OOPS! THE HOUSE NEEDS SOME CLEANING

COMMON HOUSE KEEPING PROBLEMS AND WHAT TO DO ABOUT THEM

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Speaker

Claudia Akroyd, CHST, CISEC

BOWERS + KUBOTA CONSULTING

Project Inspector

Responsible for conducting independent inspections of DOT-HWYS Contract Construction projects in accordance with DOT-HWYS National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit on Oahu

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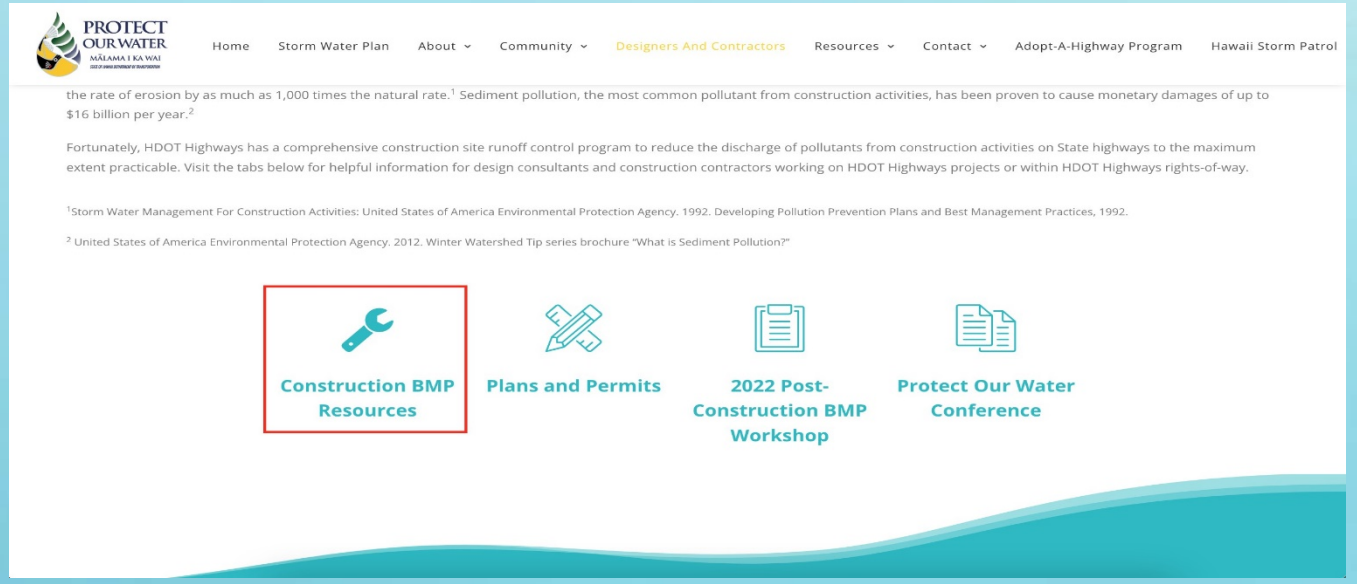
Purpose of Presentation

- Highlight some common mistakes
- Tools available to find the answers to your questions
  - Construction Best Management Practices Field Manual (Oct 2021)*
  - Stormwaterhawaii.com
    - Designers and Contractors



- Will take you to short videos on various subject by clicking on Training Videos
- Full presentation available by clicking on YouTube site at bottom of the page

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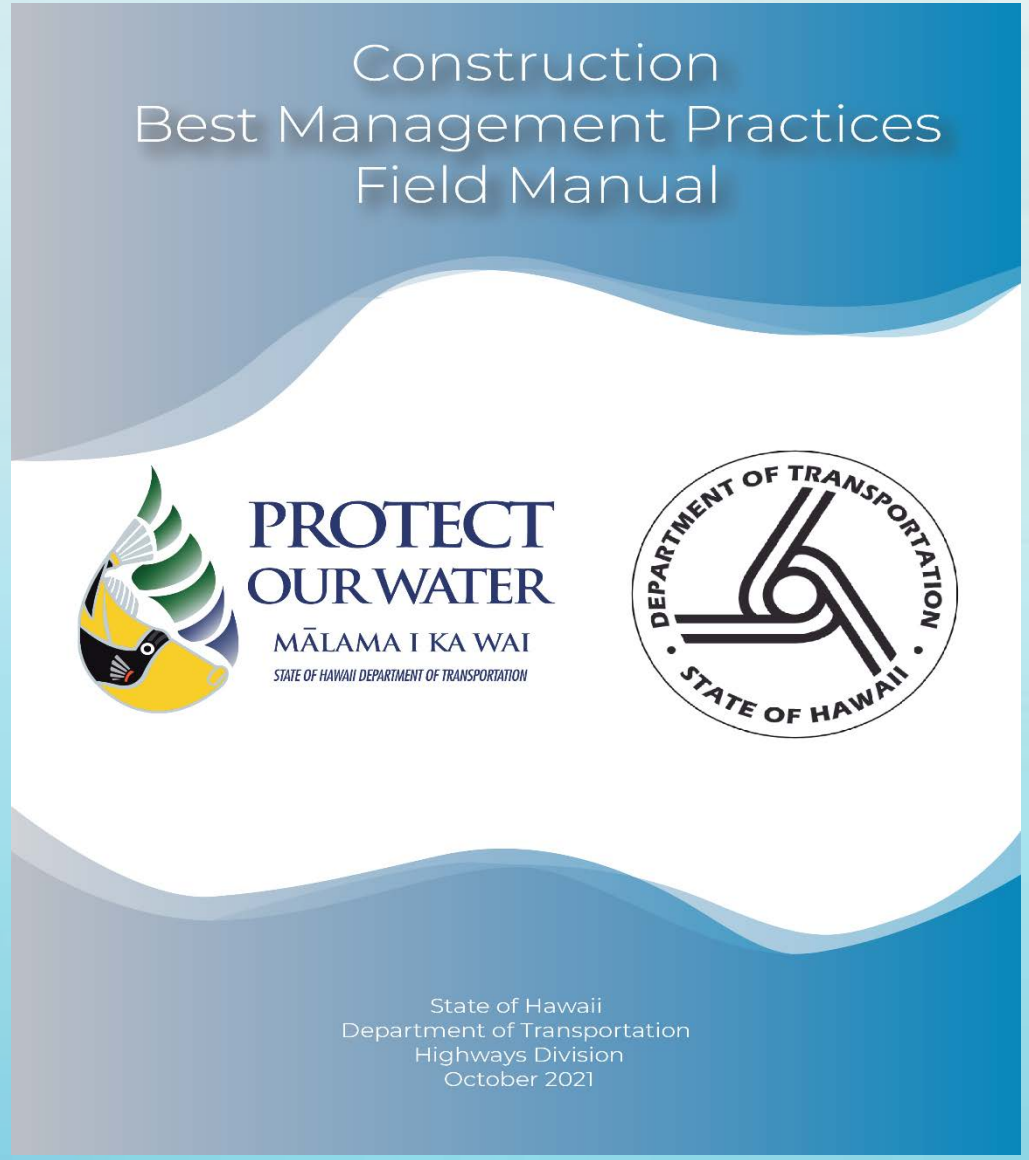

Emphasis

- Highlight some of the changes
- Translate or provide field application
- Some new additions to the Manual

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Manual Overview Table

Pick an operation – gives you the sections that apply

Table 1. Overview of Storm Water BMPs for Construction Operations

Construction Operation	BMP Category	BMPs	BMP Reference
Mobilization	Sediment Control	Street Sweeping	SC-11
		Stabilized Construction Entrance/Exit	SC-11
	Tracking Control	Stabilized Construction Roadway	SC-10
		Entrance/Outlet Tire Wash	SC-11
		Material Delivery and Storage	SM-2
	Waste Management and Materials Pollution Control	Material Use	SM-2
		Spill Prevention and Control	SM-10
		Solid Waste Management	SM-6
		Hazardous Waste Management	SM-9
		Sanitary Waste Management	SM-7
Clearing/ Grubbing	Soil Stabilization	Scheduling	SM-14
		Preservation of Existing Vegetation	SM-17
		Hydraulic Mulch	EC-13, EC-15
		Hydroseeding	EC-13
		Soil Binders	EC-16
		Straw Mulch	EC-14
		Geotextiles, Plastic Covers & Erosion Control Blankets/Mats	EC-11
		Wood Mulching	EC-14
		Earth Dikes/Drainage Swales & Lined Ditches	EC-5
		Outlet Protection/Velocity Dissipation Devices	EC-8
		Slope Drains/Subsurface Drains	EC-7
	Sediment Control	Silt Fence	SC-7
		Desilting Basin	SC-5
		Sediment Trap/Filter Bags	SC-4
		Check Dam	SC-3
		Compost Filter Socks	SC-6
		Gravel Bag Berm	SC-9
		Street Sweeping	SC-11
		Sandbag Barrier	SC-8
		Storm Drain Inlet Protection	SC-1
	Wind Erosion Control	Dust Control	SM-19

BMPs for Construction Operations (continued)

BMPs	BMP Reference
hicle and Equipment Cleaning	SM-11
hicle and Equipment Maintenance	SM-12
hicle and Equipment Refueling	SM-13
kpile Management	SM-3
d Waste Management	SM-6
taminated Waste Management	SM-8
duling	SM-14
ervation of Existing Vegetation	SM-17
aulic Mulch	EC-13, EC-15
oseeding	EC-13
linders	EC-16
Mulch	EC-14
xtiles, Plastic Covers & Erosion ol Blankets/Mats	EC-11
Mulching	EC-14
Dikes/Drainage Swales & Lined s	EC-5
Protection/Velocity Dissipation s	EC-8
rains/Subsurface Drains	EC-7
ce	SC-7
g Basin	SC-5
nt Trap/Filter Bags	SC-4
am	SC-3
t Filter Socks	SC-6
ag Berm	SC-9
veeping	SC-11
Barrier	SC-8
ain Inlet Protection	SC-1
d Construction Entrance/Exit	SC-11
trol	SM-19

Water BMPs for Construction Operations (continued)

BMPs	BMP Reference
Temporary Stream Crossing	EC-1
Vehicle and Equipment Cleaning	SM-11
Vehicle and Equipment Maintenance	SM-12
Vehicle and Equipment Refueling	SM-13
ntaminated Soil Management	SM-8
et Sweeping	SM-20
lized Construction Entrance/Exit	SC-11
and Grinding Operations	SM-20
Delivery and Storage	SM-2
Use	SM-2
Management	SM-2
e Management	SM-3
aste Management	SM-6
in	SM-4
o/Filter Bags	SC-5
t Protection	SC-4
nage Swales & Lined	SC-3
Velocity Dissipation	SC-1
s	EC-5
perations	EC-8
sing	SM-18
cleaning	SM-20
laintenance	EC-1
	SM-11
	SM-13

erations (continued)

	BMP Reference
	SM-2
	SM-2
	SM-3
	SM-10
	SM-6
ment	SM-9
nent	SM-4
erations	SM-20
ssing	EC-1
Storage	SM-2
	SM-2
ent	SM-3
ement	SM-6
Management	SM-9
Management	SM-4
	SC-11
et Protection	SC-1
struction Entrance/Exit	SC-11
quipment Cleaning	SM-11
Equipment Maintenance	SM-12
Equipment Refueling	SM-13
elivery and Storage	SM-2
Use	SM-2
e Management	SM-3
aste Management	SM-6
ous Waste Management	SM-9
ete Waste Management	SM-4
t Sweeping	SC-11
m Drain Inlet Protection	SC-1
ockpile Management	SM-3

of Storm Water BMPs for Construction Operations (continued)

Category	BMPs	BMP Reference
	Scheduling	SM-14
	Preservation of Existing Vegetation	SM-17
	Hydraulic Mulch	EC-13, EC-15
	Hydroseeding	EC-13
	Soil Binders	EC-16
	Straw Mulch	EC-14
	Geotextiles, Plastic Covers & Erosion Control Blankets/Mats	EC-11
	Wood Mulching	EC-14
	arth Dikes/Drainage Swales & Lined ches	EC-5
	et Protection/Velocity Dissipation es	EC-8
	nce	SC-7
	veeping	SC-11
	Barrier	SC-8
	n Inlet Protection	SC-1
	uipment Cleaning	SM-19
	nd Storage	SM-11
		SM-2
		SM-2

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Table 1. Overview of Storm Water BMPs for Construction Operations (continued)

Construction Operation	BMP Category	BMPs	BMP Reference
Erosion Control, Highway Planting, and Landscaping	Soil Stabilization	Scheduling	SM-14
		Preservation of Existing Vegetation	SM-17
		Hydraulic Mulch	EC-13, EC-15
		Hydroseeding	EC-13
		Soil Binders	EC-16
		Straw Mulch	EC-14
		Geotextiles, Plastic Covers & Erosion Control Blankets/Mats	EC-11
		Wood Mulching	EC-14
		Earth Dikes/Drainage Swales & Lined Ditches	EC-5
		Outlet Protection/Velocity Dissipation Devices	EC-8
	Sediment Control	Silt Fence	SC-7
		Street Sweeping	SC-11
		Sandbag Barrier	SC-8
		Storm Drain Inlet Protection	SC-1
	Wind Erosion Control	Dust Control	SM-19
	Non-Storm Water Control	Vehicle and Equipment Cleaning	SM-11
	Waste Management and Materials Pollution Control	Material Delivery and Storage	SM-2
		Material Use	SM-2

Pick an operation – gives you the sections that apply

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SM-2 Material Storage and Handling

Material Storage and Handling

SM-2

Description

Practices and procedures to promote proper handling, storage, and use of construction materials in a manner that minimizes or eliminates storm water pollution, groundwater pollution, soil contamination, and injury to workers or visitors.

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Table SM-2.1

Proper storage and handling of material commonly found on construction sites

Table SM-2.1 Proper storage and handling of materials commonly found on construction sites

Materials Commonly Found on Construction Sites	Proper Material Storage and Handling
• Soil • Fill • Aggregate	• Designate a material storage area. • Locate stored materials away from inlets, concentrated flows and open waterbodies. • Cover stored materials containing fines with an impermeable material to prevent erosion caused by storm water and wind. • Place a compost filter sock, silt fence, or similar sediment barrier device at the base of material stockpiles. • *See* section SM-3 Stockpile Management.
• Soil stabilizers and binders • Fertilizers • Pesticides and herbicides • Detergents • Plasters	• Designate a material storage area. • Locate stored materials away from inlets, concentrated flows and open waterbodies. • Store materials on proper dunnage, pallet, or similar materials to elevate off the ground. • Cover stored materials with an impermeable material to prevent contact with storm water. • Tightly seal container lids when not in use. • Do not apply fertilizer or herbicides during or just before a rain event. • Materials shall be in sealed and properly labeled bags or containers. • All liquid materials shall be stored with an appropriately sized secondary containment.
• All metals, including galvanized metal • Rebar	• Rack materials off the ground on proper dunnage, pallet, or similar materials to elevate off the ground. • Cover all metal materials, including galvanized metals and rebar, with an impermeable material to prevent contact with storm water.

Table SM-2.1 Proper storage and handling of materials commonly found on construction sites (continued)

Materials Commonly Found on Construction Sites	Proper Material Storage and Handling
• Asphalt • Asphalt products (i.e., cold patch, tack coat, etc.) • Concrete products (i.e., cold curing compound, form release agents, etc.)	• Designate a material storage area. • Locate stored materials away from inlets, concentrated flows and open waterbodies. • Store materials on proper dunnage, pallet, or similar materials to elevate off the ground. • Cover asphalt and concrete products with an impermeable material to prevent contact with storm water. • Seal in a properly labeled container with a secure lid when not in use. • Provide appropriately sized secondary containment for asphalt and concrete products.
• Hazardous materials: acids, lime, glues, paints, solvents, curing compounds, etc. • Petroleum products: fuel, oil, hydraulic fluid, and grease • Creosote-soaked materials	• Designate a material storage area. • Locate stored materials away from concentrated flows, inlets, and open waterbodies. • Cover stored materials with an impermeable material to prevent contact with storm water. • Hazardous materials shall be labeled and stored in the original containers. • Provide appropriately sized secondary containment. • Properly dispose of containers only after all of the product has been used. • *See* section SM-9 Hazardous Materials and Waste Management.

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SM- 3 Stockpile Management

SM-3

Stockpile Management

Description

Stockpile protection measures to reduce the potential for air and water pollution originating from stockpiles of construction materials and spoil piles. Stockpiled materials may include soil, Portland cement concrete (PCC), asphalt concrete, cold mix asphalt, and aggregate. Spoil piles may include materials excavated from a trench, tunnel, shaft or other excavation activity.

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SM- 3 Stockpile Management

Manual provides a quick chart covering most things often stockpiled
Quick Reference Table SM-3.1

Table SM-3.1 Common stockpiled materials and example BMPs

Common Stockpile Material	Examples of BMPs
• Soil • Topsoil • Excavated material • Imported material • Spoil piles	• Cover stockpile with either: – 10 mil plastic sheeting or comparable impermeable material. – soil stabilization measures (i.e., hydromulch, tackifier). • Protect stockpile with a temporary perimeter sediment barrier.

Table SM-3.1 Common stockpiled materials and example BMPs (continued)

Common Stockpile Material	Examples of BMPs
• PCC – Rubble – Crushed – Hardened – Saw cut	• Cover with 10 mil plastic sheeting or comparable impermeable material (applicable if fines are present). • Protect stockpile with a temporary perimeter sediment barrier.
• Asphalt – Hot mix asphalt – Asphalt cement (cold mix) – Rubble – Reclaimed asphalt pavement – Cold planed material	• Cover with 10 mil plastic sheeting or comparable impermeable material. • Protect stockpile with a temporary perimeter sediment barrier. • Asphalt (cold mix and hot mix) must be stored on an impervious material.
• Aggregate – Base – Sub-base	• Cover with 10 mil plastic sheeting or comparable impermeable material. • Protect stockpile with a temporary perimeter sediment barrier.
• Treated wood – Creosote telephone poles	• Cover with 10 mil plastic sheeting or comparable impermeable material at all times. • Rack materials off the ground or place on top of impermeable material.

SM- 3 Stockpile Management

Quick Reference Table SM-3.1 – Note common items

Table SM-3.1 Common stockpiled materials and example BMPs

Common Stockpile Material	Examples of BMPs
• Soil • Topsoil • Excavated material • Imported material • Spoil piles	• Cover stockpile with either: – 10 mil plastic sheeting or comparable impermeable material. – soil stabilization measures (i.e., hydromulch, tackifier). • Protect stockpile with a temporary perimeter sediment barrier.

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• Treated wood – Creosote telephone poles	• Cover with 10 mil plastic sheeting or comparable impermeable material at all times. • Rack materials off the ground or place on top of impermeable material.

Common Errors

Spoil pile perimeter is not site perimeter

Pile perimeter and site perimeter are two separate things

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Use of Jersey Barriers or K-rails

- Barriers often used to create large cells for stock or spoil piles.
- **NOT** considered a BMP for perimeter control
- Perimeter control must be separate from the stock or spoil pile perimeter.

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Use of Jersey Barriers or K-rails

- Barriers have gaps between, through and under
- Also need site or area perimeter (outside camera shot)

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Mixing Spoils

- See SM-20 Paving Operations
- "If waste asphalt (new) must be stored, rather than removed….."
- "It cannot be stored in dirt or rubble piles"
- See Table SM-3.1 for storage requirement

Asphalt – Hot mix asphalt – Asphalt cement (cold mix) – Rubble – Reclaimed asphalt pavement – Cold planed material	• Cover with 10 mil plastic sheeting or comparable impermeable material. • Protect stockpile with a temporary perimeter sediment barrier. • Asphalt (cold mix and hot mix) must be stored on an impervious material.

SM -4 Concrete Wash and Waste Management

SM-4

Concrete Wash and Waste Management

Description

Practices and procedures to manage concrete/cementitious products, washout, and waste to prevent discharges to the ground, the drainage system, or adjacent waterbodies.

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SM-4 Applies to:

Table SM-4.1 Commonly used cementitious products.

Commonly Used Cementitious Products
• Concrete • Mortar • Plaster • Stucco • Grout • Cement-Treated Base (CTB)

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What do they have in common?

- CEMENT – This is the hazardous element
- Other components are various levels of water, sand or aggregate that are not hazardous by themselves
- Wash water and/or waste, especially while wet, are the main concern for contaminant.
- Need to consider fines when sawcutting
- Water displaced when placing concrete, such as with a tremie pour, is considered contaminated as with wash water.

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Washouts

Type of Washout

Considerations

- Construction – Ready made or contractor constructed
- Size
- Location – Can leave to dry

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Preparation for Pour

Anticipate amount of concrete waste for size of washout then add more

Where is the wash out?
Using top of traffic barrels.

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Standard Inground Washout

Washout has holes in plastic

- Must have one continuous sheet of at least 10 mil plastic
- NO holes
- NO overlaps
- Fill to only 75%

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Washout Leaks/Blobs

Even commercial washouts can leak

Recommend a washout monitor

Recommend add a secondary containment to any washout

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Sawcut fines/Rubble

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Paving

Asphalt Cement Waste Management

SM-5

Description

Practices and procedures to prevent asphalt cement millings and waste from discharging into the drainage system or adjacent waterbodies.

Paving Operations

SM-20

Description

Practices and procedures to prevent or reduce the discharge of pollutants into the storm drain system or adjacent waterbodies from paving, sawcutting, or grinding activities.

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Drip Protection (SM-5, SM-16 & SM-20)*

- Paving equipment requires pad
- 10 mil plastic under geotextile fabric with downslope berm <u>under the plastic</u>
- Best to make plastic slightly larger than fabric
- Fabric repairable, plastic is <u>not</u> – plastic must be replaced

*SM-5: Asphalt Waste Management
SM-16: Staging Area
SM-20: Paving Operations

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Why you need a drip pad !

- Oily residue remains in the hopper and on roller assembly
- Drip pan too small – can't get under the hopper or roller assembly
- Rain will cause an oil slick out the back of paving equipment
- Pad required by SM-5 (Asphalt Waste Management), SM-16(Staging Area) and SM-20 (Paving Operations)

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Typical Paving Operations Waste

Bad examples one and all

Cold Planed Material

Asphalt in inlet on top of protection

Waste on bare ground

Asphalt waste mixed with dirt/rubble pile

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Paving near GDI

- Clean drains **immediately** when done paving before leaving the site
- Asphalt does not allow drainage
- Duct tape and plastic can be your friend – easy clean up

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SC-11 Stabilized Construction Entrance/Exit

Stabilized Construction Entrance/Exit

SC-11

Description

Designated areas for entry and/or exit from a construction site to reduce the amount of sediment tracked off-site by construction vehicles.

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SC-11 Stabilized Construction Entrance/Exit Requirements

- BMP Manual – "Stabilized construction entrances/exits shall be used at all points where access to a construction site from paved roads is required."
- Section 209 Amended of the Special Provisions 2005 Standard Specifications: "Include Stabilized Construction Entrance at all points that exit onto paved roads."
- Para 5.1.2.3.2, HAR 11-55, Appendix C: "Use appropriate techniques at all points that exit onto paved roads so that sediment removal occurs prior to the vehicle exit."
- BOTTOM LINE: You need a construction entrance/exit when ever you go from soil to asphalt.

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SC-11 Stabilized Construction Entrance/Exit Examples

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SC-11 Stabilized Construction Entrance/Exit Examples Cont. "Modified entrance/exit"

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Thinking Outside the Box

Geoterra Grid use for load distribution for boggy area

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Tire Washing – SC 11

- Size for load with minimum 50 ft. from state waters
- Auto shut off valves
- Wash water must be retained on project site
- Drain to properly constructed sediment trap or similar devise
- Seeping into construction entrance NOT ALLOWED

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Water

- Cannot wash down roads – SC-11
- Must use sediment trapping devise to wash tires – SC-11
- Critical Deficiency – "Any observed discharge or evidence of discharge …..generated by construction activity."
- Water in a water generating equipment regardless of source of water is considered "construction water":
  - Water trucks
  - Trident Barriers
  - Cold planning equipment
  - Rollers

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Potential Critical Deficiencies

- Trident barriers leak or are drained
- Water runs to inlets
- If enters drainage system considered a critical deficiency
- In this case scuppers plugged with catchment system in place under scuppers

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Actual Critical Deficiency – Key point is inlet protection does not block drain

Cold planer create puddle of water/slurry mix

Inlet has inlet protection

Slurry mix enters the drain – proof on the walls of the drain box

Water/slurry mix runs to inlet

Big clue you have a discharge – Water level in front of inlet protection does not keep rising as more water is added

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Water Trucks/Buffalos – Careful where you park it

Cited as a Critical Deficiency

- Water from construction equipment is “construction water” regardless of source
- Goes into a drain – Critical deficiency
- Critical deficiency is any discharge of construction water to storm drain system, surface waters, or State waters
- Construction water is water from construction activities or construction equipment.

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Water Trucks- Not good but not great

No drains in area – fabric wicked water to plastic under the biosock

No drains in area – percolate into the ground

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Staging Area

SM-16

Description

An approved location, designated in the *Storm Water Pollution Prevention Plan (SWPPP)*, where construction equipment, vehicles, materials, and other construction-related materials are stored. Staging areas can be a significant point source for pollution, so BMPs are necessary to ensure no contaminated storm water exits the site.

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General Requirements

- Locations identified in the SWPPP
- SWPPP must allow stock/spoil piles
- If area is not specifically identified – AMEND THE SWPPP
- Area included in project disturbed area – Cumulative
- Layout

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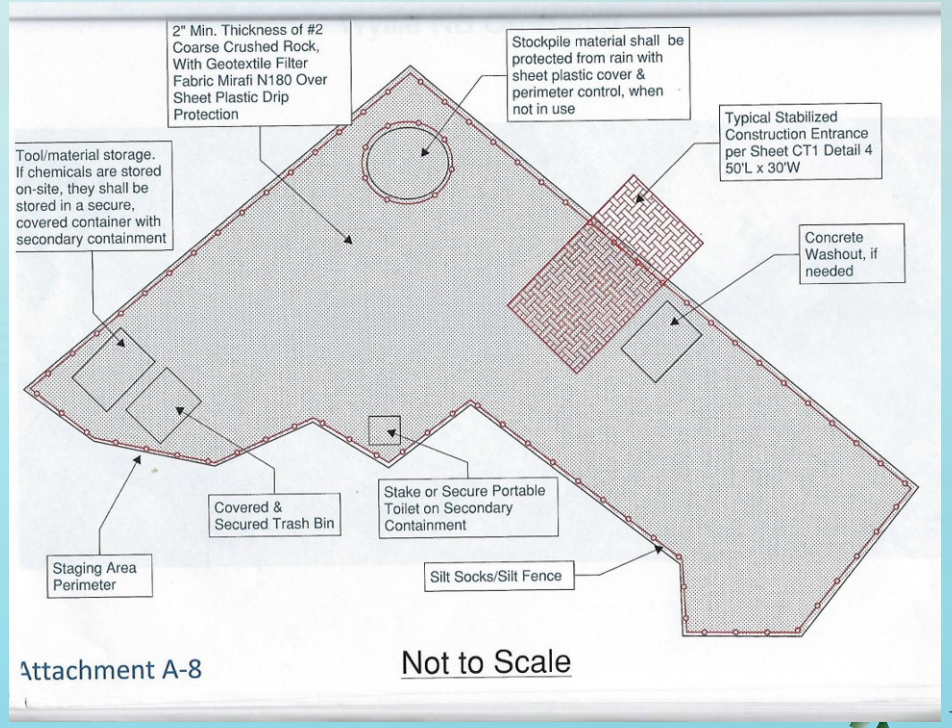
Location/Layout Examples



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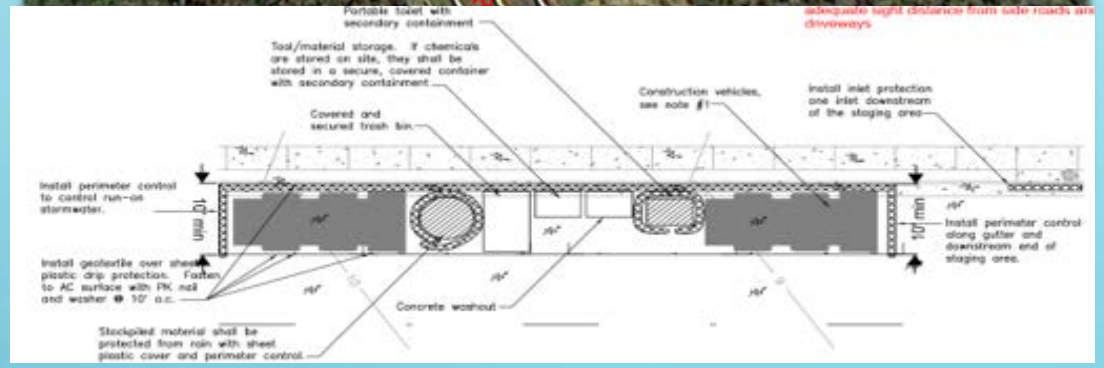
Paving Project Example



- Long and linear
- Can include a standard layout for shoulder staging area
- May not be specifically identified at SWPPP development
- Again, must specify area – Amendment
- May need to add acreage to project acreage if not in construction area

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Construction Road and Parking Lot Stabilization

SC-10

Description

Stabilization and maintenance of temporary construction roads and parking areas after grading to minimize erosion and dust from vehicular traffic.

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Construction of temporary construction roads/parking area

Table SC-10.1 Allowable and not allowable materials used for temporary construction roads and parking areas.

Allowable Materials	Not Allowable Materials
• Aggregate • Concrete • Asphalt cement • Compacted base course	• Cold mix asphalt • Uncompacted and compacted asphalt cement grindings • Crushed concrete • Concrete-treated Base

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Construction entrance with construction road

- Construction entrance is 3”-6”
- Construction road is 2-3” aggregate
- Geotextile fabric under aggregate

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Sanitary Waste Management

SM-7

Description

Practices and procedures to reduce or prevent the discharge of sanitary wastes from construction sites into the storm drain system or adjacent waterbodies.

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Securing the Portable Toilet

- Photo is the bottom of blown over portable toilet
- Secure the portable Toilet from tipping over
  - Straps
  - Stakes
  - Similar devises

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Location, Location, Location

Position away from area where they may get knocked over

Position away from drainage structures

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Hazardous Materials

SM-2 Material Storage and Handling

- Secondary Containment
- Containment must be able to retain 100% of largest container or 10% of all containers
- Cover metal containers
- All product containers must have Globally Harmonized System (GHS) Labels
- All containers labeled as to contents
- No more than stacked 2 containers high – unless secured from tipping over

SM-9 Hazardous Materials and Waste Management

- Restates much of what is in SM-2
- Provides list of examples of hazardous materials
- Provides more information on disposal requirements and storage of the waste prior to disposal.

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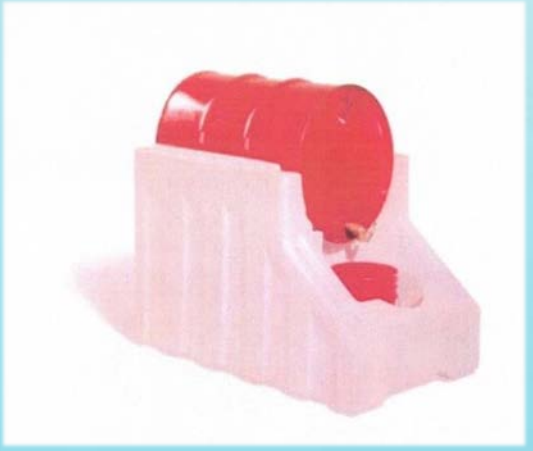
Containment Systems

Commercial



Contractor Constructed

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Contractor Constructed

Plastic under biosock – no containment

Plastic over biosock – creates pool Best to cover to prevent water collection

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Cover Metal Containers – Prevents rust

Berm

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Inadequate Labeling

Container has “Retarder” written on lid with Sharpie pen

Contractor provided proper label

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Reuse of Totes

- Must be labeled as to contents
- May need secondary containment depending on contents
- Valve at bottom can drain contents

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•Questions?

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