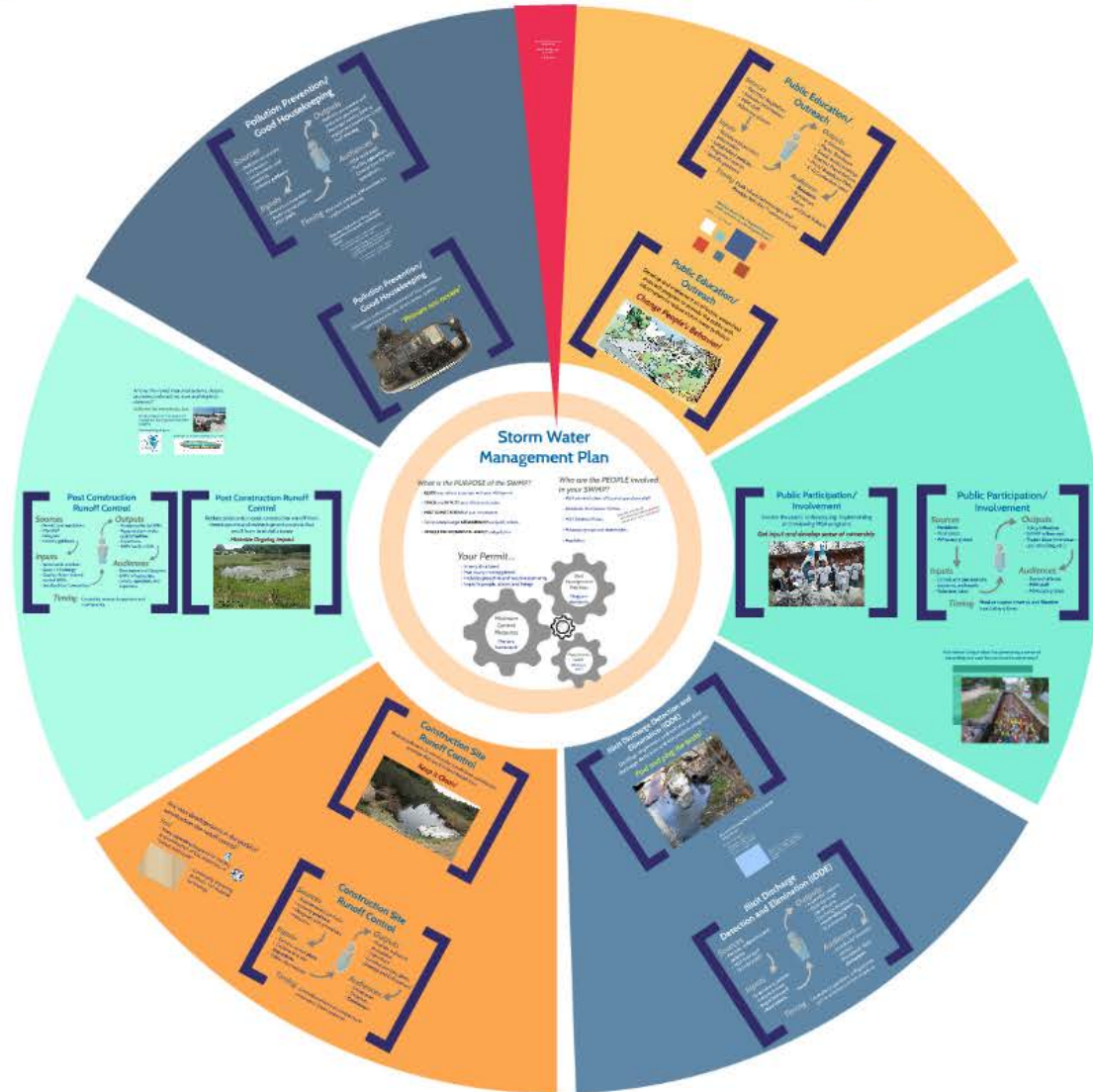
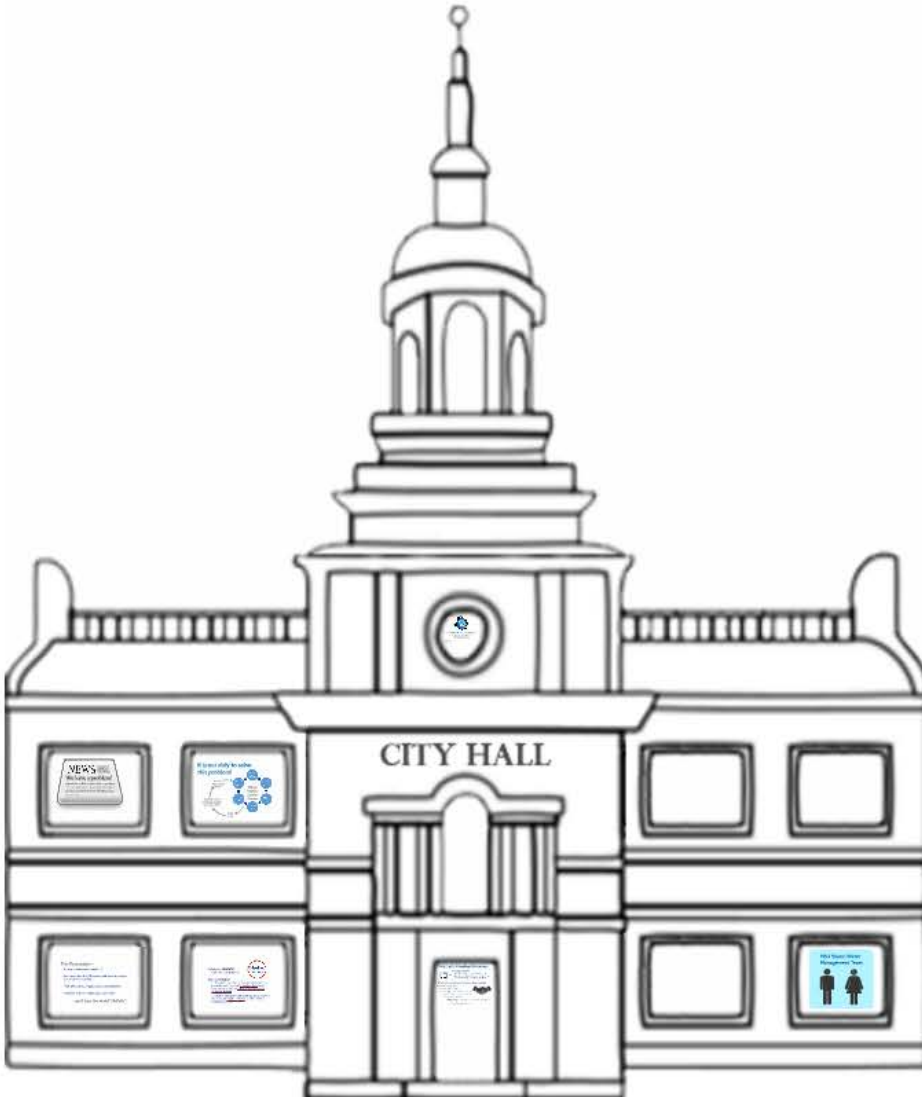


The MS4 Permit - A Holistic Approach to Storm Water Management





The MS4 Permit - A Holistic Approach to Stormwater Management!

*Lambeau Field, Green Bay - Rm A
10:35 a.m. Wednesday March 7, 2018*

*Jeff Mazanec, PE
Jeff.Mazanec@raSmith.com
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raSmith

First, Let's Introduce Ourselves...



My Background -

- Consultant serving local government since 1978
- Have worked with MS4s in several states to implement MS4 permit management software applications

When you are not learning and networking at a conference, do you...

Administer an MS4 program?

Provide regulatory guidance and motivation?

Provide equipment, materials and products for storm water management?

Build great projects to manage runoff and improve water quality?

Serve MS4s as a consultant?



This Presentation -

- Is not a software commercial :-)
- Focuses on how the MS4 permit addresses our impact on surface water quality
- Highlights sources, inputs, outputs and audiences
- Considers structure and process over content

...and uses the word "Holistic"

Definition of **HOLISTIC**

1: of or relating to holism



Definition of **HOLISM**

1: a theory that the universe and especially living nature is correctly seen in terms of interacting wholes (as of living organisms) that are more than the mere sum of elementary particles

2: a study or method of treatment that is concerned with wholes or with complete systems: a holistic study or method of treatment



CITY HALL

NEWS City of Portland
We have a problem!
City of Portland has a responsibility to protect the quality of our water. We have a problem!

It is our duty to solve this problem!

Stormwater Management Program
Clean Watershed Program

This Presentation -
• Overview of the presentation
• Why we have the MS4 permit and what we need to do to meet it
• Why it matters to us as citizens and leaders
• Considerations and possible outcomes
• ...and uses the word "Holistic!"

Definition of HOLISTIC
holistic /ˈhɒlɪstɪk/

Definition of MS4
The MS4 permit is the cornerstone of the program to protect the quality of our water. It is a permit that requires the permittees to meet certain water quality standards and to implement a stormwater management program.

First, Let's Introduce Ourselves...

MS4 Stormwater Management Team



MS4 Storm Water Management Team

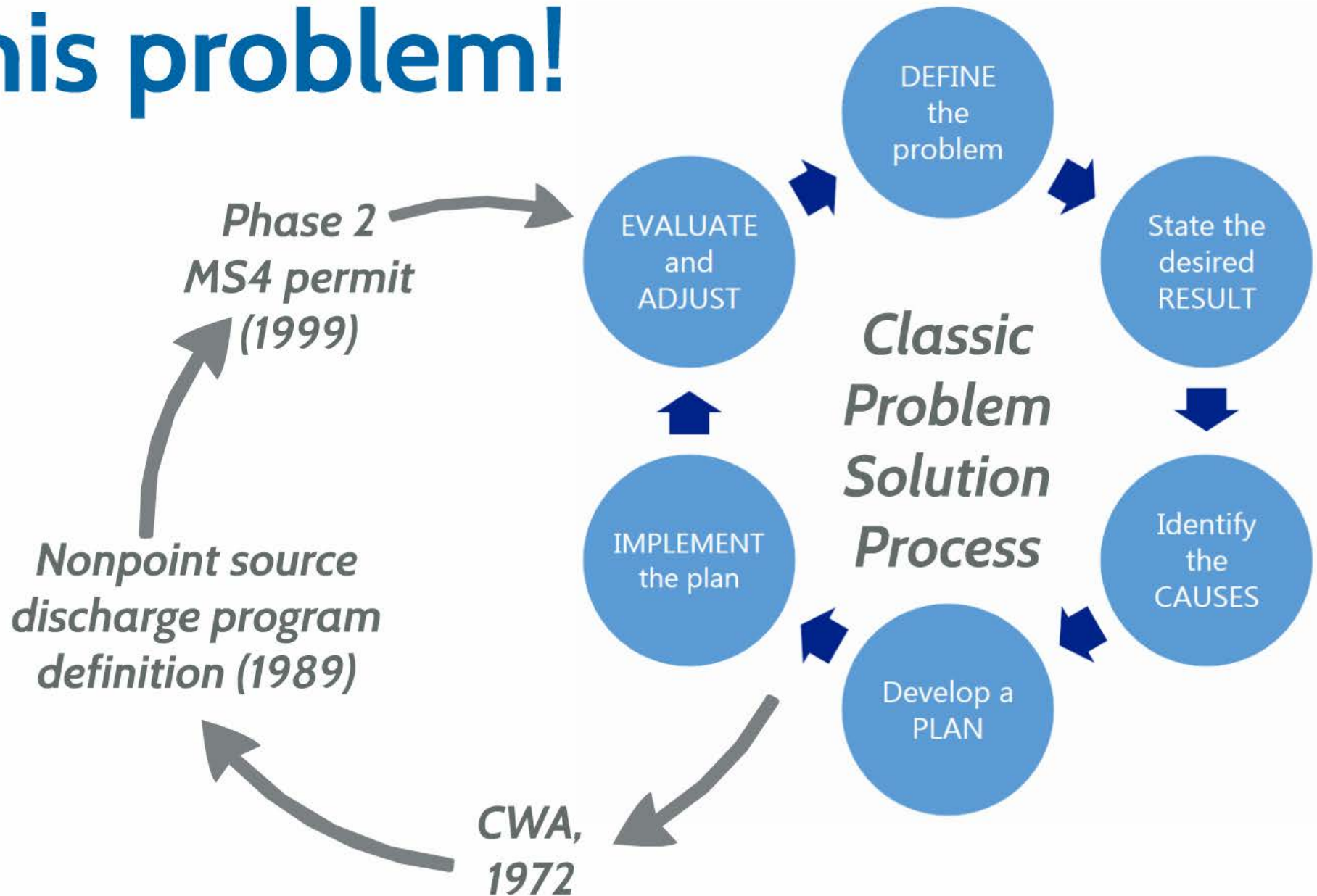
NEWS

Across the
U.S. c. 1970)

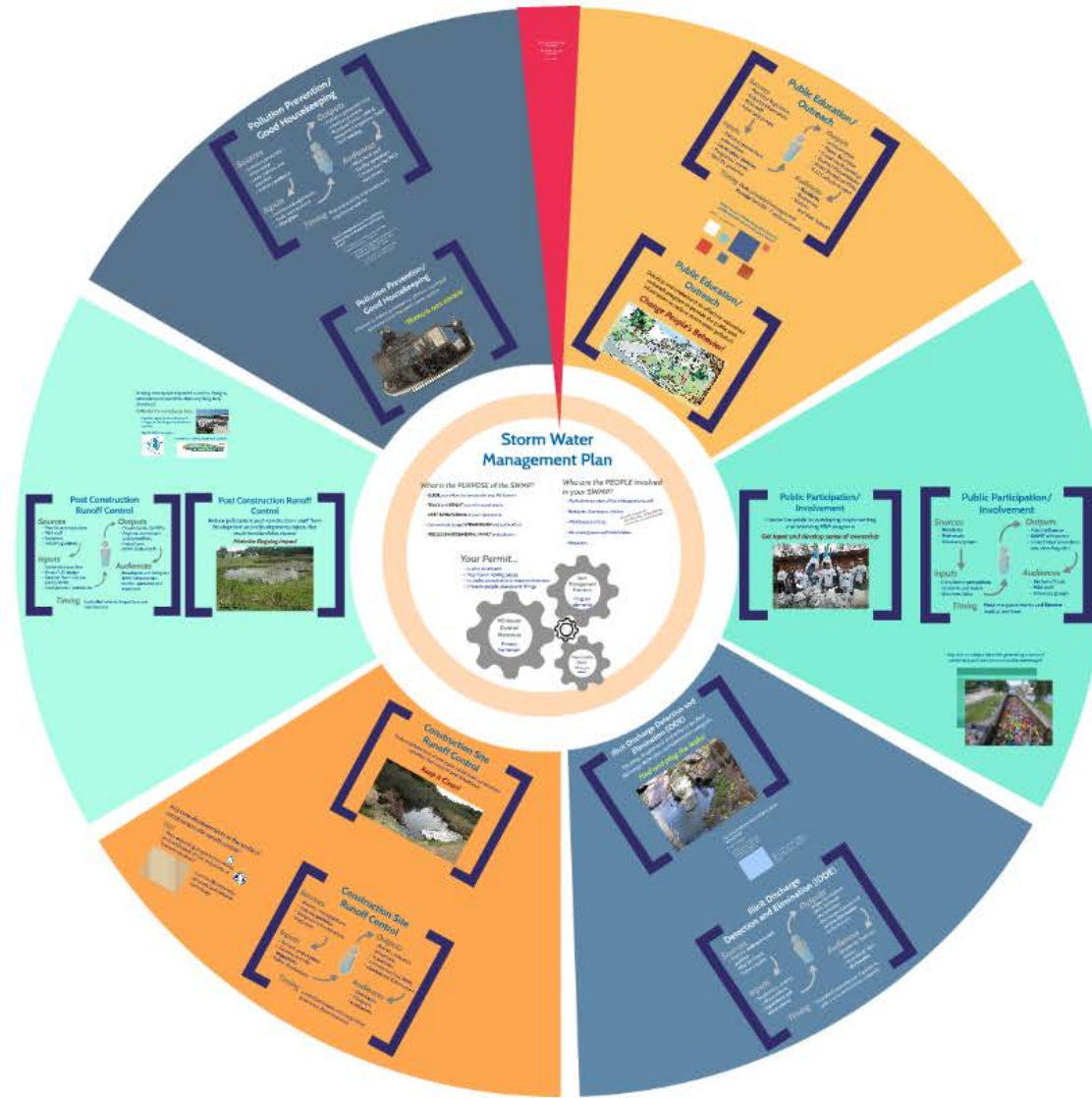
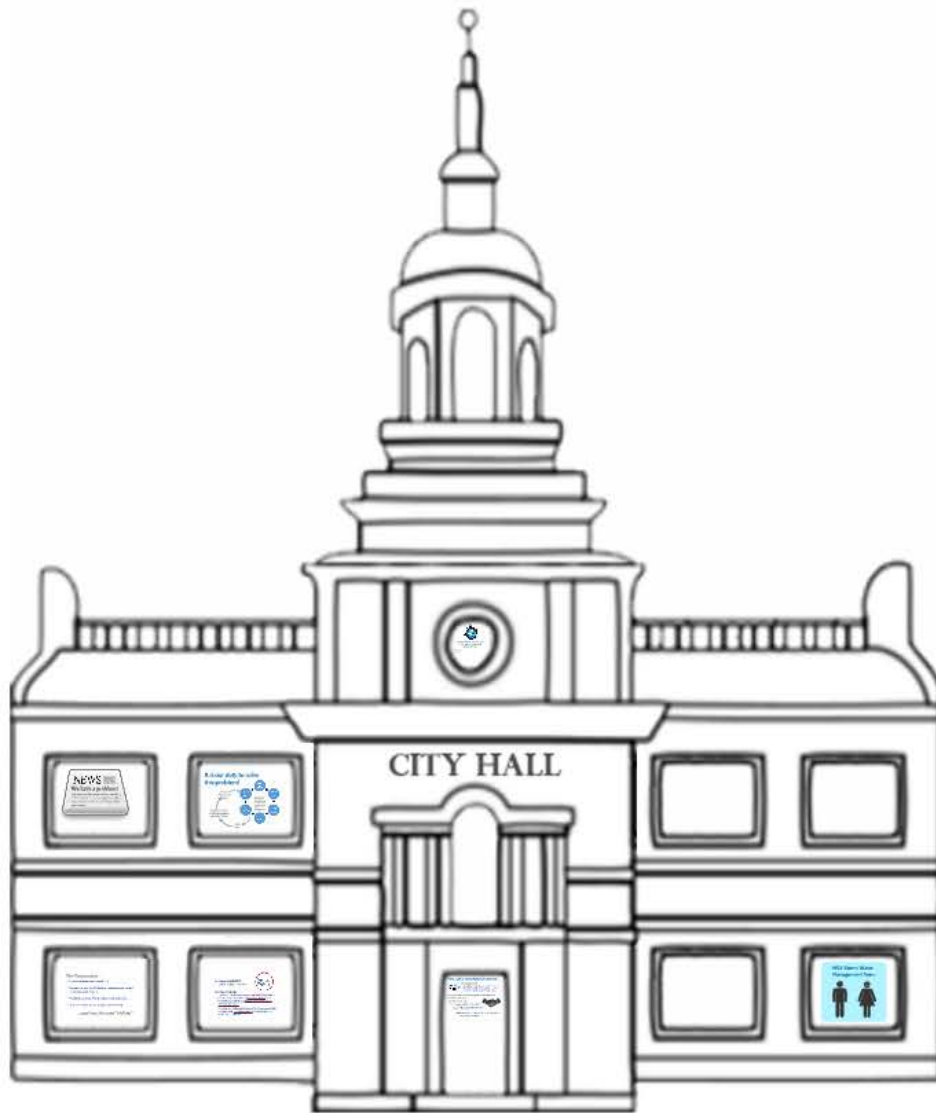
We have a problem!

Our actions and the impact of our expanding built environment are degrading the quality of our natural environment, killing our lakes and streams.

It is our *duty* to solve this problem!



The MS4 Permit - A Holistic Approach to Storm Water Management



Storm Water Management Plan

What is the *PURPOSE* of the SWMP?

- **GUIDE** your efforts to comply with your MS4 permit
- **TRACK** and **REPORT** your efforts and results
- **MEET EXPECTATIONS** of your constituents
- Demonstrate budget **STEWARDSHIP** and justify efforts
- **REDUCE ENVIRONMENTAL IMPACT** and pollution

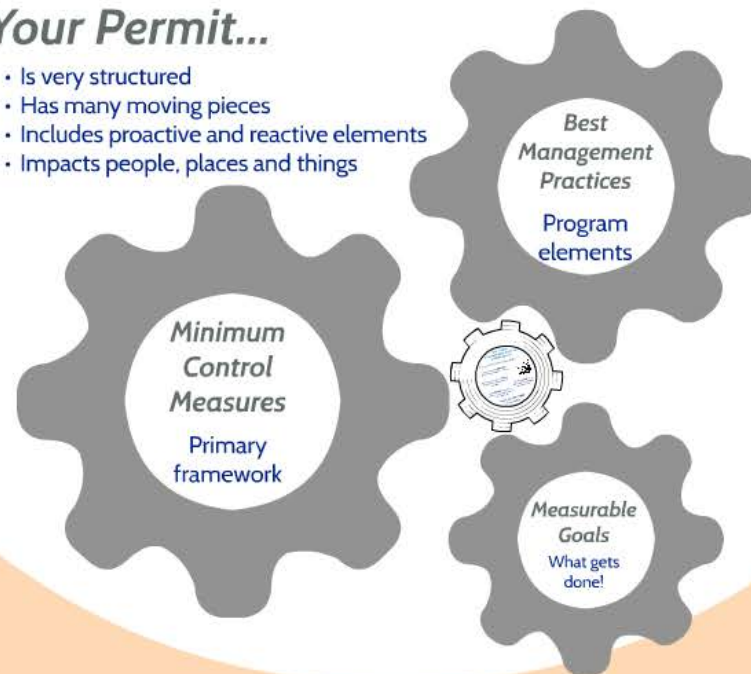
Who are the *PEOPLE* involved in your SWMP?

- MS4 administration, office and operations staff
- Residents, Businesses, Visitors
- MS4 Elected officials
- Advocacy groups and stakeholders
- Regulators

*Virtually, Everybody!
But ultimately led by **ONE** key person (or a very small group!)*

Your Permit...

- Is very structured
- Has many moving pieces
- Includes proactive and reactive elements
- Impacts people, places and things



ction and
mit



*What is the **PURPOSE** of the **SWMP**?*

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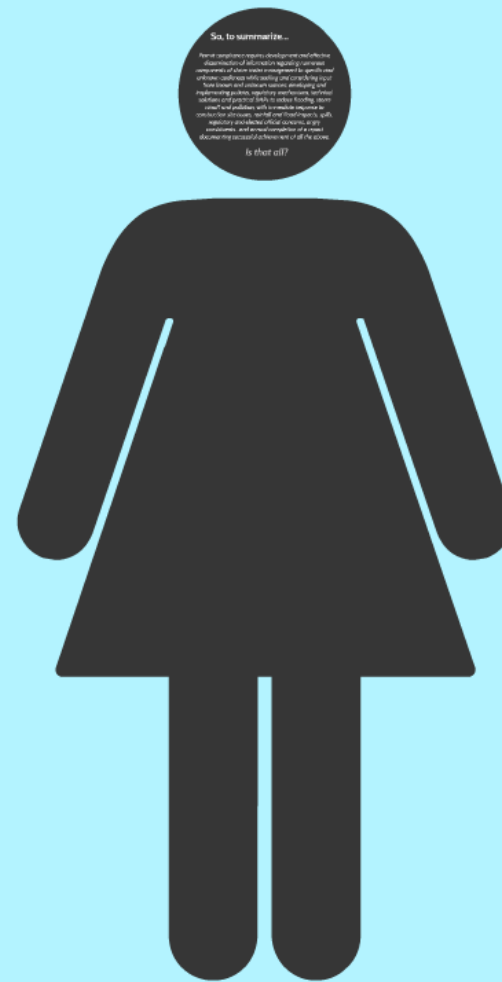
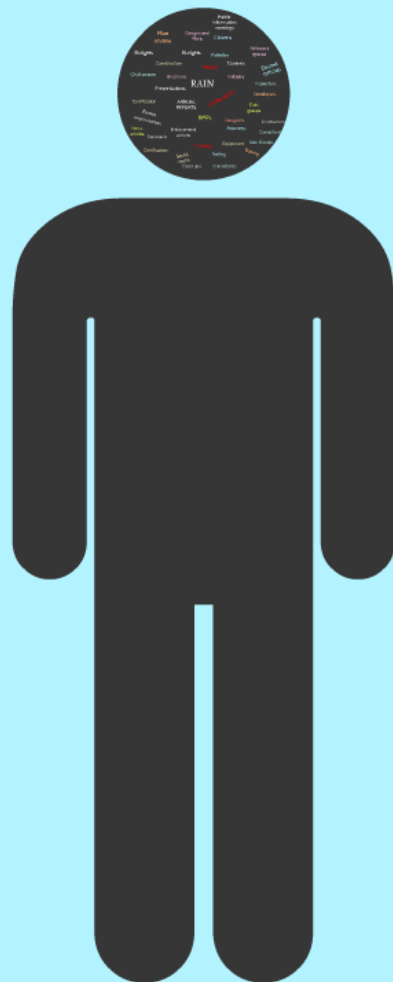


Who are the PEOPLE involved in your SWMP?

- MS4 administration, office and operations staff
- Residents, Businesses, Visitors
- MS4 Elected officials
- Advocacy groups and stakeholders
- Regulators

*Virtually, Everybody!
But ultimately led by **ONE** key
person (or a very small group!)*

MS4 Storm Water Management Team



Storm Water Management Plan

What is the PURPOSE of the SWMP?

- **SURE** you are following all applicable MS4 permits
- **PROTECT** and **RESTORE** your watershed
- **MINIMIZE** the risk of storm water runoff
- **REDUCE** the environmental impact of storm water runoff

Who are the PEOPLE involved in your SWMP?

- **MS4** (Municipal Separate Storm Sewer System) operators
- **Businesses**, **Homeowners**, **Agencies**
- **Neighbors**, **Community**
- **Regulators**

Your Permit...

- It is a **legal** document
- It **requires** you to follow certain rules
- It **includes** specific rules and regulations
- It **applies** to your specific area and things



Pollution Prevention/ Good Housekeeping



Pollution Prevention/ Good Housekeeping



Public Education/ Outreach



Public Education/ Outreach



Post Construction Runoff Control



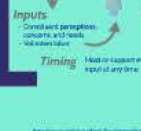
Post Construction Runoff Control



Public Participation/ Involvement



Public Participation/ Involvement



Construction Site Runoff Control



Illicit Discharge Detection and Elimination (IDDE)



Construction Site Runoff Control



Illicit Discharge Detection and Elimination (IDDE)



Among the myriad of options, design, construction practices that are most likely to succeed?



Are there any practices for generating revenue of storm water management for community support?



Public Education/ Outreach

Develop and implement an effective watershed outreach program to provide the public with information to reduce storm water pollution

Change People's Behavior!



Public Participation/ Involvement

Involve the public in developing, implementing
and reviewing MS4 programs

Get input and develop sense of ownership



Illicit Discharge Detection and Elimination (IDDE)

Develop, implement and enforce an illicit discharge detection and elimination program

Find and plug the leaks!



Illicit Discharge Detection and Elimination -
A Guidance Manual for Program Development and
Technical Assessments (2004)

Construction Site Runoff Control

Reduce pollutants in storm water runoff from construction activities that result in land disturbance

Keep it Clean!



Post Construction Runoff Control

Reduce pollutants in post-construction runoff from development and redevelopment projects that result from land disturbance

Minimize Ongoing Impact



Pond #1 - 8/14/2015
City of Rochester, MN

Pollution Prevention/ Good Housekeeping

Prevent or reduce pollutant runoff from municipal operations into the storm sewer system

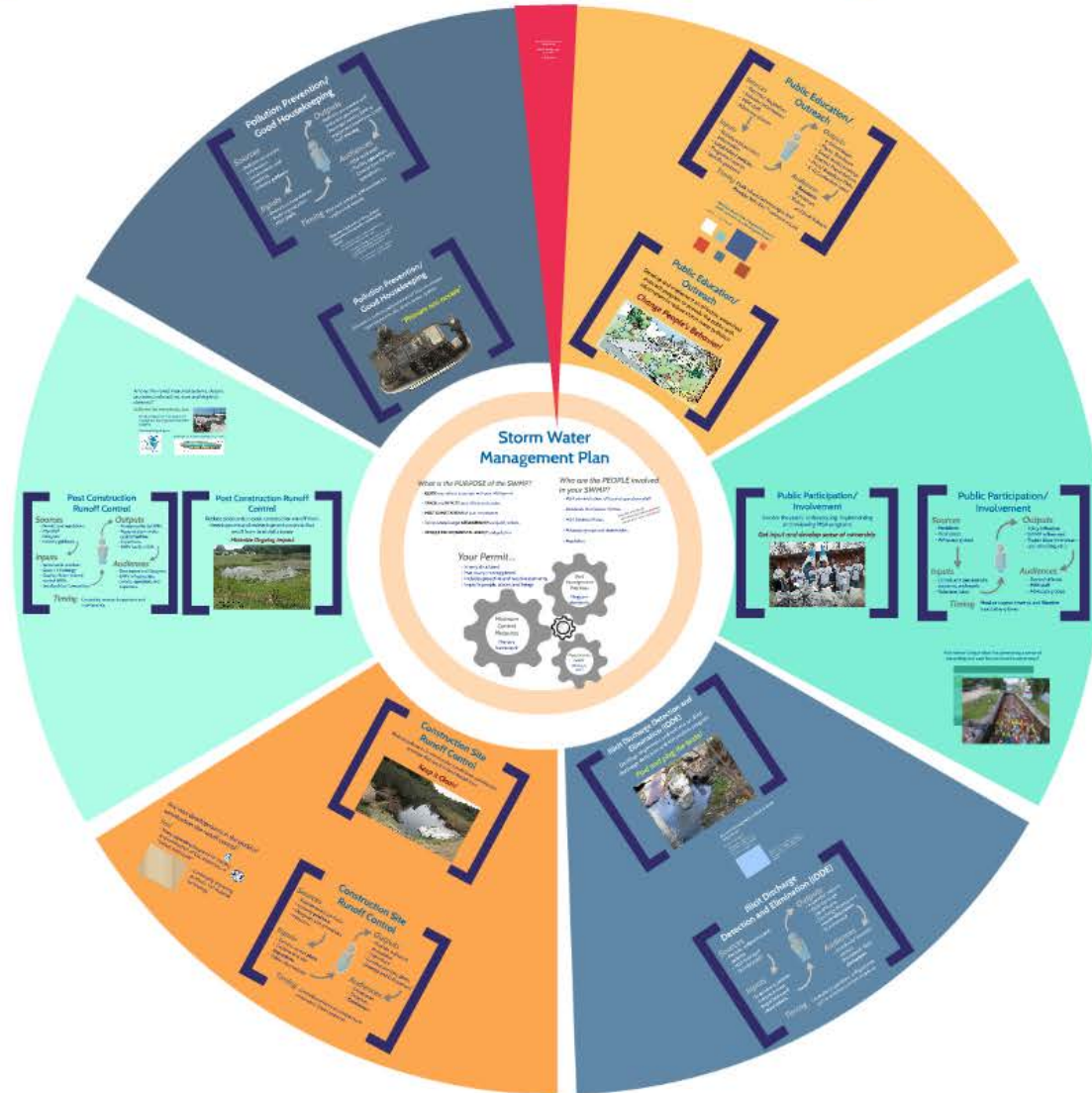
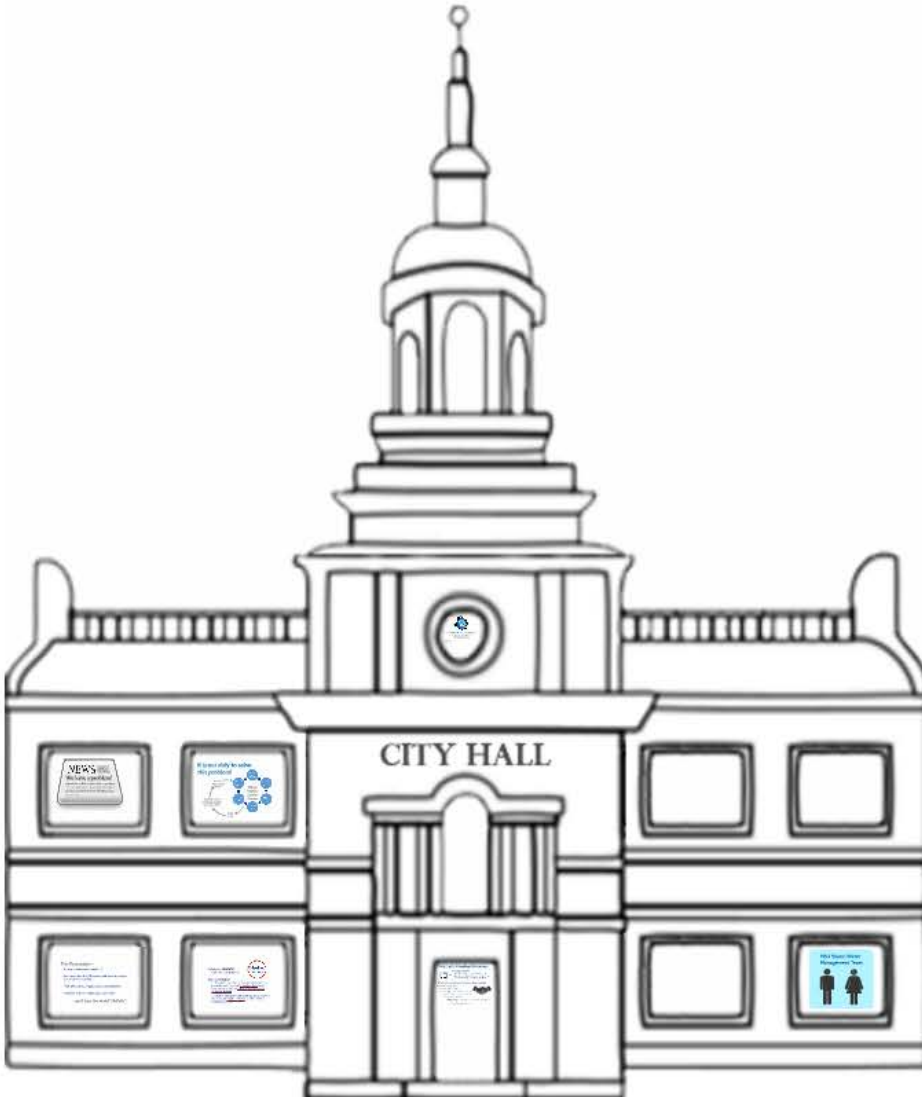
“Primum non nocere”



MUIR SYNDICATE'S STEAM STREET SPRINKLER AND SWEEPER.

Image courtesy of the AACA Library & Research Center.

The MS4 Permit - A Holistic Approach to Storm Water Management



Public Education/ Outreach

Sources

- Permits/ Regulation
- Industry information
- MS4 staff
- Advocacy groups



Inputs

- Pollution prevention information
- **Local rules/ policies**
- Programs/ events
- Specific guidance



Outputs

- e-Information
- Flyers, Brochures
- Social media postings
- Events/ Presentations
- Print/ Broadcast PSAs
- K-12 Curriculum input

Audiences

- **Residents**
 - Businesses
 - Visitors
- and their Subsets

Timing Push scheduled messages and
Provide 365/24/ 7 resource access

What has given MS4s the greatest boost in public outreach since the program began?

IMHO...Social Media



Public Participation/ Involvement

Sources

- Residents
- Businesses
- Advocacy groups



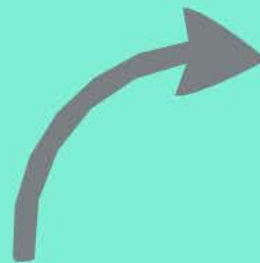
Inputs

- Constituent **perceptions**, concerns, and needs
- Volunteer labor



Outputs

- Policy influence
- SWMP refinement
- Project labor (river clean-ups, stenciling, etc.)



Audiences

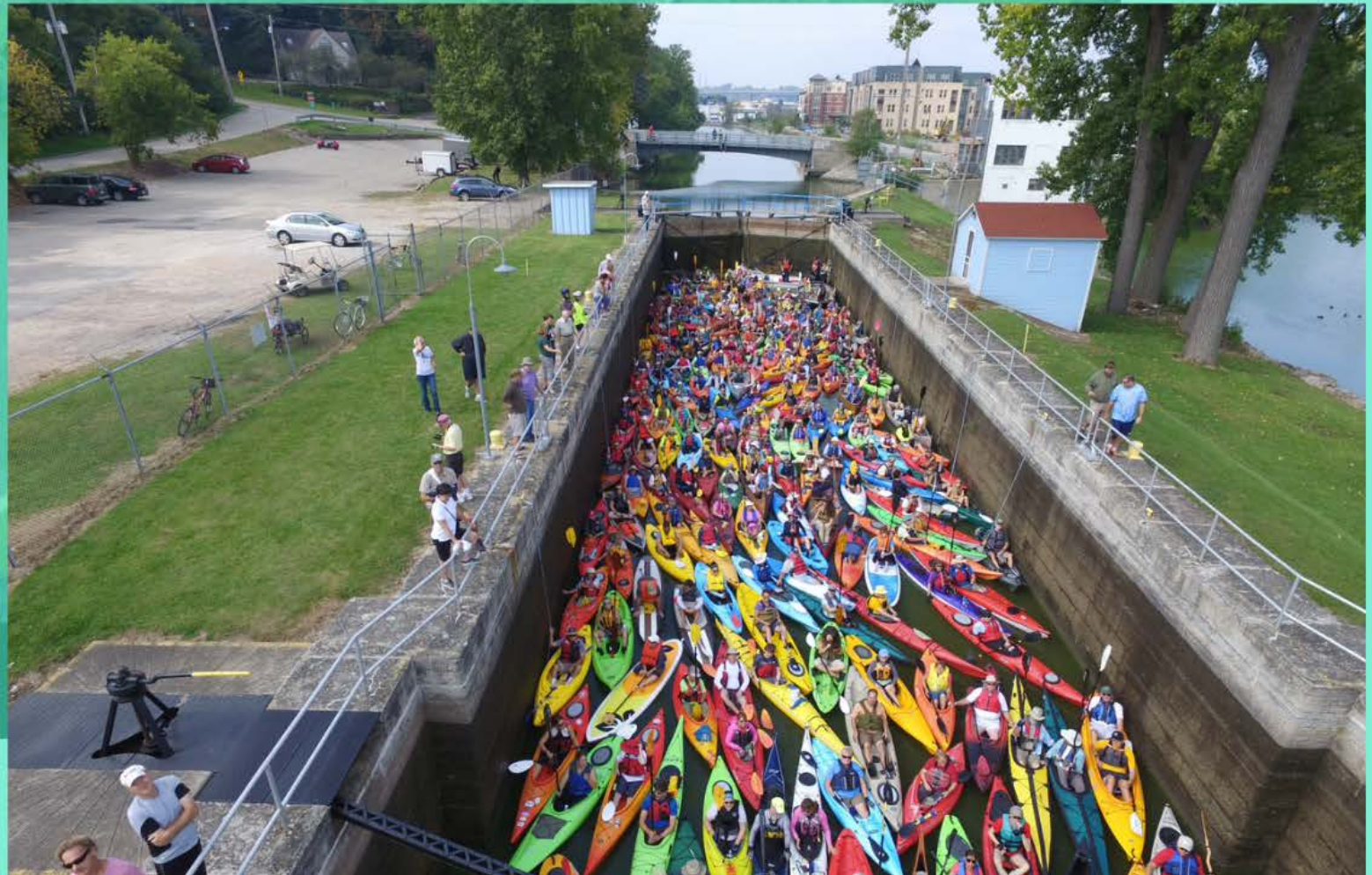
- Elected officials
- **MS4 staff**
- Advocacy groups



Timing

Host or support events and Receive input at any time

Any new or unique ideas for generating a sense of ownership and care for community waterways?



Illicit Discharge Detection and Elimination (IDDE)

Sources

- Permits, ordinances and policies
- MS4 field staff
- General public

Inputs

- Regulations, policies and procedures
- Inspections and observations

Timing

Controlled inspections and guidance;
spill or occurrence driven response

Outputs

- Inspection reports
- Illicit discharge identification
- Discharge cleanup and source elimination
- Enforcement

Audiences

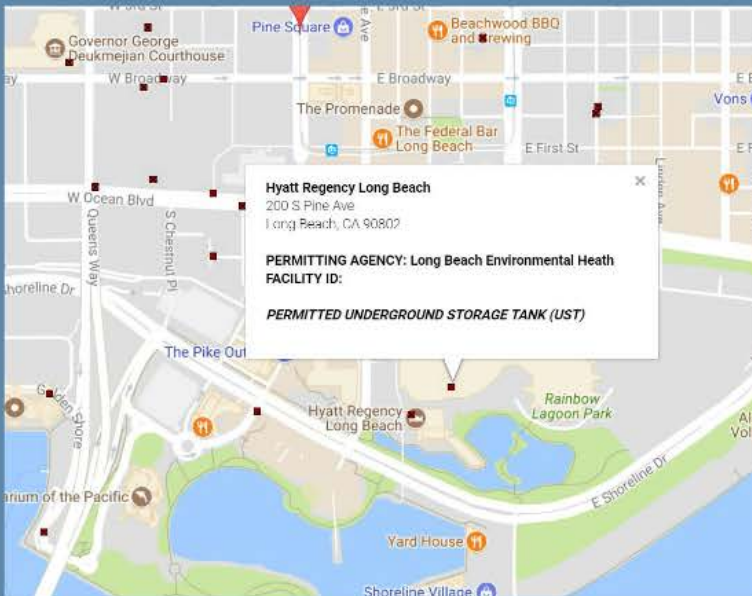
- Residents/ Business owners
- Permitted/ Illicit dischargers



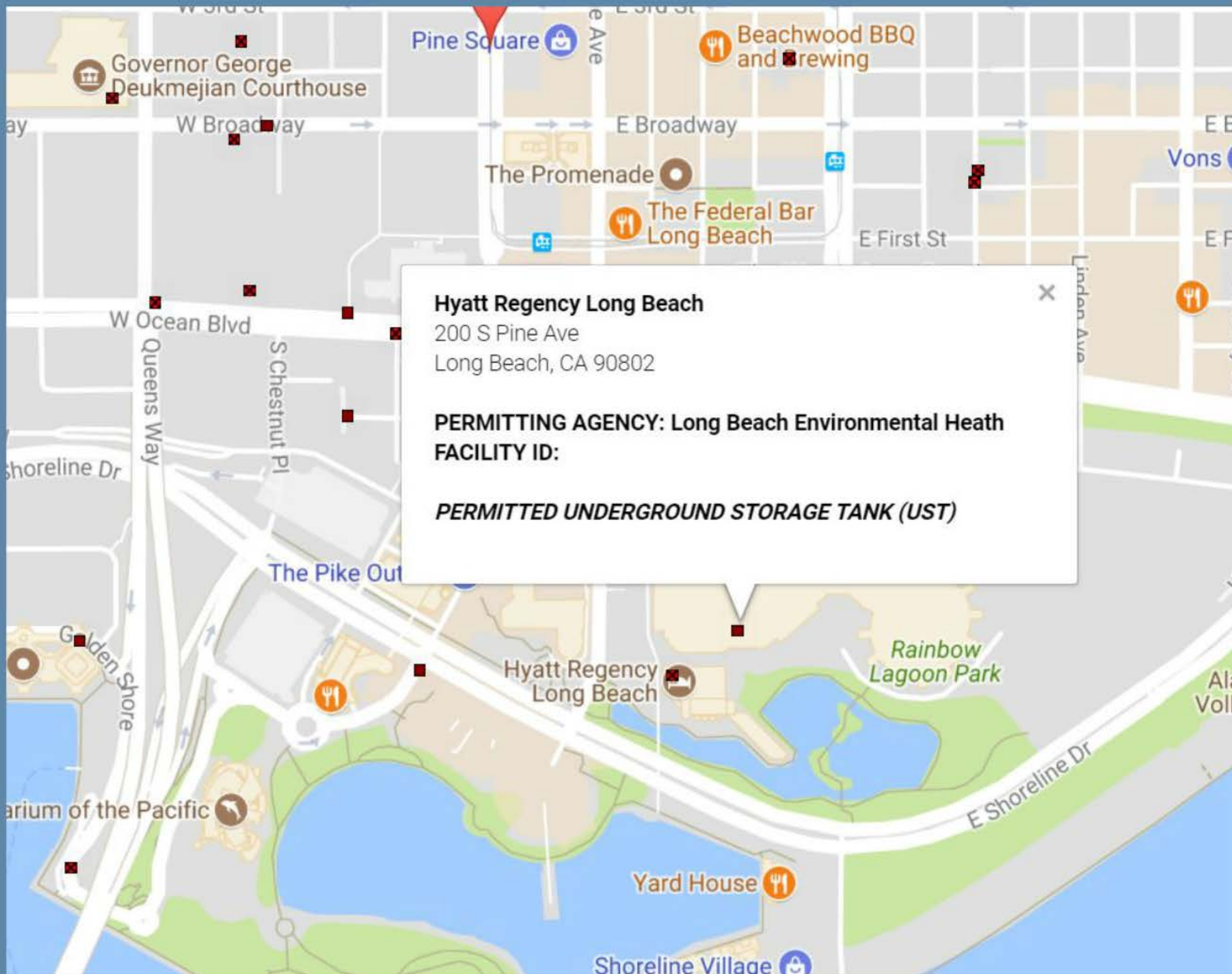
Any new developments in IDDE methods or practices?

Couple thoughts

- GIS mapping capabilities have greatly advanced since the first permit period, along with GPS support for finding things



- 2016 Indiana Annual MS4 Conference - presentation on UAV-mounted thermal imaging of storm water ponds for illicit inflows



Hyatt Regency Long Beach

200 S Pine Ave
Long Beach, CA 90802

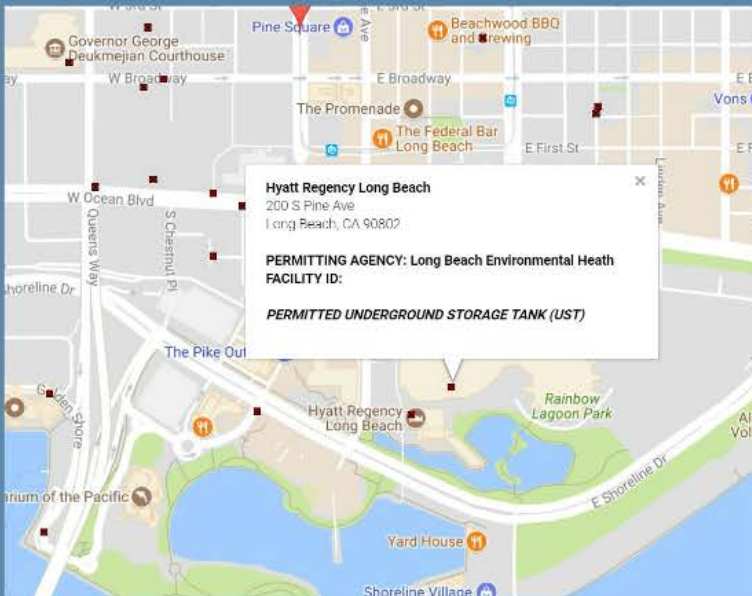
PERMITTING AGENCY: Long Beach Environmental Health
FACILITY ID:

PERMITTED UNDERGROUND STORAGE TANK (UST)

Any new developments in IDDE methods or practices?

Couple thoughts

- GIS mapping capabilities have greatly advanced since the first permit period, along with GPS support for finding things



- 2016 Indiana Annual MS4 Conference - presentation on UAV-mounted thermal imaging of storm water ponds for illicit inflows

Construction Site Runoff Control

Sources

- Permits and regulations
- Industry **guidance**
- Designers and contractors
- Inspectors

Outputs

- Permits, policies & procedures
- Inspections
- Construction ESC BMPs
- **Cleanup** and Enforcement

Inputs

- Erosion control **plans**
- Construction site **inspections**
- Public observations

Audiences

- Developers
- Designers
- **Contractors**

Timing

Controlled reviews and inspections;
occurrence driven response



Any new developments in the world of construction site runoff control?

Yes!

- Many expanding programs for training and certification of ESC inspectors, or "trained individuals"



- Continually improving products and material technology

Post Construction Runoff Control

Sources

- Permits and regulations
- MS4 staff
- Designers
- Industry **guidance**

Inputs

- Sustainable practices
- Green/ LID **design**
- Quality/ flow/ volume control BMPs
- Local policies/ procedures



Outputs

- Private facility SWPPPs
- Regional storm water quality **facilities**
- Inspections
- BMP/ facility O&M

Audiences

- **Developers and Designers**
- BMP/ Infrastructure owners, **operators** and inspectors

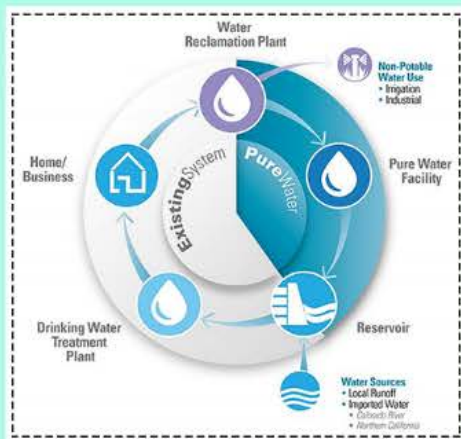
Timing

Controlled reviews, inspections and maintenance

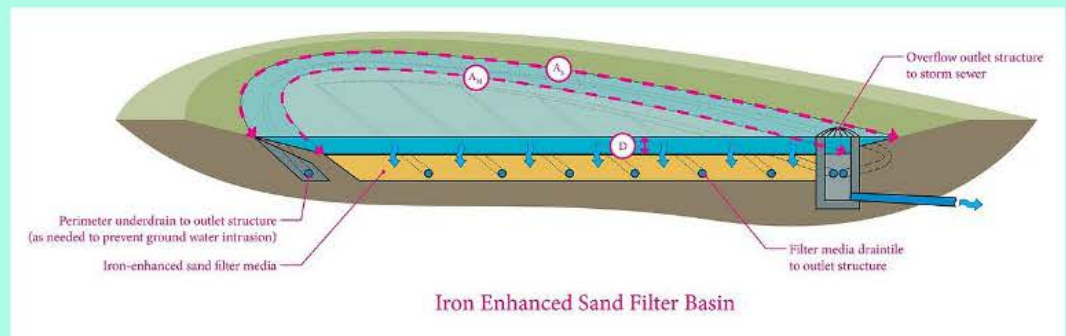
Among the myriad improved systems, designs, processes and practices, does anything truly stand out?

Different for everybody, but...

- Rapid acceptance of underground storage and underground treatment systems
- Sustainability programs



- Advance of active treatment systems



Pollution Prevention/ Good Housekeeping

Sources

- Pollution prevention information
- Local policies and practices
- Industry guidance

Inputs

- Permits and regulations
- Trade organizations
- MS4 SOPs



Outputs

- Pollution prevention and reduction practices
- Municipal facility, BMP & equipment inspection, O&M
- Staff training

Audiences

- MS4 field staff
- Facility operators
- Contractors for MS4 operations

Timing

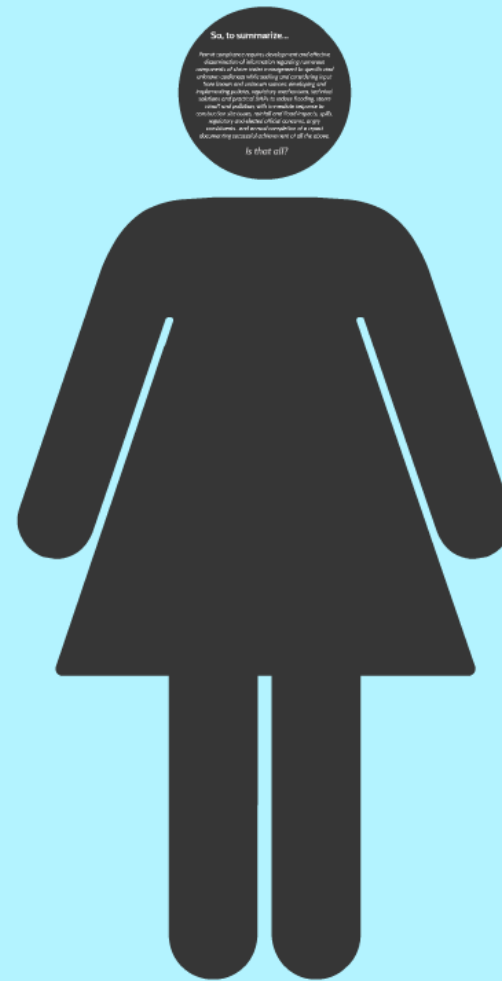
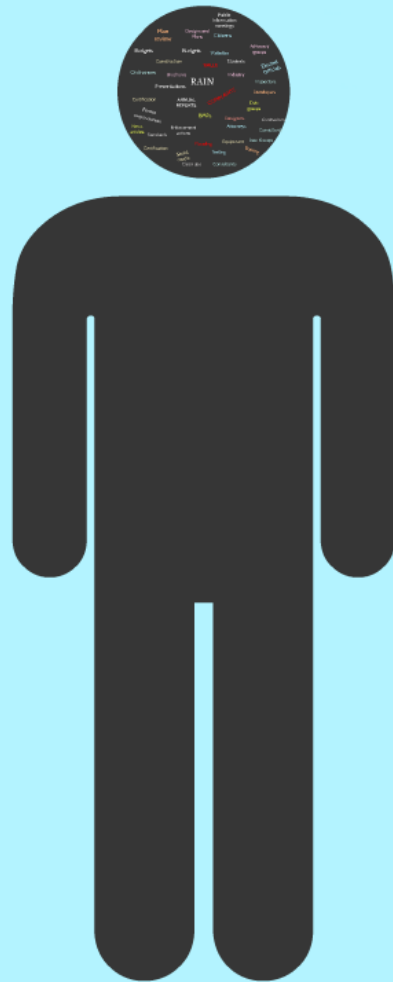
Planned activity and reactive to unplanned events

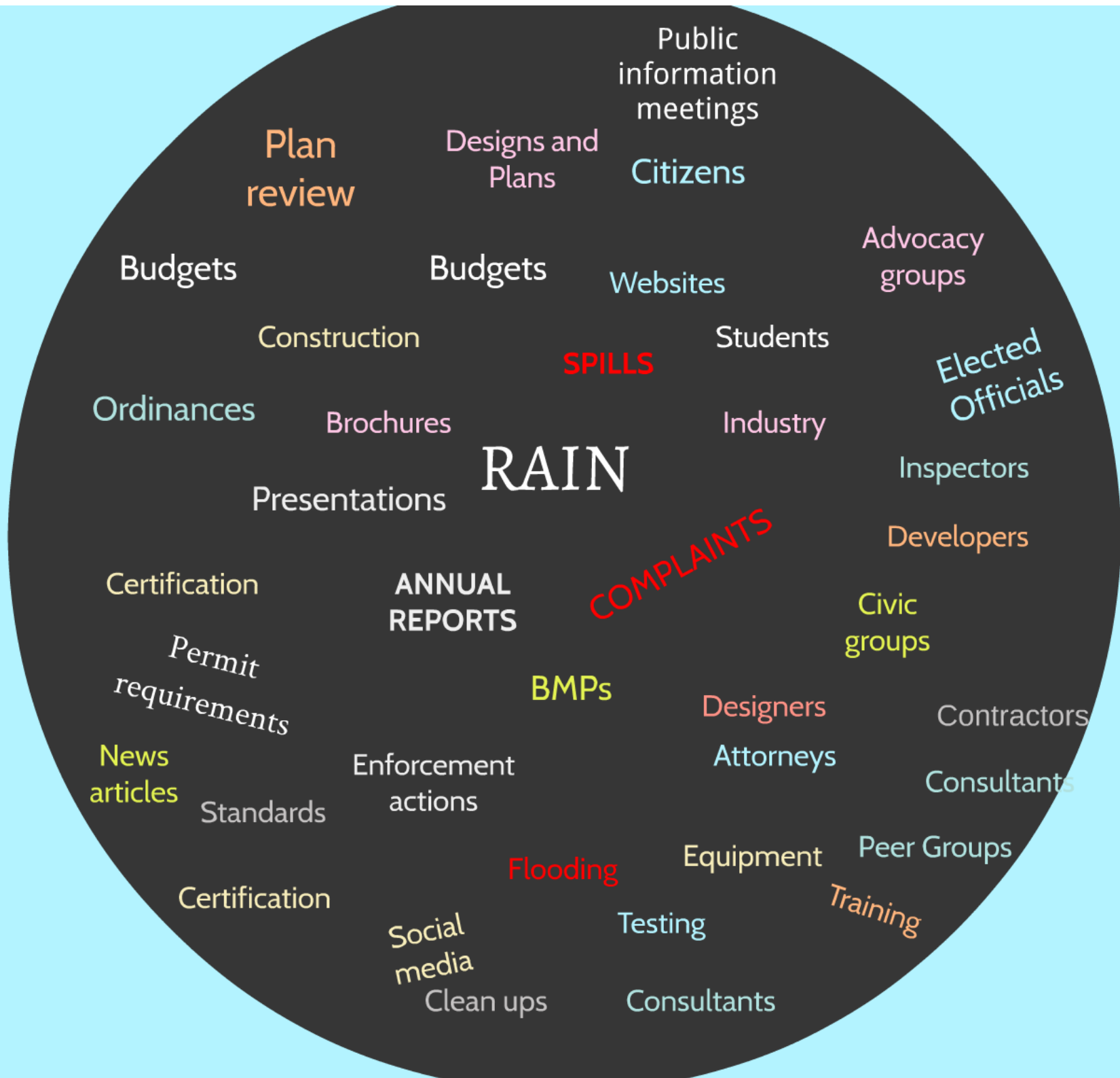
New developments on the pollution prevention and good housekeeping front?

- Increasing variety of well developed training programs and guidance materials.
- Improved and expanded implementation of Storm Water Pollution Prevention Plans (SWPPPs) for municipal facilities
- In many areas, increased attention on road salt use and its impact.



MS4 Storm Water Management Team





So, to summarize...

Permit compliance requires development and effective dissemination of information regarding numerous components of storm water management to specific and unknown audiences while seeking and considering input from known and unknown sources; developing and implementing policies, regulatory mechanisms, technical solutions and practical BMPs to reduce flooding, storm runoff and pollution, with immediate response to construction site issues, rainfall and flood impacts, spills, regulatory and elected official concerns, angry constituents...and annual completion of a report documenting successful achievement of all the above.

Is that all?

Your Permit...

- Is very structured
- Has many moving pieces
- Includes proactive and reactive elements
- Impacts people, places and things



Well-defined measurable goals are the key to SWMP success!

A well defined measurable goal -

Describes a specific **OUTCOME**.
What are you going to do or achieve?

Specifies an appropriate **METRIC**.
How will you measure success or completion?

States **REPORT** requirements.
What do you need to document, and in what form?

Clearly identifies **WHO** is responsible.



Identifies **WHEN** these tasks must be completed.
Are they recurring?



Pollution Prevention/ Good Housekeeping

Sources: Pollution prevention, housekeeping, maintenance, facility systems

Inputs: Training, materials, time, money, etc.

Timing: Regularly and frequently

Outputs: Pollution prevention, housekeeping, maintenance, facility systems

Audiences: MS4 District Board, Residents, Businesses, Agencies

Public Education/ Outreach

Sources: MS4 District Board, Residents, Businesses, Agencies

Inputs: Training, materials, time, money, etc.

Timing: Regularly and frequently

Outputs: Pollution prevention, housekeeping, maintenance, facility systems

Audiences: MS4 District Board, Residents, Businesses, Agencies

Public Education/ Outreach

Change People's Behavior!

Develop and implement an effective watershed protection program to reduce MS4 pollution

Public Participation/ Involvement

Sources: Residents, Businesses, Advisory groups

Inputs: Outreach materials, signage, etc.

Timing: Month or support events and regular input of any time

Outputs: Policy influence, SWMP refinement, Report Card Score (better than the last one)

Audiences: District Board, Residents, Businesses, Agencies

Post Construction Runoff Control

Sources: Stormwater runoff, debris, sediment, etc.

Inputs: Stormwater runoff, debris, sediment, etc.

Timing: Regularly and frequently

Outputs: Clean water, reduced sediment, etc.

Audiences: Residents, Businesses, Agencies

Post Construction Runoff Control

Reduce pollutants in post-construction runoff from development and redevelopment projects that would harm and obstruct the **Watershed Ongoing Impact**

Construction Site Runoff Control

Keep It Clean!

Reduce pollutants in runoff from construction sites that would harm and obstruct the **Watershed Ongoing Impact**

Illicit Discharge Detection and Elimination (IDDE)

Find and plug the leaks!

Develop and implement an effective illicit discharge detection and elimination program

Illicit Discharge Detection and Elimination (IDDE)

Sources: Illicit discharges, leaks, etc.

Inputs: Outreach materials, signage, etc.

Timing: Regularly and frequently

Outputs: Clean water, reduced sediment, etc.

Audiences: Residents, Businesses, Agencies

Construction Site Runoff Control

Sources: Stormwater runoff, debris, sediment, etc.

Inputs: Stormwater runoff, debris, sediment, etc.

Timing: Regularly and frequently

Outputs: Clean water, reduced sediment, etc.

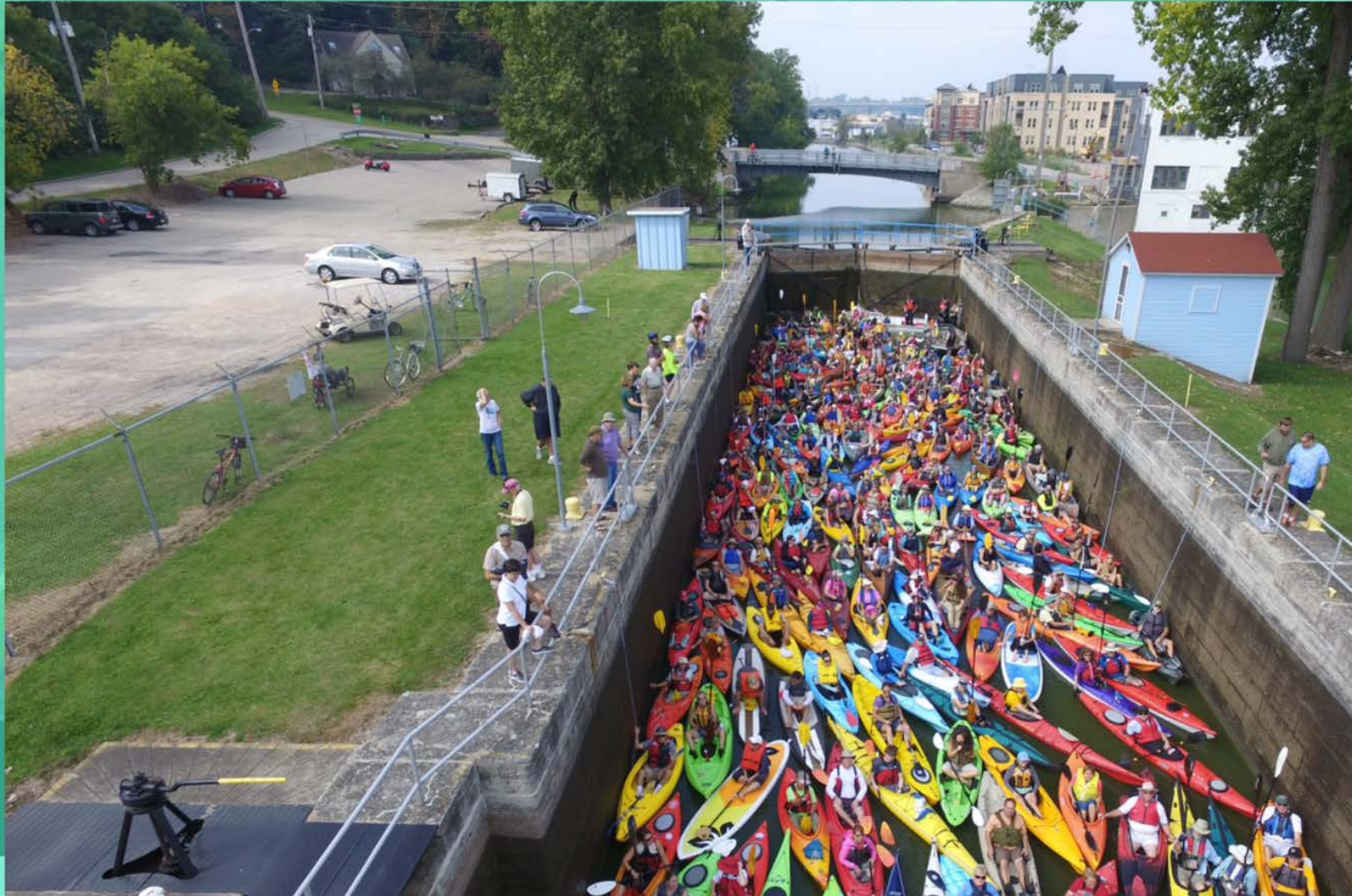
Audiences: Residents, Businesses, Agencies



**Does the MS4 permit cover
all the bases?**

**What's falling through
the cracks?**

Is it, Holistic?





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