

ECS LUNCH AND LEARN 02/25/2017

MS-4 BMP and SMC design insights from a maintenance contractor

Our goal: To share some elementary lessons learned by being on site to maintain and repair a failed systems. Save the client money and long term maintenance head aches by designing with maintenance and installation in mind .

Facilitator: Clarke Willey is a Landscape Architect and former civil pm with 15 years design and 4 years manufacturing in Virginia during the first decade of the Chesapeake Bay Act. He now works for a BMP & SCM maintenance contractor



TPM Environmental Group 2040 Old Louisville Rd Bowling Green Ky 42101

DISCLAIMER;

**THIS PRESENTATION IS
FROM THE PERSPECTIVE
OF A MAINTENANCE
CONTRACTOR WHO GETS
PAID MAINTENANCE
MONEY
NO WARRANTY IMPLIED
OR EXPRESSED**

IN THE
BEGINNING
When I was a
kid in New
England











**IT WAS "NORMAL" FOR BROWN
AND RED LAKES RIVERS AND
STREAMS TO CATCH FIRE**

The Clean Water Act 1977, 1981, 1987

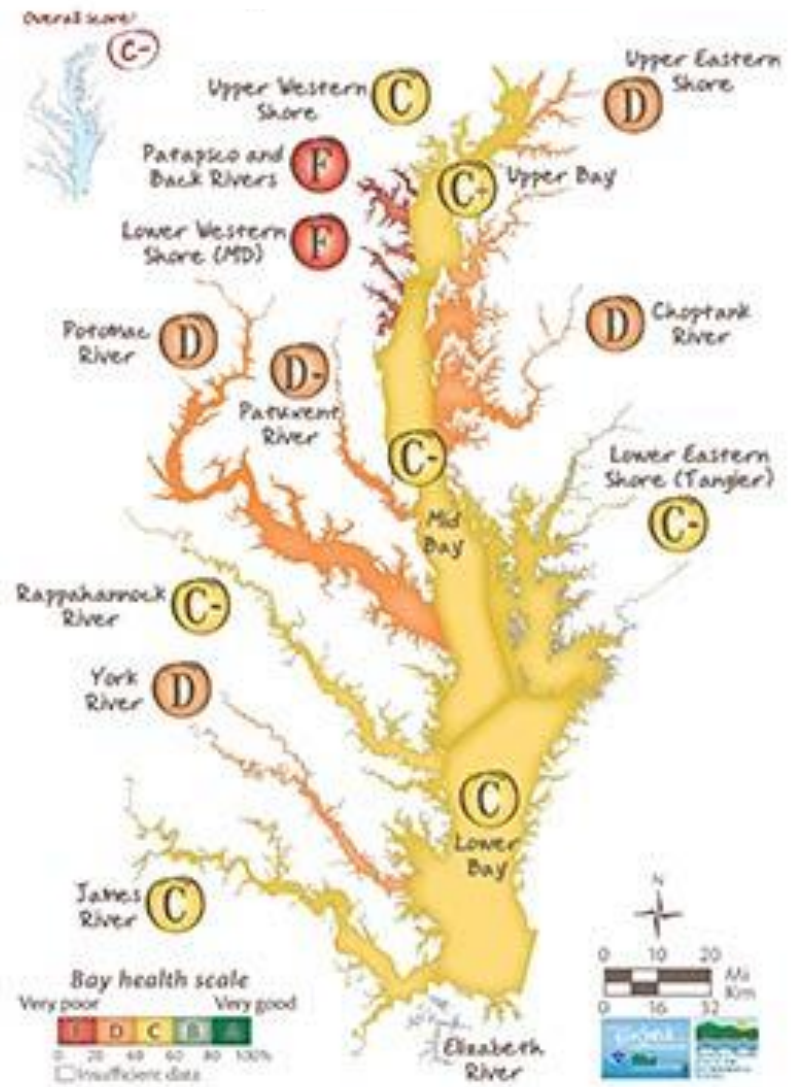
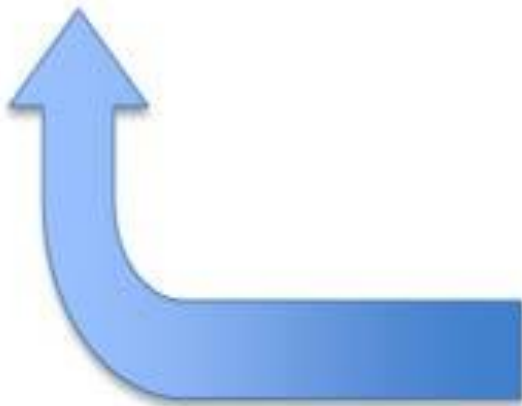
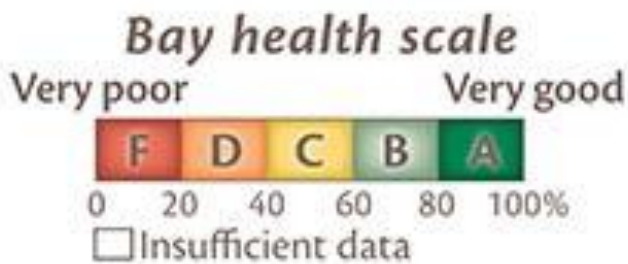
CWA

- ❖ Originally drafted in 1977
- ❖ Amendment Years: 1977, 1981,
1987
- ❖ National-United States

Ryan Taylor

P. 5

**HELP ARRIVED NOT A
MOMENT TO SOON**



IN 1988 THE SHELLFISH POPULATION OF THE CHESAPEAKE BAY WAS IN DECLINE GRASS BEDS WERE SHRINKING THE BAY WAS SICK CHESAPEAKE BAY ACT WAS BORN



EVOLUTION OF THE BMP



**EXAMPLE OF A TEMPORARY
SEDIMENT TRAP/BASIN 1980
DESIGNED BY AN ENGINEER?
ILLUSTRATED BY A DRAFTSMAN
APPROVED BY PLANNING**



**A TYPICAL SEDIMENT
TRAP IN 1988**



**PROGRESS WAS BEING MADE IN
THE EFFORT TO DO A BETTER JOB
TYPICAL SEDIMENT BASIN IN
1992**

CLARKE WILLEY'S TOP TEN LESSONS LEARNED

Cant stand to see money
and energy wasted

LESSON #1

GOOD SILT FENCES MAKE
GOOD NEIGHBORS



Best SEDIMENT & TRASH
CONTROL

Smart=BMP

DON'T LET SOIL GO DOWN THE DRAIN
Soil and labor cost money



**POOR HOUSE KEEPING
BY YOU AND YOUR NEIGHBORS
WILL COST EVERYONE TIME AND
\$\$\$\$\$\$\$\$\$\$\$\$**





How healthy is this system? Is it working as designed?

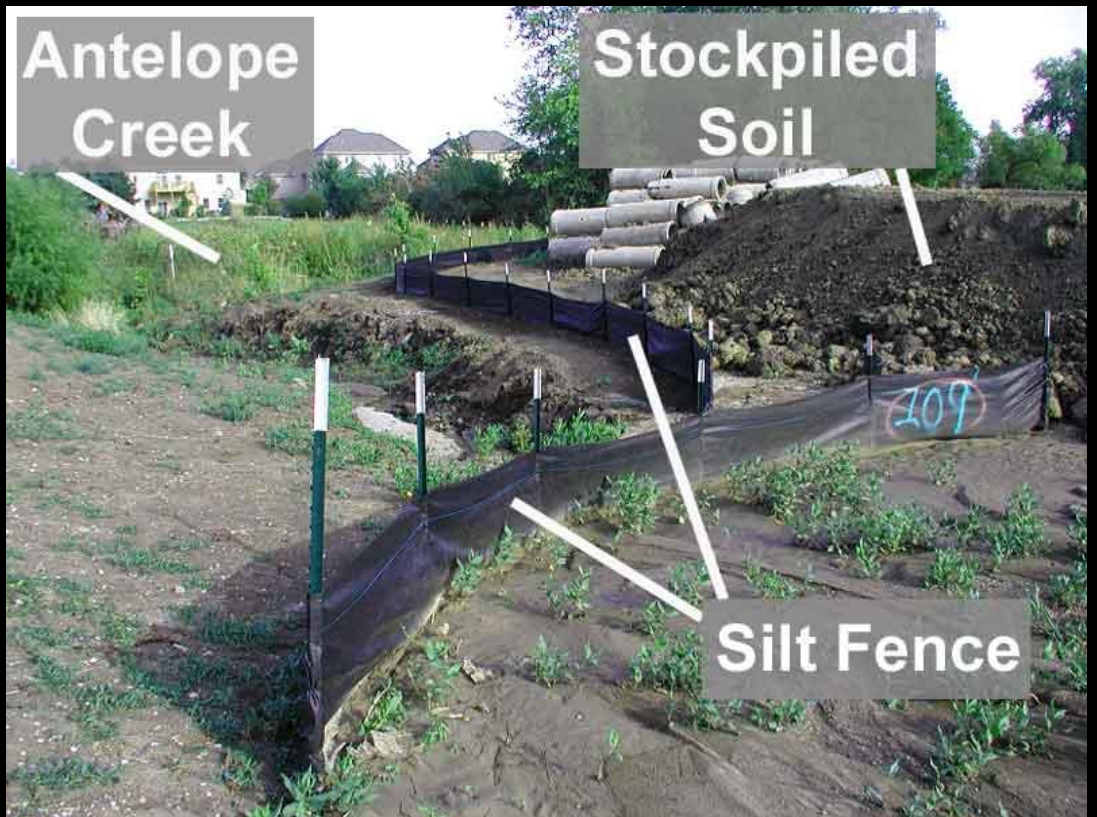


WHATS
WRONG WITH
THIS PICTURE?











**KEEP YOUR
MONEY ON SITE**





**SILT IN STORM DRAIN EXPENSIVE TO
REMOVE**



Inspect YOUR NEW STORM SEWER
before you accept it
Once everyone walks from the site
its the old adage **Out of site
out of mind**



HOW DID THIS GET DOWN
HERE,,,AND HOW DO WE GET IT
OUT?

\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$

STAY VIGILENT NOT ONLY ON YOUR SITE
BUT YOUR NEIGHBORS

PROPER MAINTENANCE IS LESS
EXPENSIVE ;

THAN HAVING TO

- ❖ BRING IN MORE DIRT
- ❖ GO UNDERGROUND TO CLEAN AND
UNCLOG PIPES VAULTS AND
CHAMBERS
- ❖ SUE YOUR NEXT DOOR NEIGHBOR



LESSON #2

PERVIOUS PAVEMENT
CANNOT BE REPAIRED
EFFECTIVELY



WINDOW DRESSING

**MUST PROACTIVELY
PROTECT PERVIOUS
PAVEMENT SURFAACE
FROM SILT AND ORGANIC
DEBRIS**

**INVESTING TIME AND
ENERGY**

**ONCE CLOGGED MAY
MAKE IT LOOK BETTER**

**BUT ONCE ITS FAILED ITS
DONE**

RESTORATION EXPENSIVE

\$\$\$\$\$\$\$\$\$\$





**PAVERS ARE A BETTER
APPROACH THEY CAN BE
PULLED UP AND REUSED**



LESSON #3

**STORM DRAIN CLEANING IN
ROADS AND STREETS IS
DANGEROUS**



**CARS BEING FLOWN BY TEXTING
DRIVERS**









LESSON #4

WHAT YOU SEE IS NOT ALWAYS
WHAT YOU GET

IT'S A PAIN IN THE BUTT TO CHASE DOWN
DESIGN DRAWINGS / AS-BUILTS

ESPECIALLY POST VALUE ENGINEERED CHANGE
ORDER INSTALLS

Water Quality Unit/ Proprietary Device Inspection Checklist

Complete one checklist per stormwater control measure. Submit checklists together per site.

WQU Make and Model: _____

Number of Filter Cartridges, if present: _____

Date of Last Rain: _____

Please note whether feature is satisfactory, unsatisfactory, or non-functioning. Clarify with your own comments. Note locations of photographs.

Feature		Comments
Inlet structure stable?	Y / N	
Trash rack free of debris?	Y / N	
Area draining to WQU stable?	Y / N	
Outlet Structure stable?	Y / N	
Downstream of discharge point stable?	Y / N	
Is there associated Underground Detention?	Y / N	
Depth of accumulated sediment (note inches or feet)		
Depth of accumulated sediment in underground detention (note inches or feet)		
Manufacturer's recommended pump-out volume/ sediment depth		
Total volume of sludge removed (Attach copy of waste manifest for disposal)		

General Comments:

Date of Next Inspection: _____

Inspector's Signature: _____ Date: _____

Owner's Signature: _____ Date: _____

WITH OUT PLANS HOW DO YOU KNOW WHAT YOUR INSPECTING TO

WHATS DOES THIS NUMBER MEAN
TO YOU? NOTHING UNLESS YOU
HAVE A SET OF PLANS

Sediment cleanout needed (over 50 percent full)?	<i>A/S</i>		
Permanent Pool Areas (if applicable)			
Undesirable vegetation growth?	<i>A/M</i>		
Visible pollution?	<i>A/M</i>		
Shoreline erosion?	<i>A/M</i>		
Erosion at outfalls into pond?	<i>A/M</i>		
Headwalls and endwalls in good condition?	<i>A/M</i>		
Encroachment into pond or easement area by other activities?	<i>A/M</i>		
Evidence of sediment accumulation?	<i>A</i>		
Dry Pond Areas (if applicable)			
Vegetation adequate?	<i>A/M</i>		
Undesirable vegetation or woody plant growth?	<i>A/M</i>		
Excessive sedimentation?	<i>A</i>		
Hazards			
Have there been complaints from residents?	<i>A/M</i>		
Public hazards noted?	<i>A/M</i>		
Inspector Comments:			

DO YOU HAVE ACCESS TO THE APPROVED LANDSCAPE PLAN





ALL GOOD RIGHT?
CONTRACTOR INSTALLED AN SCM THAT
WAS NOT ON THE APPROVED PLAN SET
AND THE CITY DID NOT HAVE CORRECT
AND APPROVED
AS-BUILTS
HOW DO YOU INSPECT?

WHATS WRONG WITH THIS PICTURE ? DETENTION WORKING?



**WHEN PERFORMING AN
INSPECTION HOW ACCURATE ARE
THE ASBUILTS?**

CAN YOU EVEN FIND THEM ?

**THERE WAS NO EVIDENCE OF AN
APPROVED DESIGN PLAN ON FILE**



LESSON #5

**CONFINED SPACE CLEANING
MORE EFFORT = MORE
DANGER=COST MORE
MONEY**



WATER QUALITY UNITS??

THERE IS MORE THAN ONE WAY TO
SKIN A CAT



OH SO MANY CHOICES

❖ PAPER AND TRASH

❖ SUSPENDED SOLIDS DISCHARGE

❖ PHOSPHATES AND NITROGEN

❖ MECHANICAL VS BIOLOGICAL FILTRATION

MAINTENANCE = \$\$\$\$\$\$

IF YOU CAN DESIGN A STRUCTURE THAT CAN BE
CLEANED WITH OUT GETTING IN IT
WILL SAVE \$\$\$\$\$\$\$











1-800-TPM-4ERT
24 Hour Emergency Response

❖ **CONFINED SPACE WORK
REQUIRES 3X WORKERS AND
EQUIPMENT**

❖ **REQUIRES A PERMIT**

❖ **CAN BE DANDEROUS WORKING
IN THE HOLE**









LESSON #6

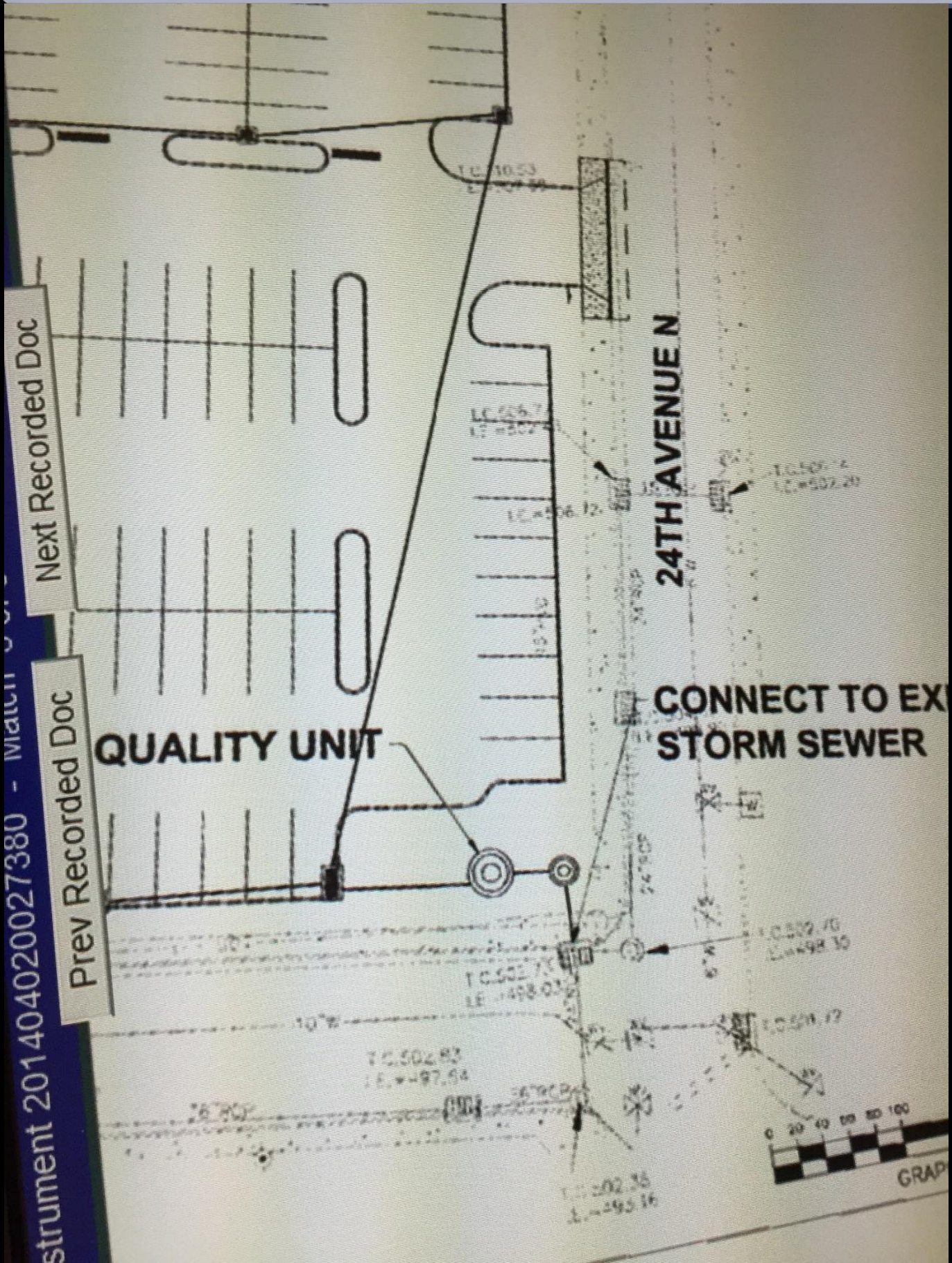
**SCM; STRUCTURE LOCATION IS
PARAMOUNT TO SUCCESS
SAVE \$\$\$\$\$\$\$\$\$\$**

**CLOSER TO PAVED / HARD SURFACE
THE BETTER**



**BIG TRUCKS THEY ARE HEAVY
WILL SINK IN SOFT SOILS
AND PAVEMENT**





LOCATION OF THE RISER STRUCTURES

- ❖ FURTHER AWAY FROM HARD SURFACES MORE EXPENSIVE TO CLEAN
- ❖ WILL HAVE TO SCHEDULE SERVICE AROUND WEATHER
- ❖ POTENTIAL TRUCK GETTING STUCK
- ❖ LESS LIKELY SOME ONE WILL GET OUT AND INSPECT / MAINTAIN



❖ **INSPECTORS AND MAINTENANCE FOLKS DO NOT WANT TO EXPLORE THROUGH THE WOODS AND TALL GRASS TO INSPECT FOR PROPER FUNCTION**

Ticks, Snakes and Chiggers

**MOST VAC TRUCKS
HAVE A MAXIMUM
REACH OF 25'**





NICE SERVICE ROAD?

**WHERE IS THE RISER
STRUCTURE**



LESSON #7

BIGGER IS BETTER

**REGIONAL BASINS AND PLANT
MATERIAL GET THE JOB DONE**

SIZE MATTERS



RETENTION PONDS



ITS ALL ABOUT SCALE

**YOU HAVE TO HAVE A
ENOUGH WATER TO SUSTAIN
A COMPLETE ECOSYSTEM OR
YOU WILL CREATE A PEST
HABITAT**



BMP=BIG MISQUITO PIT



**HEALTHY SYSTEMS (SUPPORT) SUSTAIN
FISH
AND DIVERSITY OF PLANTS AND
PREDATORS**

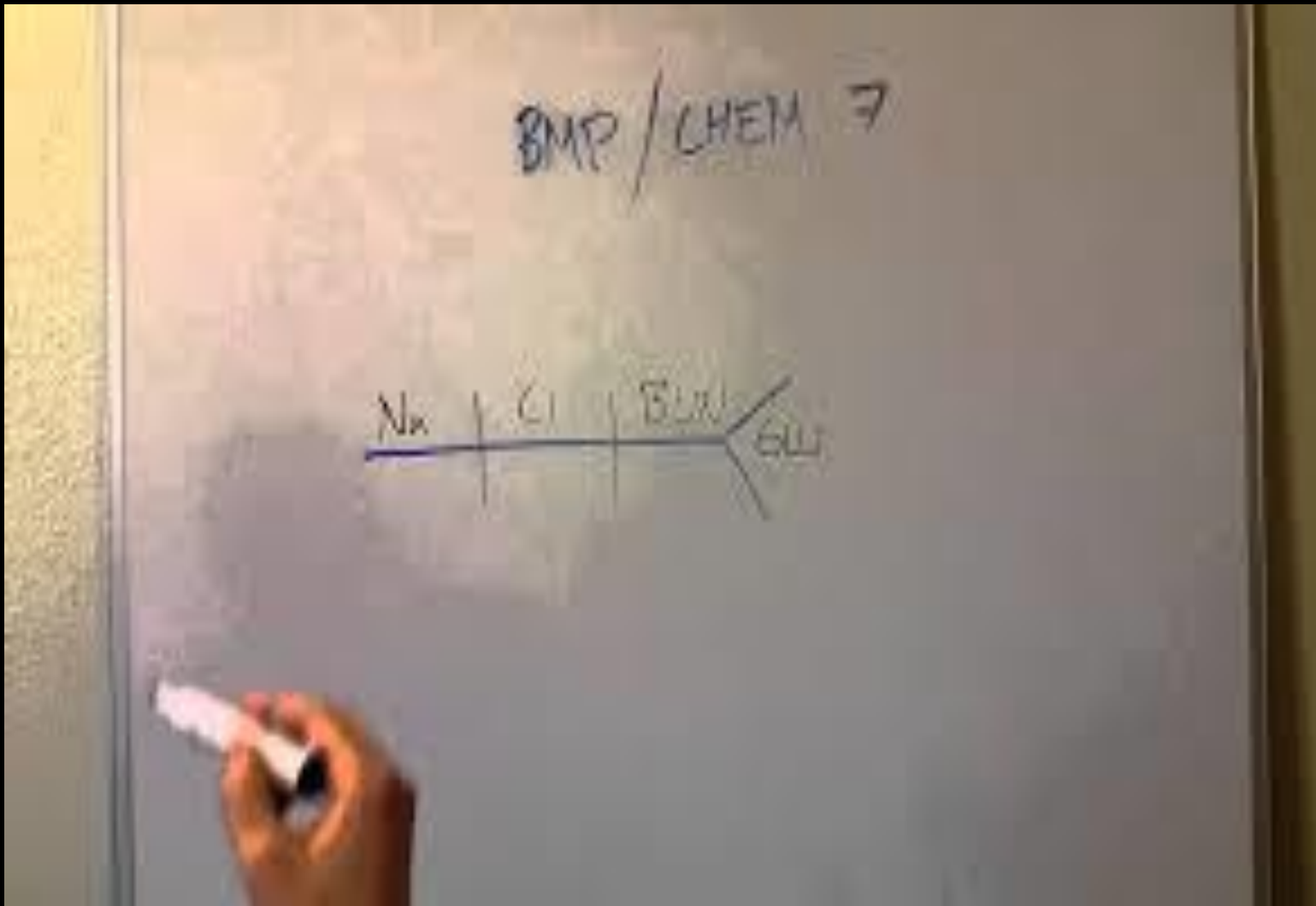
LESSON 8

DETENTION BASINS
DOUBLING AS BMP'S FAIL /
ESPECIALLY IF THE
CONTRACTOR DID NOT
BUILD THEM CORRECTLY





1-800-TPM-4ERT
24 Hour Emergency Response



**BASIC DETENTION BASINS
ASKED TO DO MORE**



EXPENSIVE REPAIRS





1-800-TPM-4ERT
24 Hour Emergency Response















IS IT SOUP YET

DON'T GET INTO A FAILED POND
WITH HEAVY EQUIPMENT

IF YOUR EQUIPMENT HAS RUBBER
TIRES DEFINETLY STAY OUT

EARTH MOVING
EQUIPMENT IS HEAVY
AND EXPENSIVE TO
MOVE \$\$\$\$

**IS IT PRUDENT TO REPAIR
AND OR RESTORE A
DESIGN / BUILD THAT WAS
NOT A VIABLE SOLUTION
IN THE FIRST PLACE?**



LESSON #9

BIO-RETENTION BASINS ARE
NOT ALWAYS WHAT THEY
APPEAR

CAN BE A WOLF IN SHEEPS
CLOTHING



**OVER MY CARREER IVE SEEN
MORE MONEY WASTED ON
FAILED ATTEMPTS TO BUILD
SYSTEMS THEN ON ANY OTHER
SCM / BMP**



SIMPLE BUT VERY EFFECTIVE
“GREEN AND CLEAN”
SIMPLER IS SIMPLY BETTER
\$\$\$\$\$\$



1-800-TPM-4ERT
24 Hour Emergency Response



MAINTENANCE HAS TO BE ABLE
TO EASILY IDENTIFY INSTALLED VS
ALIEN INVASIVE PLANT MATERIAL
OR NO ONE WILL

CONFUSION WILL CONTRIBUTE
TO A NO ACTION PLAN

Inspection Items				
Pre-Treatment Area				
Area free of debris?				
Standing water longer than 24 hours after a storm event?				
Bare soil or erosion?				
Excessive landscape waste/yard clippings?				M/S
Inlet/Outlet Structures				A/M
Inlets provide stable conveyance into the facility?				
Evidence of erosion at or around inlet?		A		
If connected to extended detention, is outlet to pond functioning properly?		A		
Other				
Basin				
Adjacent area fully stabilized (no evidence of eroding material into Bioretention area)?		A		
Plant height not less than design ponding depth?		A		
Adequate media layer present?		A		
Plant composition according to approved		A		

THE AVERAGE LAWN CARE MOWING
CONTRACTOR DOESN'T KNOW THE
DIFFERENCE BETWEEN RAG WEED AND
ORNIMENTAL RUSH SO THEY WILL EITHER
YANK OR SPRAY THEM ALL OR SIT ON THE
SIDE LINES SCRATCHING THEIR HEAD

WASTING TIME AND MONEY



**VERY EXPENSIVE AND FRAGILE
PLANTS**







**BIO-RETENTION
BASINS ARE THE
MOST
COMPLICATED AND
FRAGILE SCMs**



- ❖ NEED PROPER BALANCE OF SUNLIGHT
FOOD AND WATER
- ❖ PROPER TEMPATURE ENVIRONMENT
- ❖ FOCUSED AND CONTINUED
MAINTENANCE
- ❖ PLAN AHEAD (FIXING FUNDS)
HIGH PROBABILITY OF FAILURE
- ❖ EXPENSIVE RESTORATION

GOOD LUCK

QUICKLY finding the original
landscape plans
ON FILE WITH THE COUNTY
OR CITY
YOU CAN BET THE
PROPERTY OWNER OR
MANAGER DOESN'T HAVE
A COPY ON SITE



**LONGER IT TAKES TO LOCATE THE
PLANS, MORE ENERGY SPENT=LESS
PROFIT=LESS FOCUSED ENERGY
LESS LIKELY TO SUCEED**



IF YOU WERE CONTRACTED TO INSPECT THIS SCM
WHAT COULD YOU REPORT?

BIO RETENTION?

DETENTION?

PLANT MATERIAL?

VOLUME CAPACITY?

YOU WOULD NEED A SET OF PLANS

MAINTENANCE LAWN CARE THEY DON'T WANT TO GET
OFF THEIR RIG
THEY DON'T ENJOY USING A WEED EATER
THEY JUST WANT TO ENJOY THE RIDE



BONUS LESSON DESIGN WITH NATIVE PLANTS WHEN EVER POSSIBLE

- ❖ CHOOSE PROVEN SURVIVORS
BY SURVEYING ADJACENT
PROPERTY BMP'S
- ❖ NATIVE SPECIES WILL FIND
THERE WAY IN ANY WAY
- ❖ VALUE PRICING
- ❖ GENETICALLY TOUGHER

**NATIVE PLANTS ARE LESS EXPENSIVE
AND WILL HAVE A GREATER CHANCE OF
STAYING ALIVE**





Events Calendar
www2.dollargeneral.com



6 Likes



Chuck Lacey, Jr. PE



published this
9 hrs

Stormwater, VE Proposal



What's in your Value Engineering Proposal?



Chuck Lacey, Jr. PE on LinkedIn

Value Engineering (VE) proposals need to provide the needed functions to accomplish the original purpose of...

7 Likes



Home



My Network



Messaging



Notifications



Me¹¹⁴



CHOICES

METAL VS CONCRETE VS
PLASTIC

BE AFRAID

**AN UNDERGROUND DETENTION
SYSTEM COULD ONE DAY
AWAKE AS A SLEEPING GIANT**

**RUST
DEFLECTION
SINK HOLE**

ITS BEEN MY EXPERIENCE METAL PIPE
OF ALL KINDS WILL EXPERIENCE SOME
FAILURE IN YOU CAREER LIFE TIME

ONE THING YOU MAY WANT TO
CONSIDER,,,,,,MAKE SURE YOU HAVE
LONG TERM REPLACEMENT COSTS IN
THE MENTAL AND FINIANCIAL
BUDGET

- ❖ SELECT MATERIALS BASED ON APPLICATION VARIABLES NOT ON INITIAL COSTS
- ❖ SHORT TERM COSTS vs LONG TERM LIFE COSTS
 - ❖ LOCATION
 - ❖ SOIL TYPES
 - ❖ WATER TABLE VELOCITY







1-800-TPM-4ERT
24 Hour Emergency Response

WHEN I WAS PERFORMING SITE AND
STORMWATER DESIGN,

BASICALLY DID
WHAT THE DEVELOPER WANTED AND
CHOSE THE LEAST EXPENSIVE PRODUCT
TO GET THE JOB DONE.

7 YEARS LATER WHEN I WAS WORKING
FOR A MANUFACTURER OF STORM DRAIN
REPAIR PRODUCTS WAS SURPRISED TO BE
IN THE FIELD REPAIRING MY OLD DESIGNS



SHORT TERM SOLUTION







MEDIUM TERM SOLUTION



LONG TERM SOLUTION





**JOINT FAILURE AND
PIPE FAILURE
WILL PULL
STRUCTURAL
MATERIAL
CREATE SINK HOLES**





CONCLUSION

FOOD FOR THOUGHT

THINK OF THE MONEY TIME
AND ENERGY SPENT AND
THE RESULTS ACHIEVED

SHOULD WE SEEK A
DIFFERENT DIRECTION

Chesapeake Bay REPORT CARD 2008

*A geographically detailed and integrated assessment
of Chesapeake Bay health*





**Chesapeake Bay
Report Card 2014**



University of Maryland Center for Environmental Science



**Chesapeake Bay
Report Card 2016**



**WAS IT WORTH
IT ?**



ASCE

AMERICAN SOCIETY OF CIVIL ENGINEERS



**National Society of
Professional Engineers®**



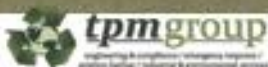
This is to certify that _____
has successfully completed one hour of
presentation and participated in an open
discussion on proactive design and
minimizing maintenance problems



LUNCH AND LEARN 03/08/2017

MS-4 BMP and SMC design insights from a maintenance contractor
Elementary lessons learned by being on site to maintain and repair a failed systems. Goal: Save the client money and long term maintenance head aches by designing with maintenance and installation in mind . Focus on how Chesapeake Bay Act. has shaped BMP & SCM design and maintenance

This certifies that the recipient has earned 1 professional development hour



TPM Environmental Group 2040 Old Louisville Rd Bowling Green Ky 42101