Cost-Effective Means of Meeting the New Stormwater Treatment Criteria

Mark Thomasson, P.E.

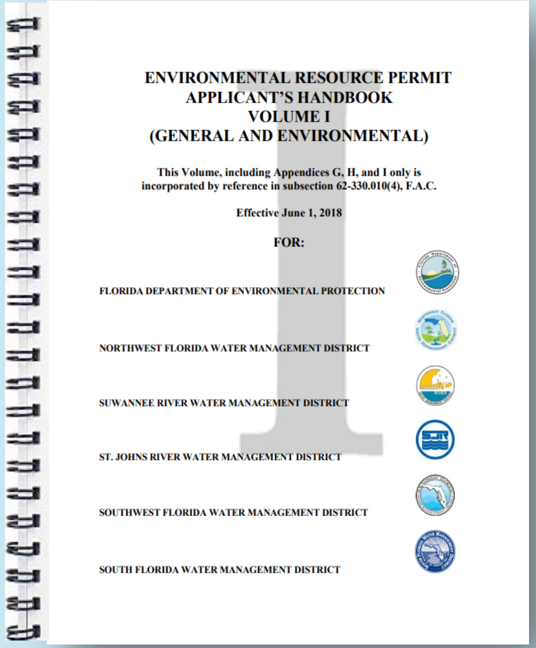
December 16, 2025

national stormwater trust®

Session Overview

1. New Stormwater Rule
2. New Treatment Requirements – Effective December 28, 2025
3. Traditional BMP Effectiveness
4. Options for Meeting New Requirements
5. FSA EF BMP Life-Cycle Costing Tool
6. Example Site 1
7. Example Site 2
8. Q&A

FDEP Rule Development



ENVIRONMENTAL RESOURCE PERMIT
APPLICANT'S HANDBOOK
VOLUME I
(GENERAL AND ENVIRONMENTAL)

This Volume, including Appendices G, H, and I only is incorporated by reference in subsection 62-330.010(4), F.A.C.

Effective June 1, 2018

FOR:

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT

SUWANNEE RIVER WATER MANAGEMENT DISTRICT

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

1. **SB 712 – Clean Waterways Act (2020)**
2. **Signed by Governor June 28, 2024 – EFFECTIVE DATE**
    - Grandfathering \
    - New O&M requirements
        - Cost Estimates
        - O&M Plan
        - O&M Certification
        - Inspection Requirements
    - Nutrient Loading EMCs
    - Treatment Train Equation
    - GSI/LID
    - Expanded Treatment Options/Alternative Designs
    - Defines Redevelopment
3. **Certified Inspector Requirements – Effective June 28, 2025**
4. **New Treatment Standards (% Nutrient Removal) – December 28, 2025**

Summary of Quality Standards

Project Scenario	TN	TP	Additional Criteria
All Sites	55	80	Or post ≤ pre
Upstream of OFW	80	90	Or post ≤ pre
Upstream of Impaired Water	80	80	And post ≤ pre plus net improvement for the pollutant of concern
	Or basin specific criteria and net improvement for the pollutant of concern		
Upstream Impaired + OFW	95	95	And post ≤ pre plus net improvement
Redevelopment	45	80	N/A
Redevelopment + OFW	60	90	N/A
Redevelopment + Impaired	45	80	And net improvement for the pollutant of concern

Adapted from: Kevin Coyne, Florida Stormwater Association, 2025

Standard BMP Efficiencies

Standard BMP Type	Minimum Design Requirements	TN Removal Efficiency*	TP Removal Efficiency*	TN WD Train Efficiency*	TP WD Train Efficiency*
Wet Detention	1" or 2.5"*Imp 21-day WS RT 72-120 hr Recovery	39%	65%		
Retention	0.5" 72 hr Recovery	48%	48%	66%	82%
Retention	1.0" 72 hr Recovery	71%	71%	80%	89%
Detention w/Sand Filtration	0.5" 72 hr Recovery	12%	12%		
Detention w/B&G Filtration	0.5" 72 hr Recovery	36%	46%	67%	72%

*Removal efficiencies are approximate and will vary based on location and design

Options for Meeting New Requirements

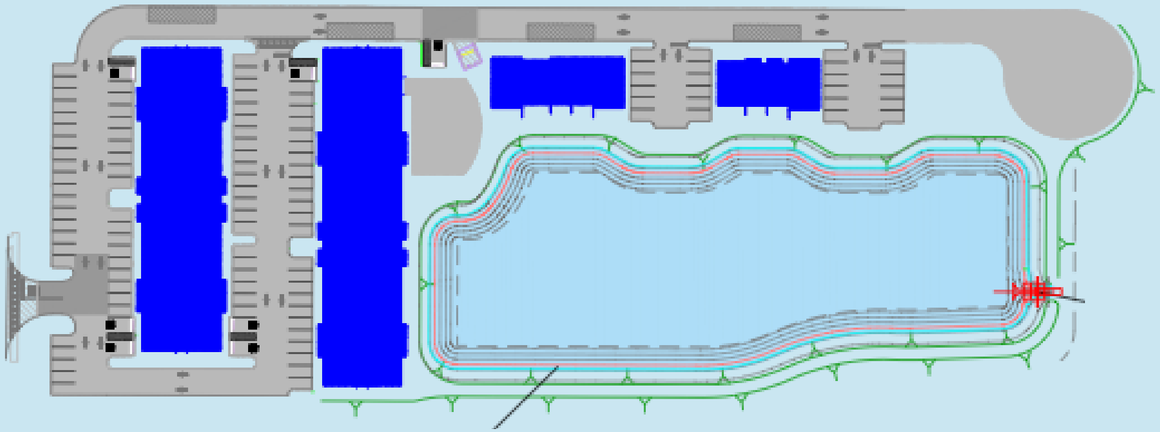
1. Reduce Runoff
2. Standard BMPs
3. Alternative Designs
4. Green Stormwater Infrastructure (GSI)
5. Other BMPs – CMAC (i.e. Smart Ponds)
6. Offsite Compensating Treatment
7. Stormwater Nutrient Credits (SNCs™)

FSA EF BMP Life-Cycle Costing Tool

1. Collaborative with:
   1. WMDS
   2. FDEP
   3. FSA Partners
2. Provides a consistent procedure
3. Available to members and non-members at: https://www.florida-stormwater.org/research#BMP
4. Excel Spreadsheet

Example Site 1

- Site Area: 5.51 acres developed
- Zone 2
- 51-inches/year rainfall
- Existing LU: Mix of Planted Pines and Wetlands
- Proposed LU: Multi-family
- Soils: A/D
- Existing Impervious: 0%
- Proposed Impervious: 67%
- Proposed DCIA: 67%



Summary of Quality Standards

Project Scenario	TN	TP	Additional Criteria
All Sites	55	80	Or post ≤ pre
Upstream of OFW	80	90	Or post ≤ pre
Upstream of Impaired Water	80	80	And post ≤ pre plus net improvement for the pollutant of concern
	Or basin specific criteria and net improvement for the pollutant of concern		
Upstream Impaired + OFW	95	95	And post ≤ pre plus net improvement
Redevelopment	45	80	N/A
Redevelopment + OFW	60	90	N/A
Redevelopment + Impaired	45	80	And net improvement for the pollutant of concern

Adapted from: Kevin Coyne, Florida Stormwater Association, 2025

Site 1: Nutrient Loads and Required Removal

Nutrient Reduction Requirement			
Description:	**TN (kg/yr)**	**TP (kg/yr)**	
Pre-Development Load:	2.65	0.38	From BMPTrains
Post-Development Load:	20.52	5.80	From BMPTrains
Minimum Required Removal:	55%	80%	AH Vol I, 8.3.2(a)
Pre/Post Required Removal:	87.1%	93.4%	AH Vol I, 8.3.2(b)
Total Required Removal:	17.88	5.42	
	87.1%	93.4%	Greater of (a) or (b)

Standard BMP Efficiencies

Can we meet:
87.1% TN and 93.4% TP?

Standard BMP Type	Minimum Design Requirements	TN Removal Efficiency*	TP Removal Efficiency*	TN WD Train Efficiency*	TP WD Train Efficiency*
Wet Detention	1" or 2.5"*Imp 21-day WS RT 72-120 hr Recovery	39%	65%		
Retention	0.5" 72 hr Recovery	48%	48%	66%	82%
Retention	1.0" 72 hr Recovery	71%	71%	80%	89%
Detention w/Sand Filtration	0.5" 72 hr Recovery	12%	12%		
Detention w/B&G Filtration	0.5" 72 hr Recovery	36%	46%	67%	72%

*Removal efficiencies are approximate and will vary based on location and design

Treatment Alternatives Considered:

1. Wet Detention with Littoral Zone and 760 lf BAM Filter
2. Wet Detention with Littoral Zone and Stormwater Harvesting @ 1.5 in/wk*
3. Pervious Pavers with Wet Detention and Stormwater Harvesting
4. Smart Pond (CMAC) with 300 lf BAM Filter
5. Smart Pond (CMAC) with Stormwater Harvesting @ 1.0 in/wk
6. Wet Detention Pond and Stormwater Nutrient Credits

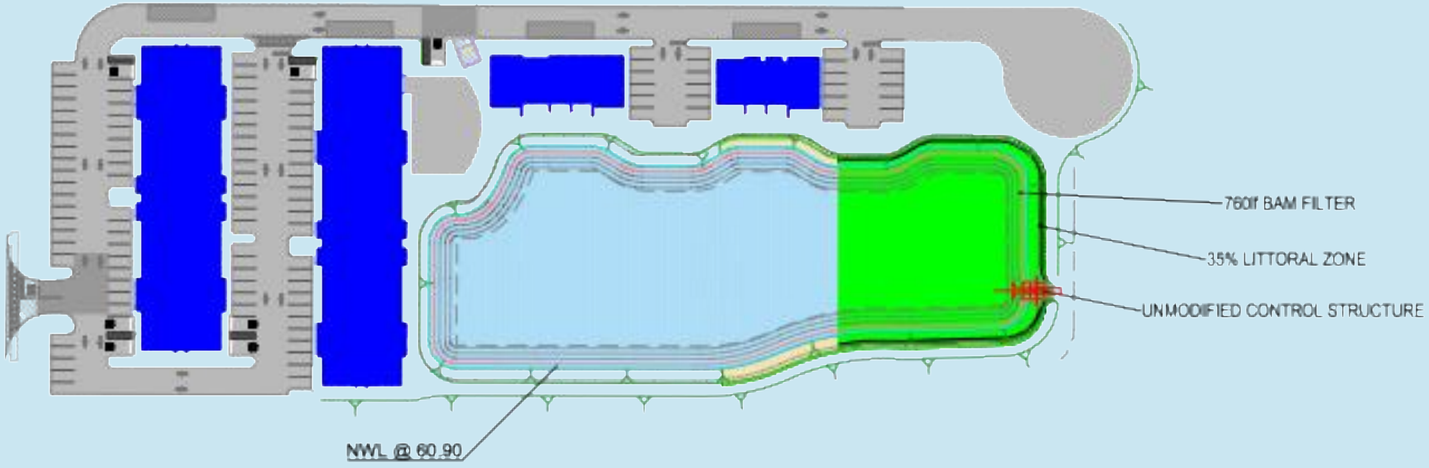
Some Notes on costs:

1. Costs presented here are based on conceptual design and are preliminary – these are not contractor costs
2. Costs will vary based on location, size of project and specific design options
3. Not all BMPs are designed the same
4. Quality of soil can significantly impact costs
5. OpEx costs are engineer’s best judgement

national stormwater trust®

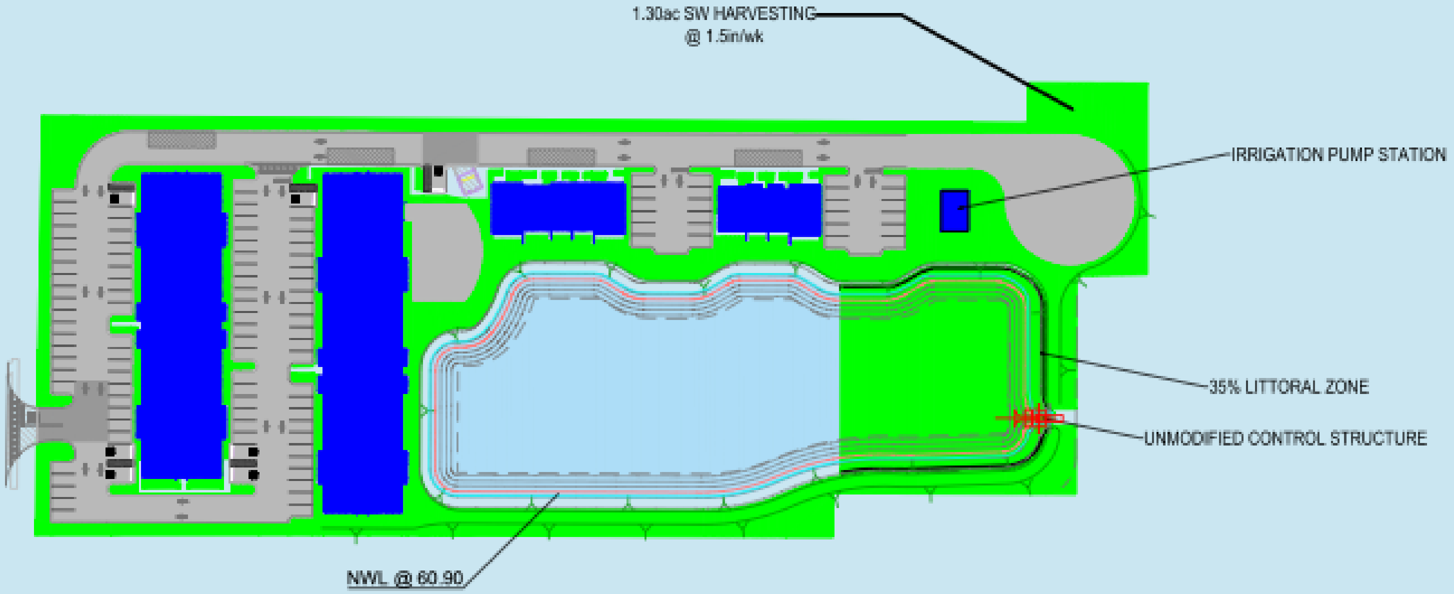
Alternative 1: Wet Detention with Littoral Zone and BAM Filter

	BMP 1	BMP 2	BMP 3	Treatment Train Total
BMP Type	Wet Detention	Littoral Zone	BAM Filter	
Description	1.77 ac; 4.21 ac-ft PPV	0.62 ac	760 lf with ICS Media	
TN Removed, kg/yr	8.75	1.17	8.08	18.00
TP Removed, kg/yr	4.54	0.12	1.03	5.69
Estimated CapEx	$380,000	$90,000	$625,000	$1,095,000
30 Yr O&M NPV				$980,000
Total CapEx & OpEx NPV:				**$2,075,000**



Alternative 2: Wet Detention with Littoral Zone and Stormwater Harvesting

	BMP 1	BMP 2	BMP 3	Treatment Train Total
BMP Type	Wet Detention	Littoral Zone	Stormwater Harvesting*	
Description	1.77 ac; 4.21 ac-ft PPV	0.62 ac	1.83 acres @ 1.5 in/wk	
TN Removed, kg/yr	8.75	1.17	8.37	18.29
TP Removed, kg/yr	4.54	0.12	0.90	5.56
Estimated CapEx	$380,000	$90,000	$187,500	$657,500
30 Yr O&M NPV				$307,500
Total CapEx & OpEx NPV:				**$965,000**



Alternative 3: Pervious Pavers, Wet Detention, and Stormwater Harvesting

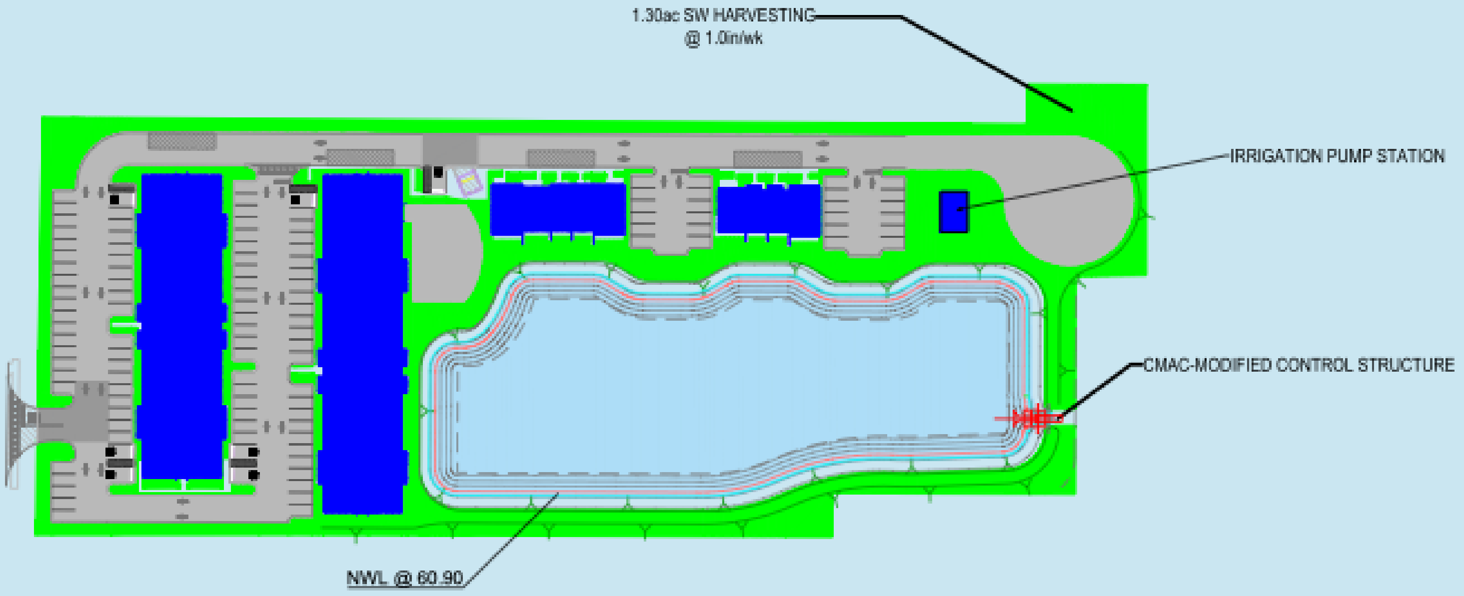
	BMP 1	BMP 2	BMP 3	Treatment Train Total
BMP Type	Pervious Pavers	Wet Detention	Stormwater Harvesting	
Description	1.2 acres	1.77 ac; 4.21 ac-ft PPV	1.83 acres @ 1.0 in/wk	
TN Removed, kg/yr	9.81	3.92	4.46	18.19
TP Removed, kg/yr	2.77	2.46	0.38	5.61
Estimated CapEx	$750,000	$380,000	$125,000	$1,255,000
30 Yr O&M NPV				$1,785,000
Total CapEx & OpEx NPV:				**$3,040,000**

national stormwater trust®

Alternative 4: CMAC with BAM Filter				
	BMP 1	**BMP 2**	**BMP 3**	**Treatment Train Total**
BMP Type	CMAC	BAM Filter		
Description	Smart Pond Flume Gate	300 lf with ICS Media		
TN Removed, kg/yr	14.56	4.76		19.32
TP Removed, kg/yr	5.62	0.15		5.77
Estimated CapEx	$525,000	$250,000		$775,000
30 Yr O&M NPV				$650,000
Total CapEx & OpEx NPV:				**$1,425,000**

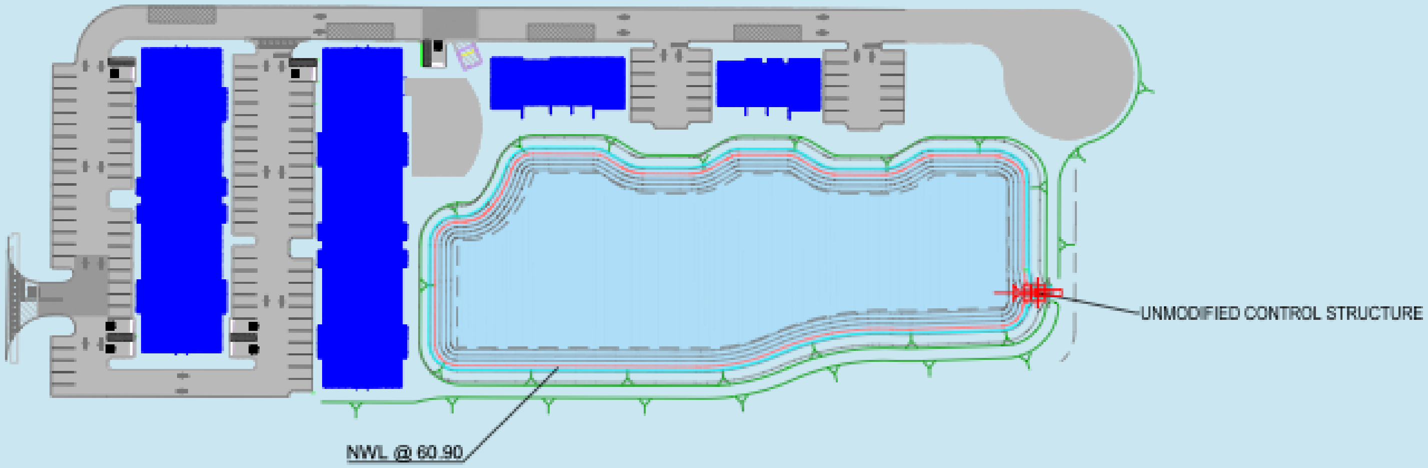
Alternative 5: CMAC with Stormwater Harvesting

	BMP 1	BMP 2	BMP 3	Treatment Train Total
BMP Type	CMAC	Stormwater Harvesting		
Description	Smart Pond Flume Gate	1.83 acres		
TN Removed, kg/yr	14.56	4.67		19.23
TP Removed, kg/yr	5.62	0.15		5.77
Estimated CapEx	$525,000	$125,000		$650,000
30 Yr O&M NPV				$825,000
Total CapEx & OpEx NPV:				**$1,475,000**



Alternative 6: Wet Detention with Stormwater Nutrient Credits (SNCs™)

	BMP 1	BMP 2	BMP 3	Treatment Train Total
BMP Type	Wet Detention	SNCs™		
Description	1.77 ac; 4.21 ac-ft PPV	Credits		
TN Removed, kg/yr	8.75	9.13		17.88
TP Removed, kg/yr	4.54	0.88		5.42
Estimated CapEx	$380,000	$383,130		$763,130
30 Yr O&M NPV				$221,870
Total CapEx & OpEx NPV:				**$985,000**



Site 1 Treatment Alternatives Summary

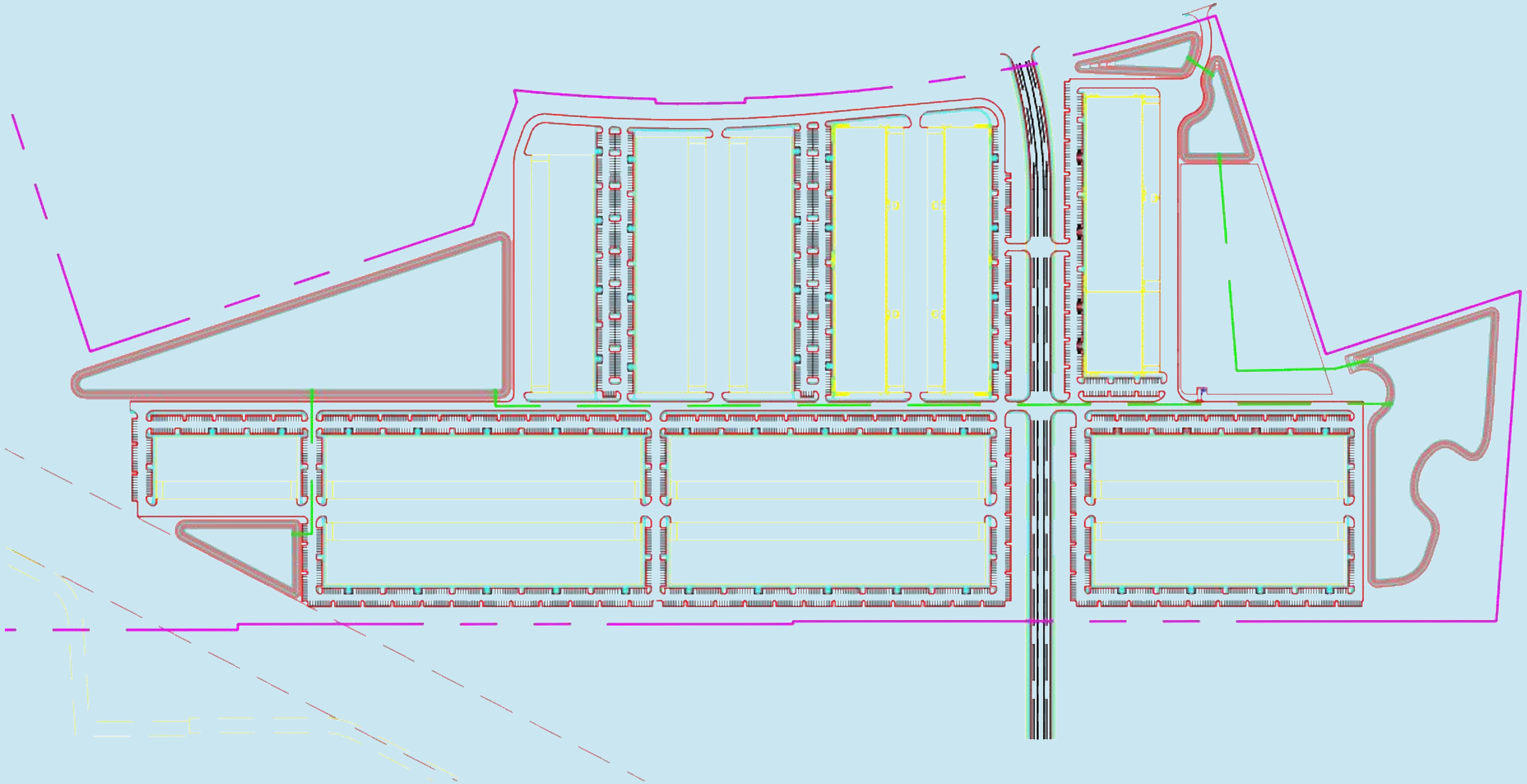
	BMP 1		BMP 2		BMP 3			Est. CapEx + 30yr OpEx	
Alt	**Type**	**Est. CapEx**	**Type**	**Est. CapEx**	**Type**	**Est. CapEx**	**Total Est. CapEx**	**Low**	**High**
1	Wet Detention w/LZ	$470,000	760 lf BAM Filter	$625,000			$1,095,000	$1,760,000	$2,390,000
2	Wet Detention w/LZ	$470,000	SW Harvesting @1.5 in/wk*	$187,500			$657,500	$830,000	$1,100,000
3	Pervious Pavers	$750,000	Wet Detention	$380,000	SW Harvesting @1.0 in/wk	$125,000	$1,255,000	$2,330,000	$3,750,000
4	CMAC	$525,000	300 lf BAM Filter	$250,000			$775,000	$1,190,000	$1,660,000
5	CMAC	$525,000	SW Harvesting @1.0 in/wk	$125,000			$650,000	$1,160,000	$1,790,000
6	Wet Detention	$380,000	SNCs™	$383,130			$763,130	$930,000	$1,040,000

Site 1 Unit Costs Comparison

	CapEx per kg TN							
BMP	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Average**	**OpEx Avg**	**Total**
Wet Detention	$43,429	$43,429	$96,939			$61,265	$79,000	$140,265
Littoral Zone	$76,923	$76,923				$76,923	$354,701	$431,624
BAM Filter	$77,351			$52,554		$64,953	$257,999	$322,952
SW Harvesting		$22,401	$28,027		$26,762	$25,730	$74,371	$100,101
Pervious Pavers			$76,453			$76,453	$232,416	$308,869
CMAC				$36,067	$36,067	$36,067	$77,286	$113,353
SNCs™						$25,500	$0	$25,500

Example Site 2

- Site Area: 150 acres
- Zone 2
- 51-inches/year rainfall
- Existing LU: Mix of Upland and Wetlands
- Proposed LU: Industrial
- Existing Impervious: 0%
- Proposed DCIA: 80%
- Upstream of OFW



Summary of Quality Standards

Project Scenario	TN	TP	Additional Criteria
All Sites	55	80	Or post ≤ pre
Upstream of OFW	80	90	Or post ≤ pre
Upstream of Impaired Water	80	80	And post ≤ pre plus net improvement for the pollutant of concern
	Or basin specific criteria and net improvement for the pollutant of concern		
Upstream Impaired + OFW	95	95	And post ≤ pre plus net improvement
Redevelopment	45	80	N/A
Redevelopment + OFW	60	90	N/A
Redevelopment + Impaired	45	80	And net improvement for the pollutant of concern

Adapted from: Kevin Coyne, Florida Stormwater Association, 2025

Site 2: Nutrient Loads and Required Removal

Nutrient Reduction Requirement			
Description:	**TN (kg/yr)**	**TP (kg/yr)**	
Pre-Development Load:	48.15	13.44	From BMPTrains
Post-Development Load:	511.59	110.85	From BMPTrains
Minimum Required Removal:	80%	90%	AH Vol I, 8.3.2(a)
Pre/Post Required Removal:	90.6%	87.9%	AH Vol I, 8.3.2(b)
Total Required Removal:	463.44	99.76	
	90.6%	90.0%	Greater of (a) or (b)

Site 2 Treatment Alternatives Summary

	BMP 1		BMP 2		BMP 3			Est. CapEx + 30yr OpEx	
Alt	Type	Est. CapEx	Type	Est. CapEx	Type	Est. CapEx	Total Est. CapEx	Low	High
1	Wet Detention w/LZ	$2,000,000	BAM Filter	$7,000,000	SNCs™	$3,600,000	$12,600,000	$23,470,000	$33,400,000
2	0.5" Retention	$1,750,000	SNCs™	$9,000,000			$10,750,000	$11,270,000	$12,460,000
3	Dry Pond	$1,750,000	CMAC*	$350,000	SNCs™	$2,000,000	$4,100,000	$5,850,000	$7,720,000
4	Wet Pond	$2,000,000	CMAC	$350,000	SNCs™	$5,250,000	$7,600,000	$8,850,000	$10,200,000
5	Wet Pond	$2,000,000	CMAC	$350,000	Filters	$3,000,000	$5,350,000	$6,770,000	$8,330,000

More Resources:

DISCOVER OUR WEBINAR SERIES

New Stormwater Rule: What You Need to Know — PowerPoint Slides

Explore expert insights on Florida's new stormwater rule with the official PowerPoint slides from our recent webinar featuring Mark Thomasson, P.E. Whether you attended the live session or want to review the key updates and practical guidance, this presentation is a valuable resource for engineers and project managers navigating the updated regulations.

Avoiding Offsite Impacts with Wetland Assimilative Capacity Analysis Webinar

The webinar explains how Florida's updated stormwater rule allows more design flexibility through strategies like off-site compensatory treatment and RSMS, which may involve discharging partially treated runoff to wetlands. It explores wetland assimilative capacity and its significance for demonstrating that your project

Real-Time Data, Real-World Impact: Smarter Stormwater Solutions with CMAC Technology Webinar

Watch our recent webinar with Jeff Littlejohn, P.E., as he delves into how CMAC (Continuous Monitoring and Adaptive Control) technology is transforming stormwater management. This session is packed with insights on how Smart Pond technology can save time, reduce costs, and

New Regulations & Nutrient Credits Explained Webinar

Explore the latest updates to Florida's stormwater regulations and learn how to meet the new treatment requirements using stormwater nutrient credits™ (SNCs) from regional stormwater management systems (RSMSs). Led by Mark Thomasson, P.E., the session covers the new treatment requirements, non-standard options for meeting new requirements, exemptions and

https://nationalstormwater.com/resources/

Contact NST

For info on SNCs™ and CMAC:

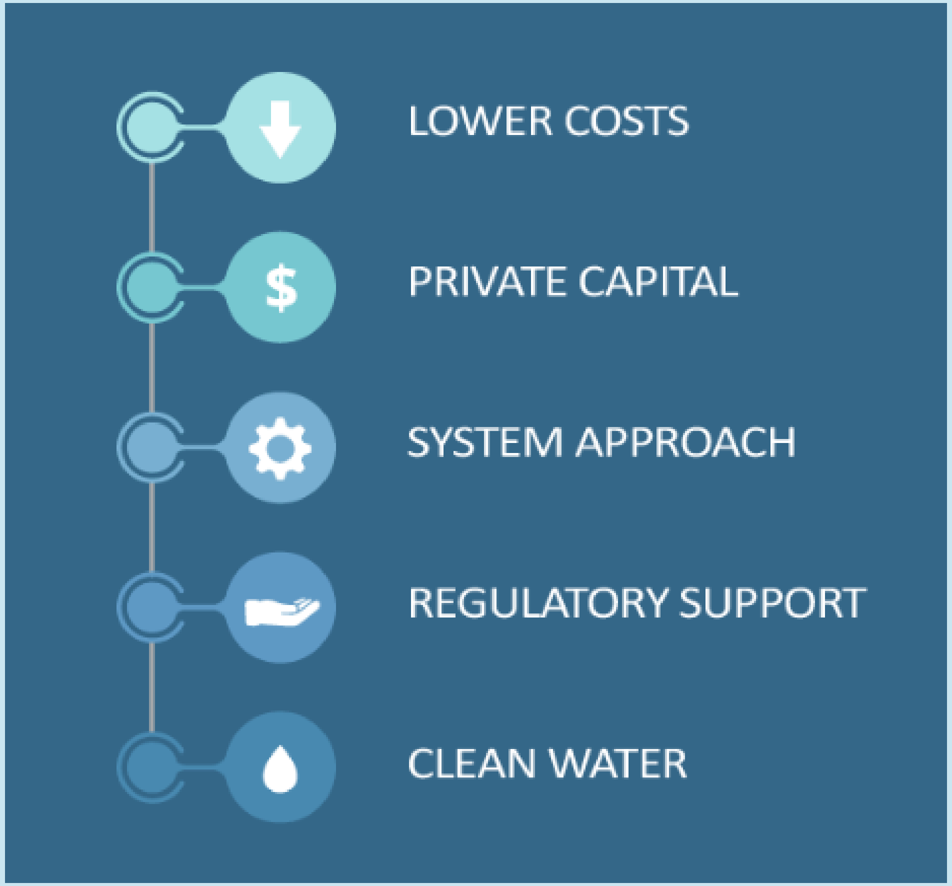
Email
info@NationalStormwater.com

Call 888.597.6872

Follow NST on LinkedIn

Subscribe to the NST Newsletter

Contact me:
mpt@NationalStormwater.com



national stormwater trust®