
Clean Water Project Verification

Standard Operating Procedure (SOP)

Vermont Department of Environmental Conservation
Clean Water Initiative Program

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Key Terms and Definitions

Adoption: The process for Clean Water Service Providers (CWSPs) to take on Operation and Maintenance (O&M) responsibilities of previously established projects and receive an adopted project's associated phosphorus reduction credits starting at time of adoption.

Clean Water Project Verification (Verification): The use of visual and measured indicators to assess clean water project condition.

Clean Water Service Provider (CWSP): A regional organization established under the Clean Water Service Delivery Act (Act 76) who is responsible for overseeing clean water project identification, prioritization, development, design, construction, verification, and operation and maintenance.¹

Design Life: The period of time that a clean water project is designed to operate according to its intended purpose. Typically, the design life is determined by the project designer following the DEC Tracking and Accounting Standard Operating Procedures (SOPs) where available.

Landowner Liaison: The primary entity to communicate between the landowner and the CWSP about site visits and project concerns under Formula Grant Site Access Agreements.

Maintainer: An entity contracted to conduct the routine maintenance on clean water projects.

Non-regulatory Projects: Projects that are voluntarily implemented.

Operation and Maintenance (O&M): Actions taken with the goal of holding implemented projects up to standards that ensure clean water projects provide water quality benefits throughout their design life.

Regulatory Projects: Projects that are required/compelled by water quality-related regulatory programs such as but not limited to Municipal Separate Storm Sewer System (MS4) General Permit or 3-acre general permit.

Site Access Agreements: General term that encompasses both site access license and site access easements and their accompanying O&M plan, for projects funded by the Water Quality Restoration Formula Grant. These are signed agreements between the landowner(s) and CWSP to allow access to a project area for planned visits to implement, verify, conduct maintenance, and if necessary, repair damage to a project.

Total Maximum Daily Load (TMDL): is the calculation of the maximum amount of a pollutant that a waterbody can receive and still meets Vermont Water Quality Standards. In a broader sense, a TMDL is a plan that identifies the pollutant reductions a waterbody needs to meet Vermont's Water Quality Standards and develops a means to implement those reductions.

Verifier: An entity who conducts verification site visits and is certified by attending DEC led trainings.

Water Quality Restoration Formula Grant (Formula Grant): Grant awarded to Clean Water Service Providers to meet non-regulatory pollutant reduction requirements as described in EPA approved water quality restoration plans (i.e., such as TMDLs for Lake Champlain and Lake Memphremagog).

¹ Pursuant to Act 76 of 2019 § 39-101 Purpose. The CWSP bears responsibility for overseeing clean water project identification, prioritization, development, design, construction, verification, inspection, and operation and maintenance to be administered in accordance with this Rule.

Introduction and Scope of Document

Vermont Department of Environmental Conservation (DEC) Clean Water Initiative Program (CWIP) funds, tracks, and accounts for priority clean water projects to restore Vermont's waters and communicates progress toward meeting water quality goals. Projects that are state funded are tracked in the Watershed Projects Database (WPD)² and used to account progress towards clean water restoration plans known as Total Maximum Daily Loads (TMDLs).³

This **Clean Water Project Verification Standard Operating Procedure** establishes standardized protocols and tools used to determine the condition of an implemented clean water project and the ultimate verification score. DEC has developed tools, guidance, and training for clean water partners to perform Clean Water Project Verification, with an emphasis on verification of projects funded through the Clean Water Service Provider (CWSP) network. (See [Resources section](#) for additional materials).

Clean Water Project Verification Purpose and Goals

Clean Water Project Verification is the use of visual and measured indicators to assess clean water project condition and to ensure that water quality improvement projects implemented with state funds are built, properly maintained, and functioning according to an Operations and Maintenance (O&M) plan. Overall, the goals of the Verification Program are to:

- Verify that projects funded with DEC funds are being maintained and functioning as intended.
- Support tracking and accounting of clean water projects and their contribution toward Vermont's Water Quality Goals.
- Expand partnerships with landowners and Vermont's Clean Water Network.
- Increase confidence that state dollars are being spent effectively.

Verification provides accountability for pollutant reduction benefits that count toward CWSP phosphorus targets and DEC Total Maximum Daily Load (TMDL) tracking and accounting. Verification findings are documented on standardized checklists for each project type which are accessed digitally via ESRI Survey 123.

Clean water projects outside the scope of CWIP funding are not verified in the Clean Water Project Verification program. These projects are managed by other State agencies and programs, such as the DEC Rivers Program, Vermont Agency of Transportation (VTrans), and the Agency of Agriculture, Farm and Markets (AAFM). These programs provide oversight and technical assistance for proper design, installation, operation, and maintenance.

² The Watershed Projects Database (WPD) is a DEC database developed by the Agency of Digital Services (ADS) used to manage a variety of clean water projects across the state. DEC's CWIP uses the WPD to track and report on CWIP-funded clean water projects in Vermont. DEC's Watershed Planning Program uses the WPD to track prospective clean water projects in Vermont identified through the tactical basin planning process. Access WPD: <https://anrweb.vt.gov/DEC/cleanWaterDashboard/WPDSearch.aspx>

³ Visit the Clean Water Initiative Program webpage to learn more: <https://dec.vermont.gov/water-investment/cwi>

Verifier Responsibility

Trained and certified verifiers⁴ are responsible for routine, and as needed, project visits to assess condition and function of implemented clean water projects. Depending on the project, the verifier may also be the project implementer, maintainer, or another contracted entity.

Verifiers will:

- Attend DEC verification trainings as they become available.
- Stay up to date with future DEC training and program updates.
- Coordinate site visits to assigned project sites on a general schedule determined by the CWSP.
- Obtain and review project designs and O&M plans.
- Contact the landowner liaison or responsible party to alert landowner of upcoming site visit. The landowner should be given at least 48-hours advance notice.
- Conduct site visits and collect information and photos following this Verification Standard Operating Procedure (SOP).
- Conduct QA/QC of collected data following site visit.
- Report to CWSP on project status and any project maintenance needs.

View Act 76 Guidance Chapter 7⁵ for additional roles and responsibilities within Clean Water Project Operation and Maintenance under the CWSP network.

Verifier and CWSP Agreements

CWSPs will procure entities to perform necessary verification services. Below are some considerations to articulate in any agreement between the CWSP and hired verifier:

- Verification Site Visit routine frequency and triggers for additional as-needed visits. See Chapter 7 Guidance for additional information on expected frequency of verification visits and as-needed verification visits.
- Best practices for contacting the landowner liaison (i.e., clear roles on who should contact and schedule the visit with the landowner liaison).
- Preferred methods of reporting verification findings (see [Report section](#)).
- The use or purchase of any necessary tools or equipment to conduct Verification (if applicable).
- CWSPs should discuss with verifiers what degree of maintenance verifiers should engage in while out on a site visit.
- Best practices with landowner communication and troubleshooting.

Landowner Communication

The verifier may be approached by the landowner while on the property conducting a verification visit. Below are some considerations for communication and troubleshooting with the landowner:

- Landowner(s) should be given the opportunity to join verification visits if they are interested.

⁴ See up to date training and certification information posted on the Verification and Maintenance webpage: <https://dec.vermont.gov/water-investment/cwi/projects/verification>.

⁵ View Act 76 Guidance Chapter 7 as well as other chapters of guidance on the DEC's Act 76 website: <https://dec.vermont.gov/water-investment/statutes-rules-policies/act-76/background-law-rule-and-guidance#Guidance>

- If the landowner has concerns about site visits, maintenance activities, or the project itself, direct them to either their landowner liaison or the CWSP as applicable.
- If a landowner consistently denies access or is unaccommodating when attempting to schedule site visits, the CWSP should be alerted.
- Language in the site access agreement cover letter⁶ can be used as a resource to help communicate benefits of clean water projects with landowners.

Verification Process

The verification process involves preparing for and conducting regular site visits to visually assess projects' status, condition, and success of routine O&M. Data and photos are collected in Survey123 checklists using standardized methods. Following a site visit, verifiers inform CWSPs about the projects' current condition and additional maintenance needs if applicable.

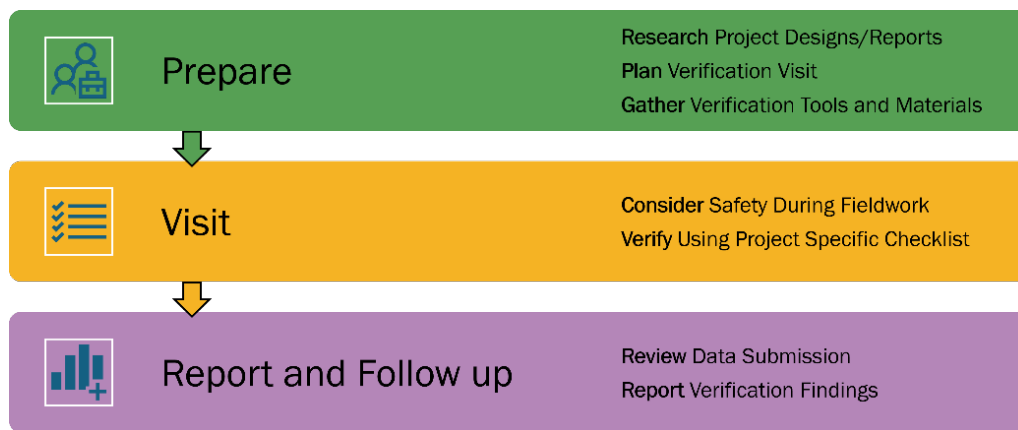


Figure 1: Steps involved in the Clean Water Project Verification Process

Preparing for Site Visits

Prior to a verification site visit, verifiers will review resources, gather materials, and plan site visit routes. The next few sections describe best practices to be prepared to go to a site visit.

Research the Project

Prior to visiting a clean water project, verifiers should gather information that will help with evaluating the project in the field.⁷ It is important to get a general sense of the overall project, elements of the practice, location, and previous condition. Reference materials such as photos, final designs, and O&M plans can be useful to bring in the field with you (see [Gather Field Materials](#) section).

Below is a list of recommended items and metrics to reference prior to and during a verification visit.

- **Record of any maintenance or repair activities since the last site visit.**

⁶ Site Access Agreements and Cover Letters can be found on the DEC's Applicant and Recipient Resources webpage: <https://dec.vermont.gov/water-investment/cwi/clean-water-grants/applicant-recipient-resources#O&M>

⁷ Older projects that were previously implemented under a non-Formula Grant program may have different levels of information and resources available. The responsible party may be able to provide resources to aid your review of materials. DEC can also assist with finding deliverables associated with a project if needed (contact the DEC Verification and Maintenance Specialist with the WPD ID and project name).

- Knowing the status of recent maintenance work and can be helpful with identifying challenging areas.
- What to look for:
 - Recent maintenance activities (e.g., was the forebay recently cleared of sediment?).
 - Maintenance notes (e.g., has the maintainer noted any maintenance challenges with this project?).
 - Past repairs (e.g., was a repair done that may have changed the design/location of the project).
- **Site Access Agreements/cover letter/O&M Plan**
 - The O&M plan, within the site access agreement, outlines routine maintenance tasks that should be scheduled throughout the project's design life. Prior to a verification visit, review the O&M plan since it can help with identifying additional maintenance needs for the project to maintain function and condition.
 - The site access agreement cover letter provides information to the landowner about the project, O&M activities that the landowner is responsible for (if applicable), and the landowner's preferences for communication.
 - What to look for:
 - Expected routine maintenance activities.
 - Site/landowner specific details (e.g., is the landowner conducting the maintenance?).
- **Watershed Projects Database (WPD)⁸**
 - Helpful project information can be found in WPD.
 - What to look for:
 - Project description
 - Location
 - BMP System information
 - Records
 - Project photos
- **As-built designs (if applicable)**
 - Engineering designs or plans can provide details on the extent of the project, its components, and how the project was designed to operate.
 - What to look for:
 - Inlet and outlet locations.
 - How was the project designed to operate and where should water flow? Does it have conveyance, pre-treatment, or multiple outlet locations?
- **Planting plans and species list (if applicable)**
 - Some projects may have planting plans showing number, types of plants, and locations that should be used to assess vegetation condition.
 - What to look for:
 - How many plants were planted? Verifier should learn about how many plants to look for and how many survived.
 - Which plant species were planted? The verifier should learn the types of plants to look for (e.g., a verifier could note that all the white pine that were planted have died).

⁸ Access the Watershed Projects Database: <https://anrweb.vt.gov/DEC/cleanWaterDashboard/WPDSearch.aspx>

- Where were the plants planted? The verifier should learn where to look for planted species and differentiate between volunteer species that have established. For example, if a project plan indicated willow stakes along a bank, but when visiting the project, the verifier sees no surviving willows, they should note this.
- **Photos of the project**
 - Before and after photos of the project are required grant deliverables for projects funded by the DEC Clean Water Fund. Additional photos taken during implementation may be available and prior verification visit photos (see ‘Prior Verification Visit Findings’). Photos are important to get a baseline understanding of what the project looked like at implementation and can help the verifier evaluate current project conditions.
 - What to look for:
 - Visually compare the project at implementation compared to its current state.
 - The location of the project and area near the project site..
 - Note anything that may not have been included in initial reports that would be good for maintainers and the CWSP to know (e.g., there are tree tubes around panted trees that may need be removed soon).
- **Prior Verification Visit Findings⁹**
 - All previous verification visit data including photos, notes, and scores is accessible to verifiers via submitted surveys in the online Survey123 database (see [Field Maps and Survey123 Access](#) section).
 - What to look for:
 - What portions of the project scored low on the last visit? Is there anything to flag for the upcoming visit?
 - Compare previous photos of the project to current condition.
- **O&M Manual Practice Sheet for practice-specific considerations**
 - What to look for:
 - Description of the practice types.
 - Routine O&M activities for the practice type.
 - Factors that can affect the project’s lifespan.
- **Recent Weather**
 - What to look for:
 - Recent rain (within 48 hours) can indicate how well infiltration is happening (if applicable).
 - Large storm events in the area such as localized flooding may have damaged or impacted the project.
- **Project location and maps of the area**
 - Exploring maps of the project area can help with understanding factors that may affect the project’s condition, put pressure on the system, and assist in planning the site visit and accessing the project.
 - Vermont Natural Resources Atlas¹⁰ can be used to find information such as soil characteristics, topography, and mapped wetlands.
 - What to look for:

⁹ During the Verification Pilot Program, DEC staff visited several clean water projects to test the verification checklists. This information can be requested by contacting the Verification and Maintenance Specialist.

¹⁰ Vermont Agency of Natural Resources Natural Resources Atlas: <https://anrmaps.vermont.gov/websites/anra5/>

- What is the surrounding land use and/or drainage area of the project?
- How to access the site? Is the site publicly accessible? Is there a safe location for parking, are there fences in the way that you may need the landowner's permission to cross?

The Verification Project Info Sheet Template (Appendix C) is an optional resource to organize pre-visit project information, site specific details, and contact information. This resource can also be used to generate driving directions from [Google My Maps](#). It is also advised to bring either paper or digital copies of photos, reports, and planting plans the field with you (see [Gather Field Materials](#) section).

Plan the Visit

Verifiers should consider the travel distance, geographic location of projects, and ability to group multiple sites together when planning site visits.

Route planning suggestions:

- Explore project locations on the Verification Map, found in the Clean Water Project Verification ArcGIS Group (see [Verification Survey123 Access](#) section).
- Verifiers should know the project's physical address, where to park, and how to access project site areas. The contact for the project (landowner liaison or O&M responsible party) may provide site specific information.
- Use Google Maps for driving directions and route planning. Project locations can be uploaded to [Google My Maps](#).

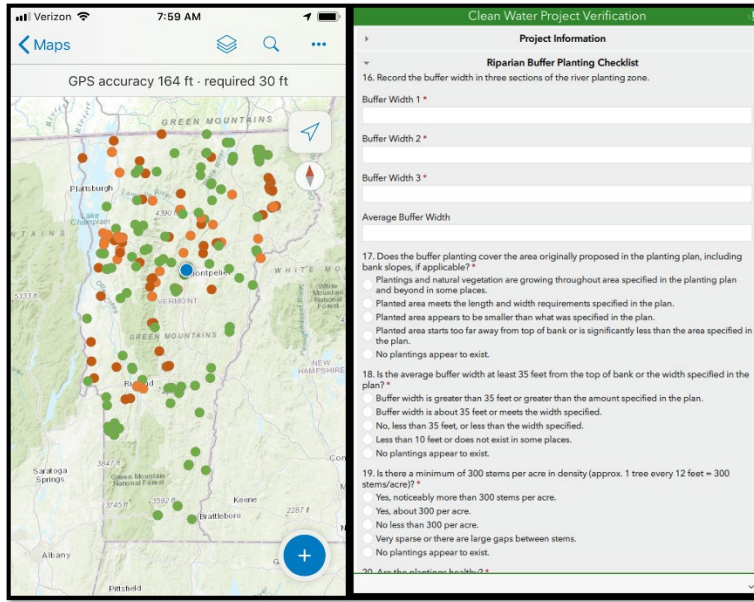
Timing and Duration of Site Visits

Site visits should be scheduled in consultation with the landowner. Site visits take approximately 15-45 minutes depending on the project type and site conditions. DEC recommends scheduling routine verification visits during the growing season and to avoid scheduling visits when there is snow cover through the end of mud season in the spring.

Verification Tool Setup

ESRI Survey123 and Field Maps are ArcGIS applications used to conduct verification field visits. The Field Maps application contains a GIS map populated with details about implementation-phase projects funded by CWIP from the Watershed Projects Database (WPD).¹¹ Field Maps displays project locations geographically by project type and allows a user to choose a project and launch a Survey123 checklist to collect data in the field. The Survey123 checklist is used to gather information, images, and scores the project based the verifier's selected answers. Survey123 and Field Maps are linked to autofill project data in the checklist, such as location, project ID, project name, BMP type, town, and BMP ID. This reduces the potential for human error when entering data and increases efficiency in the field.

¹¹ Note that Watershed Projects Database (WPD) information is updated on an annual basis and there may be a delay from when a project is implemented to when a projects information is updated in WPD and likewise updated in the Field Maps application. Field Maps data is pulled from WPD.



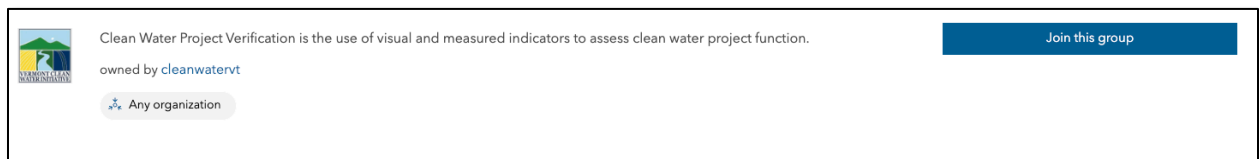
Example Field Maps (left) and Survey123 Checklist (right)

Field Maps and Survey123 Access

Follow the instructions listed below to access verification tools in Survey123 and Field Maps. This must be done prior to going out in the field. A recorded training on accessing Verification Tools is available on the [Verification and O&M webpage](#).

- 1) Via desktop computer web browser, sign into [ArcGIS Online](#) using your ArcGIS Online member account. Ensure the member account is public, has at least a GIS professional basic account, and administrative privileges.
 - If your organization does not have an ArcGIS member account, connect with CWSP about best practice to access. They may have a shareable account for verifiers to use.
 - Alternatively, verifiers may use DEC’s shared field worker ArcGIS member account. Please contact the CWIP Verification and Maintenance Specialist for log in information. If you opt to use this account, you can skip step #2 below.

- 2) Submit a request to join the [Clean Water Project Verification Group](#)¹² to access verification field map and checklists.



Select “join this group”

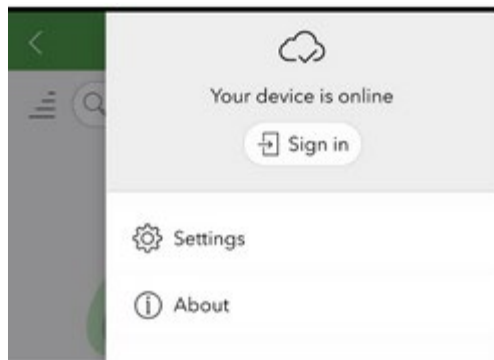
¹² Link to Clean Water Project Verification Group:
<https://vtanr.maps.arcgis.com/home/group.html?id=1777f7badfd44a89286173da10d8e03#overview>

- 3) Download Survey123 and Field Maps onto the phone or tablet (ensure the device is camera and GPS empowered) that you will be using to conduct the survey.

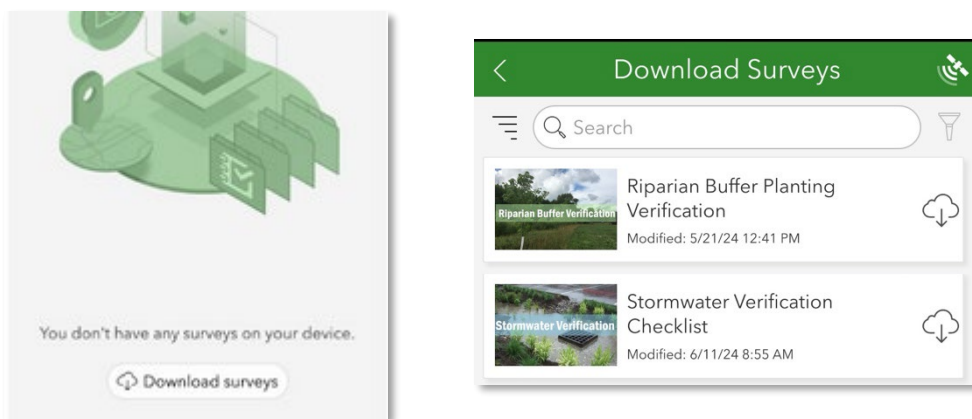


- Android users, download [ArcGIS Field Maps](#) and [Survey123](#) from the Google Play Store.
- Apple users, download [ArcGIS Field Maps](#) and [Survey123](#) from Apple Store.

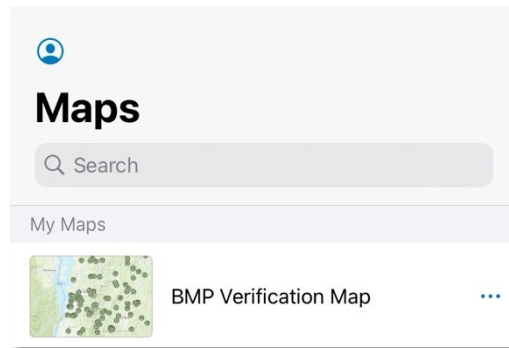
- 4) Sign into ArcGIS Survey123 mobile application using ArcGIS account.



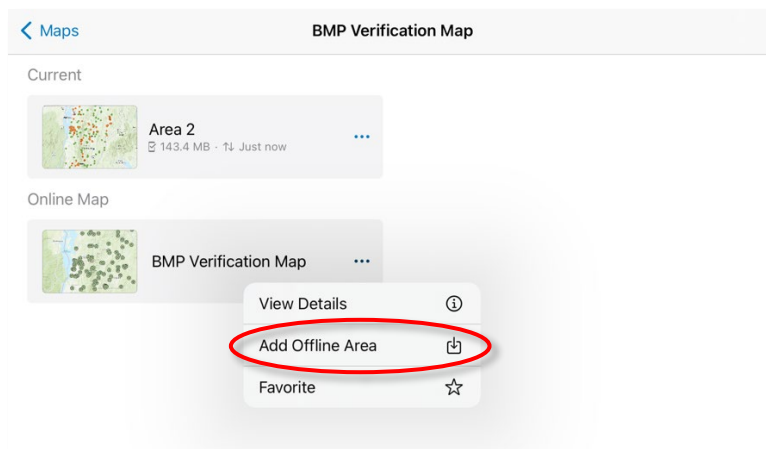
- 5) Once signed in, select 'Download Surveys' and search the name of all available Verification Surveys and select download. Each project type checklist only needs to be downloaded to a device once. Note: your request to join the verification group must be approved by DEC before you can access surveys.



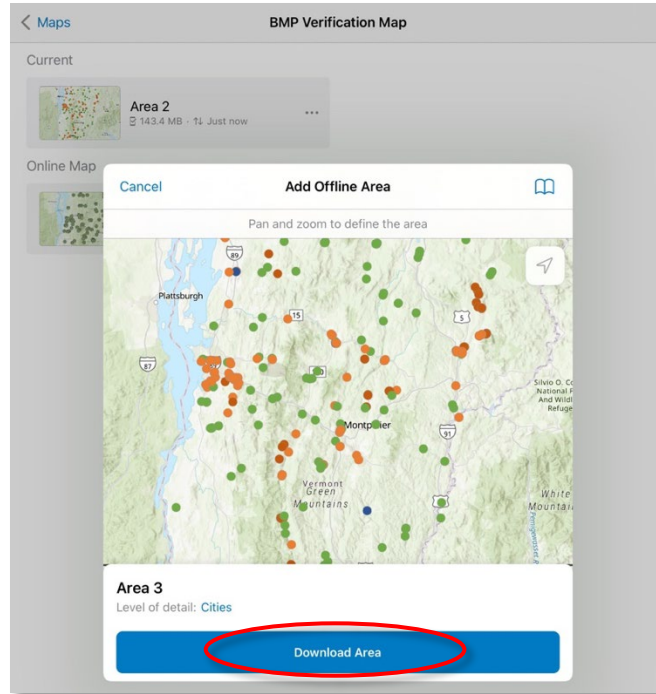
- 6) Sign into ArcGIS Field Map app using the same credentials as Survey123. Once logged in, you will be able to view and download the BMP Verification Map. This map includes CWIP-funded clean water projects across the state. (Project types included in the map are: stormwater, river planting, road projects, floodplain/stream restoration, and lake shoreland).



- 7) To access the BMP Verification Map offline, download a section of the map. Select the drop-down options menu next to the name of the map and select “Add Offline Area.”



- 8) In the pop-up window, pan and zoom to outline the area to download to the device. By changing the level of detail option to “cities” the area to download will be wider. It might be necessary to download two map areas in order to download the map for the entire state.



Gather Field Materials

Gather the following materials and tools prior to going out to the field to conduct a verification site visit:

Required materials:

- Phone/tablet with confirmed access to Survey123 and Field Maps
- Printed copies or digital versions (that are accessible without cell service) of the O&M plan, final reports, photos, and designs for reference while in the field.
- Field measuring tape (for riparian buffer plantings)
- Yard stick

Suggested materials:

- First Aid Kit
- High visibility safety vests
- Clipboard and pencil
- Charger with car adapter

Areas of Vermont have limited to no cell phone service. Keep this in mind when preparing for your site visit and ensure that the Survey123 and Field Maps applications are downloaded on your device, and you can access the checklists. Survey123 checklists can be completed offline and later submitted to the online database once you are back in the office. For driving directions, download offline google maps to navigate to the project sites.

Visit: Conduct a Verification Site Visit

Field Safety Considerations¹³

Ensure you are aware of and prepare for potential field safety concerns while conducting field work. Below are some general resources on outdoor hazards.

- [DEC Field Safety Document](#)

Vermont Poisonous Plants

Learn to identify plants that cause irritations, exposure symptoms, and treatment.

- [Poisonous Plants in Vermont | Vermont Department of Health \(healthvermont.gov\)](#)

Ticks and Tick Prevention

Ticks are active any time the temperature is above freezing. In Vermont the highest risk is in spring, summer, and fall, with ticks being most active on warm days in spring and fall.

- [Prevent Tick Bites & Tick Bite Illnesses | Vermont Department of Health \(healthvermont.gov\)](#)

Environmental Conditions

Environmental conditions such as heat, air quality, and inclement weather are important safety factors to consider before going out in the field. Consider what terrain you will encounter when in the field and if the weather may make the area unsafe to traverse (e.g., steep terrain that is unsafe with rain).

- [Hot Weather | Vermont Department of Health \(healthvermont.gov\)](#)
- [Warning Signs and Symptoms of Heat-Related Illness | Natural Disasters and Severe Weather | CDC](#)
- [Air Quality Alerts, Wildfires & Your Health | Vermont Department of Health \(healthvermont.gov\)](#)

Additional General Safety Resources:

- [Health & The Environment | Vermont Department of Health \(healthvermont.gov\)](#)
- [The University of Vermont Safety for Field Work website](#) has general information on outdoor hazards when working in the field.
- OSHA: [OSHA Field Safety and Health Management System \(SHMS\) Manual | Occupational Safety and Health Administration](#)

Project Type Checklists

There are current and future verification checklists for project types eligible for CWIP grant funding: stormwater, road projects, riparian buffer planting, river and floodplain restoration, wetland restoration, and lake shoreland (Table 1). Checklists are based on a visual inspection of elements throughout the practice that impact functionality. For example, riparian buffer questions focus on the health and distribution of vegetation in the river corridor. The checklists for stormwater practices

¹³ Vermont Youth Conservation Corps (VYCC) provided content from their work crew field operations manual to help develop the Field Safety Considerations section of this SOP.

assess the amount of accumulated sediment or erosion. If a project consists of multiple practices (e.g., rain garden and riparian buffer planting) a separate survey is used to evaluate each practice.

Checklist questions ask the user to evaluate the project for the presence of factors that negatively impact the function of the project (Table 1). For example, many of the surveys ask about the presence of erosion within the project area, which could indicate that a certain level of maintenance is needed. Each survey allows the user to take and upload photos to capture certain aspects of the practice. Photos and captions are highly recommended to help determine maintenance needs and monitor change overtime.

Table 1: Implementation-phase project types eligible for Verification

Project Type	Project Description ¹⁴	Checklist Visual Indicators
Current Project Types for Verification		
Stormwater	Implementation of high priority Tier 1 or Tier 2 stormwater management practice(s) that collect, store, infiltrate, and filter runoff that contains nutrient, sediment and/or other contaminant pollution from existing impervious, hard (e.g., paved) surfaces associated with developed/urban/suburban areas. Permit(s), access license(s)/easement(s), and operation and maintenance plan(s) are in place prior to construction. Refer to most updated Vermont Stormwater Management Manual for more information on Tier 1 and Tier 2 practices.	<p>There are eight different stormwater practice types¹⁵ with unique verification checklists:</p> <ol style="list-style-type: none"> 1. Bioretention 2. Gravel Wetland 3. Dry Detention Pond 4. Vegetated Swale 5. Infiltration Trench/Basin 6. Permeable Pavement 7. Sand Filter 8. Wet Pond <p>The stormwater checklist is split into four sections based on components of the practice structure: the pretreatment, the inlet, within the practice, and the outlet. Various observations are noted within each component. Three common questions across each component and all practice types are: the extent of excess sediment, evidence of erosion, and the presence of trash and natural debris.</p>
Riparian buffer plantings	Planting of native woody trees and shrubs within buffer area of rivers/streams, wetlands, and/or lakes. Planting results in a minimum average buffer width of 35-feet and a minimum density of 300 stems per acre. Buffer supports restoration of river corridor/floodplain, wetland and/or lakeshore, filters	A riparian buffer planting is scored on the average buffer width measured in the field, density of tree plantings (minimum 300 stems per acre) and health of tree plantings and percent survivability. When conducting a site visit of a riparian buffer planting the verifier is also asked about extent of human

¹⁴ Definitions are from the CWIP Project Types Table, available on the DEC Applicant and Recipient Resources webpage: <https://dec.vermont.gov/water-investment/cwi/clean-water-grants/applicant-recipient-resources>.

¹⁵ For stormwater practice types that are eligible for verification, but the terminology does not match this list, please connect with VT DEC to help determine the appropriate checklist to use.

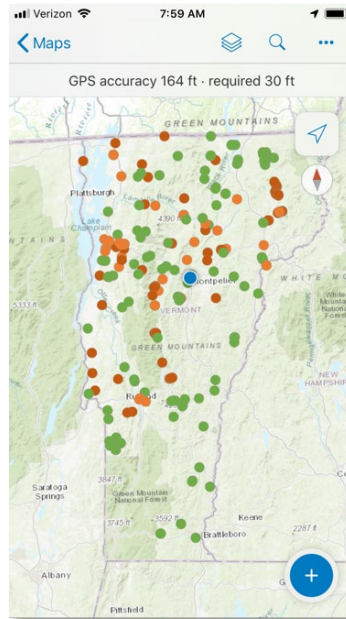
	<p>nutrient and sediment pollution from runoff, and provides habitat benefits. Includes riparian plantings on agricultural lands. Work includes site identification, planting plan development, materials sourcing, site preparation, and planting installation. Sites will be selected for their benefits to water quality and must meet approval of the State (local DEC River Scientist and Basin Planner). Sites will be stable, proximate to water, and high-priority. Permit(s), access license(s)/easement(s), and operation and maintenance.</p>	<p>activities (e.g. mowing, parking lot, road, crops) within the designated buffer area and presence of invasive species.</p>
Future Project Types for Verification		
Roads project	<p>Implementation of high priority road-related erosion and drainage treatment practices to divert, collect, store, infiltrate, and/or filter runoff from transportation infrastructure (e.g., ditches, turnouts, check dams, culvert armoring). Practices should be located on hydrologically connected gravel and/or paved road segments not/partially meeting Municipal Roads General Permit (MRGP) standards. Practices should be listed in the MRGP and designed to make the road segment(s) meet MRGP standards. Road segments identified and improved in the absence of a local road erosion inventory (REI) must perform a pre and post segment assessment using the REI protocols. Permit(s), access license(s)/easement(s), and operation and maintenance plan(s) are in place prior to construction. Note that if a roads project includes a stream crossing improvement, the Floodplain/Stream Restoration project type should also be followed including applicable definitions, milestones, deliverables, and programmatic reviews.</p>	<p>The road checklist focuses on road and culvert condition as well as presence of erosion and deposition. When completing a site visit the verifier will select applicable components (ditches, culverts, slope stabilization...) and road type (unpaved, paved, class IV) allowing for verification of variable road project types.</p>

<p>Lake shoreland</p>	<p>Implementation of high priority lake shoreland habitat restoration projects and/or lakeshore nutrient/sediment pollution reduction structural practices at priority locations, within 250 feet of a lake shore. Practices must be listed in the Vermont Bioengineering Manual or otherwise have support from the Vermont DEC Lakes and Ponds Program. Permit(s), access license(s)/easement(s), and operation and maintenance plan(s) are in place prior to construction.</p>	<p>The lakeshore projects verification checklist should be used to verify the following BMPs:</p> <ol style="list-style-type: none"> 1. Vegetated Buffer 2. Live Crib Wall 3. Slope Regrading 4. Encapsulated Stone Lift 5. Live Staking 6. Stone Toe <p>Visual indicators include planted vegetation health, human and animal disturbance, extent of erosion and deposition within the practice, ice damage, presence of invasive plants, and stability of practice.</p>
<p>River and floodplain restoration</p>	<p>Implementation of high priority stream/river and floodplain restoration projects to restore the stream/river to least erosive condition (i.e., equilibrium condition) and improve habitat. Restoration work includes channel/ floodplain modification to improve equilibrium dimensions/ connections OR removal/ retrofit of river corridor/ floodplain encroachments or instream structures. Permit(s), access license(s)/easement(s), and operation and maintenance plan(s) are in place prior to construction.</p>	<p>Floodplain and stream restoration projects stabilize banks, restore river elevation and floodplain connectivity, encourage channel meander, and add woody debris into the channel. Depending on the project, the checklist can be used to evaluate restored sections of the stream and the floodplain, if floodplain restoration or both. The checklists questions evaluate: evidence of erosion and deposition, blockages, depth and width of the river, plantings or changes to the floodplain, and condition of structures.</p>
<p>Dam removal</p>	<p>Implementation of high priority dam removal project to restore hydrologic connectivity of surface waters. Permit(s), access license(s)/easement(s), and operation and maintenance plan(s) are in place prior to construction.</p>	<p>In most cases, dam removals also include aspects of river and floodplain restoration. Verifiers should use the river and floodplain restoration checklist.</p>
<p>Wetland restoration</p>	<p>Implementation of high priority wetland and buffer area restoration and protection projects to promote water quality benefit, encourage flood resiliency, and provide habitat benefits. Permit(s), access license(s)/easement(s), and operation and maintenance plan(s) are in place prior to construction.</p>	<p>The wetlands checklist is the Vermont Rapid Assessment Method (VRAM). The VRAM considers the size of the wetland and the size of its buffer, land use surrounding the wetland, hydrology of area, human intervention, plant species and habitat, and the inlet and outlet of the wetland.</p>

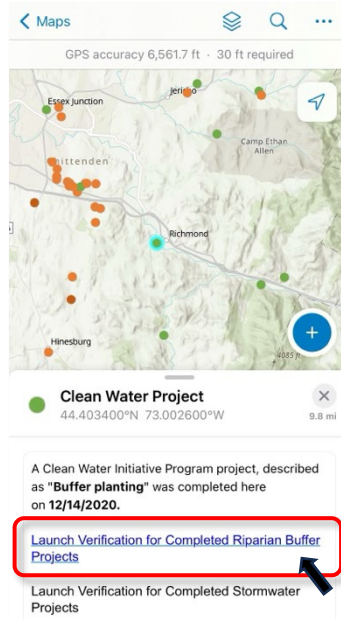
Launch Verification Checklist

After confirming access to Verification Field Map and all Survey123 checklists, the verifier can launch a checklist and begin a field verification visit.

- 1) In Field Maps, open the BMP Verification Map. Navigate to the appropriate location pin for the project. Ensure you know the correct project name that is stored in WPD.



- 2) Select the location pin and a project description will open. Select the link to the appropriate project type survey (i.e., Riparian Buffer checklist for a riparian buffer planting project).



- 3) Survey123 will then launch the verification checklist within the Survey123 application on your device. Check that fields #1-7 autofill correctly: Project ID, Name, Type, Town(s), BMP ID, BMP System Name, Project Completion Date.

Clean Water Project Verification

Project Information

1. Project ID
9571

2. Project Name
Richmond Volunteers Green Riparian Buffer Plan

3. Project Type
River - Planting

4. Town(s)
Richmond

5. BMP ID
2194

6. BMP System Name
Buffer planting

7. Project Completion Date
Sunday, December 13, 2020

8. Select CWSP: *

- 4) Survey questions ask the verifier to evaluate key aspects of the clean water project that impact function. See user guides (Appendix A) that explain each question and outline considerations for aspects to look for while in the field. Verifiers should select best answers to all questions using their experience and knowledge of the project. It is helpful to visit the site in teams of 2-3 people so everyone can discuss the best response to each question. There are several different types of questions:
- Rate visual indicators
 - Select one appropriate answer. Questions are connected to a number score from 0-4 and are automatically averaged within the Survey123 checklist.

What is the extent of...

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

4 3 2 1 0

None Minor Moderate Major Severe

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

4 3 2 1 0

None Minor Moderate Major Severe

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

4 3 2 1 0

None Minor Moderate Major Severe

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

4 3 2 1 0

No Erosion Sheet (<1 in) Rill I (1-6 in) Rill II (>6-12 in) Gully (>1 ft)

Additional Notes:

Average Inlet Score

Takes average or answers selected above (range 0-4)

Inlet Grade: **Functional, Marginal, or Failed**

Example of the number scores associated with each selection for the inlet section of the stormwater checklist

- b. Photos
 - i. Take clear photos that show the overall project or a certain aspect that is important to note. Sometimes the camera within the Survey123 application doesn't take the highest quality photos so best practice is to take the photo with the device's camera app and then upload into Survey123.
 - ii. Multiple photos can be added to each photo upload section.
- c. Maintenance/concerns: short answer
 - i. Use these responses to make notes about issues that are observed in the field for follow up.
 - ii. Add any notes with comments, concerns, and notes of what was found during the site visit.

5) Survey123 will calculate a project score based on responses to questions, from 0-4. See [Verification and Checklist Scoring](#) section for details.

6) Complete checklist and select "send later" to save the checklist as a draft. See [Report](#) section for follow up after the visit.

Note for CWSPs: Maintenance During Verification Visits

After completing the verification scoring checklist and as time allows, DEC encourages verifiers to conduct simple maintenance tasks such as removing trash or debris and should inform the CWSP about the work they complete. CWSPs should discuss with verifiers what degree of maintenance verifiers should engage in while out on a site visit.

Verification Checklist Scoring

The final score in the survey is automatically calculated as an average of all the scores the verifier provides rounded to the nearest whole number. If a practice has multiple factors that negatively

impact and impede its function, the practice will receive a low verification score for that site visit. The overall score corresponds to a grade that falls in three categories (Table 2):

- 1) Functional (meets requirements)
- 2) Marginal (maintenance is needed)
- 3) Failed (not functional, needs repairs, or does not exist)

Table 2: Scoring rubric for final grading, maintenance actions to consider, and implications for WPD operating period (important for tracking and accounting purposes).

Score	Grade Equivalent	Maintenance Actions	WPD operating period implication
4-2.5	Functional (practice is operating to meet requirements, no additional maintenance required)	<p>No change in action required. Practice meets the requirements for functionality and does not require additional maintenance above and beyond the O&M plan.</p> <p>The verifier may note areas of concern or change from a previous visit (such as sediment accumulation) that could impact functionality in future if not addressed. These areas should be monitored going forward.</p>	<p>If this score is received as part of an end of design life verification visit, operating period should be renewed for its full estimated design life value.</p>
<2.5-.5	Marginal (practice needs maintenance to meet requirements)	<p>Maintenance should be mobilized to address issues found during verification. CWSP should evaluate potential causes, discuss with maintainers/landowner liaisons, and implement changes. Solutions may include a need to adjust O&M activities/frequency, update O&M plan within site access agreement, and/or adjust contracted maintainers.</p> <p>If the verifier and CWSP do not know which corrective actions should be taken, they should confer with the project designer or other technical expert. Appropriate O&M should be planned and scheduled as soon as possible (depending on seasonality) following the site visit, preferably within a year.</p> <p>If the items cannot be corrected within a year, this may impact the CWSP's adequate annual progress review conducted by DEC.</p>	<p>If this score is received as part of an end of design life verification visit, operating period should not be renewed until maintenance issues are addressed and a new verification visit receives a score of optimal or functional.</p>
< 0.5	Failed (practice is not functional or does not exist and needs significant repairs or replacement to meet requirements)	<p>A failed verification score indicates a practice has been severely damaged and repair should be considered.</p> <p>Project repair or replacement should be considered to address issues found during verification. CWSP should follow protocol outlined in Chapter 7 guidance about the repair process, potential use of risk reserve funds, and decommissioning.</p>	<p>If this score is received as part of any verification visit, including end of design life verification visit, operating period should be paused/ended and only resumed once repair/replacement is completed, and a new verification visit receives a functional score.</p>

Report

Review Data Submission

DEC suggests that verifiers save the survey in the outbox until returning to the office to review and submit the survey. The verifier should review collected field data for accuracy, including photos and site visit notes. Submitted but need to change something? You can easily edit your answers and resubmit.

Report to CWSPs

As described in CWSP/Verifier contracts, verifiers should report to the CWSP on project status and any suggested project maintenance needs (see [Verifier Responsibility section](#)).

DEC has developed Survey123 reporting templates for individual verification visits that CWSPs and verifiers can decide to use if they choose. These templates are available on the verification website. Users can update or use their own templates if desired.¹⁶ CWSPs may decide if and how they want to receive verification reports from verifiers. Responsibility for identified maintenance tasks and who should be notified (i.e., project implementer or project designer) should be overseen by the CWSPs. Unless requested, these reports do not need to be submitted to DEC.

DEC is developing an ArcGIS Online Dashboard that will display results from all state-wide verification site visits conducted in basins where CWSPs are established.

CWSPs are required to report annually to DEC on O&M activities, verification scores, and funding spent on O&M activities. Details on reporting requirements can be found in Chapter 7 Guidance.

Follow-up

Project Data

While conducting verification visits, a verifier may find that Watershed Projects Database data do not match the project's details on the ground. Verifiers may note any deviations from information in WPD and suggest updates to the DEC's Verification and Maintenance specialist.

Note for CWSPs: Maintenance Follow-Up

Additional maintenance needs above and beyond routine maintenance may be determined based on a practice's verification score and findings during the visit. The overall project score gives a general idea of the condition and function of a project, but CWSPs should still pay close attention to responses to each question and notes to help identify problem areas. Photos are especially helpful and can be used to track changes to the project over time.

To identify maintenance fixes, CWSPs should review the O&M Plan for the project, utilize the DEC O&M manual, and consult with project designers and other experts. CWSPs may consult with DEC staff if technical maintenance questions remain. Potential outcomes of verification visits include the need to update an O&M plan or schedule larger repairs.

¹⁶ ESRI has many helpful resources for Survey123 functionality, including how to design and create reports: <https://doc.arcgis.com/en/survey123/browser/analyze-results/featurereporttemplates.htm>

Resources

Act 76 Guidance Chapter 7: The purpose of this chapter of guidance is to outline the process and requirements for Verification and Operation and Maintenance (O&M) of clean water projects funded by Water Quality Restoration Formula Grants. View Chapter 7 Guidance and other chapters here:

<https://dec.vermont.gov/water-investment/statutes-rules-policies/act-76/background-law-rule-and-guidance#Guidance>.

Verification and O&M Webpage: The Clean Water Project Verification and Maintenance webpage provides educational materials, training information, and additional resources. Access the Verification and O&M webpage: <https://dec.vermont.gov/water-investment/cwi/projects/verification>.

Operations and Maintenance (O&M) Manual: Provides detailed guidance for maintaining clean water projects and provides tools/resources to determine appropriate O&M planning. Included in the manual are descriptions of practice types, equipment and materials needed for routine maintenance, and factors known to affect the lifespan of a clean water project. O&M can be found (once finalized) on the O&M Webpage: <https://dec.vermont.gov/water-investment/cwi/projects/verification>.

For more information on available CWIP funding sources, grants, and resources: <https://dec.vermont.gov/water-investment/cwi/grants>.

Applicant and recipient resources for CWIP grants: <https://dec.vermont.gov/water-investment/cwi/clean-water-grants/applicant-recipient-resources>.

Next Steps

As the DEC Verification and Operation and Maintenance program establishes, DEC will continue to update this document, resources, and the website as needed. Please reach out to the Verification and Maintenance Specialist with questions and feedback.

Appendices

Appendix A - Checklist User Guides

Appendix B– Site Visit Preparation checklist

Appendix C – Verification Project Info Sheet Template