STORMWATER MANAGEMENT

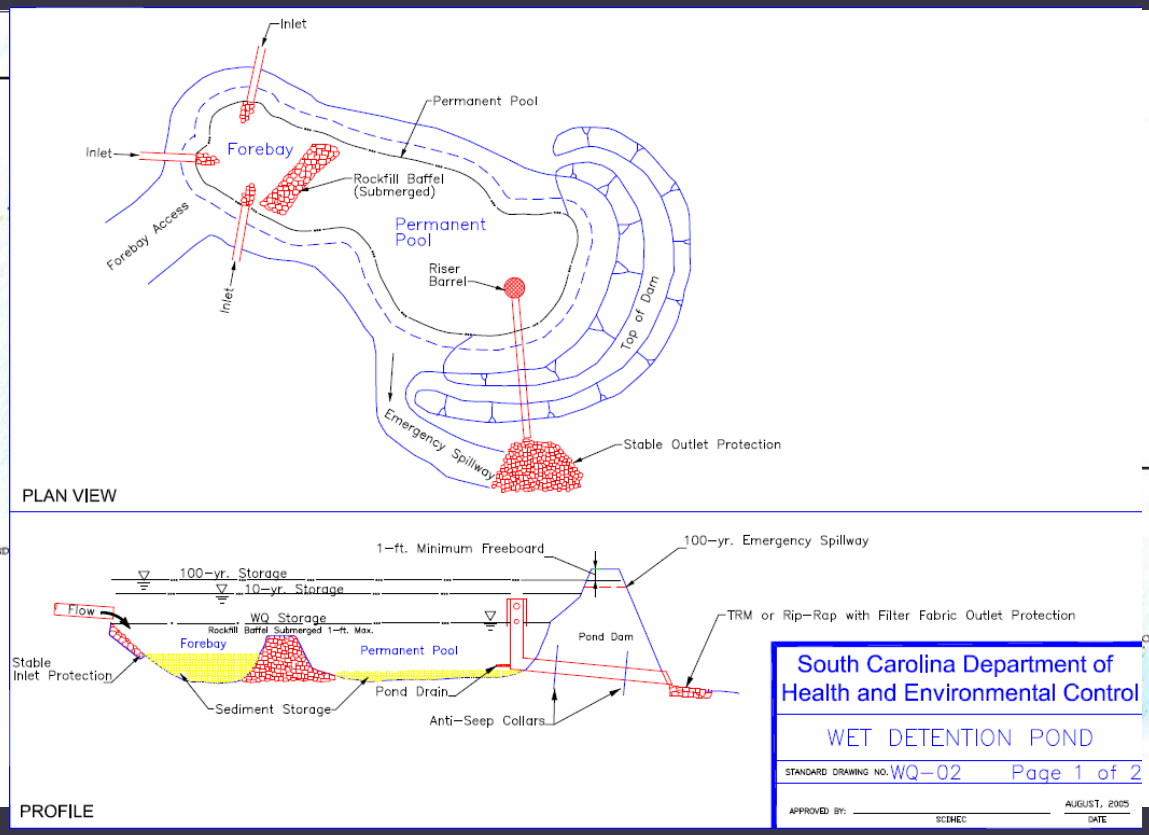
Managing stormwater through control systems

STORMWATER pond MANAGEMENT conference 2016

MANAGING STORMWATER

- Functions
- Stormwater Control Types
- Roles
- Responsibilities
- Challenges
- Resources

STORMWATER CONTROL FUNCTIONS



Flood Control

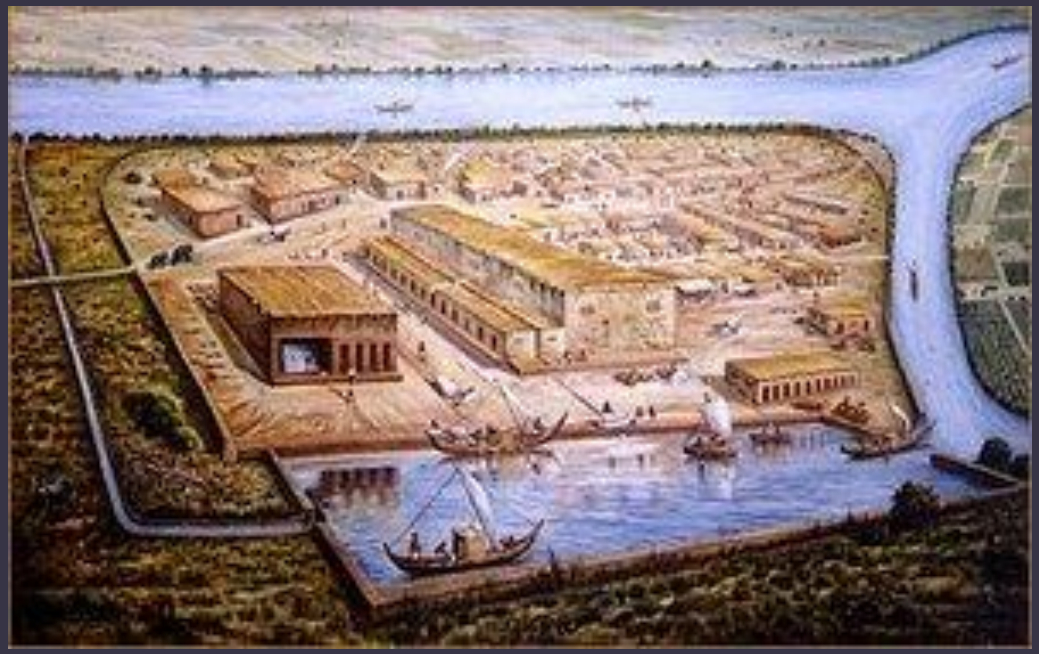
Protect downstream properties from flooding

Water Quality

Protect waterways (creeks) from pollution

AESTHETICS

MODERN STORMWATER CONTROLS?



- Wet Ponds
- Dry Ponds
- Constructed Wetlands
- Underground Storage
- Separator Devices
- Low Impact Development (LID)

WET PONDS

Maintain a permanent pool of water

- Impoundments/ Old Ponds
- Stormwater Ponds
  - Saltwater Ponds
  - Borrow Pit Ponds
  - Aesthetic Ponds
  - Subdivision/ Commercial Ponds

DRY PONDS & WETLAND PONDS

Have dry bottoms after rain events

or small wet areas with special plants to mimic wetlands

UNDERGROUND SYSTEMS

- Infiltration Chambers
- Underground Retention
- Allows for different site use
- Mostly commercial properties

SEPARATION CHAMBERS

- No Flood Control
- Separate out trash and debris from certain storms
- Require frequent inspections and cleaning
- Easily managed/ scheduled
- Bacteria Management ???

LOW IMPACT DEVELOPMENT (LID)

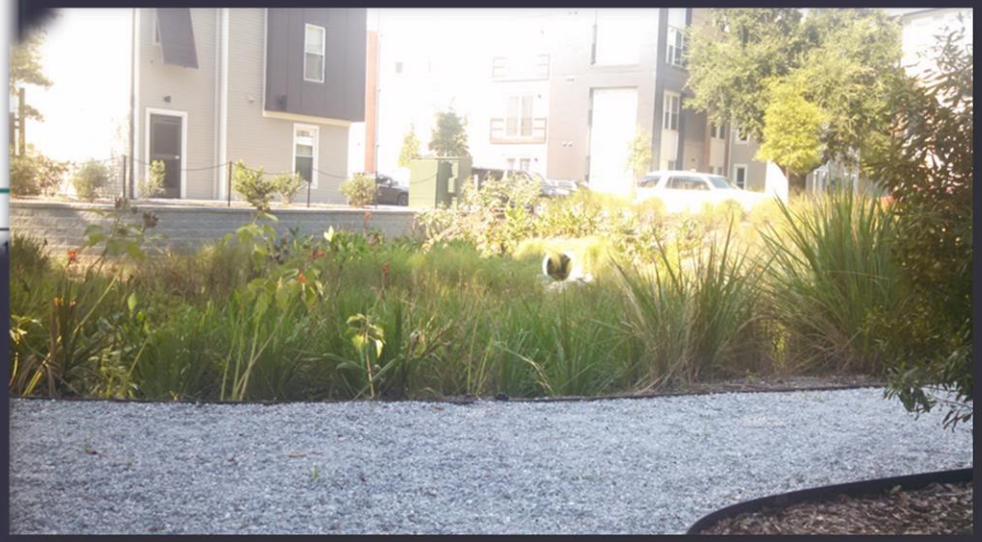
"GREEN INFRASTRUCTURE"

Harris Teeter Supermarket: Highway 41 Mount Pleasant, SC

The bioretention cell (left) and swale (right) in grocery store parking lot intercept and treat stormwater runoff.

Low Impact Development in Coastal South Carolina: A Planning and Design Guide 1-1

- Bio-swales
- Bio-Retention
- Pervious Pavers
- Narrower Streets
- Land Conservation
- Tree Preservation



ROLES

Why are we here?

ROLES – FEDERAL & STATE

EPA & FEMA

- Regulate Water Quality
  - State
  - Local
- Mitigate Flood Damage
  - Flood Insurance programs
  - Post disaster repairs

State

- Provide Minimum Standards
- Approve Land Disturbance Permits
- Water Quality Protection of State Waters
- Enforce Compliance

SOUTH CAROLINA REGULATIONS

1991 TO 2007…

Under the South Carolina Stormwater Management and Sediment Reduction Act of 1991 (48-14-10, et. seq.), Regulation 72-308 requires the Landowner, its successors and assigns, including any homeowners association, shall adequately maintain the stormwater management/Best Management Practices (BMP) facilities. This includes all pipes and channels built to convey stormwater to the facility, as well as all structures, improvements, and vegetation provided to control the quantity and quality of the stormwater. Adequate maintenance is herein defined as good working condition so that these facilities are performing their design functions.

The Landowner, its successors and assigns, will perform the work necessary to keep these facilities in good working order as appropriate. In the event a maintenance schedule for the stormwater management/BMP facilities (including sediment removal) is outlined on the approved plans, the schedule will be followed.

I accept responsibility for ownership and proper maintenance of the stormwater system (pond, swales, etc.) on the _____ site per the approved maintenance plan. I will complete any necessary repairs and/or preventive maintenance procedures in a timely manner to ensure proper functioning as a stormwater management device(s).

It is my understanding that the maintenance plan may be amended/revised at any time by DHEC/OCRM, and I will abide by any prescribed changes.

I will continue to own and maintain the pond until DHEC/OCRM is notified in writing of a transfer in ownership and maintenance responsibility. The notification will include a date for the transfer of responsibility and a letter of acceptance from the new owner.

I understand that failure to adhere to the signed maintenance agreement may result in fines of up to $1,000.00 per day, per violation and /or the institution of a court action.

Signature of Owner/Agent	**Printed Name of Owner/Agent**	**Date**
Mailing Address	**City/State/Zip**	**Phone Number**

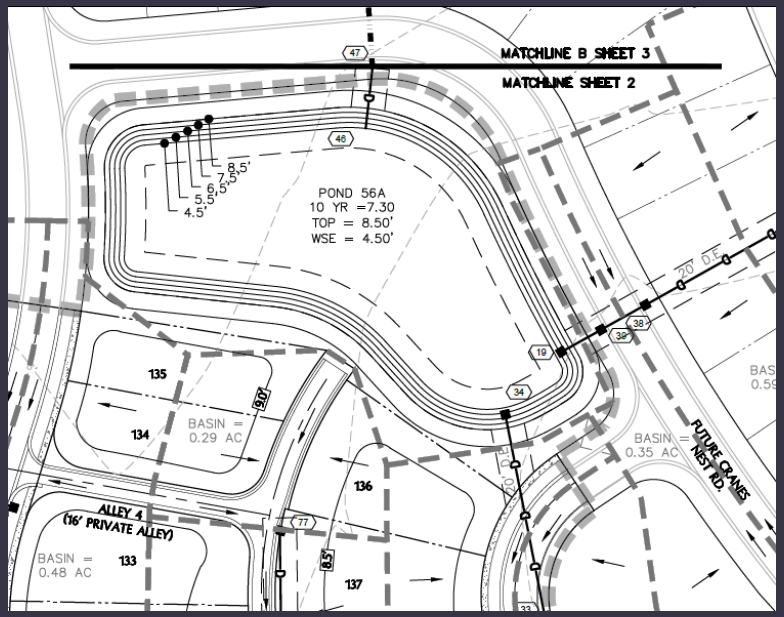
Notary Stamp/Signature/Date

ROLES – MS4
(LOCAL TOWN, CITY, COUNTY)

- Educate residents and businesses
- Encourage participation in protecting water quality
- Develop standards and programs
- Inspect to confirm standards
- Require corrective measures if needed
- Conduct enforcement if needed
- Maintain the public portions of the system

ROLES - DEVELOPERS

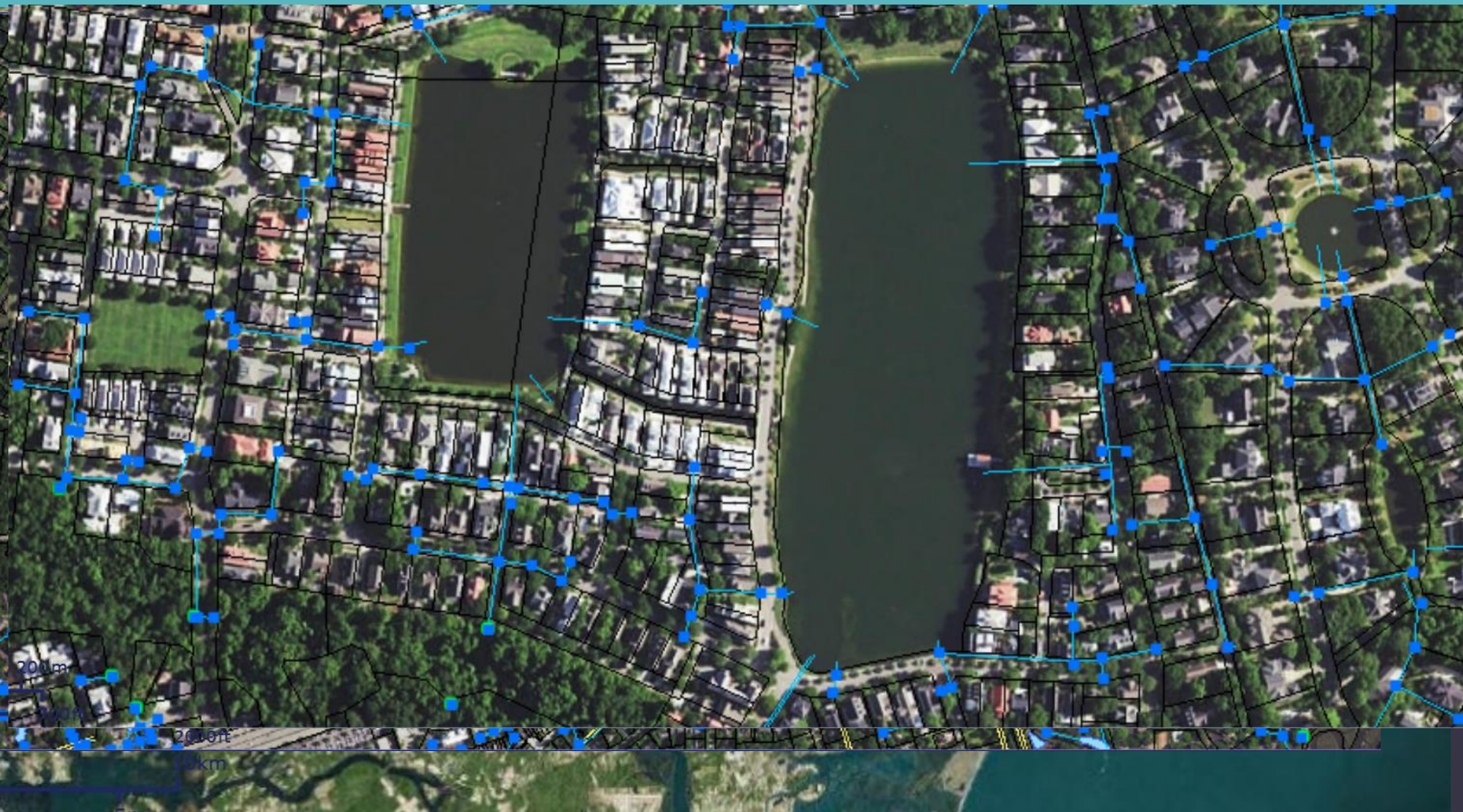
- Submit plans to meet requirements
- Build the pond according to plan
- Certify conformance to plans
- Provide as-builts
- Provide maintenance schedule/ agreement
- Turn over system and maintenance to HOA or future property owner



ROLES – POND OWNERS

- Maintain the pond/ private systems
  - Plan for adequate funding
  - Execute maintenance plan
- Correct deficiencies
- Provide upgrades as needed?
- Keep residents/ customers happy

COMMUNITY ROLL



Chore Chart

Daily Responsibilities

		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Points
SET TABLE		Bob	Joe	Kelly	Bob	Joe	Kelly	Bob	
CLEAR TABLE after Dinner		Joe	Kelly	Bob	Joe	Kelly	Bob	Joe	
Feed Dogs									
Empty Dishwasher		Joe	Kelly	Bob	Joe	Kelly	Bob	Joe	
Wash Dishes		Kelly	Bob	Joe	Kelly	Bob	Joe	Kelly	
CLEAN UP TOYS, BOOKS & Art Supplies		K, J, B	K, J, B	K, J, B	K, J, B	K, J, B	K, J, B	K, J, B	
DIRTY LAUNDRY in Hamper		K, J, B	K, J, B	K, J, B	K, J, B	K, J, B	K, J, B	K, J, B	
PUT CLEAN LAUNDRY AWAY				Kelly		Kelly			

RESPONSIBILITIES – MS4

4.2.5.4 **Long-Term Maintenance of Post-Construction Stormwater Control Measures**

4.2.5.4.1 All structural stormwater control measures installed and implemented to meet the performance standards of Part 4.2.5.2 must be maintained in perpetuity. Permittees must ensure the long-term maintenance of structural stormwater control measures installed

4.2.5.4.2 **Verification of maintenance responsibilities.** Permittees must require that property owners or operators of any new development or redeveloped site subject to the performance standards in Part 4.2.5.2 provide verification of maintenance for the approved structural stormwater control

RESPONSIBILITIES –MS4

4.2.5.6 **Inspections and Enforcement**

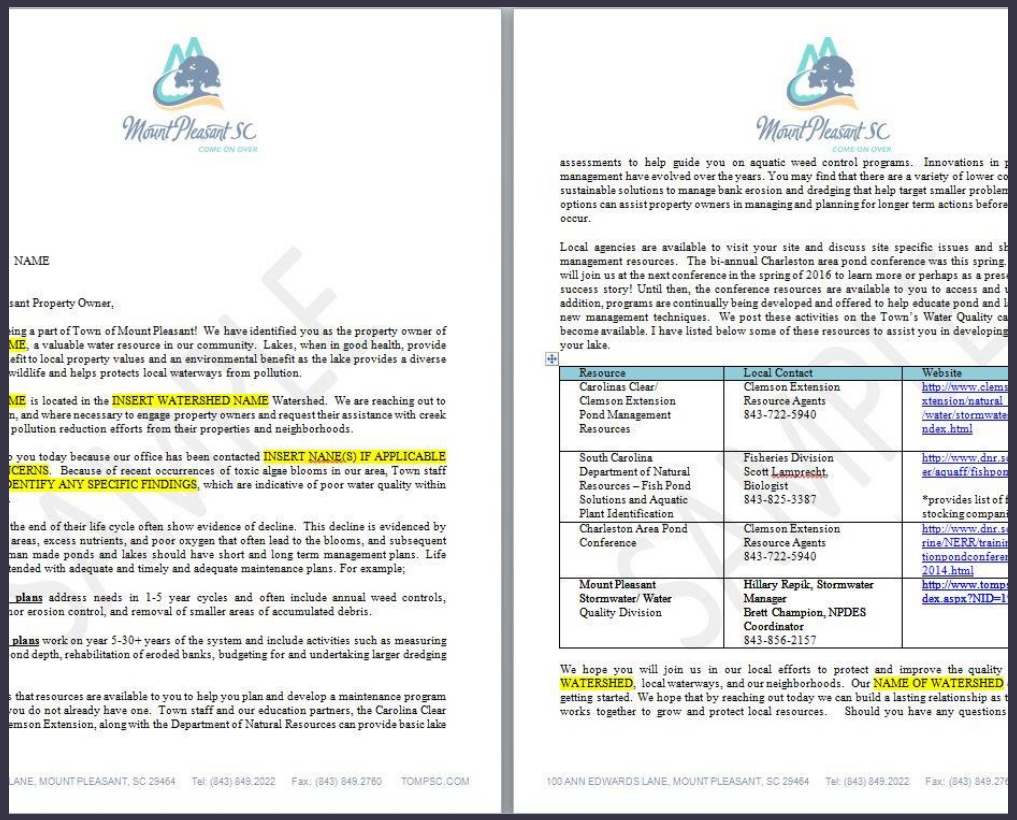
4.2.5.6.1 **Inspection Frequency.** To ensure that all stormwater control measures are operating correctly and are being maintained as required consistent with its applicable maintenance agreement, Permittees must conduct inspections of each project site covered under Part 4.2.5.2 performance standards, *at least one time during the permit term*. A description of inspection procedures must be included in the SWMP document.

4.2.5.6.3 **Inspection Reports**. Permittee must document its inspection findings in an inspection report.

Permittees must document and maintain records of inspection findings and enforcement actions and make them available for review by the permitting authority.

"VOLUNTARY PROGRAM"

SYSTEMS INSTALLED PRIOR TO -2007



Mount Pleasant SC
COME ON OVER

NAME

sant Property Owner,

ing a part of Town of Mount Pleasant! We have identified you as the property owner of ME, a valuable water resource in our community. Lakes, when in good health, provide efit to local property values and an environmental benefit as the lake provides a diverse wildlife and helps protects local waterways from pollution.

ME is located in the INSERT WATERSHED NAME Watershed. We are reaching out to n, and where necessary to engage property owners and request their assistance with creek pollution reduction efforts from their properties and neighborhoods.

o you today because our office has been contacted INSERT NANE(S) IF APPLICABLE CERNS. Because of recent occurrences of toxic algae blooms in our area, Town staff DENTIFY ANY SPECIFIC FINDINGS, which are indicative of poor water quality within

the end of their life cycle often show evidence of decline. This decline is evidenced by areas, excess nutrients, and poor oxygen that often lead to the blooms, and subsequent man made ponds and lakes should have short and long term management plans. Life tended with adequate and timely and adequate maintenance plans. For example;

plans address needs in 1-5 year cycles and often include annual weed controls, or erosion control, and removal of smaller areas of accumulated debris.

plans work on year 5-30+ years of the system and include activities such as measuring ond depth, rehabilitation of eroded banks, budgeting for and undertaking larger dredging

s that resources are available to you to help you plan and develop a maintenance program ou do not already have one. Town staff and our education partners, the Carolina Clear emson Extension, along with the Department of Natural Resources can provide basic lake

LANE, MOUNT PLEASANT, SC 29464 Tel: (843) 849.2022 Fax: (843) 849.2760 TOMPSC.COM

Mount Pleasant SC
COME ON OVER

assessments to help guide you on aquatic weed control programs. Innovations in p management have evolved over the years. You may find that there are a variety of lower co sustainable solutions to manage bank erosion and dredging that help target smaller problem options can assist property owners in managing and planning for longer term actions before occur.

Local agencies are available to visit your site and discuss site specific issues and sh management resources. The bi-annual Charleston area pond conference was this spring, will join us at the next conference in the spring of 2016 to learn more or perhaps as a pres success story! Until then, the conference resources are available to you to access and addition, programs are continually being developed and offered to help educate pond and l new management techniques. We post these activities on the Town's Water Quality ca become available. I have listed below some of these resources to assist you in developing your lake.

Resource	Local Contact	Website
Carolinas Clear/ Clemson Extension Pond Management Resources	Clemson Extension Resource Agents 843-722-5940	http://www.clems xtension/natural /water/stormwate ndex.html
South Carolina Department of Natural Resources – Fish Pond Solutions and Aquatic Plant Identification	Fisheries Division Scott Lamprecht, Biologist 843-825-3387	http://www.dnr.s er/aquaff/fishpon *provides list of f stocking compani
Charleston Area Pond Conference	Clemson Extension Resource Agents 843-722-5940	http://www.dnr.s rins/NERR/traini tionpondconferen 2014.html
Mount Pleasant Stormwater/ Water Quality Division	Hillary Repik, Stormwater Manager Brett Champion, NPDES Coordinator 843-856-2157	http://www.tomp dex.aspx?NID=1

We hope you will join us in our local efforts to protect and improve the quality WATERSHED, local waterways, and our neighborhoods. Our NAME OF WATERSHED getting started. We hope that by reaching out today we can build a lasting relationship as t works together to grow and protect local resources. Should you have any questions

100 ANN EDWARDS LANE, MOUNT PLEASANT, SC 29464 Tel: (843) 849.2022 Fax: (843) 849.276

- Conduct site visits upon request
- Encourage action
- Educate on resources
  - Clemson Education Program
  - Pond Conference (2-years)
  - Letters of request to owners

"COMPLIANCE PROGRAM"

SYSTEMS INSTALLED AFTER 2007

- Maintenance Agreements
- Annual Reporting Form for owners
- Mandatory inspections by the jurisdiction – every 5 years for new systems (new in 2014)

CHALLENGE – "TO ENSURE"

C: The results of this inspection are as follows:	
☐	***FAIL*** *VISUAL INSPECTION FOUND APPARENT PROBLEMS WHICH NEED IMMEDIATE ATTENTION. COMPLETE THE REPAIR AND/OR MAINTENANCE ITEMS INDICATED ON THE ATTACHED CHECKLISTS WITHIN 30-DAYS OF THE DATE OF THIS REPORT. RE-INSPECTION AND CERTIFICATION PRIOR TO OR AT THE 30-DAY INTERVAL WILL FOLLOW SATISFACTORY COMPLETION OF ALL REPAIRS AND MAINTENANCE. REPORTS NOT RECEIVED WITHIN 30-DAYS WILL AUTOMATICALLY DEFAULT INTO ENFORCEMENT ACTIONS. SEE ITEM "D" BELOW REGARDING ENFORCEMENT.*
☐	**PASS/CERTIFIED** *(CHECK HERE AFTER INITIAL FAILURE IF THIS IS A RE-INSPECTION)* ☐ *DATE:* Click here to enter a date. **VISUAL INSPECTION FOUND NO APPARENT PROBLEMS, (CERTIFICATION BELOW; SEE ITEM "E").**

D. Enforcement Actions. Enforcement is triggered as follows:

1) *When an annual inspection is 30-days past due and no efforts have been documented (submitted) to the TOMP indicating that the inspection has taken place; or*
2) *When a site inspection does take place but fails, and the follow-up 30-day repair time period outlined above elapses and no repairs and/or follow-up certification is received by the TOMP;*
3) *When a site inspection does take place but fails and then, after 30-days, only some (but not all) of the necessary repairs have been rectified.*

E. Certification (is <u>only</u> performed when BMP is functional and has no outstanding repair or maintenance issues)

DRAFT

WATER QUALITY PERFORMANCE INSPECTION MATRIX		
System Built	Inspection Schedule	Resolution Guide
Prior to 2007	• Courtesy or Complaint Inspections upon Request	• Conduct inspection • Provide Guidance on new techniques • Direct owners to additional resources • No timeframe for correction unless there is an evident water quality or flood control violation
2007-2013	• Post-Construction/ Final Inspection • Random Town Inspection • Complaint Inspections	• Conduct Inspection • Verify Annual Reporting Status • Notify Owner of reporting requirements • Provide Guidance on new techniques • Direct owners to additional resources • Timeframe for correction will be based upon severity of any evident water quality standards violation (structural issues may not be considered a violation unless severe)
2014+	• Post-Construction/ Final Inspection • Complain Inspections • Town Inspection every 5-years	• Verify Annual Reporting Status • Notify Owner of reporting requirements • Conduct Inspection • Provide guidance on new techniques • Direct owners to additional resources • Timeframe for correction will be based upon severity of any evident water quality standards violation (structural issues may not be considered a violation unless severe)

RESPONSIBILITIES

FROM DEVELOPER TO FUTURE OWNERS

DRAINAGE FACILITIES MAINTENANCE PLAN

3) PONDS SHOWN HEREON SHALL BE MAINTAINED BY THE HOMEOWNER'S ASSOCIATION (H.O.A.)

SLOPE EROSION, AND ESTABLISHING GRASSING AS SOON AS POSSIBLE.

2. ONCE CONSTRUCTION ACTIVITIES ARE COMPLETED, THE DEVELOPER IS RESPONSIBLE FOR

9. ALL PONDS, PRIVATE DRAINAGE SYSTEMS AND BUFFER AREAS SHOWN HERE ON SHALL BE MAINTAINED BY HOMEOWNERS ASSOCIATION (H.O.A.)

RESPONSIBILITIES – OWNERS

b. After construction:

i. The Owner or his Assigns shall be responsible for perpetual maintenance including but not necessarily limited to:

(1) Bi–weekly:

(a) Aesthetic maintenance of the banks and surrounding common areas including mowing, landscape maintenance, and removal of trash and debris.

(2) Every 6 months:

(a) Inspection of the pond(s) and associated outlet structure(s).

(b) Removal of any blockages and accumulated debris at the outlet structure(s).

(c) Repair and stabilization of any bank erosion.

(d) Repair or replacement of any damage to the outlet structure(s).

(3) Every 12 months:

(a) Treatment, as necessary, for aquatic weed control.

(4) Every 5 years:

(a) Removal and proper disposal of accumulated sediment.

CHALLENGES

Every system is different…

But the same

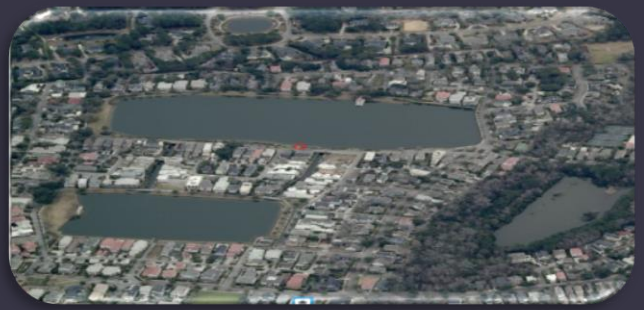
- More ponds – every day?
- Ownership
  - Individual Owners
  - Group owners
  - HOAs
- Defined Maintenance?
- Measurable Performance?
  - Aesthetics
  - Pollution
  - Flooding
- Inspection Resources
- Compliance Actions/ Enforcement

CHALLENGE
AGE / DESIGN & LOCATION

"Saltwater" Lakes

MAY Require Federal permits

- More work may be needed upstream to protect
- Dredging
- Different Aquatic Weeds
- Trash
- Bank Erosion
- Fish Kills- Oxygen Depletion



Borrow Pit Lakes

Large – Deep Ponds

- Bank Erosion
- Aquatic Weeds
- Trash/ Pollution
- Safety Concerns
- Recreational Uses

CHALLENGE
AGE / DESIGN & LOCAL ISSUES

Subdivision Ponds

- Bank Erosion
- Aquatic Weeds
- Trash/ Pollution
- Dredging and material disposal
- Consensus on management
- Prioritizing issues
- Funding issues

Commercial Ponds

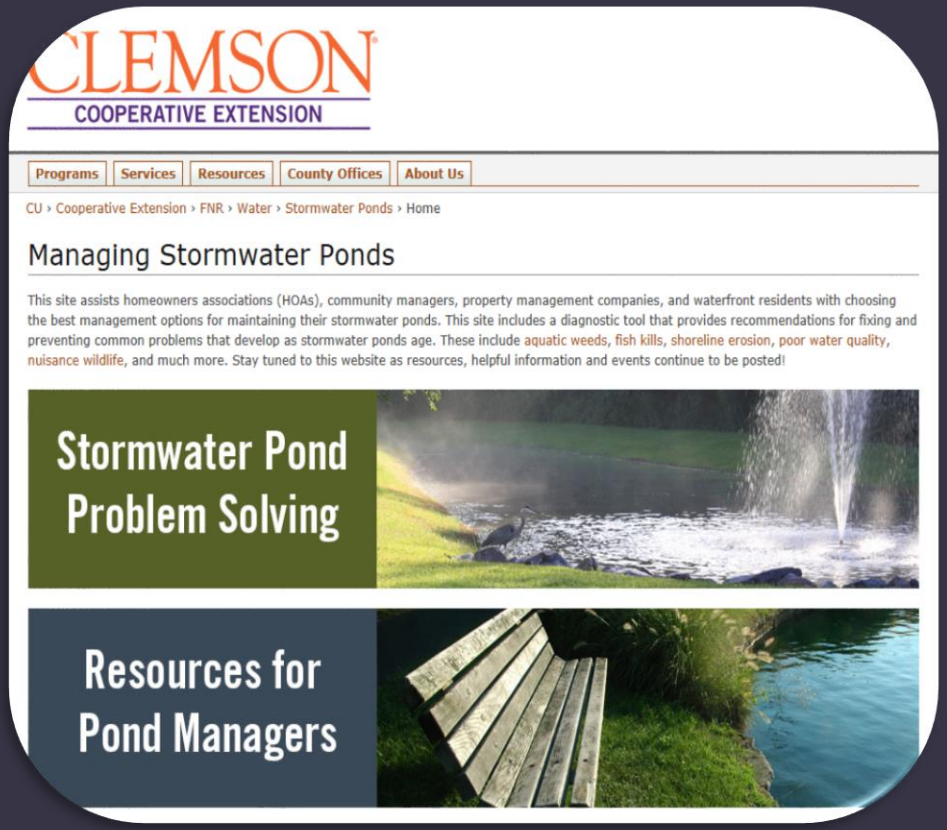
Ponds and other BMPs

- Bank Erosion
- Aquatic Weeds
- Trash/ Pollution
- Oils & Heavy Metals
- Dredging and material disposal
- Multiple owners?
- May have higher maintenance needs
- Out of State Owners

TOWN RESOURCES

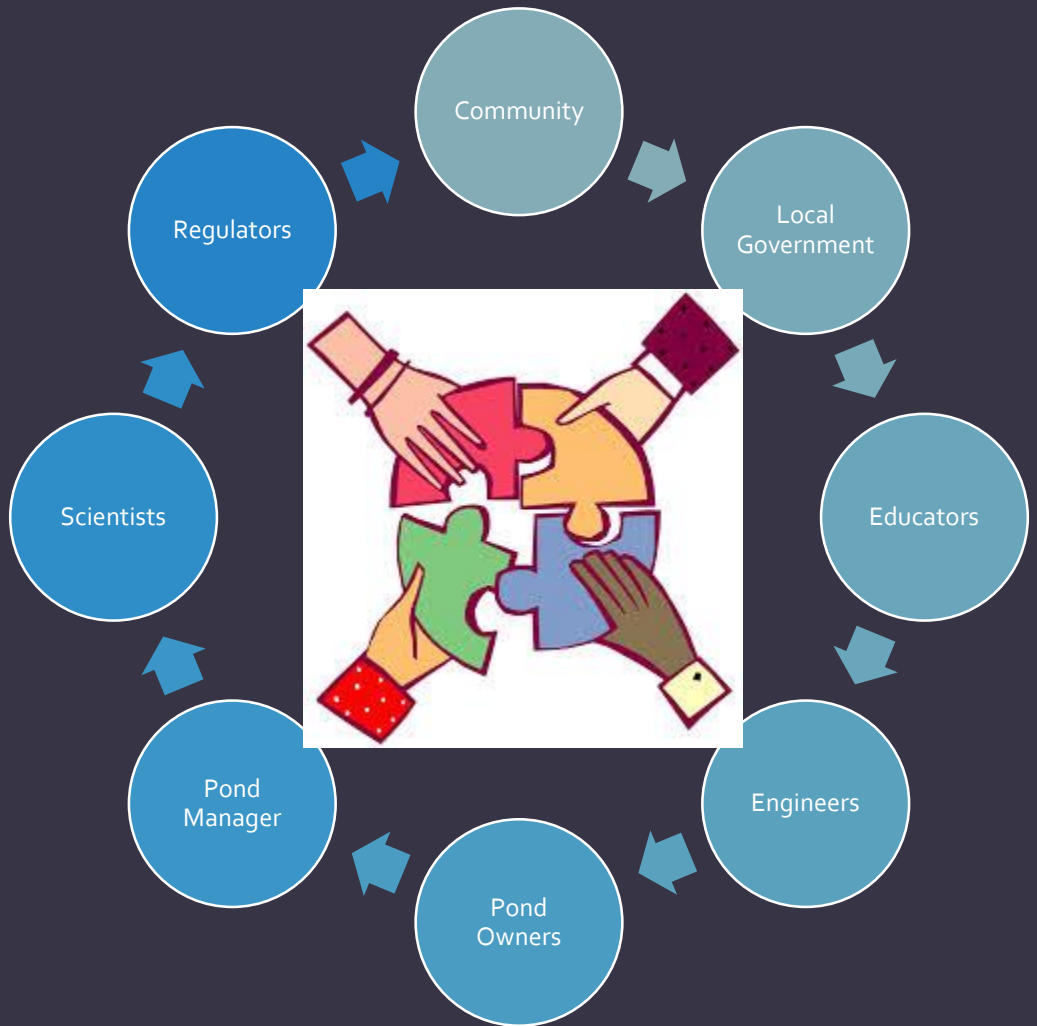
- Site Visits
- Issue Identification
- Resource Sharing
- Web Resources
- Communication with Owners
- Updating Program Forms

PARTNER RESOURCES



- Issue Identification
- Resource Sharing
- Web Resources
- Training and Certification Sessions

SUSTAINABLE PARTNERSHIPS



CONCLUSION

- Stormwater Controls are privately owned
  - Owners may not be aware of responsibilities
  - Owners do not always have resources
  - Owner may not be willing to take action