

WASTE SITE CLEANUP AND STORMWATER - AN INTRODUCTION TO THE ISSUES

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EARLY HISTORY OF STATE CLEANUP PROGRAMS

- INDUSTRIAL REVOLUTION
- SUPERFUND AND HAZARDOUS WASTE
AUTHORITIES
- FIRST STATE REGULATIONS

THE BIRTH OF BROWNFIELDS

- CLEANUP STANDARDS
- NEW ENGLAND STATES PASSING "BROWNFIELD ACTS"
- EPA STARTS GIVING OUT "BROWNFIELD" GRANTS
- FEDERAL AND STATE INCENTIVES TO REDEVELOP BROWNFIELD SITES

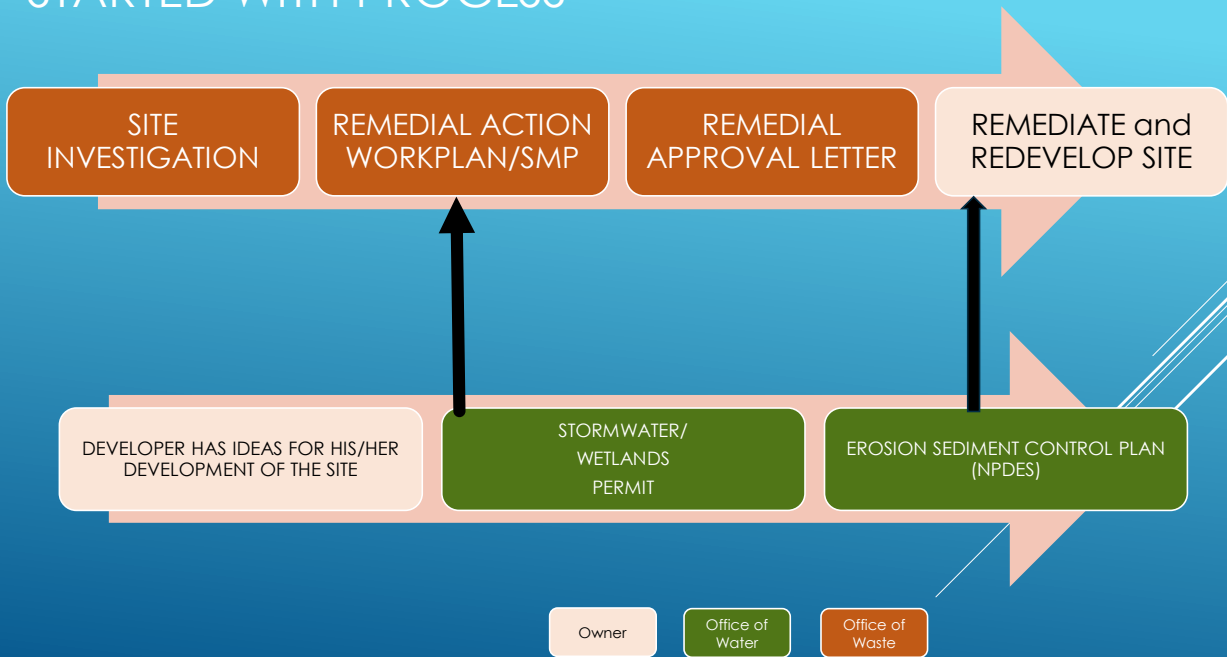


STONE HARBOUR – BRISTOL, RI



T.H. BAYLIS CHEMICAL BECAME THE T.F. GREEN AIRPORT INTERMODAL STATION, WARWICK, RI

STARTED WITH PROCESS





Picture Courtesy of EA Engineering

THE STEELYARD, PROVIDENCE, RI

WHY IS STORMWATER AN ISSUE AT REDEVELOPMENT SITES?

- CSO's – COMBINED SEWER OVERFLOWS
- SOME REMEDIATION TECHNIQUES AND CONTAMINANTS DO NOT ALLOW FOR ONSITE STORMWATER MANAGEMENT
- PERVIOUS AND IMPERVIOUS SURFACES
- NOT ENOUGH ROOM

WHY STORMWATER MANAGEMENT SHOULD BE HANDLED BEFORE REMEDIATION STRATEGY IS FINAL

- SOME REMEDIATION TECHNIQUES DO NOT WORK WELL WITH STORMWATER MANAGEMENT
- INFILTRATION OF STORMWATER THROUGH CONTAMINANTS SUCH AS VOCs, PETROLEUM MAY SPREAD CONTAMINATION
- PERVIOUS SURFACES CAN BE UTILIZED – PAVERS, CONCRETE, ASPHALT
- INFILTRATION SYSTEMS CAN BE DESIGNED INTO THE REMEDY
- GREEN SPACE – RAIN GARDENS, COLLECTION OF WATER FOR OTHER USES

CLIMATE RESILIENCY PLANNING, REMEDIATION & STORMWATER MANAGEMENT - CHALLENGES

- UNCERTAINTY IN CLIMATE CHANGE EVENTS
- LACK OF INFORMATION ABOUT FUTURE DEVELOPMENT
- BUILDING LOCAL CAPACITY
- LIMITED INFORMATION ON COSTS AND BENEFITS OF GREEN INFRASTRUCTURE

WHAT'S THE BIG DEAL WITH STORMWATER?

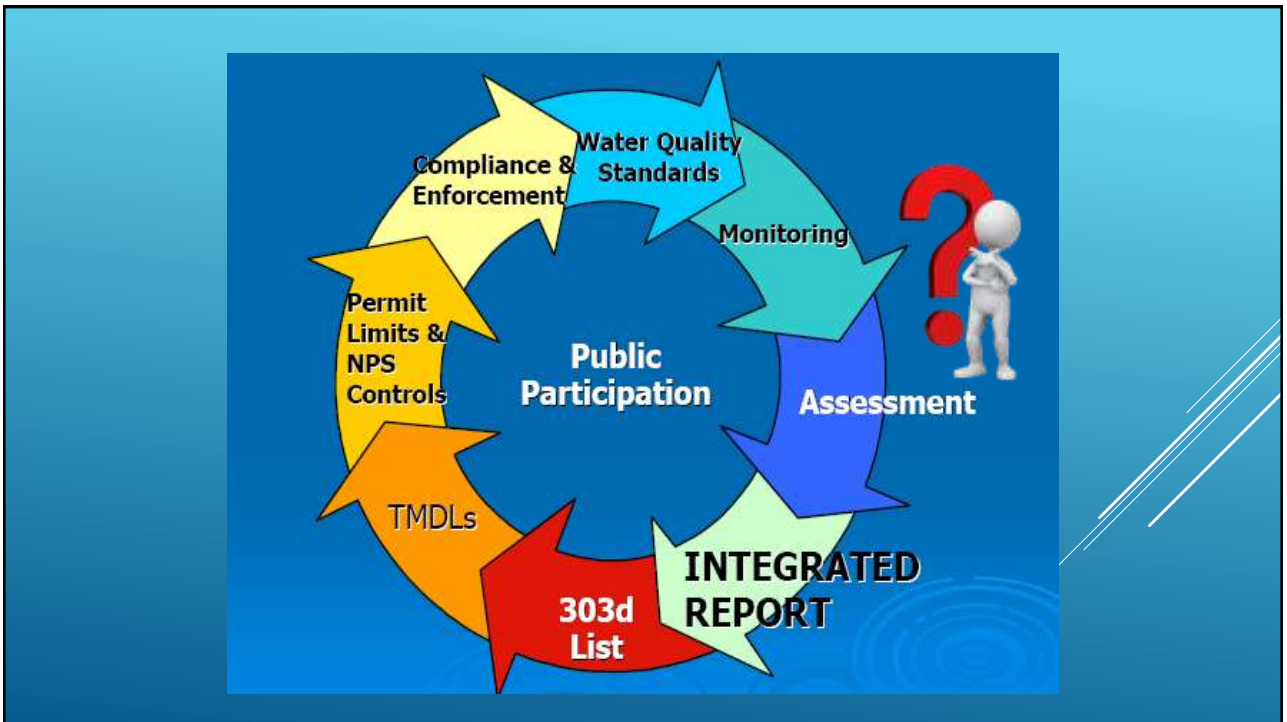
'72 CLEAN WATER ACT (CWA)

- ▶ 1948 – First version of the Clean Water Act
- ▶ 1972 - Congress passed the Clean Water Act which created the NPDES Program- National Pollutant Discharge Elimination System (NPDES) to regulate industrial and municipal sewerage.
- ▶ They were easily regulated because they emanated from identifiable locations, such as pipe outfalls.



1969 fire on Cuyahoga River





- ▶ 1987 Congress wrote Section 402(p) of the CWA, bringing stormwater control into the NPDES program
- ▶ 1990 the U.S. Environmental Protection Agency (EPA) issued the Phase I Stormwater Rules. These rules require:
 - ▶ NPDES permits for operators of municipal separate storm sewer systems (MS4s) serving populations over 100,000 and for
 - ▶ Multi-Sector Permitting for runoff associated with industry,
 - ▶ Construction Permitting including construction sites five acres and larger.
- ▶ In 1999 EPA issued the Phase II Stormwater Rule to expand the requirements to small MS4s and construction sites between one and five acres in size.



~55% of Rhode Island is in a STORMWATER IMPACTED Catchment Area

Stormwater Pollution is the Fastest Growing Source of Pollution

Primary Pollutants

- Sediment
- Salt
- Temperature
- Heavy Metals
- Oil & Grease
- Solids



Sources

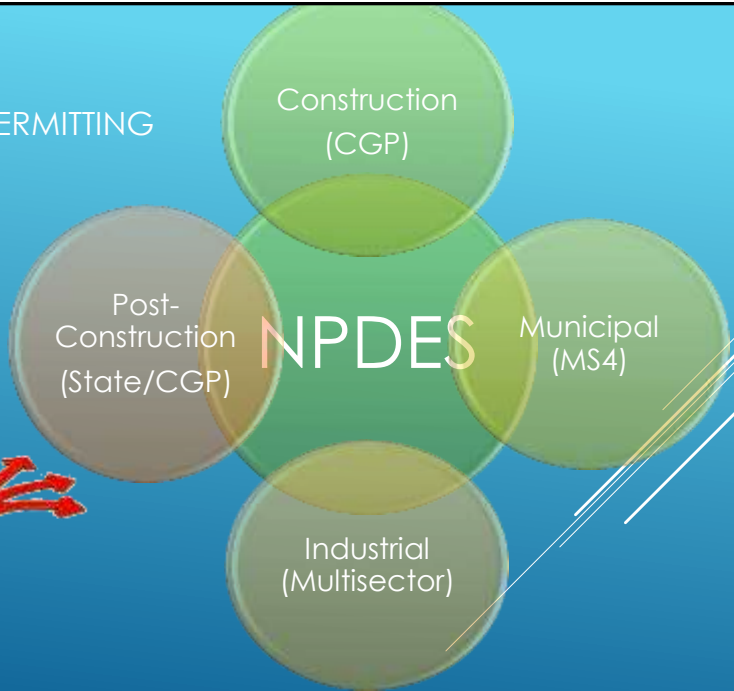
- Brake dust, tire wear, fluids
- Litter
- Construction
- Maintenance Activities
- Atmospheric Deposition
- Agricultural Activities



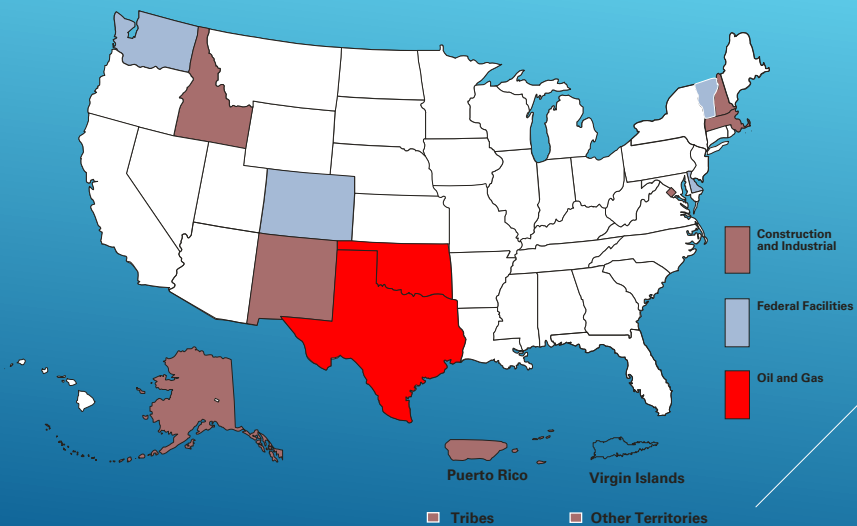
THE WORLD OF STORMWATER PERMITTING

Why?

It rains everywhere!



EPA AS NPDES PERMITTING AUTHORITY



NPDES

Post-Construction Stormwater Management

- **Required to Treat:**
 - **Water Quality**
 - ✓ Remove pollutants
 - **Water Quantity**
 - ✓ Amount of stormwater that enters a stream

Challenge

- Comply with permit requirements
- Fit into linear project footprint
- Limited ability to acquire right of way

Managing the Environmental & Project Development Process



STORMWATER RUNOFF

Stormwater runoff is rain or snowmelt that flows over land and does not percolate/get absorbed into the soil.

- ▶ Water QUANTITY
- ▶ Flooding
 - ▶ Baseflow to surface waters
 - ▶ Runoff volumes
- ▶ Groundwater recharge - streamflow

HYDROLOGY

NPDES STORMWATER

Post-Construction Stormwater BMPs

Infiltration Techniques

- Storm water filters through substrate consisting of soil, sand, or gravel
- Discharges treated storm water into ground water rather than into surface waters



Bioretention Cells

- Depressed, low-lying areas that treat storm water through evapotranspiration and filtering
- Underlying perforated storm sewer or underdrain carries treated storm water to an outlet
- Extensive vegetation assists in the filtration of the storm water prior to filtering through the soil

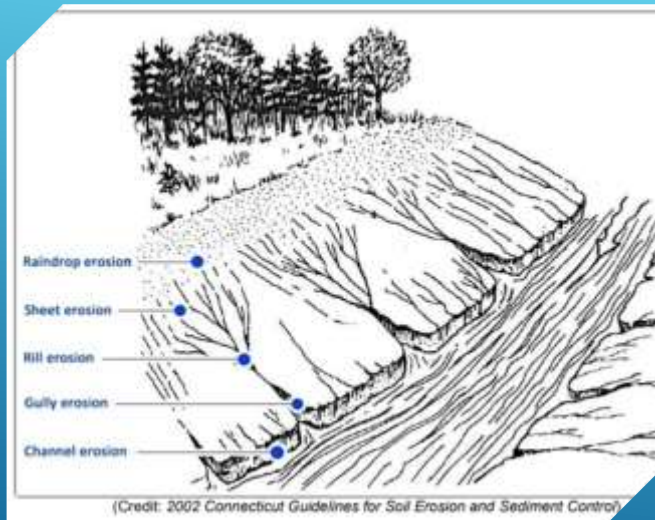


Constructed Wetlands

- Treat storm water through bio-retention
- Designed in a similar manner as a retention basin
- Depressed, heavily planted areas designed to maintain a dry weather flow depth of 0.5 to 2 feet



Managing the Environmental & Project Development Process



EROSION

- ▶ Erosion and Sediment Control Management
 - ▶ Includes vehicle washing and waste management
 - ▶ Salinity
 - ▶ Equipment
- ▶ Solids can move off-site, get into waterways, or change topography

- ▶ Total Maximum Daily Loads (TMDLs) for Total Suspended Solids (TSS), Nitrogen, and Phosphorous
- ▶ Need to consider all building blocks to reach water quality standards



WATER QUALITY

Human Health

- ▶ Chemical pollutants and pathogens
- ▶ Chronic and acute waterborne illness/diseases
 - ▶ Drinking water
 - ▶ Seafood
 - ▶ Shellfish
 - ▶ Contact recreation i.e. beaches

Environment

- ▶ Growth of algae and unwanted microbial growth
- ▶ Plant productivity
 - ▶ Salt tolerance

HEALTH



CLEAN WATER ACT REQUIREMENTS

- ▶ Establish **water quality standards** for the state's waters
- ▶ **Monitor, Assess and Report** water quality conditions of the state's waters (CWA §305(b))
- ▶ Identify and **list impaired waters** i.e water where traditional technology based pollution controls are not adequate to meet *water quality standards* (CWA §303(d))
- ▶ Prioritize a schedule for development of total maximum daily loads (**TMDLs**) for all 303(d) listed waters

QUESTIONS



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