# Stormwater Survey123 Checklist User Guide


**Summary:** This checklist should be used by qualified and trained verifiers to assess implemented Stormwater projects. See the Verification Program Standard Operating Procedure (SOP) for details on the verification process and to access the applications. Prior to a visit, review as-built site plans, planting plans (as applicable), reports, and notes from prior verification visits. This user guide provides a breakdown of all the possible questions in the stormwater checklist and best practices on collecting data and images.

**Checklist Sections, Questions, and Scoring:** Verifiers are encouraged to use their experience and best judgment when scoring the project's condition. The stormwater checklist is separated into five sections: Project Information, Pretreatment (if applicable), Inlet, Within the Practice, and Outlet (note: permeable pavement practice type has an additional section). You do not have to complete the checklist sections in any specific order. Questions ask the verifier to indicate the severity of the presence of visual indicators of project condition such as erosion, sediment accumulation, standing water, vegetation, and presence of trash/natural debris.

Question responses range from "None" (no presence) to "Severe" (high presence), and each response has a numerical score associated with the response. The scores are given in this guide, but not in the checklist itself. The table below provides the range for responses, their associated numerical value, and a description of what the response means in terms of presence of visual indicators.

| **Responses** | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| **Score** | **4** | **3** | **2** | **1** | **0** |
| **Description** | No presence of the visual indicator. | Some presence of the visual indicator, but extent is not enough to require/flag maintenance needs. | Functional but may require some maintenance, the condition is on a downward trend. | Functional but requires maintenance, the condition is on a downward trend and approaching not functional. | Not functioning, the extent of the visual indicator is disrupting project function, maintenance and/or repair needed. |

Based on the calculated score, a section "Grade" will indicate if that section of the project is Functional (4-2.5, meets requirements), Marginal (<2.5-.5, maintenance may be needed), Failed (<0.5-0, not functional, needs repairs, or does not exist). At the end, the checklist automatically calculates an average overall score. See Table 2 of the Verification SOP for additional information on scoring.

## SURVEY QUESTIONS (* INDICATES REQUIRED FIELD)

### Project Information

**1. Practice Type** Drop down, select the practice type to get relevant checklist sections.

Practice Types: Bioretention, Dry Detention Pond, Gravel Wetland, Infiltration Trench/Basin, Permeable Pavement, Sand Filter, Vegetated Swale, and Wet Pond.

*Note: Gravel Wetland checklist numbering will jump from W-5 to W-8 in the "Within Practice" section, but for the rest of the practice types the numbering won't have gaps.*

**2. Project ID*** Implementation Phase Watershed Projects Database ID (auto populates)

**3. Project Name*** (auto populated)

**4. Project Type*** (auto populated)

**5. Town(s)*** (auto populated)

**6. BMP ID*** (auto populated)

**7. BMP System Name*** (auto populated)

**8. Project Completion Date*** (auto populated)

**9. Select Clean Water Service Provider (CWSP)***

**10. Verifier Name(s)***

**11. Verifier Organization***

**12. Verification Date and Time*** (auto populated)

**13. Date of Last Rain Event** (select the appropriate date)

**14. Are you able to locate the project?***

Verifier note: If the project area cannot be located, select "No" and include relevant information in the notes section that appears. Then complete Questions 15-18 to the best of your ability.

**15. Project Location**

Verifier note: if GPS location is enabled, use that to enter location info. Can also enter manually.

**16. Capture / Browse to Photo***

Verifier note: Photo quality is best when taken with tablet/phone's camera app and then uploaded to Survey123. Try to take a photo that shows the full extent of the practice. Best practice is to take the photo from same location during subsequent visits.

*Example photo of a bioretention showing **full extent** of the practice.*

### 17. Photo Description*

Verifier note: write in anything notable about the full project site area.

### 18. Is there pretreatment associated with the practice?*

Verifier note: Review final designs and reports to determine if a pretreatment practice was included with the implementation of the stormwater treatment practice.

## Pretreatment

**Pretreatment** practices are designed to improve water quality and enhance the effective design life of the overall practice by consolidating the more frequent maintenance to a specific location. When working through this section of the checklist, evaluate the pretreatment practice condition and identify maintenance concerns. Be sure to inspect the surrounding area that contributes stormwater runoff to the practice. For example, if there are signs of erosion in the pretreatment are, note likely sources. There may be additional stormwater management needs upgradient of the practice. Note any concerns to the CWSP.

### P-1. What type of pretreatment practice?* Select one

- Swale/Grass channel
- Filter strip
- Sediment forebay
- Deep sump catch basin
- Other *(describe type in the note section that will appear)*

### P-2. Capture/Browse to pretreatment photo*

Verifier note: Photo quality is best when taken with camera app and then uploaded to Survey123. Best practice is to take the photo from same location and perspective during subsequent visits.

*Example photo of **pretreatment** practice.*

### P-3. Photo description*

Verifier note: write in anything notable or concerns about the pretreatment area that is visible in the photo.

*What is the extent of…*

### P-4. Trash at the pretreatment?*

| **Responses** | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| **Score** | **4** | **3** | **2** | **1** | **0** |

## P-5. Leaf or woody debris at the pretreatment?*

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

*Example photo of **Minor** leaf debris.*

Verifier note: Intent of question is to look for any natural materials (leaf litter, sticks, branches, etc.) that may obstruct flow of water into the practice.

## P-6. Erosion at the pretreatment?*

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

Verifier note: Intent of question is to evaluate for signs of erosion that could contribute excess sediment and negatively impact functionality, like clogging and runoff bypassing the system. Note evidence of erosion this for future visits to monitor changes.

## P-7. What percentage of the pretreatment is filled with sediment?*

| Responses | <10% | >10-30% | >30-50% | >50%-90% | >90-100% |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

*[Left] Example of **>30%-50%** pretreatment filled with sediment. [Right] Pretreatment forebay 100% full of sediment.*

Verifier note: Intent of question is to look for signs of clogging and sediment accumulation. Sediment should be removed when the practice is over 50% full. Note the approximate percentage to track future maintenance needs.

### Additional Notes (optional)

Verifier note: Use this space to provide additional information that informed responses to the above questions or note observations that weren't covered in this section. Note any aspects of the project that should be monitored for maintenance needs.

## Inlet

The **inlet** is the point at which the water enters the practice, from a pipe or unconstructed flow. Locate the inlet to the practice, evaluate the condition, and identify maintenance concerns in this section. Use as-built designs for details on inlet location if needed.

### I-1. Capture/Browse to Inlet Photo*

*Example photo of the **inlet** to a stormwater practice.*

Verifier note: Locate and take a photo(s) of the inlet to the stormwater practice to capture full extent of its condition. Note the presence of erosion, sediment build up, trash, or natural debris impacting inlet function.

**I-2. Photo Description***

Verifier note: write in notes about inlet condition that is shown in the photos.

*What is the extent of…*

**I-3. Erosion at the inlet or channel leading to inlet?***

| **Responses** | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| **Score** | **4** | **3** | **2** | **1** | **0** |

*Example photo of **Moderate** erosion (Rill I).*

Verifier note: Use your best judgement to determine the erosion severity. Consider referring to photos of the practice after it was implemented with current site conditions. Answering I-6 can also be helpful (if applicable) to determine the extent.

**I-4. Sediment accumulation at the inlet or channel leading to inlet?***

| **Responses** | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| **Score** | **4** | **3** | **2** | **1** | **0** |


*[Left] Example of **Minor** sediment accumulation at the inlet. [Right] Example of **Major** sediment accumulation at inlet.*

**I-5. Leaf or woody debris at the inlet (grate, swale, slope)? ***

| **Responses** | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| **Score** | **4** | **3** | **2** | **1** | **0** |

*Example photo of **Minor** natural debris at the inlet.*

Verifier note: Intent of question is to evaluate the extent of accumulated natural debris that may be affecting the inlet, such as blocking water flow.

**I-6. What is the depth of erosion at the inlet?***

| **Responses** | No Erosion | Sheet (<1 in) | Rill I (1-6 in) | Rill II (>6-12 in) | Gully (>1 ft) |
|---|---|---|---|---|---|
| **Score** | **4** | **3** | **2** | **1** | **0** |

*Example photos of **Rill 1** erosion. [Left] looking in towards bioretention. [Right] looking out towards impervious surface.*

Verifier note:[1] Erosion is the wearing away of the land surface or detachment of soil or rock fragments by running water. A ruler or yard stick will be helpful for this question. If you do not have one with you, use your best judgement and estimate the erosion depth.

- Sheet erosion: spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may or may not subsequently be removed by surface runoff.
- Rill erosion: erosion process in which numerous small channels 1 inch < 12 inches.
- Gully erosion: erosion process whereby water accumulates in narrow channels and over short period, removes the soil from this narrow area to considerable depths, ranging from greater than 1 foot to as much as 75 to 100 feet.

### Additional Notes (optional)

Verifier note: Space to provide additional information or observations not yet covered in this section.

## Within Practice

The area "within the practice" is where stormwater runoff is temporarily stored and treated. Evaluate the condition within the practice and identify maintenance concerns in this section.

### W-1. Capture/Browse to Photo*

Verifier note: Consider taking multiple photos at different distances (up close, medium distance, wide view) that support aspects that are evaluated in questions for this section of the checklist.

[1] Additional definition and information can be found in the Vermont Stormwater Management Manual.

*Example photo showing **within the practice**.*

**W-2. Photo Description***

Verifier note: write in anything notable about the condition within the practice.

*What is the extent of…*

**W-3. Erosion within the practice?***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

**W-4. Sediment accumulation within the practice?***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

**W-5. Trash within the practice?***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

**W-6. Is standing water present?***

| Responses | No | Yes (<48 hours) | Yes (>/= 48 hours) | N/A |
|---|---|---|---|---|
| Score | 4 | 2 | 0 | 2 |

Verifier note: Refer to question 13, date of last rain event, to answer this question.

**W-7. What is the extent of covered or clogged filter media/natural soils?***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

*Example photo of bioretention with **Severe** sediment accumulation and clogged filter media/natural soils.*

Verifier note: Intent of question is to look for signs of clogging and sediment accumulation that may be causing poor infiltration.

**W-8. Overgrown vegetation within the practice?***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

**W-9. Dead plant material and/or natural debris within the practice?***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

*Example photo of **Moderate** natural debris within the practice.*

Verifier note: Intent of question is to look for natural materials impacting project's condition. Make a note in the "additional notes" section if plantings have died off so they can be replaced during maintenance visits.

**W-10. What is the percentage of vegetative cover within the practice?***

| Responses | 70-100% | 50-70% | 30-50% | 10-30% | <10% | N/A |
|---|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 | 2 |

*Photo example of **50-70%** vegetative cover in a gravel wetland.*

Verifier note: It can be helpful to visualize a grid to aid the eye in estimating percentage of established vegetative cover verses where vegetation is dead or not present and there is exposed soil or ground cover.

## Additional Notes (optional)

Verifier note: Space to provide any additional information or observations not covered in this section.

## Outlet

The **outlet** is the point at which water discharges from a pipe, channel, or drainage area. Evaluate the condition of the outlet and identify maintenance concerns in this section.

**O-1. Capture/Browse to Outlet Photo***

Verifier note: Locate and take a photo of the outlet from the stormwater practice. Take note of presence of erosion, sediment build up, trash, or natural debris impacting the outlet's function or discharge location. Take multiple photos to capture the full extent of outlet condition. If the outlet is not accessible, answer questions to the best of your ability and indicate the in-accessibility in end of section "additional notes".

*Example photo of an **outlet**.*

**O-2. Photo Description***

Verifier note: write in anything notable about outlet condition.

*What is the extent of…*

**O-3. Erosion at the outlet? ***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

*Example photo of **Minor** erosion at the outlet.*

**O-4. Sediment accumulation at the outlet/underdrain or outlet structure, or trash rack? ***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

*(Left) Example of outlet with **Minor** sediment accumulation. (Right) Example of **Major** sediment accumulation.*

**O-5. Trash or natural debris at the outlet, outlet structure, or trash rack? ***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

## Additional Notes (optional)

Verifier note: Space to provide any additional information or observations not covered in this section questions or needs greater explanation. If the outlet was inaccessible or unable to be located, indicate that here.

## Permeable Pavement

**Permeable pavement** includes a suite of hardscape surfaces (interlocking stones/bricks or grid pavers) with an underlying reservoir course that captures and temporarily stores precipitation before infiltrating into the underlying soil or conveying it elsewhere. This section requests additional information supplementing the other section information to evaluate the condition of the permeable pavement practice.

*What is the extent of…*

**PP-1. Deterioration of pavement surface (cracking or heaving)?***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

**PP-2. Clogging of pavement by sediment or particles?***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

**PP-3. Trash or natural debris on the pavement?***

| Responses | None | Minor | Moderate | Major | Severe |
|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 |

**PP-4. Sediment accumulation in the underdrain/observation wells?***

| Responses | <20% | 20-30% | 30-40% | 40-50% | 50-100% | N/A |
|---|---|---|---|---|---|---|
| Score | 4 | 3 | 2 | 1 | 0 | 2 |

## Additional Notes (optional)

Verifier note: Space to provide any additional information or observations not covered in this section questions or needs greater explanation.

| Total Score |
|---|

**Are there any maintenance concerns (i.e., sinking, woody growth where it shouldn't be, etc.)? Enter below.**

Verifier note: Use this space to note any maintenance concerns to flag for the CWSP and maintainer. Also use this space to provide any additional information that should be noted about the project's condition and functionality that wasn't covered by checklist questions or additional notes sections.