



UNIVERSITY OF MASSACHUSETTS
AT AMHERST

Water Resources Research Center
Blaisdell House, UMass
310 Hicks Way
Amherst, MA 01003

Massachusetts Stormwater
Evaluation Project

(413) 545-5532
(413) 545-2304 FAX
www.mastep.net

MASTEP Technology Review

Technology Name: Vortechs System. (Models 1000, 1100, 2000 and 4000 reviewed in these studies)

Studies Reviewed:

- NJCAT Technology Verification. Vortechs. April 2011
- A Study of the Effectiveness of a Vortechs Stormwater Treatment System for Removal of Total Suspended Solids, 2001. NYSDEC
- ETV Rpt. Stormwater Source Area Treatment Device. Vortechtechnics, inc. Vortechs System, Model 1000, 2005
- NJCAT Technology Verification Vortechtechnics, Inc. May 4, 2004
- Two Vendor-supplied studies conducted at Delorme Publishing Company, Yarmouth Maine

Date: 11/04/2011
Reviewer: Jerry Schoen

Rating: 1 for SSC, 2 for TSS

Brief rationale for rating: SSC rating is primarily based on the NJCAT 2011 field study; TSS on the ETV field study with some consideration of the NJCAT 2004 laboratory study. All have scientific merit. Both field studies (NJCAT and ETV) monitored 18 storms and provided detailed description of methods, quality control procedures and results. The NJCAT lab study tested a good range of flow rates, particle sizes, influent sediment concentrations. Problems: no scour test, large abnormally large particles sizes in the NJCAT field study; raw data not shown in ETV study, few details on test equipment or setup. Other studies reviewed offer some useful information, but had more significant quality control problems and/or lacked detailed discussion of methods.

TARP Requirements Not Met:

- NJCAT 2011: excessive quality control failure rate for TSS analysis
- ETV: At least 50% of annual rainfall must be sampled (36% was sampled)
- ETV: Minimum of 15" of precipitation must be sampled (11.8" were sampled)

Other Comments:

- NJCAT field study (2011). Conducted on a Vortechs Model 4000, at flows up to 97% design flow. Good documentation of quality control. Mean influent particle sizes were approximately 500 microns, well above the recommended < 100 microns. SSC results were reported for several discreet influent particle size ranges, with results of 52-95% depending on size. TSS and TVSS results not considered reliable in this study because of QC failures, likely due to the large particle sizes, which tend to skew results for this analysis method.
- ETV study: conducted on a Vortechs Model 1000. Quality control results were good, with the exception of some problems with outlet flow measurements. Inlet TSS concentrations were 46-305 mg/l, lower than the target of 100-300 mg/l. this is considered a strong point of the study, since performance usually suffers during "cleaner" storms. Similarly particle size analysis showed a high concentration of fines; most influent particles were less than 62 microns – producing influent sediments that are difficult to treat.
- NJCAT lab study: conducted on a Vortechs Model 2000. 64% TSS removal obtained.