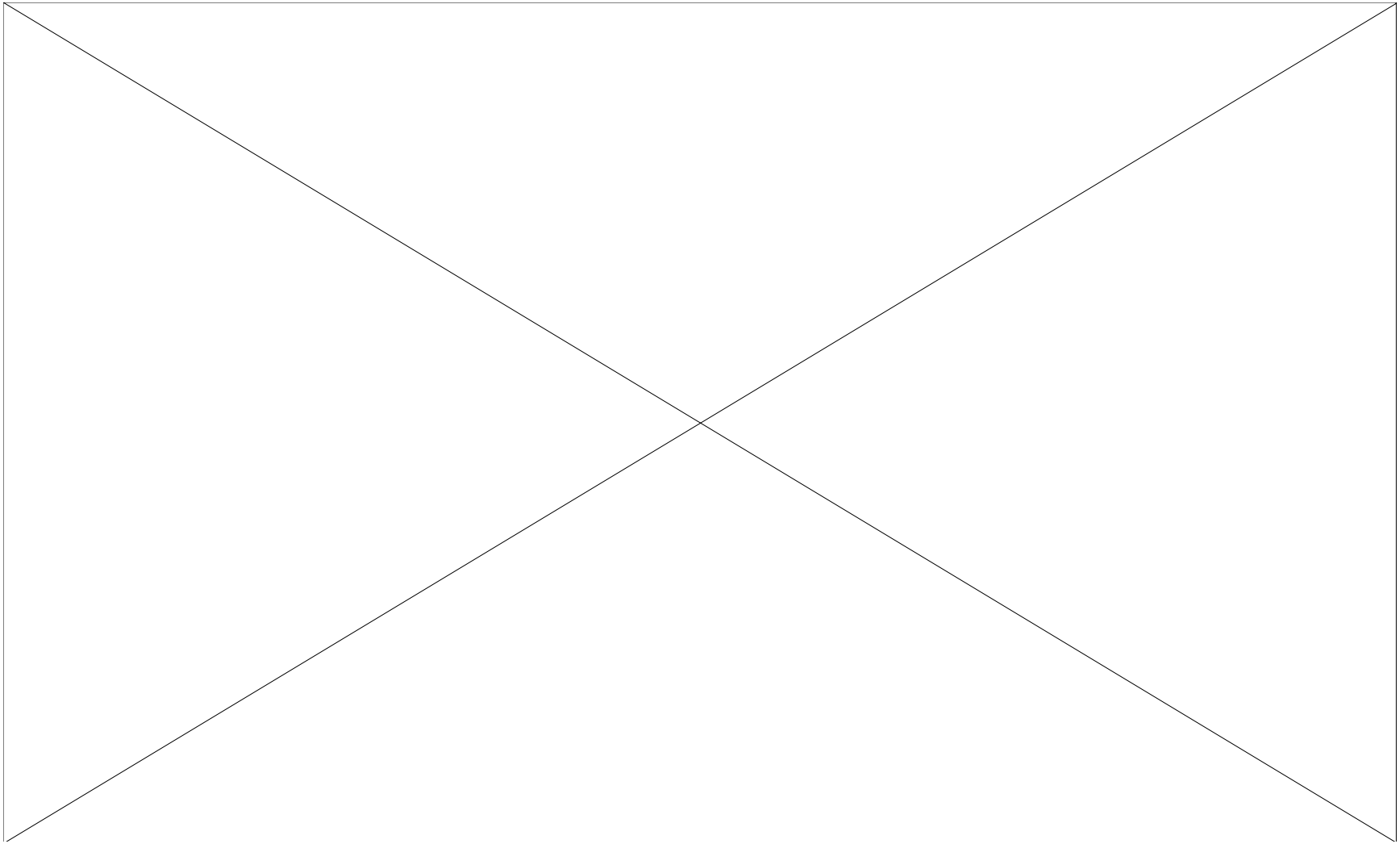


What Flows Off A Construction Site?

Lorraine Joubert
URI Cooperative Extension, NEMO

What is an “Illicit Discharge?

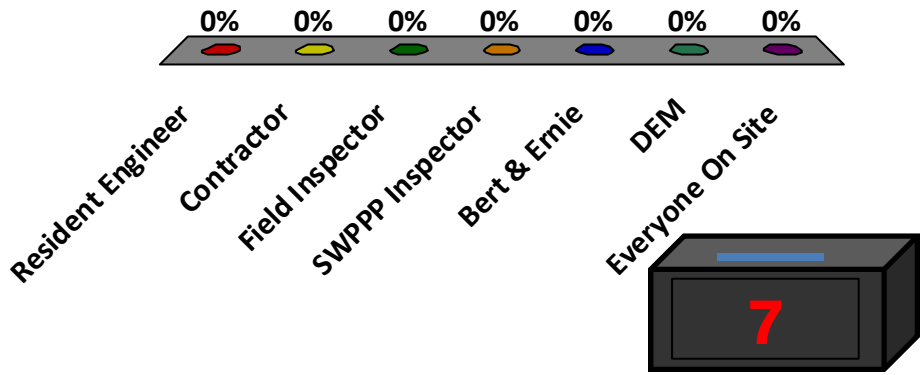
“any discharge to the municipal separate storm sewer system that is not composed entirely of stormwater” – EPA

Corrective Measures:

“Illicit Discharge Detection and Elimination (IDDE)” – EPA

What are the Top 3 “illicit discharge” pollutants from RIDOT Construction Sites?

1. Sediment
2. Concrete washout
3. Trash
4. All of the above



RIDOT Pollution Problem #1
Sediment

How it happens:

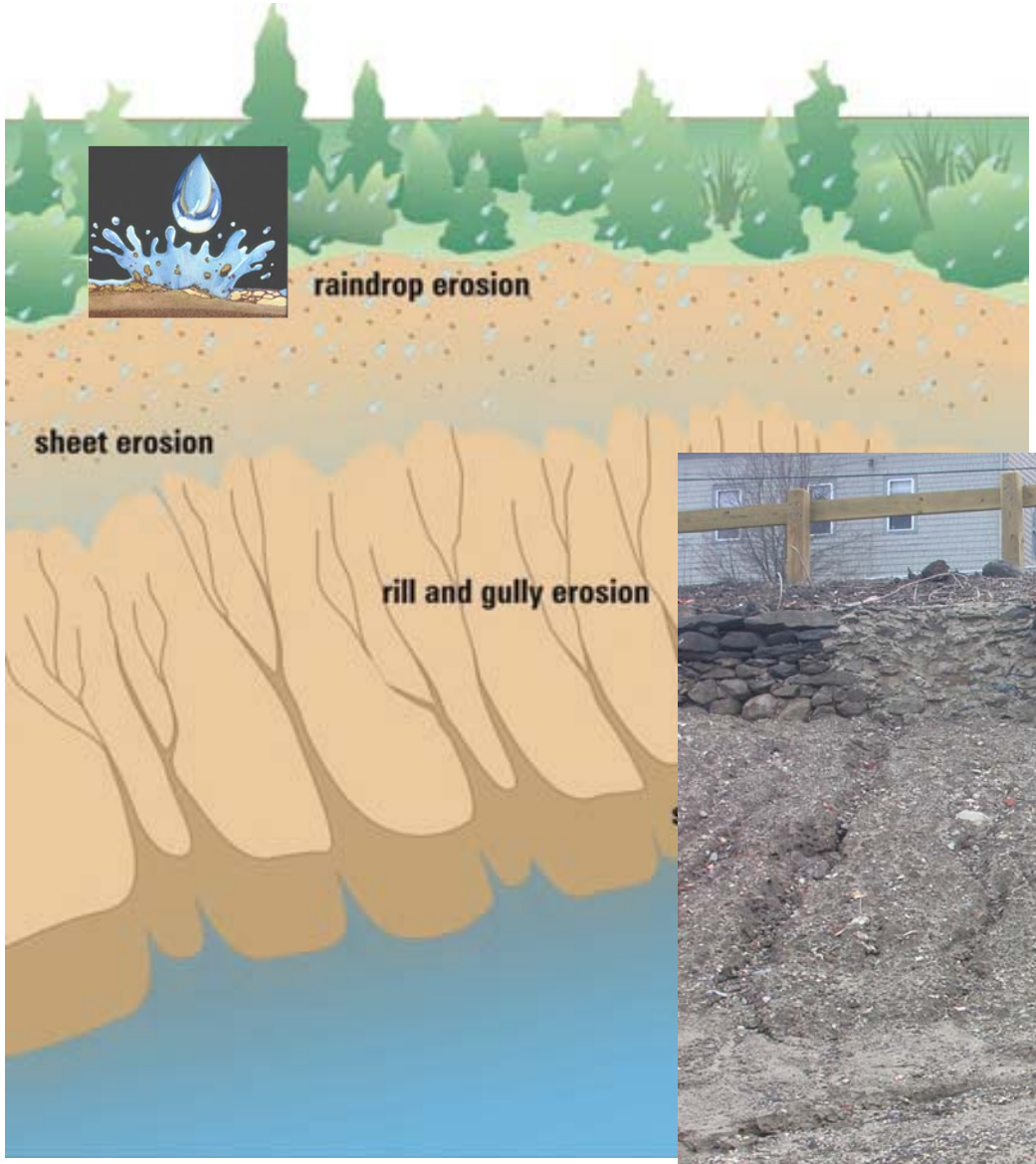
→ Erosion

→ Runoff

→ Sedimentation

Erosion

Raindrops and flowing water dislodge soil



Source: USEPA-833-R-06-004 May 2007

Source: RIDEM – RIPDES Permitting Program

Runoff

Stormwater transports the eroded soil as suspended sediment

Suspended sediment can be transported long distances.

Silt and other fine particles can remain in suspension for a long time.

Sedimentation

- Eroded materials are deposited.

Effect of fine sediment on fish and other aquatic life?

First let's look at a healthy trout stream.

Effect of fine sediment on fish and other aquatic life

- Smother fish eggs and macroinvertebrates
- Clogs fish gills
- Reduces disease resistance
- Lowers growth rates, leads to increased mortality
- Leads to shift from cold water to pollution tolerate species, reduced habitat diversity.
- Duration of high total suspended solids (TSS) events is as critical as the concentration of TSS.

Effect of heavy sediment on streams

- Blankets stream bottom , altering habitat
- Suspended sediment reduces light entering stream
- Increases water temperature, lowers dissolved oxygen.
- Makes streams shallower and warmer.

- Clogs stormdrains and stream channels.
- Causes flooding.

Sediment also carries attached nutrients:

Phosphorus and Nitrogen.

These stimulate growth of algae and aquatic plants.

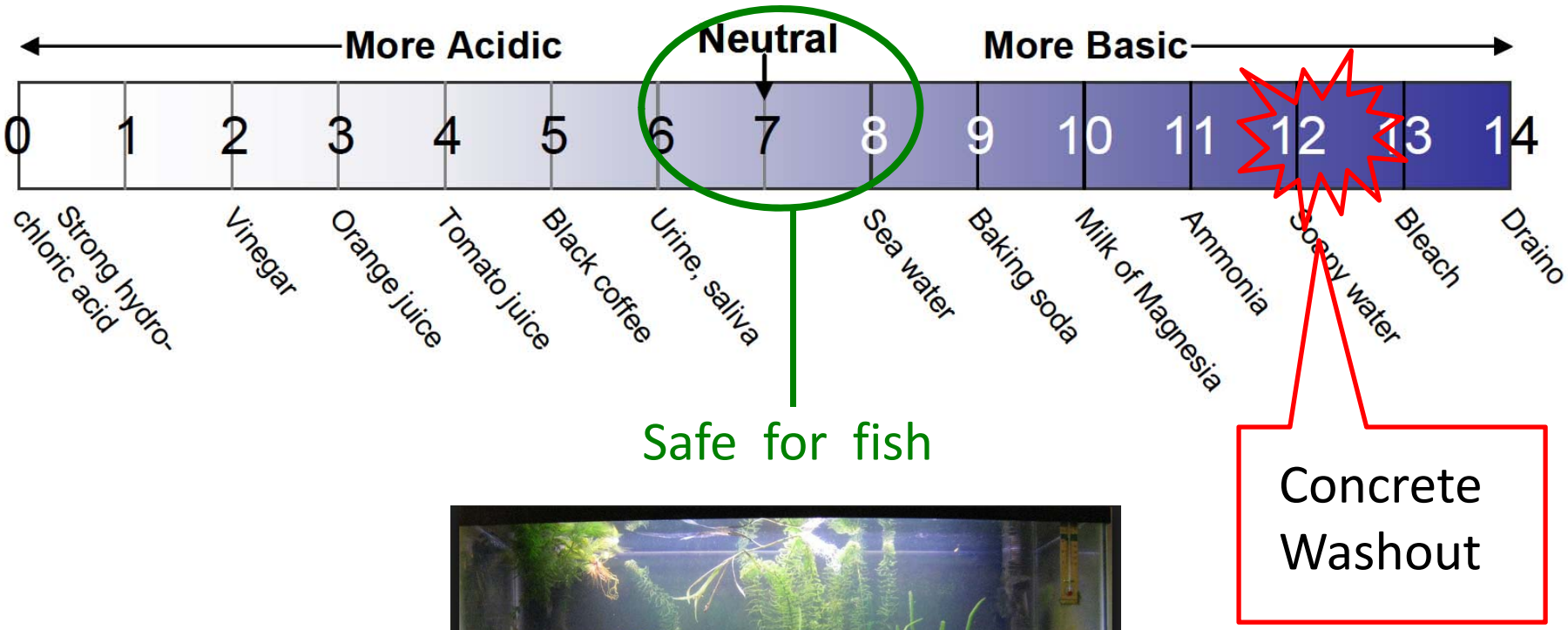
Nitrogen affects coastal waters

Phosphorus affects freshwater

Organic matter from algae and aquatic plants affects taste & odor of drinking water.

RIDOT Pollution Problem #2
Concrete Washout

pH



The scale is logarithmic:
1 unit change in pH = a ten-fold change.

Storm drain marker on URI campus with normal wear

Storm drain marker after contact with concrete washout

Concrete Washout Solutions

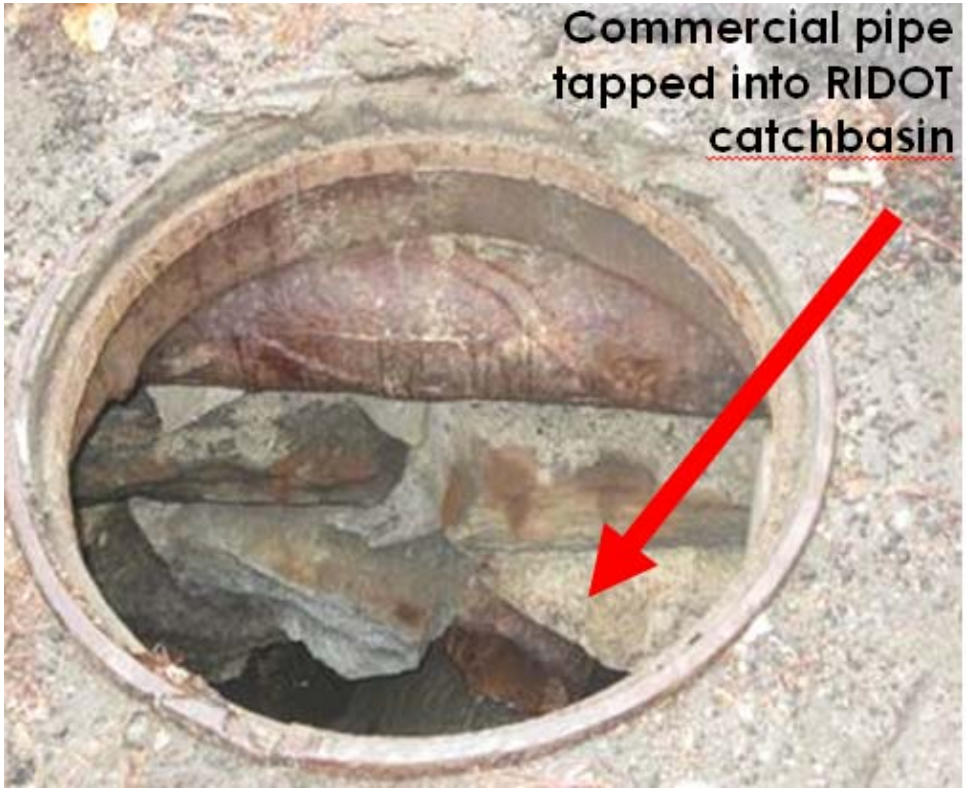
- Contain and properly dispose of 100% of the waste
- Designate a wash out area with clear signage
- Cover any stockpiles contaminated with concrete dust

RIDOT Pollution Problem #3
Trash

Solutions

- Keep trash contained and covered.
- Clean up daily.

One More Problem to Look out for
Illicit Connections



Illicit Connection – Any unauthorized pipe, ditch, or other manmade structure that is physically connected to RIDOT's

Illicit Connections

What is it?

Any unauthorized pipe, ditch, or other manmade structure that is physically connected to RIDOT's

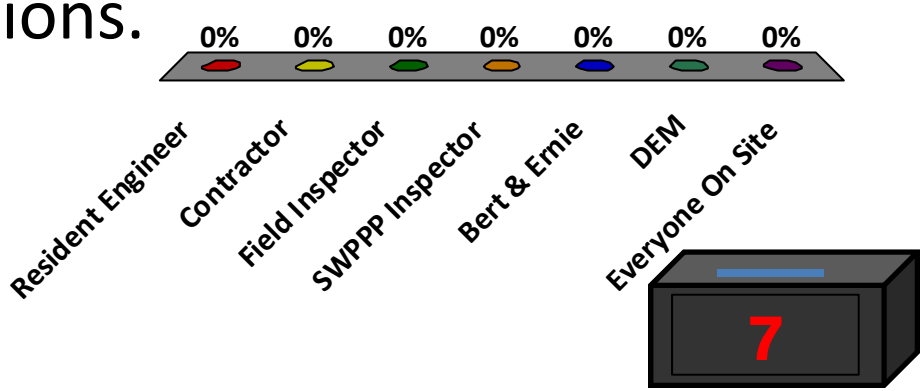
What to look for?

- Pipes, hoses or waterflows not part of the RIDOT drainage system.
- Look for "dry weather" flows (no rain in 3 days)
- Look / sniff for signs of sewage (toilet paper, odor, grey water, staining) in RIDOT pipes & outfalls.

Summary Quiz

How can you control illicit discharges?

1. Keep stockpiles covered.
2. Use gravel construction entrance.s
3. Contain 100% of Concrete washout.
4. Keep trash contained & covered.
5. Look out for illicit connections.
6. All of the above.



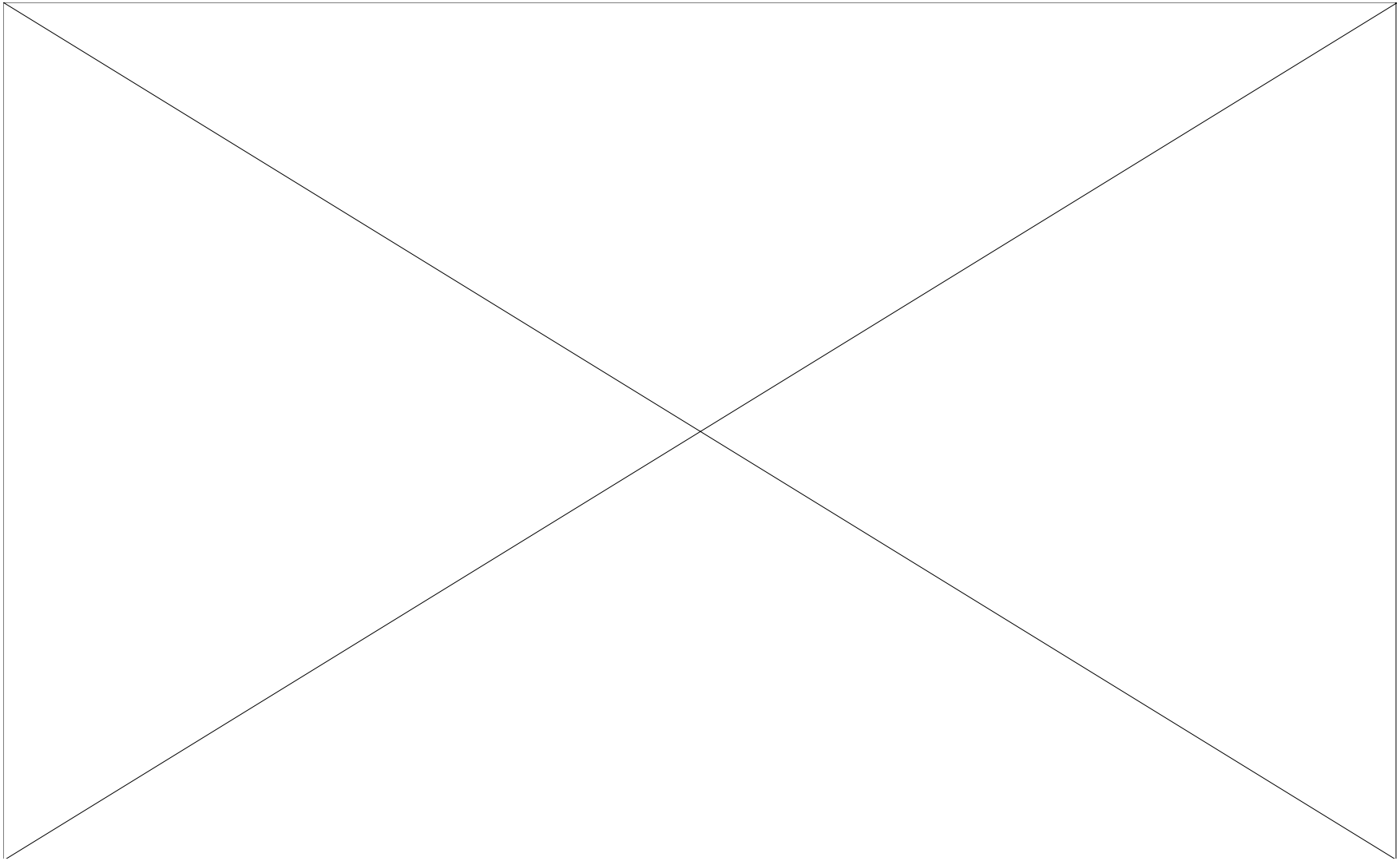
Case Studies

Live and Learn?

RI dot Driven to get you there

THE UNIVERSITY OF RHODE ISLAND

THINK BIG WE DO™



Route 403

An Evolution of E&S Controls

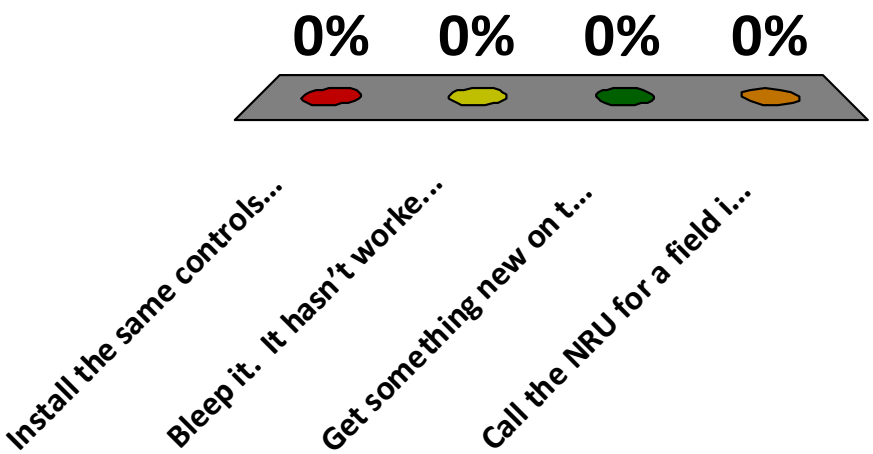
A slope keeps washing out, even though E&S controls are installed according to plans. WWYD?

A. Install the same controls again. That's what's on the plan!

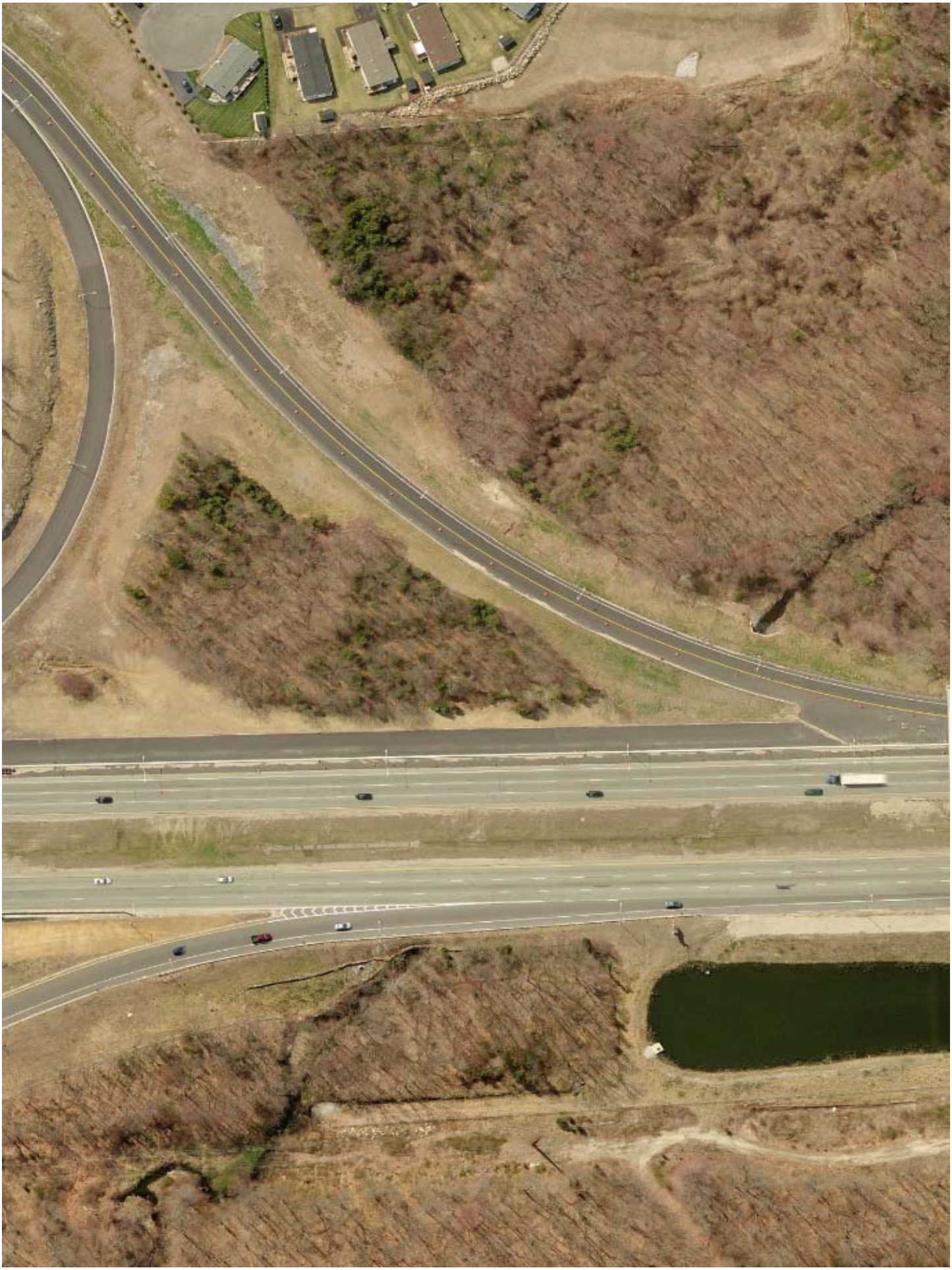
B. Bleep it. It hasn't worked so far. Why bother?

C. Get something new on that slope!

D. Call the NRU for a field inspection on Friday at 12:30.



27 10:45AM



Flowing water made the Grand Canyon… what makes us think Haybales will stop it?

GRADALL
XL 5

Compost Filter Sock

Standard Specification

Section 200 –
Earthwork & Erosion Control

–206: Perimeter Erosion Controls
–207: Check Dams

–212: Maintenance & Cleaning of Erosion & Pollution Controls

Materials Specification

- AASHTO R: 51-13

SOLUTIONS

Insanity: Doing The Same Thing Over And Over Again And Expecting Different Results.

– Albert Einstein

- Use Force Account to use new BMPs
  - Stop spending bad money after bad money
- How can the NRU help?
  - Add/Edit/Delete Contract Language
  - Field visits to assess & recommend BMPs

Sakonnet River Bridge

Contractor Compliance Strategies

A contractor fails to maintain E&S controls…repeatedly. Intentionally. WWYD?

A. Ahhh…he's a good guy. He's doing his best.

B. Nothing - the SWPPP is covering it.

C. Use a tiered fine.

D. Ask the contractor to stop doing that….*pretty please*.

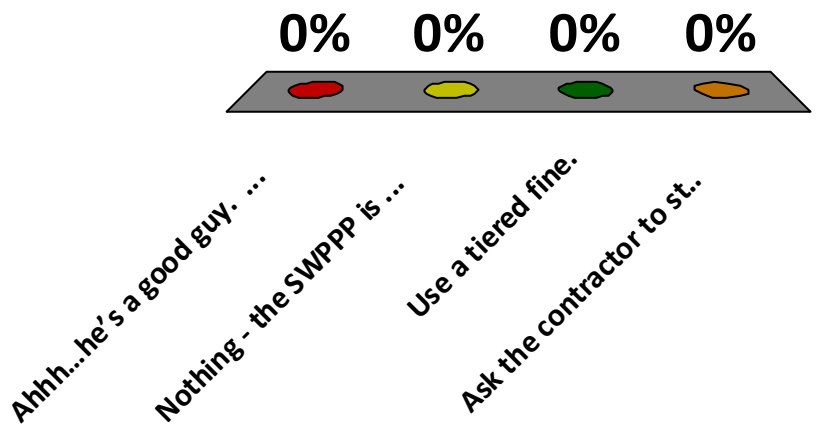
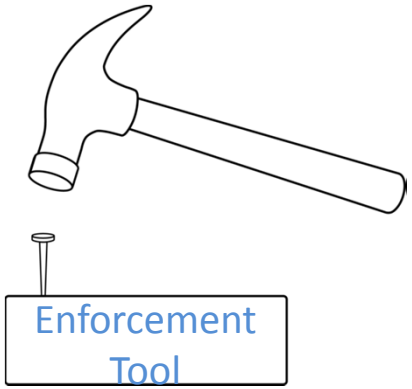


Photo by RIDOT

Photo by Richard W Dionne Jr



Contract Language

Tiered
Fines

CODE 212-1000

Failure to Maintain Erosion and Pollution Controls

<u>Description</u>: Subsection 212.03.3; Failure to Maintain Erosion & Pollution Controls

of the Standard Specifications requires that a charge be deducted from monies due the Contractor in the event that the

Engineer decides that the erosion and pollution controls are not in place or have not been

a

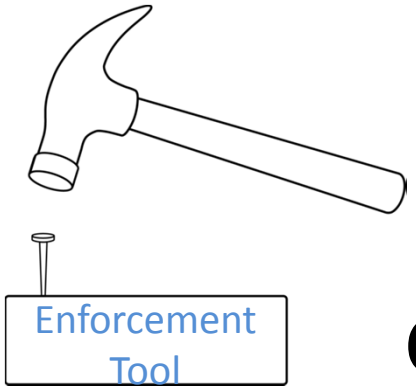
For the first violation the charge for this contract will be $ 1,000.00 per day.
For the second violation the charge for this contract will be $ 5,000.00 per day.
For the third violation the charge for this contract will be $ 10,000.00 per day.

Tl

e

The Contractor shall sign the SESC/SWPPP as the Operator prior to initiating contract work acknowledging that he understands the terms and conditions of the SESC/SWPPP and agrees to follow the Best Management Practices described in it.

The contractor shall be held responsible for any and all cost associated with fines and clean up activities over and above the penalty assessed herein resulting from contractor failure to comply with this JS and the contract environmental permits and approvals.



Permit Language

Consultant Inspector With Regular Communication

CRMC Assent required an

Independent Environmental Compliance Monitor

on site to oversee compliance

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

COASTAL RESOURCES MANAGEMENT COUNCIL
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, R.I. 02879-1900

(401) 783-3370
FAX: (401) 783-3767

ASSENT
(*corrected May 20, 2008)

CRMC File No.: 2006-04-002 CRMC Assent No.: *B2006-04-002

Whereas, **RI Department of Transportation**
of **2 Capitol Hill, Room 271**
Providence, RI 02903

has applied to the Coastal Resources Management Council for assent to: The project will include: Replace existing Sakonnet River Bridge (RI Bridge No. 250) that carries RI Route 24 over the Sakonnet River between Portsmouth and Tiverton, with a new bridge span and approaches south of the existing bridge location. The project will require a CRMC setback variance for work within 50' of

State Agency Support

- Communication
  - Periodic reporting to agencies
- Follow-up
  - Response from agencies to unresolved issues
  - Timely corrective action
- Follow-through
  - Enforcement
  - Tools and training

Communication

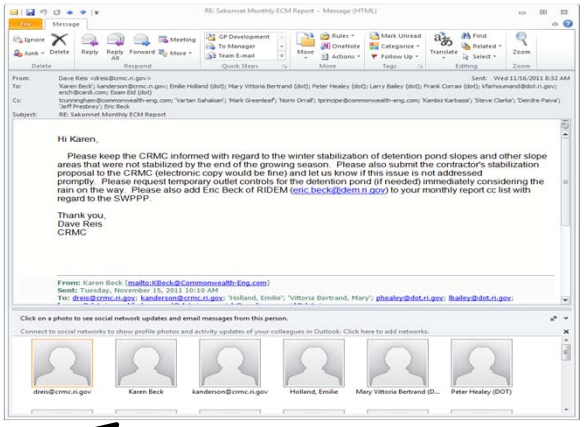
Emails between permitting Agencies

RIDOT Consultant (SWPPP) Inspector Forwards Monthly Reports to CRMC and RIDEM

Documentation – Tools and Templates

Communication:
Periodic Reporting to Agencies

E-mail



CC:

- *Keep CRMC informed and notify if issues are not addressed*
- *Deal with forecasted rain*
- *Send monthly inspection report summaries to DEM*

Documentation - Monthly Summary of Weekly Inspections

Documentation Tool

SWPPP-250-Weekly -Nov 4 2011.pdf - Adobe Reader

File Edit View Window Help

Open 1 / 4 75.7%

Appendix E –Inspection Report

General Information			
Project Name	Sakonnet River Bridge No. 250		
NPDES Tracking No.	RI-R100712	Location	Portsmouth / Tiverton
Date of Inspection	11-4-11	Start/End Time	7:00 a.m.
Inspector's Name(s)	Thomas J. Principe, III, PE, ECM		
Inspector's Title(s)	Environmental Compliance Monitor		
Inspector's Contact Information	Commonwealth Engineers & Consultants, Inc. 401-273-6600		
Inspector's Qualifications	Environmental Compliance Monitor		
Describe present phase of construction	Girder installation- Span 4, overhang brackets, Span 8 & 9 re-steel, roadway trim and fine grading, Span 8 concrete pour, Pier 2 Flutes		

Type of Inspection:
☒Regular ☐ Pre-storm event ☐During storm event ☐ Post-storm event

Weather Information

Has there been a storm event since the last inspection? ☒Yes ☐No
If yes, provide:
Storm Start Date & Time: 10/30 Storm Duration (hrs): 24-hr
Approximate Amount of Precipitation (in):) 1" (10/30) per NOAA

Weather at time of this inspection?
☒Clear ☐Cloudy ☐Rain ☐ Sleet ☐ Fog ☐ Snowing ☐High Winds
☐ Other: Temperature: 50°F

Have any discharges occurred since the last inspection? ☐Yes ☒No
If yes, describe:

Are there any discharges at the time of inspection? ☐Yes ☒ No
If yes, describe:

Site-specific BMPs

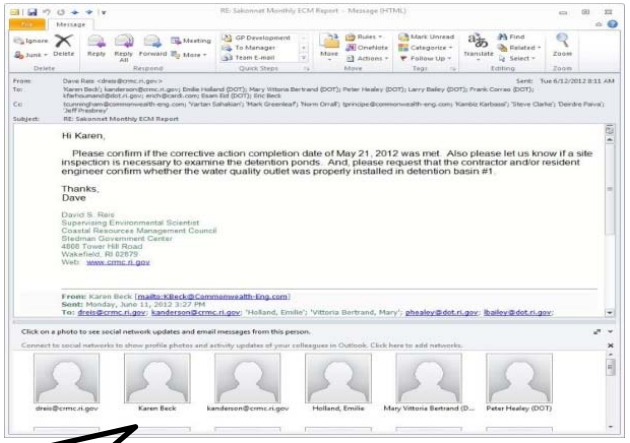
- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*
- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Temporary Seeding	☒Yes ☐No	☐Yes ☒No	
2	Erosion Control Blankets	☒Yes ☐No	☐Yes ☒No	
3	Drain Inlet Protection	☒Yes ☐No	☒Yes ☐No	On-going
4	Silt Fencing/Hay bales	☒Yes ☐No	☒Yes ☐No	Portsmouth- Wetland C-6 Area. To be trenched in per RIDOT specifications.
5	Dewatering Basins	☒Yes ☐No	☐Yes ☒ No	
	Clean basins/pipes	☒Yes ☐No	☒Yes ☐No	Needs to be completed prior to opening system at Riverside Drive HW-3A-00 (Tiverton) at DOT office

8.50 x 11.00 in

Follow-Up

E-mail



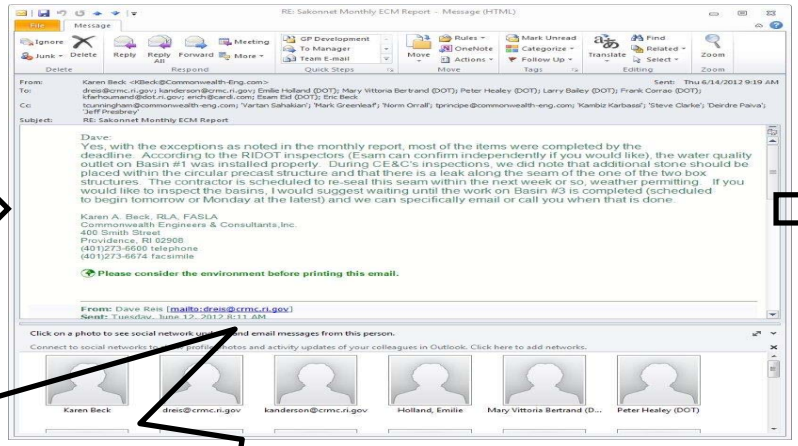
CC:

- *Confirm corrective actions have been taken*
- *Have contractor and/or Resident confirm proper installation*
- *Is inspection necessary?*

Follow-Up Continued:

Inspector's Response

E-mail



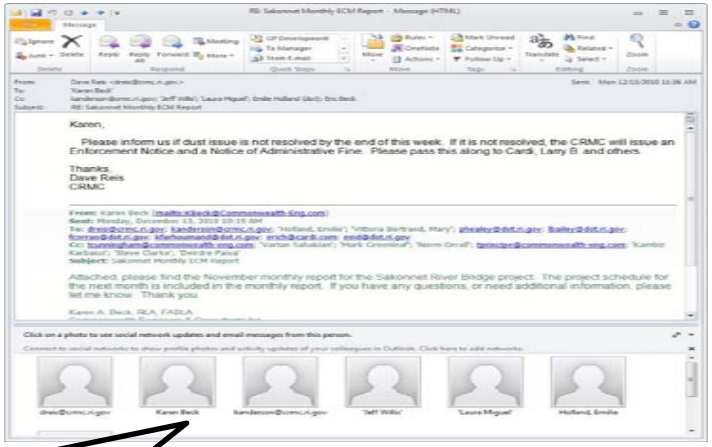
CRMC
COASTAL RESOURCES MANAGEMENT COUNCIL

CC:

- Confirm corrective actions have been taken
- Have contractor and/or Resident confirm proper installation
- Is inspection necessary?

Follow-Through

E-mail



CC:

- *Problem resolved?*
- *If not, CRMC will issue enforcement notice and fine*

TYPICAL PERSISTENT ISSUES

- Trash
- Construction Entrances
- Failure to Maintain E & S Controls
- Stockpile Management
- Street Sweeping

Compliance Assistance Program

- Improves RIDOT awareness at the beginning of Project
- Improves communication between
  - Owner
  - Operator
  - Regulatory Agencies

SOLUTIONS

- Use Tiered Fine to ensure Contractor Compliance
  - Use SWPPP Inspections as DOCUMENTATION
- Fix recurring items
  - Are they recurring b/c they are ignored?
  - Or are they recurring b/c it is a persistent problem?
- Implement the Compliance Assistance Program
  - **Increase Awareness & Communication**

- How can the NRU help?
  - Add/Edit/Delete Contract Language
  - Field Visit to assess & suggest BMPs

Viaduct

An example of anticipating weather events

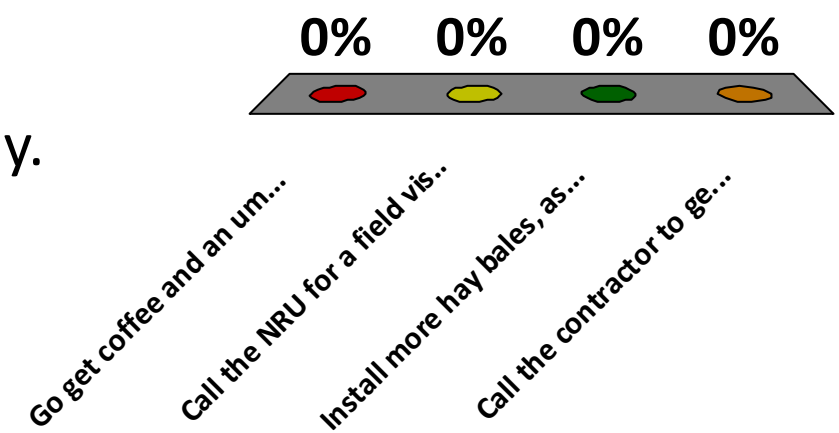
A 2-inch rain event is forecast for tomorrow morning. There's an excavator on a slope on your site, and the slope is exposed. WWYD?

A. Go get coffee and an umbrella!

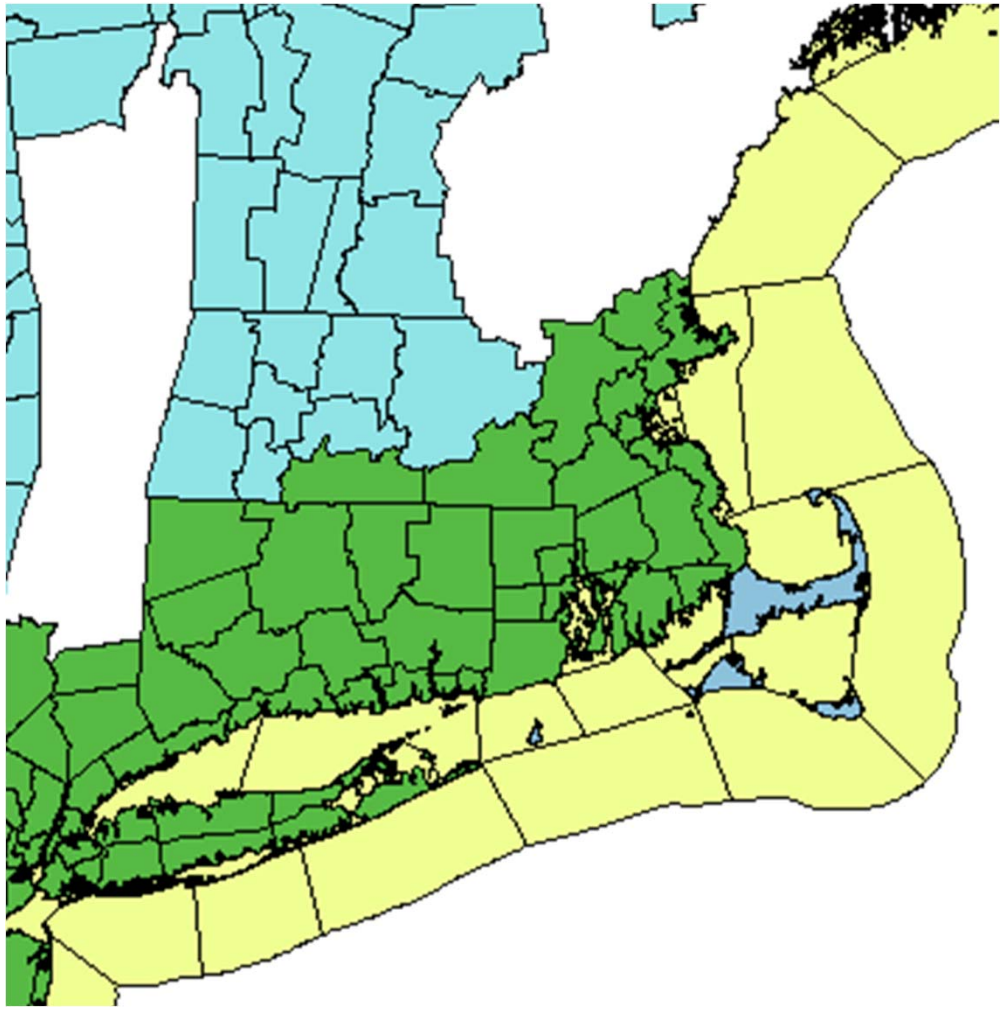
B. Call the NRU for a field visit on Friday at 12:30… that's only 4 days away.

C. Install more hay bales, as designed!

D. Call the contractor to get E&S installed before the end of the day.



NOAA Weather Southeast Providence Severe Watches & Warnings Areal Flood Watch



- Statement as of 4:37 AM EST on December 08, 2014
- **moderate to heavy rainfall will impact most of southern New England sometime late tonight into Tuesday. Rainfall totals of 2.0 to 2.5 inches are possible within the watch area by Wednesday morning. This rainfall could lead to localized flooding...mainly of urban and poor drainage areas.**

Secondary Berm for runoff/washout protection.
1st layer Crused Stone
2nd Layer Hay Bales
3rd Layer Silt Sacks along side walk
(CB inserts are installed across street)

Install fabric on Slope to
minimize erosion and
Runoff; promote sheet flow

Temp Drainage Runoff from exposed drainage RT95SB

Crushed Stone Haybales to Filter Temp Drainage Runoff

BMP#5 – On the north side of Promenade Street in front of the former Ramp AC-AD North Abutment, filter fabric was placed across two barren embankments for stabilization. A berm was also construction at the bottom of the lower embankment to act as a runoff control. Additionally, straw-wattles, hay bales and crushed stone were installed, and are to be used together as a sedimentation control along the Site perimeter next to the sidewalk on the north side of Promenade Street (refer to Photos #7 and #8).

Contractor had recently cleared an area off the north side of Warren Ave as part of the Washington Pedestrian Bridge project. The most recent SWPPP report listed this area as non-compliant requiring stabilization. Water containing suspended sediment is able to migrate across a recently installed tracking pad and enter a catch basin.

SOLUTIONS

- Monitor Weather DAILY
  - www.wunderground.com
  - BE PROACTIVE
- Have effective COMMUNICATION between RIDOT, Contractor, & SWPPP Inspector
- How can the NRU help?
  - Add/Edit/Delete Contract Language
  - Field Visit to assess & suggest BMPs

System-Wide Solutions

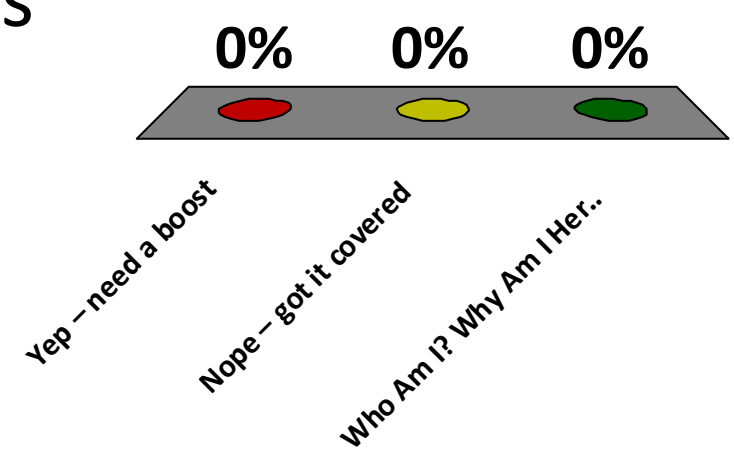
Environmental compliance

on ***MY*** project

April, 2015

Environmental BOOOOOOOOST

A. Yep – need a boost
B. Nope – got it covered
C. Who Am I? Why Am I Here? Am I really here? Will I be here tomorrow? If a construction barrel falls in the middle of the night but no one sees it, does it right itself on its own?



Group Exercise

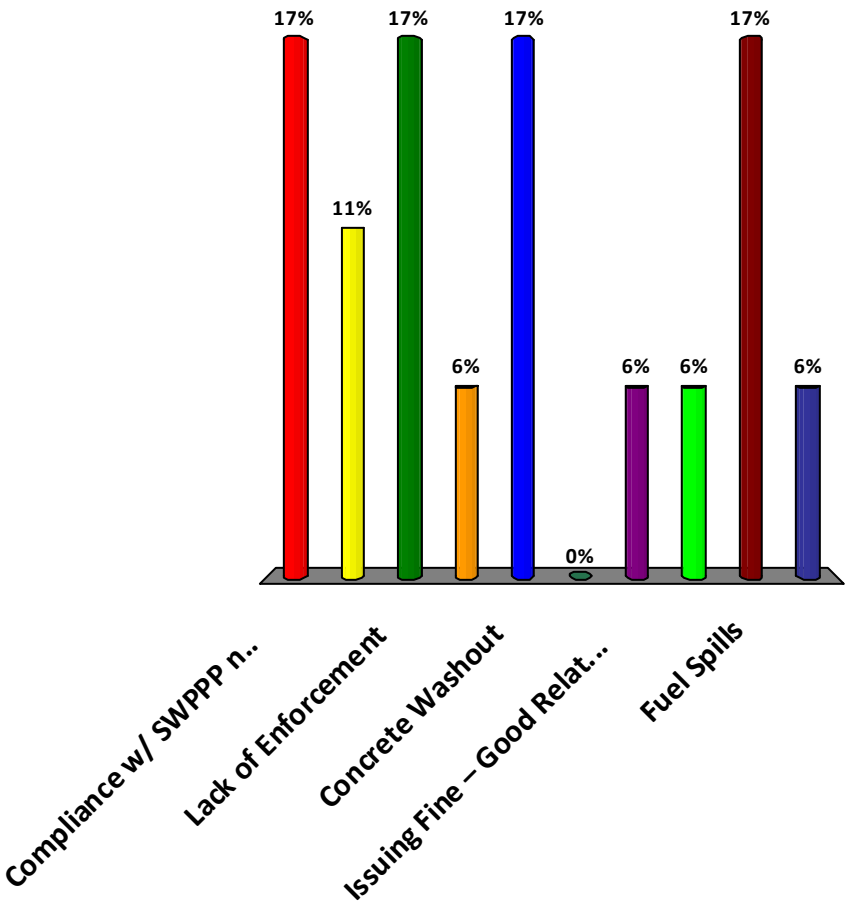
WHAT ARE THE TOP FIVE HEINOUS CRIMES ON A CONSTRUCTION SITE?

- Is it something we covered today?
- Something we TOTALLY missed?

You will report your top ten to the class…
we will then clicker-vote the top five & discuss those further

Top ten HEINOUS crimes

1. one
2. two
3. three
4. four
5. five



NRU/URI/DEM votes…

1. Catch Basin Protection
2. Outfall Protection
3. Temporary Slope Stabilization
4. Improper Concrete Washout
5. Trash on site
6. Construction Site entrance/exit
7. Stockpile management
8. ATTITUDE

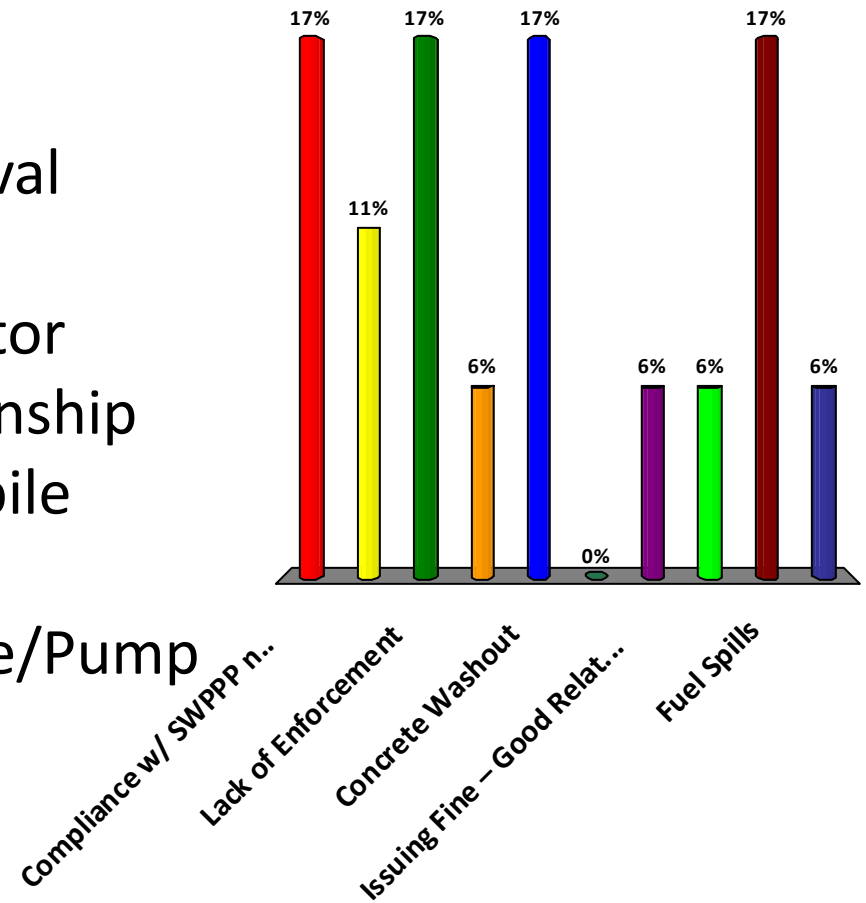
Missing BMPs

Failure to Maintain

Pollution Prevention

Top ten HEINOUS crimes

1. Compliance w/ SWPPP not priority
2. E&S Not installed properly
3. Lack of Enforcement
4. Trash containment & removal
5. Concrete Washout
6. Quick Action from COntractor
7. Issuing Fine – Good Relationship
8. Active vs Non-Active stockpile
9. Fuel Spills
10. Overflow of Concrete Chute/Pump trucks

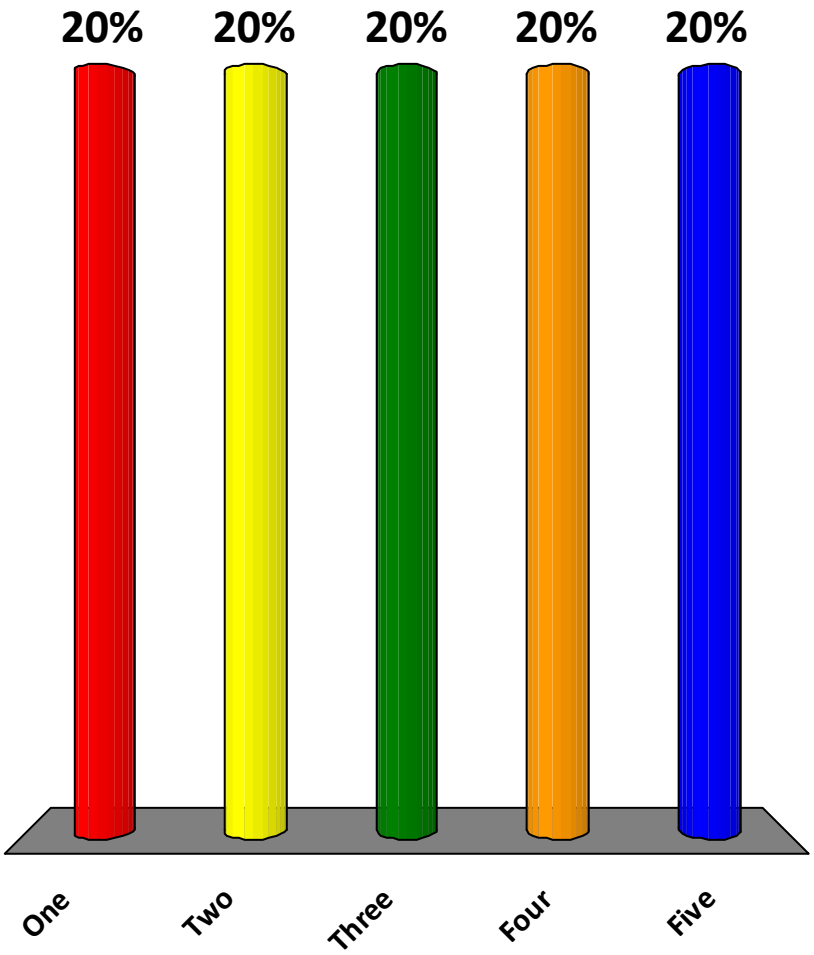


Group Exercise 2

What are the **SOLUTIONS** to the top five crimes?

Top 5 SOLUTIONS

1. One
2. Two
3. Three
4. Four
5. Five



Possible SOLUTIONS

1. Know the requirements (training ☺, call NRU)
2. Don't pay unless the BMP is installed correctly
3. Use Tiered Fines for Failure to Maintain
4. Treat all Contract Document elements EQUAL
5. Train the CONTRACTORS
6. Train the Design Engineers
7. Change Contract Language
8. Audit the Contractor's work (CAP inspection!)

What is NEEDED for these SOLUTIONS to be implemented?

- From RIDEM
- From RIDOT
  - Chief Engineer
  - Deputy Chief Engineer of Construction
  - Area Engineers
  - Resident Engineers
  - Engineering Technicians
  - Natural Resources Unit

The end….

Except for evaluations & door prize ☺

Group Exercise 3

- How Can NRU Help
  - What Add/Edit/Deletes can the NRU work on?
    - Include "Incidental" language

      "Control of Stormwater is **incidental** to the construction of __xxx__."

  - Change entire program to have CONTRACTOR responsible for SWPPP inspections & compliance

1. Establish Clear Expectations Before Construction Begins

Communication is essential to establishing expectations of the contractor.

- **Hold an environmental preconstruction meeting**
- **Discuss communication procedures**
- **Reinforce that compliance is a team effort**

2. Enforce the Contract

Standard Specifications are loaded with environmental requirements.

- 12.104.14 -- Contractor's Responsibility For The Work
- 12.104.15 -- Environmental Protection
- 12.107.17 -- Hazardous Material
- Section 825 -- Painting Structural Steel (i.e. lead paint)
- JS-code
  - Concrete Washout Areas
  - Failure to Maintain E&S Controls

- 12.101.16 CONTRACTOR. The individual, partnership, corporation, or any combination thereof, or joint venture contracting with the State for performance of the prescribed work. (The terms “Contractor” and “Bidder” are frequently used synonymously.)

- 12.101.23 ENGINEER. The Chief Engineer of the Division of Public Works, acting directly or through his or her duly authorized representatives, who is responsible for engineering and administrative supervision of the Contract.

- 12.101.53 RESIDENT ENGINEER. The Engineer's authorized representative at the site of the work whose main responsibility is to insure Contract compliance.

3. Audit the Contractor's Work

Regularly inspect the site, especially early in your project, and hold the contractor to their obligations.

- **Ensure best management practices (BMPs) are installed correctly**.
- Use the Compliance Assistance Program (CAP) inspection form to conduct Audit.

4. Be PROACTIVE

Respond to issues before they happen…

- **MONITOR THE WEATHER**
- **Train all staff** to recognize environmental issues
- **Keep track of issues**
- **Implement recommendations from the inspection form**

5. React In a Timely Manner

When the foo hits the pavement, respond quickly to prevent issues from becoming larger ones.

- **Implement recommendations from the inspection form asap**
- **Stop work if compliance problems persist**. The Resident Engineer has the authority to suspend any part of the Work if the contractor does not comply with the Contract *(according to Wisconsin DOT)*

5. Praise the Positive Efforts

Don’t forget to recognize the good things you see happening out there!

- **Consider ways to recognize staff** doing their part to ensure environmental compliance on your project
- **Give the contractor positive feedback** when you see work that meets or exceeds contract requirements.

RIDOT CONSTRUCTION
Winter Development Series

Evaluation

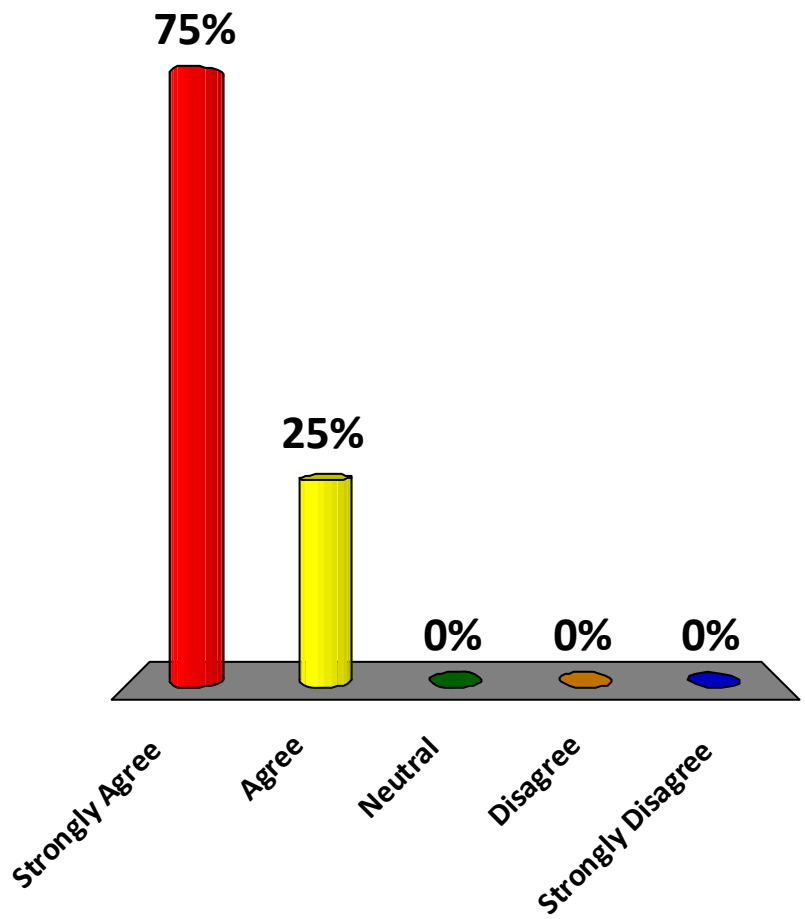
April, 2015

Time for Evaluations!

Please tell us how we did.

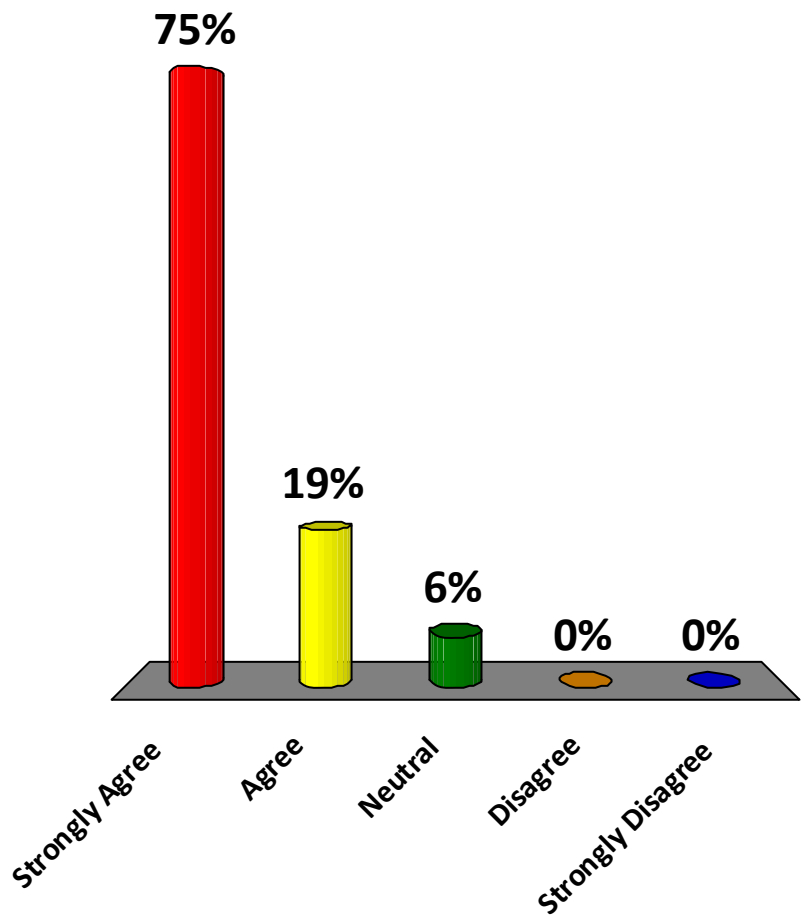
This training was relevant for my work.

A. Strongly Agree
B. Agree
C. Neutral
D. Disagree
E. Strongly Disagree



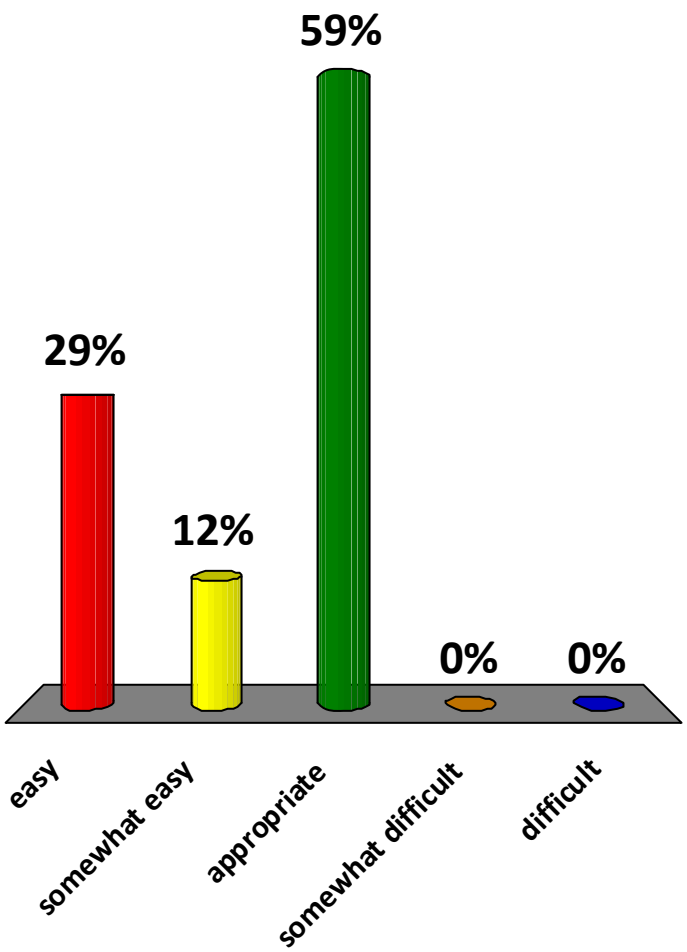
I plan to use what I learned at this training.

A. Strongly Agree
B. Agree
C. Neutral
D. Disagree
E. Strongly Disagree



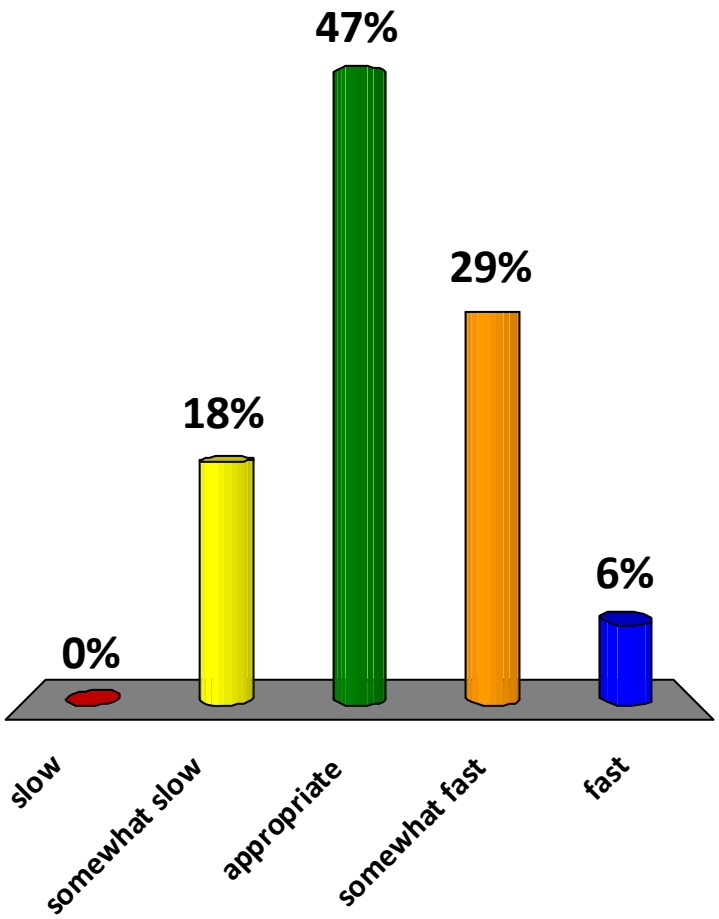
The level of technical information today was….

A. easy
B. somewhat easy
C. appropriate
D. somewhat difficult
E. difficult



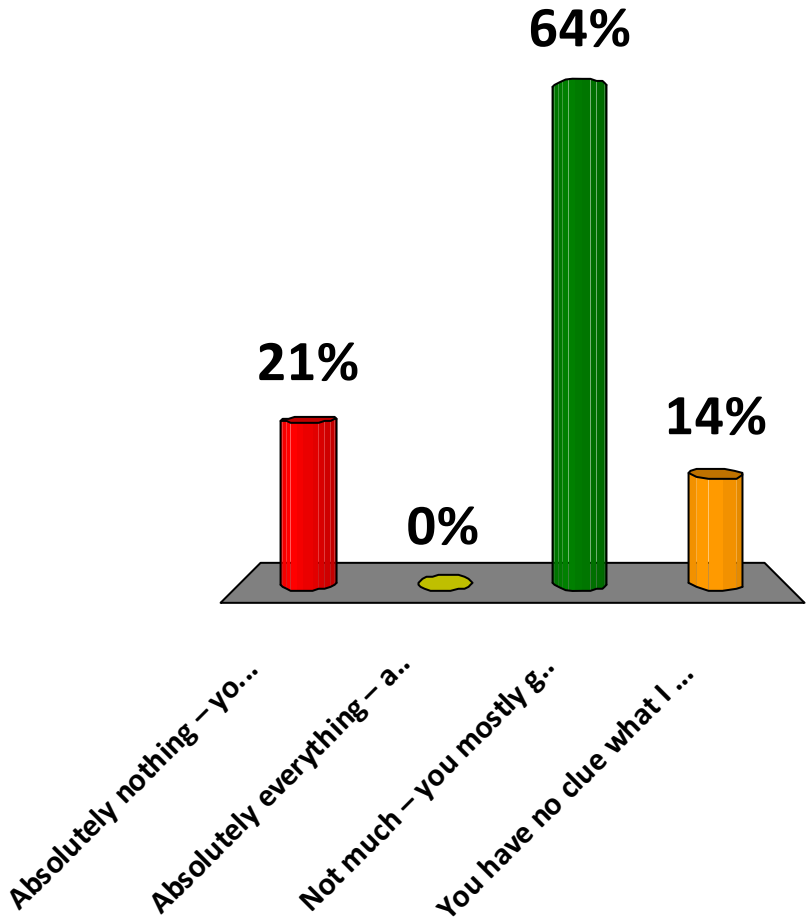
The pace of the training was….

A. slow
B. somewhat slow
C. appropriate
D. somewhat fast
E. fast



For this training…
I wish you would change….

A. Absolutely nothing – you guys ROCK
B. Absolutely everything – are you kiddin' me!?
C. Not much – you mostly got it.
D. You have no clue what I deal with



Door Prize Question!

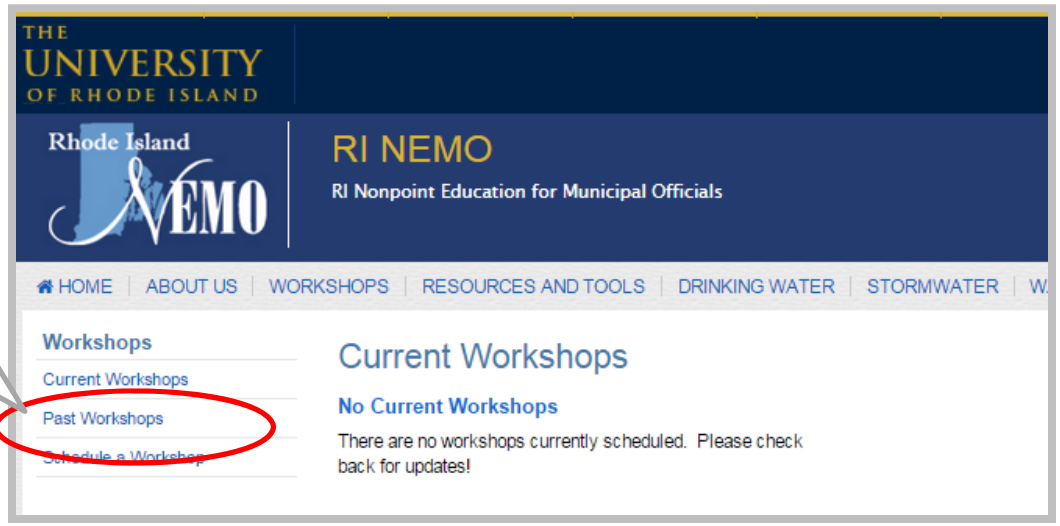
You have heard *something* repeatedly today, aside from the messages about soil erosion and sediment control. What was it?

(Hint: think “Clicker”!)

Thank you!
And please
return the
keypad!

Presentations available at:

www.ristormwatersolutions.org.

1. Go to *Quick Links - Workshops*

2. Then *Past Workshops*