Rainwater Management Guide (RMG) Addendum # 2 – 08/30/2019 Manufactured Treatment Device Information Update and Stormwater Board Presentation

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City of Chattanooga
***Rainwater Management Guide* (RMG) – Addendum # 2**
Effective Date – 08/30/2019

This Addendum shall be used in conjunction with the December 1, 2014 edition of the City of Chattanooga's *Rainwater Management Guide* (RMG) to regulate stormwater control measure design, operation, and maintenance. The latest edition of the *Rainwater Management Guide* can be downloaded at the following web address: http://chattanooga.gov/public-works/water-quality-program/resource-rain. The addenda noted below are the City of Chattanooga's additions, clarifications, and exceptions based on the revised City Stormwater Ordinance, approved by Chattanooga City Council on November 21 and 28, 2017, and became effective upon signature by the Mayor and City Council Chairperson, as well as knowledge gained over the past five years of Stormwater Control Measures implementation.

This document shall have an effective date of August 30, 2019.

Exhibit 1

Manufactured Treatment Device Submission Form	
Manufacturer	Model
Size	Maximum Treatment Flow Rate
Design inflow rate	Weighted TSS removal rate

Introduction

- Recently, there have been some questions from consultants and manufacturers regarding Manufactured Treatment Devices (MTDs) have arisen.

- The City of Chattanooga's Department of Public Works – Engineering, and Department of Economic and Community Development – Land Development Office, prepared Addendum # 2 to the Rainwater Management Guide (RMG) to clarify and address these issues. It became effective on August 30, 2019.

Introduction

- The intent was to make sure the process met TDEC and City of Chattanooga Stormwater Ordinance requirements, while having a fair and consistent environment for consultants and manufacturers.

- This Addendum took into account numerous comments made during previous Stormwater Board public hearings and submitted information.

- In this case, since this Addendum was a clarification and was not a new policy or ordinance provision, it did not require Stormwater Board approval, just notification.

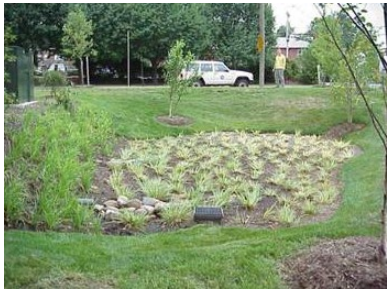
- Copies were emailed to numerous companies.

Infeasibilities & Secondary SCM's

As a reminder, on projects where conventional, Primary Control methods/onsite SCM's are infeasible for SOV, offsite mitigation is still allowed.

However, in-lieu of offsite mitigation, one or a combination of the following Secondary Control methods ("non-SOV SCM's") may be used to remove a minimum of 80% TSS from the stormwater when "infeasibility criteria" has been met:

- ***modified green infrastructure using 2.1" of rainfall, and/or***
- ***dry extended detention pond using 3.1" of rainfall, and/or***
- ***proprietary, man-made devices meeting NJCAT verification (www.njcat.org) and using 3.1" of rainfall.***

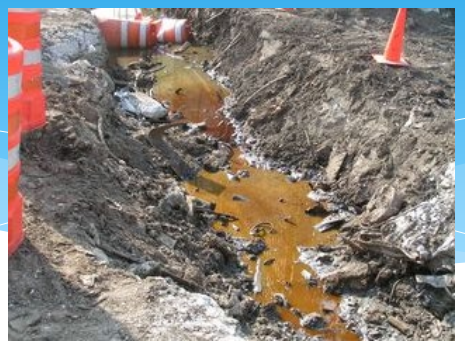


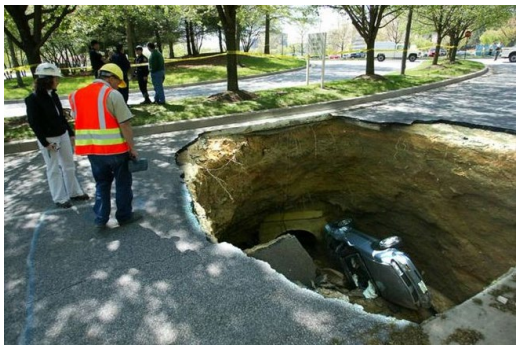
Infeasibilities

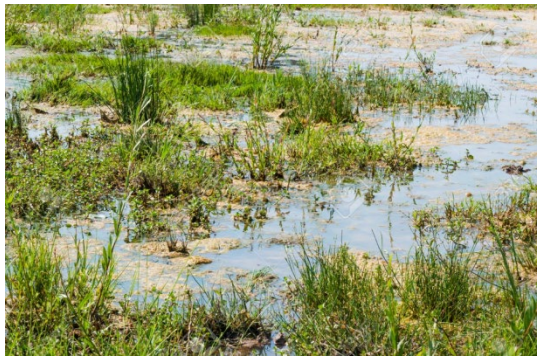
What are the infeasibilities?

Limitations to the installation of primary/infiltration-based measures include, but are not limited to, physical site infeasibilities such as:

- Groundwater pollution potential (hotspots)
- Soil contamination (brownfields certified by TDEC)
- Karst geology/sinkholes
- Limited infiltration capacity (< 0.5 in./hr.)
- High permanent groundwater table







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Below are some clarifications to the RMG:

- City Code 31-313(4)(F) allows for Manufactured Treatment Devices (MTDs) as a treatment option for 80% TSS removal when infeasibilities exist and are documented and approved.
- All MTDs must be NJCAT verified.
- MTDs in Chattanooga are given full credit for the TSS removal efficiency as shown in the reports on the NJCAT website and are not limited to the 50% TSS removal maximum imposed by the State of New Jersey for hydrodynamic separators.
- NJCAT verified MTDs that do not meet 80% TSS removal are still allowed to be part of a system (or "treatment train") that does get 80% TSS removal.

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Below are some clarifications to the RMG:

- MTDs must be selected by the Design Engineer from one of two areas on the NJCAT website: (1) Laboratory Verified and NJDEP Certified, or (2) Laboratory Verified for the specific product. This information will be placed on the final page of Addendum # 2 by the consultant and submitted to the City.

- MTDs not listed in the stated sections are assumed to not be NJCAT verified, and therefore could not be used.

Let's look at an example using the NJCAT website.

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First, go to: http://njcat.org/verification-process/technology-verification-database.htm. Choose one of two tables: "Laboratory Verified and NJDEP Certified" (the first table), or "Laboratory Verified" (the second table).

Stormwater Technologies: Laboratory Verified and NJDEP Certified

Company	Product	Verification Date	Link to Report
Aqua Shield Inc	Aqua-Filter Stormwater Filtration System with Perlite Media	June 2018	Download
Aqua Shield Inc	AquaFilter Stormwater Filtration System Model AF-3.48 Round	March 2017, revised June 2018	Download
Aqua Shield Inc.	Aqua-Swirl XCelerator Stormwater Treatment System	June 2019	Download
Aqua Shield, Inc.	Aqua-Swirl Concentrator Stormwater Treatment System	November, 2016	Download
Bay Saver Technologies, LLC	BayFilter Enhanced Media Cartridge	December 2017	Download
Bay Saver technologies, LLC	Bay Saver Barracuda Hydrodynamic Separator	September 2017	Download
Bio Clean Environmental Services	Kraken Membrane Filtration System	April 2016	Download
Bio Clean Environmental Services	SciClone Hydrodynamic Separator	December 2017	Download
Bio Clean Environmental Services Inc.	Debris Separating Baffle Box (DSBB) Stormwater Treatment Sys	May 2019	Download
Contech Engineered Solutions LLC	Stormwater Management StormFilter with Perlite Media	November 2016	Download
CONTECH Stormwater Solutions	Continuous Deflective Separator (CDS)	September 2014, Updated January 2017	Download
CONTECH Stormwater Solutions.	Filterra Bioretention System	May 2014	Download
Environment 21 LLC	StormPro Stormwater Treatment Device	October 2014, Updated January 2017	Download
Hydro International	Up-Flo Filter (with Filter Ribbon Media)	December 2016	Download
Hydro International Inc	First Defense HC	February 2016, Updated January 2017	Download
Hydro International Inc.	Downstream Defender	August 2015, Updated January 2017	Download
Hydro international Inc.	Up-Flo Filter (450R Filter Ribbon Media)	June 2018	Download
Hydroworks LLC	HydroStorm Hydrodynamic Separator	February 2018	Download
Jensen Stormwater Systems	Jensen Deflective Separator (JDS)	February 2019	Download
Lane Enterprises Inc.	StormKleener Filter Cartridge System	May 2018	Download
Oldcastle Precast Inc.	BioPod Biofilter with StormMix Media	May 2018, Updated December 2018	Download
Oldcastle Precast Stormwater	Oldcastle PerkFilter System with ZPC Media	May 2017	Download
Oldcastle Stormwater Solutions	Dual Vortex Separator (DVS)	July 2015, Updated January 2017	Download
StormTrap LLC	SiteSaver Stormwater Treatment Device	March 2019	Download
Suntree Technologies Inc.	Nutrient Separating Baffle Box with Hydro-Variant Technology	October, 2016	Download
Terre Hill Stormwater Systems	Terre Kleen Hydrodynamic Separator	January 2017	Download

Stormwater Technologies: Laboratory Verified

Company	Product	Verification Date	Link to Report
Bio Clean Environmental Services	Multi-Level Screening (MLS) Filter	November 2018	Download
Bio Clean Environmental Services	SciClone Hydrodynamic Separator	September 2017	Download
Bio Clean Environmental Services Inc.	Debris Separating Baffle Box (DSBB) Coarse Sediment	February 2019	Download
Contech Engineered Solutions	Cascade Separator	September 2019	Download
Hydro International	First Defense HC	September 2016	Download
Hydro International Inc	Downstream Defender	December 2015	Download
Lane Enterprises Inc.	StormKeeper Chamber Sediment Strip	May 2017	Download
StormTrap LLC	StormTrap SiteSaver Hydrodynamic Separator- Large PSD	August 2019	Download
Suntree Technologies Inc.	NSBB - Evaluation with 100 micron Particles	June 2013	Download

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Second, choose the column to the far right labeled, “Link to Report, and “Download” report for the corresponding device (usually shown in “blue”). For this example only, we will look at Hydro International, Inc’s “Downstream Defender.”

Stormwater Technologies: Laboratory Verified and NJDEP Certified

Company	Product	Verification Date	Link to Report
AquaShield Inc	Aqua-Filter Stormwater Filtration System with Perlite Media	June 2018	Download
AquaShield Inc	AquaFilter Stormwater Filtration System Model AF-3.48 Round	March 2017, revised June 2018	Download
AquaShield Inc.	Aqua-Swirl XCelerator Stormwater Treatment System	June 2019	Download
AquaShield, Inc.	Aqua-Swirl Concentrator Stormwater Treatment System	November, 2016	Download
BaySaver Technologies, LLC	BayFilter Enhanced Media Cartridge	December 2017	Download
BaySaver technologies, LLC	BaySaver Barracuda Hydrodynamic Separator	September 2017	Download
Bio Clean Environmental Services	Kraken Membrane Filtration System	April 2016	Download
Bio Clean Environmental Services	SciClone Hydrodynamic Separator	December 2017	Download
Bio Clean Environmental Services Inc.	Debris Separating Baffle Box (DSBB) Stormwater Treatment Sys	May 2019	Download
Contech Engineered Solutions LLC	Stormwater Management StormFilter with Perlite Media	November 2016	Download
CONTECH Stormwater Solutions	Continuous Deflective Separator (CDS)	September 2014, Updated January 2017	Download
CONTECH Stormwater Solutions.	Filterra Bioretention System	May 2014	Download
Environment 21 LLC	StormPro Stormwater Treatment Device	October 2014, Updated January 2017	Download
Hydro International	Up-Flo Filter (with Filter Ribbon Media)	December 2016	Download
Hydro International Inc	First Defense HC	February 2016, Updated January 2017	Download
Hydro International Inc.	Downstream Defender	August 2015, Updated January 2017	Download
Hydro International Inc	Up-Flo Filter (460R Filter Ribbon Media)	June 2018	Download

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By selecting this download button, it will bring-up the following report.

NJCAT TECHNOLOGY VERIFICATION

Downstream Defender® Stormwater Treatment Device

Hydro International

August, 2015
(Revised Table A-2 January 2017)

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The Engineer will now go to the appropriate page(s) within the report and find the % TSS Removal Efficiency (in this case, on page 7 of the report), where we find 54.74% in two places.

third party observer, FB Environmental Associates, Inc. The results shows that at an MTFR of 0.9 cfs, the Weighted Annualized TSS Removal Efficiency of the Downstream Defender was 54.74% **(Table 1)**, which is greater than the 50% TSS removal required by NJDEP for certification.

Table 1 - Downstream Defender Laboratory Testing Results Certified by NJDEP in January 2015

4-ft Downstream Defender Annualized Weighted TSS Removal at 0.90 cfs					
% MTFR	Mean Flow Rate Tested (cfs)	Actual % MTFR	Measured Removal Efficiency	Annual Weighting Factor	Weighted Removal Efficiency
25%	0.23	25.6%	61.8%	0.25	15.45%
50%	0.45	50.0%	54.8%	0.3	16.44%
75%	0.66	73.3%	53.5%	0.2	10.70%
100%	0.89	98.9%	50.2%	0.15	7.53%
125%	1.14	126.7%	46.2%	0.1	4.62%
				Weighted Annualized TSS Removal Efficiency	**54.74%**

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The Engineer will find the appropriate flow rates for different sizes of that device usually within the "Verification Appendix" (which is on page 51 of this same report).

Table A-1 MTFRs and Required Sediment Removal Intervals for Downstream Defender Models

Downstream Defender Model	Manhole Diameter (ft)	NJDEP 50% TSS Maximum Treatment Flow Rate (cfs)	Treatment Area (ft^2)	Hydraulic Loading Rate (gpm/ft^2)	50% Max Sediment Storage Volume (ft^3)	Required Sediment Removal Interval[1] (Months)
4-ft	4-ft	1.12	12.6	40.0	9.45	60
6-ft	6-ft	2.52	28.3	40.0	28.35	80
8-ft	8-ft	4.49	50.3	40.0	62.78	99
10-ft	10-ft	7.00	78.5	40.0	117.45	119
12-ft	12-ft	10.08	113.1	40.0	198.45	140

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Finally, the Engineer will use all of the above information and complete Page 5 of Addendum # 2. He/she will submit this form and all supporting documentation to the City of Chattanooga. Incomplete submittals will not be accepted.

Exhibit 1

Manufactured Treatment Device Submission Form

Project Address:	Previously Approved Infeasibility #:
Manufacturer:	Model Number or Name:
Size or Diameter:	Weighted TSS removal rate:
Design inflow rate (cfs):	Maximum Treatment Flow Rate (cfs):
NJCAT verified (Y/N)	NJDEP Certified (Y/N)
Remaining TSS removal required:	Other SCM specified:
Engineering Firm Submitting Form:	Engineer stamp/seal/signature:

As a Reminder, These Are The % TSS Removal Efficiencies Referenced in Addendum # 1 .

To help , we have clarified Secondary Control SCM TSS Removal %:

Stormwater Control Measure (SCM)	TSS Removal %
Pervious Pavement	65
Infiltration Bed	80
Infiltration Trench	65
Bioretention	85
Vegetated Swales	25
Vegetated Filter Strips	30
Infiltration Berms	25
Green Roofs	N/A
Runoff Capture and Reuse	N/A
Disconnection of Impervious Areas	N/A
Stormwater Planter Box	15
Manufactured Devices	50 – 80
Naturalized Basins	80
Extended Detention (w/o perm. pool of water)	40
Extended Detention (w/ perm. pool and 24-hr. min. release rate)	60
Extended Detention (w/ perm. pool and 48-hr. min. release rate)	80

N/A - These are for the stormwater amounts that do not infiltrate into the ground.

As a Brief Example of a System or "Treatment Train" using Addendum # 1 :

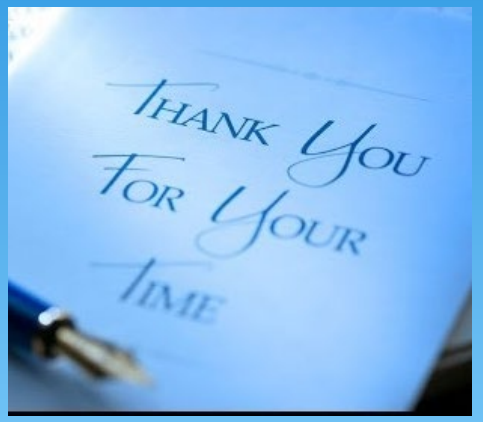
Therefore, for our example only: 80.00% (req.) - 54.74% (removed) = 25.26% (remaining to be removed)

But, choosing an SCM, such as a Vegetated Swale at 30% will not work:
25.26% (remaining) x 30.00% (removed) = 7.58% (additional removed)

And,
54.74% (removed) + 7.58% (removed) = 62.32% (total removed) < 80.00% (Therefore, will not work.)

The Design Engineer will need to submit on the Form and in supporting documentation all of the means and calculations to remove 80% TSS. In other words, one cannot simply "add" % TSS Removal Efficiencies to obtain a correct answer.

We hope you found this brief overview of RMG Addendum # 2 helpful! Please feel free to contact us at your convenience if we can be of help to you!



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