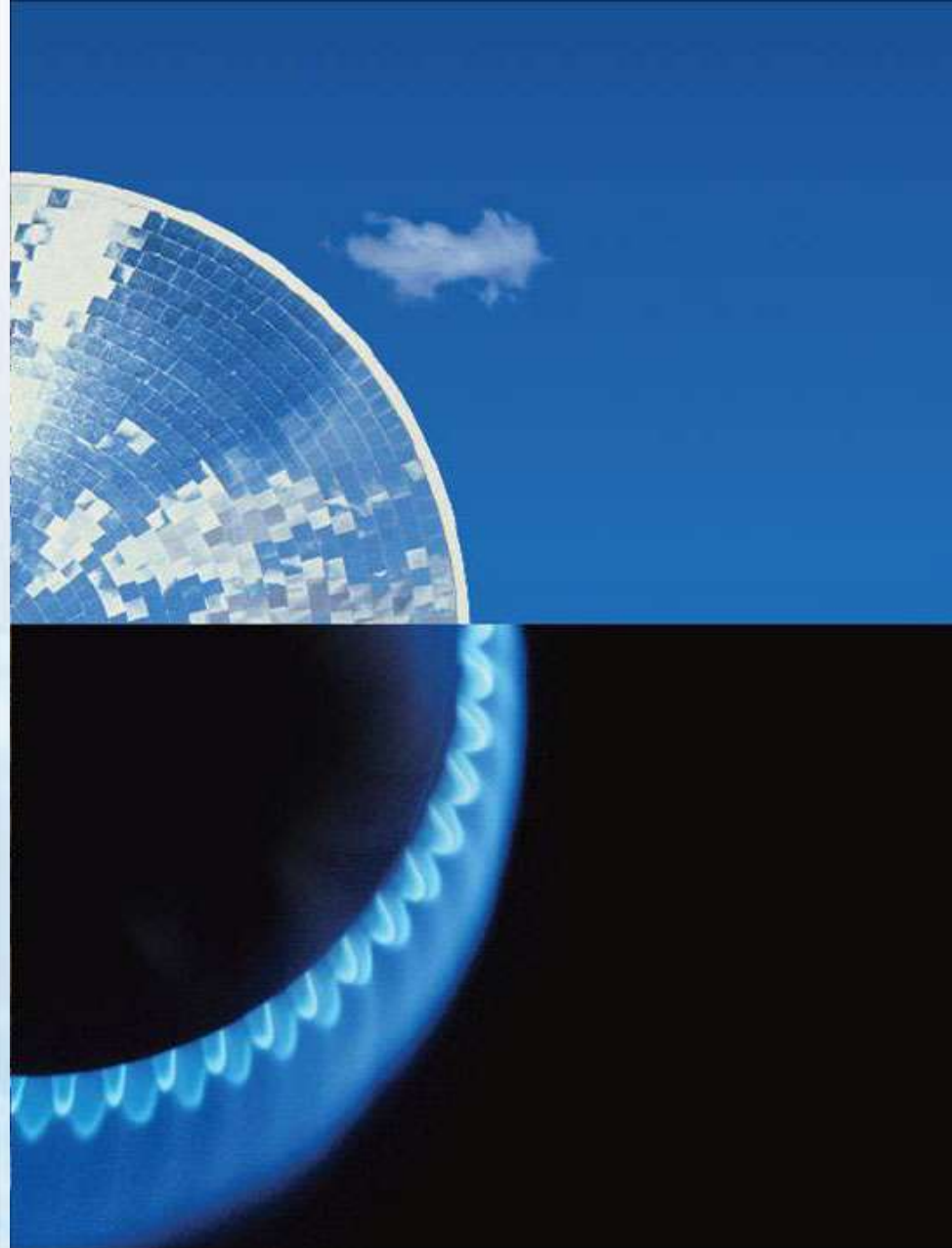


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**Special thanks to: Port of Seattle: Paul Meyer and Marilyn Guthrie, Port of Long Beach: James Vernon and Rick Cameron, Port Freeport: Lisa McMichael, and Port Everglades: Bob Muesser**

## **Ports and Maritime Stormwater Management Requirements at a Glance:**

- ▶ **Federal: Federal Multi-Sector General Permit (MSGP)**
- ▶ **State: Authorized States**
- ▶ **Types of Stormwater permits:**
  - **General/Industrial: Multi-Sector General Permits**
  - **Municipal: MS4; Phases I and II**
  - **General Construction permits**
  - **Individual NPDES for stormwater discharges**



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# Summary of Stormwater Management Requirements to Ports and Maritime Facilities

## ▪ General/Industrial/MSGP:

➤ File a Notice of Intent (NOI)

➤ Development of a Stormwater Pollution Prevention Plan (SWPPP)

➤ Requires development and implementation of Best Management Practices (BMPs) that meet or exceed BAT/BC: implementing controls that reduce pollutants in stormwater discharges to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology (BAT/BCT) performance standard. **Non-Numeric Technology-Based Effluent Limits (BPT/BAT/BCT).**

## ▪ M4 Permits: Phase I and II

➤ Development of Storm Water Management Plans (SWMPs)

➤ Requires development and implementation of BMPs that meet or exceed Maximum Extent Practicable (MEP)



Port: MS4:  
SWMP or SWPPs

Tenants: SWPP  
BMPs, P2 etc



# What are BMPs?

Definition: BMPs are devices, practices, or methods/means used to manage stormwater runoff

- ▶ Structural
  - Engineered to control both the quantity and quality of stormwater runoff
- ▶ Non-structural
  - Educational
  - Policy changing
  - Source-targeting (pollution prevention)
- ▶ Ultimate goal of both BMP types:
- ❑ Prevent Pollutants contact with run off: Pollution Prevention and source control BMPs
  - ❑ Remove/Minimize pollutants
  - ❑ Manage and/or reduce pollutant sources & Control stormwater

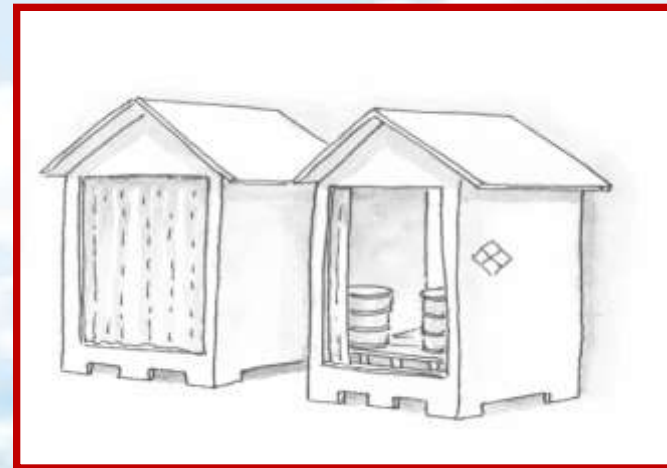


# Types of Control Measures/BMPs

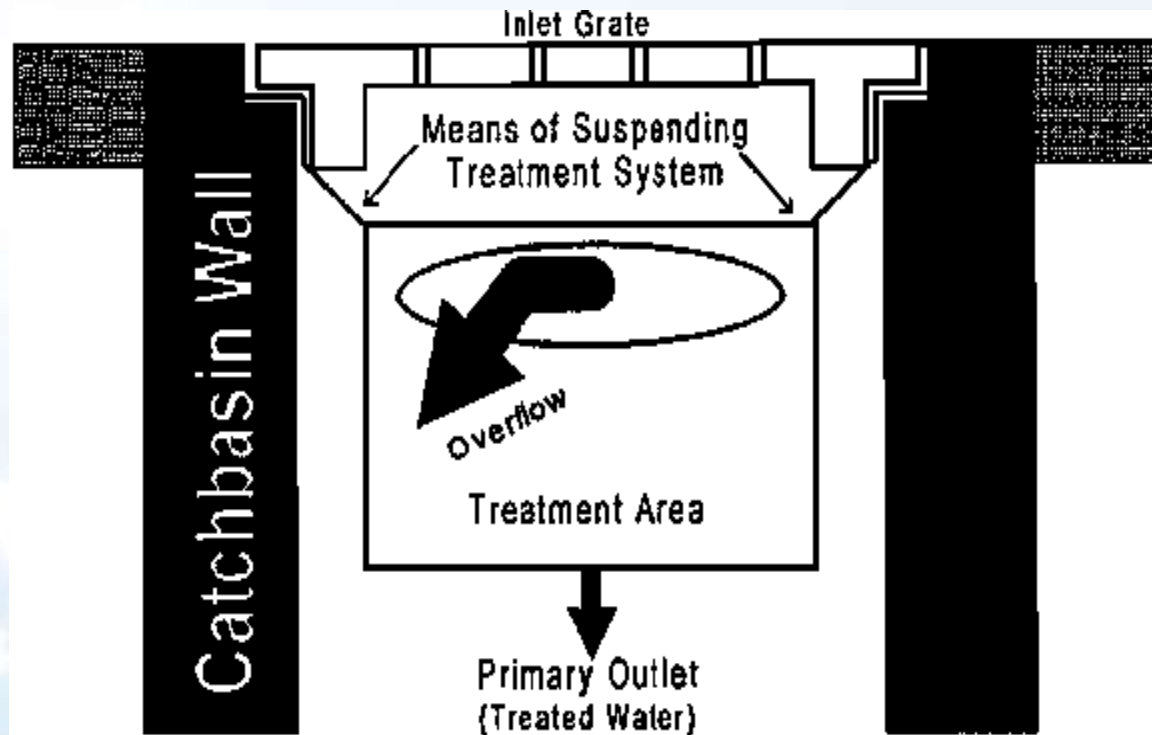
- ▶ Minimize Exposure
- ▶ Good Housekeeping Practice Measures (GHKP)
- ▶ Periodic and proper Maintenance
- ▶ Spill Prevention and Response Procedures: well functioning SPCC and or other state specific requirements: Spill Prevention and Emergency Cleanup Plan (SPECP): State of Washington Ecology
- ▶ Erosion and Sediment Controls
- ▶ Management of Runoff
- ▶ Detect and eliminate Non-Stormwater /Illicit Discharges.
- ▶ Training and education
  
- ▶ Proof of the pudding in BMP effectiveness is in:
  - Monitoring: TSS, TOC, pH, Metals, EC, O&G, and other parameters
  - Periodic Inspection and visual observations: Monthly, Quarterly, etc.



# Examples of BMPs



# Examples of BMPs: Drain Inserts



Source: King County, Washington



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# Fabric Drain Insert with Petrophilic Pouch



A worker inserts a catch basin insert for oil and grease, trash, debris, and sediment removal from stormwater as it enters the storm drainage system (Source: Ab Tech Industries, 2001)



Source: DAWG



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# Triton Catch Basin Inserts: Source Control Inside the Storm Drain



Source: Contech Construction Products



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# ARS: Automatic Retractable Screens/Insert



Source: Port of Long Beach – James Vernon and Rick Cameron      Source: West Coast Storm, Inc.



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# Bioswales

Effective in sediment, metals, oil and grease, and bacteria removal. They require year round irrigation and maintenance to clear undesired species from the swale.



**Source: Port of Long Beach – James Vernon and Rick Cameron**



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# Continuous Deflective Separation: CDS

Patented continuous deflective separation technology for solids removal/offline units can treat flows from 1 to 300 cfs (30 to 8500 L/s) Inline units can treat up to 7.5 cfs (170 L/s),



**Source: Contech Construction Products**



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# CDS Unit



Source: Port of Long Beach: James  
Vernon and Rick Cameron



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# Urban Green Biofilter: Sustainable Biofiltration

The UrbanGreen BioFilter is an enhanced biofiltration system that combines nature's ability to treat stormwater with performance of the Stormwater Management StormFilter media-filled cartridges



Source: Contech Construction Products



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# ChamberMaxx

Corrugated, open-bottom arch systems designed to collect, detain, retain and infiltrate stormwater runoff



Source: Contech Construction Products



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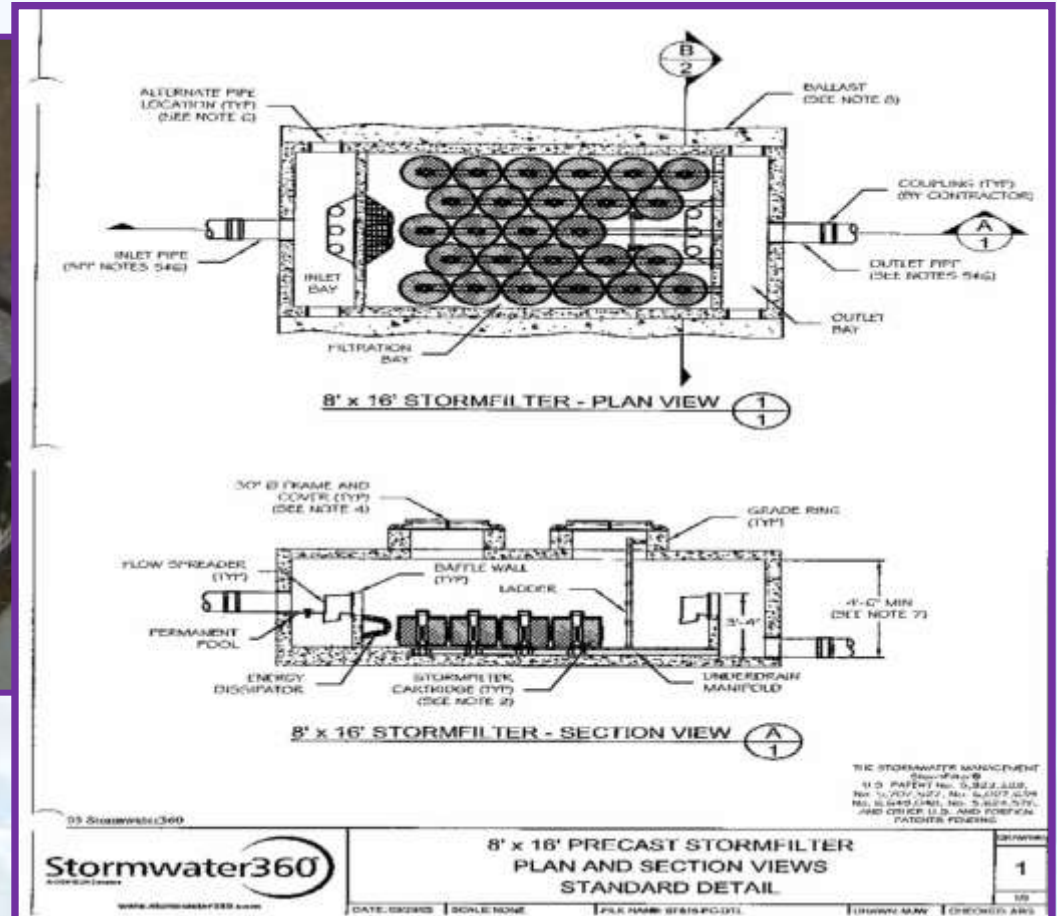
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# Stormwater Filtration BMPS: ZPG Filters



Source: TRE Consulting, Inc./San Joaquin RTD

# Inspections, Operations and Maintenance of (IM&O) BMPs



Source: TRE Consulting, Inc/San Joaquin RTD



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# BMP Compliance Strategies

- ▶ **Value of a Comprehensive BMP and Stormwater Education and Outreach:**
  - Port operations
  - Tenant operations
- ▶ **Port Freeport:** has successfully integrated a comprehensive stormwater management program and BMPs in its Environmental Management System (EMS), in addition to periodic outreach/effective communication with Staff, Tenants, and Contractors".
- ▶ **Port of Long Beach:** has integrated it into one large industrial program which involves tenant education outreach and frequent tenant facility visits and corrective actions if necessary
- ▶ **Port of Seattle:** has integrated its municipal stormwater management and other compliance programs into its flagship ECAP is a tenant and industrial property Environmental Compliance Evaluation and Assessment Program (ECAP) which recently won AAPA's Comprehensive Environmental Management Program.
- ▶ **Effective Port Compliance Strategies:** Lease Language, Port Tariffs & Other Methods



# Impact of TMDLs on BMPs/Water Quality-Based Effluent Limitations:

- ▶ The Permittee shall use all known, available, and reasonable methods of prevention, control and treatment (*AKART*) to *prevent and control pollution of waters of the State of Washington*.
- ▶ TMDL-related permit requirements through future permit modification if States determines implementation of actions, monitoring or reporting necessary to demonstrate reasonable further progress toward achieving TMDL waste load allocations, and other targets, are not occurring and shall be implemented during the term of this permit or when this permit is reissued. Permittees are encouraged to participate in development of TMDLs within their jurisdiction and to begin implementation.
- ▶ Although MEP also rely on iterative BMP approaches through an interim Benchmark process, the TMDL will ultimately result in end-of-pipe, numeric limits for wet and dry weather discharges that do not account for differences in storm size.





# SUMMARY POINTS

- ▶ While all ports are different but many ports' BMP strategies have common threads/applications and are universally applicable across the board
- ▶ LOOK OUT FOR NUMERICAL STANDARDS COMING TO PORT AND MARITIME FACILITIES NEAR YOU
- ▶ For More Information Please Contact:

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