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StoPWa

Stormwater Runoff Characterization and Treatment System Assessment Sampling Protocol for StopWa project sites

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Objective:

This protocol describes the collection of samples and field data from stormwater runoff for StopWa project partner sites during rain and/or snow-melt events in Spring, Summer, and Autumn. This includes the collection of composite water quality samples from both the inlets and outlets of the experimental treatment systems installed at the sites. The data collected will help to characterize the effectiveness of the filter systems in mitigating pollutants.

Materials:

1. Flow meter or velocimeter
2. pH meter
3. Turbidity tube
4. Clean sampling bottles
5. Two (2), clean 10 liter plastic buckets
6. Additional containers for composite samples
7. Labels and/or markers
8. Pen and/or pencil
9. Field notebook
10. Personal protective equipment (PPE): gloves, safety glasses, etc.

Procedure:

1. Sampling locations:

- Stormwater samples should be collected from both the inlet and the outlet of the treatment system.
- The sampling locations should be accessible and safe for those conducting the sampling.

2. Weather Monitoring:

- Use local meteorological stations to monitor weather conditions. The relevant parameters to be noted and recorded are precipitation volume and air temperature.

3. Flow Measurement:

- A flow meter should be installed at the outlet of the treatment system, and readings should be taken concurrently with each grab sample collected from the outlet.
- Alternatively, flow monitoring can be carried out by hand during sampling using a velocimeter and measurements of the needed channel geometry (water column height, pipe diameter etc.) to obtain volumetric flow data. Measurements should be taken concurrently with individual grab samples as outlined below.

4. Event Sampling:

- Monitor weather forecasts for potential rain or snow-melt events in the Spring, Summer, and Autumn.
- Activate the sampling team when an event is likely to occur.
- Over the course of the precipitation event, collect multiple (3+, the more the better), individual grab samples from both the runoff entering the treatment system as well as from the system outlet. The grab samples collected from an individual event should all be of the same volume. So, if you begin by collecting a 500 ml grab sample, continue to collect 500 ml grab samples for the entire duration of the event.
- The individual grab samples should be composited into two (2) clearly labeled, clean, 10 L buckets. One (1) for the inlet samples, and one (1) for the outlet samples.
- The first grab samples should be collected as soon as possible after the beginning of the precipitation event and as soon as runoff begins to enter the treatment system. This is when the heaviest pollutant load can be expected.
- The other samples should be collected at regular intervals (e.g. every ~10 mins) over the expected duration of the precipitation event. Shorter events are preferred for sampling (max. 1 hr or so), since longer events will display significant dilution of pollutants towards the end.
- The final grab samples should be collected after precipitation has ended, if possible. This way we can get an accurate picture of the overall pollutant load coming from the site and how well the treatment systems function to remove them.
- After all grab samples from both the inlet and outlet have been mixed in their respective 10 L buckets, collect a sufficient volume and number of composite samples from each bucket for all analyses. Particular attention should be taken to mix the entire volume thoroughly before collecting the final sample to re-suspend any solids present.

7. Field Measurements:

- Record field parameters such as pH, temperature, and turbidity in the field for both the untreated and treated runoff composite samples.
- Document any observable characteristics of the stormwater and treated water during while collecting grab samples (foam, color, odor, etc.).

8. Sample Handling:

- Label each composite sample with relevant information (site name, location (inlet or outlet), date, time, and event type (i.e. rain or snow melt).
- Store samples in coolers with ice packs to maintain a cold chain during transportation.

9. Laboratory Analysis:

- Transport samples to the appropriate laboratory for analysis of both the untreated and treated composite samples.
- Follow appropriate sample preservation and handling protocols for each analysis.

10. Data handling:

- Laboratory results should be sent to john.allen@helsinki.fi to be compiled and analyzed.

Note:

Adhere to all safety regulations and guidelines during field activities. Regularly calibrate field equipment, and follow proper sampling and analytical techniques to ensure the accuracy of the data collected. Adjust the protocol based on specific site characteristics and local regulations.