Data Reporting Framework for Stormwater Control Measure (SCM) Laboratory Testing

Document Posted 04/18/24

Laboratory Testing Evaluation Reports (LTER) (test reports) are submitted by the SCM proponent to STEPP following completion of testing. The LTER documents all aspects of the testing project such that STEPP can verify:

- the testing project is consistent with the Quality Assurance Project Plan (QAPP), including any changes made to the QAPP during the testing project;
- the testing project is consistent with ASTM standards referenced in the QAPP; and
- the performance objectives, as described in the Enrollment Application, were met.

The LTER should not include unsubstantiated claims or marketing materials. Specific reporting requirements depend on ASTM standards being followed. The following content represents minimum requirements for an LTER, depending on ASTM standards being followed.

1. **Summary**
    a) Executive summary identifying the specific ASTM standard(s) that the testing project was designed to follow, the specific performance objectives described in the Enrollment Application, and evidence to support achievement of those performance objectives.
        i. Specific reporting content varies depending on the ASTM standards being followed, but the Summary should summarize all test results that are required to be reported by the applicable ASTM standards.
        ii. The Summary should include the testing location and a brief description of the testing setup, identification of the testing organization and test personnel, third party observer if applicable, dates of testing, and the QAPP approval date.
2. **Definitions**
    a) Properly reference terms. See *Stormwater Testing of Products and Practices laboratory testing - abbreviations acronyms and definitions*, reference ASTM terms document, or provide a glossary for industry specific terms.
    b) Spell out acronyms when first used, for example Quality Assurance Project Plan (QAPP).

3. **Technology Description: Except where specified, the following items apply to proprietary (manufactured treatment devices or MTDs) and public domain (non-proprietary) SCMs**
    a. For proprietary SCMs (MTDs), the specific device used or prototyped (model number, size). Verify the tested system is a full scale, commercially available stormwater control measure (SCM).
    b. Operating rate or volumetric flow rate
    c. Describe treatment mechanisms, including pretreatment and bypass requirements.

d. Physical description: drawings, elevations, flow path(s), flow monitoring, water quality sampling and pollutant loading points specific to the device being tested.
    i. Describe filter media, where applicable, in as much detail as possible. If confidential business information is included, identify information that should not be made public. Include the name of the media.
    ii. Process flow diagrams, schematics, scale drawings of the tested system and the testing apparatus.
e. Sizing methodology used for test: either manufacturer's sizing methodology or agency-specific sizing requirements (flows, volumes, runoff depth, etc.)
f. Other configurations that may be applied to the device (e.g. grated vs piped inlets)

4. **Test Methods and Procedures**

The testing procedure, which shall have been outlined in a QAPP and which must follow the applicable ASTM standards, shall be described in sufficient detail to allow the test to be reproduced by another party. Key elements to report include the following.

a) Mass based particle size distribution of sediment (if used) in the influent, effluent, and residuals.
    i. Sediment captured outside the SCM (as defined by the inlet and outlet opening location) should be measured and reported separately from sediment captured inside the SCM.
b) Concentration of contaminants under investigation in influent and effluent, if applicable.
c) Water quality parameters that were monitored
    i. At a minimum this should include the constituents of the synthetic stormwater used, if applicable.
d) Sampling locations
e) Quality assurance (QA) methods and measurement accuracy and precision for the observations

5. **Testing and Sampling Event Characteristics**
    a) Number of influent, effluent and background samples, flow rate
    b) Time of sample collection, in reference to the test start time
    c) Water level within the SCM for testing duration
    d) Water temperature during test
    e) Sediment rate samples and draw down samples
    f) Comparisons with data quality objectives (DQOs)

6. **MTD Performance Results and Discussion**

For each ASTM standard applied, provide the following information if applicable to that standard.

a) Concentrations for influent, effluent, and background, as appropriate, with summary statistics as appropriate (ex. count (n), mean, median, coefficient of variation, standard deviation, one-tailed sign t-test)

b) Solids characterization: description for gross solids, particle size analysis of influent, effluent, and captured sediment, as applicable.
c) Accumulated mass reductions
d) Detection limits and confidence intervals
    i. Obey significant figure rules – in general report as many significant figures as the smallest number used in a calculation.
e) Performance metrics: removal efficiency for event mean concentration (EMC) and/or mass captured
f) Statistical evaluation: STEPP verifies performance at the 95 percent confidence level. STEPP does not prescribe specific statistical methods. Examples of statistical references include EPA (2006) and Washington Department of Ecology (2018).
g) QA, rejection criteria and rejection summary
h) Maintenance: discussion of recommended maintenance schedules, including maintenance equipment and data used to develop maintenance schedules

7. **Performance Claims and Limitations**
    a) Summarize the test results compared to performance goals/objectives provided in the Enrollment Application.
    b) If applicable, describe any modifications to the procedures described in the QAPP.
    c) If applicable, describe testing conditions that affected performance or anticipated performance.
    d) If applicable, describe any limitations to the testing project.

8. **Third Party Review**
    a) Description of who led the testing and whether testing was done by a first-party testing lab.
    b) If a first-party facility led testing, provide information on third-party observer(s). Provide a description of the qualifications of third-party staff and how they meet the requirements established by STEPP (for STEPP requirements see STEPP Program Overview document).
    c) For third-party testing, include a statement requiring that the third-party staff provide signed documentation stating that their background meets the qualifications of STEPP and that they are conflict-free.
    d) Provide a data validation review verifying the test was performed according to the QAPP and ASTM Standards.
    e) Provide a data summary that includes a review of the monitoring data including reviewer's conclusions, any recommendations for further testing, etc.
9. **Appendices:**
    a) Raw data
    b) Credentials
    c) Maintenance procedures

References

1. United States Environmental Protection Agency. 2006. *Data Quality Assessment: Statistical Methods for Practitioners*. EPA QA/G-9S. EPA/240/B-06/003.
2. Washington Department of Ecology. 2018. *Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies*. Publication no. 18-10-038.