



This document will guide CDOT staff including Design Engineers, Project Engineers, Hydraulic Engineers, and Environmental and Maintenance staff in completing the Checklist for Permanent Water Quality Control Measures (checklist). Permanent Water Quality Control Measures (PWQ CM) are installed during a project's active construction phase for long-term treatment of runoff from the project area after construction is complete. There are seven categories of PWQ CMs. The category names and SAP abbreviations include retention ponds (RTPD), extended detention basins (EXDB), inlet/vault/proprietary structures (PRST), infiltration facilities (INFF), treatment swales (TRSW), constructed wetlands (CNWL), and porous surfaces (PRSF).¹

The transfer of responsibility for a PWQ CM from a construction contractor to CDOT's maintenance program needs to occur for compliance with the requirements of the Municipal Separate Storm Sewer System (MS4) Permit (Permit No. COS000005) issued to CDOT by the Colorado Department of Public Health and Environment (CDPHE). The checklist contains 22 items that must be addressed prior to project closeout. The responsibility for the checklist will vary with the phase of the project. The CDOT Design Engineer shall be responsible for the checklist beginning with project scoping, through design, and ending with the signing of Form 128/advertisement. The CDOT Project Engineer shall be responsible for the checklist beginning with the signing of Form 128/advertisement through the final walkthrough. The CDOT Project Engineer shall remain responsible for the checklist until the updated O&M Plan, as-built drawings, and all IGAs are provided to the Maintenance Representative and Regional Maintenance Supervisor, at which point, CDOT Maintenance shall become responsible for the checklist; however, it is expected that CDOT staff from various Sections will provide input and assistance to ensure the checklist is completed to the satisfaction of all parties. Staff from Maintenance, Hydraulics, Environmental, and Landscape Architecture will play a role in this process and early coordination with these Sections is expected. The collaboration and coordination required to complete this form is intended to result in PWQ CMs that are well thought out; well designed for treatment function and longevity; accurately documented; and easily maintainable by the entity assigned to maintain them with equipment available to them.

There is a cover page for the checklist that provides information about each PWQ CM site. All designated roles are assumed to be filled by CDOT staff except for the PWQ Designer, which may be a private engineering consultant. If this is the case, include the name of the company and the engineer responsible for the design of the PWQ CM.

The following item numbers match the numbers and order of the actual checklist. Each item includes the description from the checklist, a brief narrative regarding the purpose of the checklist item, and options for completing the checklist item if a given project or maintenance entity has unique preferences or requirements.

No. Description

1. *Maintenance Representative attended scoping meeting.*

The CDOT Design Engineer must involve maintenance staff in the design of a project with a PWQ CM at the earliest stages of the project. Potential need for PWQ CMs along with their possible siting may be discussed, and it is critical that maintenance staff be allowed to express their concerns and preferences regarding design components such as access, the types of PWQ CMs they are able or unable to maintain, and preferred revegetation requirements including seed species/mixes used, among other topics. Often maintenance staff have first-hand knowledge of the types of PWQ CMs that are working well in the area and those that are not. Early input from Maintenance can lead to a more effective, accessible, and safe design. The second page of the checklist includes a space for notes on the scoping meeting that must be filled out. The CDOT Design Engineer shall contact the Region Maintenance Superintendent to determine the appropriate Maintenance Representative to be assigned to the project. The Region Maintenance Superintendent should ensure that the assigned staff attends the required meetings and will be the

¹ Refer to the PWQ Section of the Drainage Design Manual for more information (<https://www.codot.gov/programs/environmental/water-quality/documents/drainage-design-manual-1>).





same maintenance staff assigned to the project through its duration. This guidance applies to checklist items 2 and 3 as well.

2. *Responsibility for post-construction vegetation establishment was discussed and established at scoping meeting.*
This checklist item is intended to address the fact that while the construction contractor may seed the project site in accordance with the plans, the site is often accepted whether grass or other specified vegetation has established or not. If there is no mechanism to hold the contractor accountable for this, and the responsibility for establishing vegetation often falls to maintenance staff without associated funding. The CDOT Project Engineer will add a note to the end of the checklist indicating that the contractor will not be responsible for establishment of vegetation after construction.
3. *Maintenance Representative attended FIR meeting.*
This checklist item is intended to continue to meet the purposes expressed in item 1 above. Again, the second page of the checklist has a space for notes on the FIR meeting that must be filled out. Items that may be discussed at the FIR meeting include access requirements such as access road turning radius, width, and maximum slope, as well as areas to turn around large equipment such as a vac truck. Whether or not a site's access is gated may also be discussed, as well as concerns regarding required lane closures and/or confined space entry requirements, and the need and/or acceptance of responsibility for any permanent utilities, among others. The Region Maintenance Superintendent is responsible for ensuring that the Maintenance Representative attends the required meetings.
4. *Maintenance Representative attended FOR meeting.*
This checklist item is intended to continue to meet the purposes expressed in items 1 and 2 above. Again, the second page of the checklist includes a space for notes on the scoping meeting that must be filled out. Ideally, all maintenance concerns and recommendations will have been expressed prior to the FOR meeting and incorporated into the PWQ CM design. However, the FOR meeting provides a final opportunity for the Maintenance Representative to express concerns and provide direction prior to bid. The Region Maintenance Superintendent is responsible for ensuring that the Maintenance Representative attends the required meetings.
5. *Slopes are 3:1 or less and will not receive erosion control blanket where there are scheduled mowing operations.*
This checklist item is intended to ensure that if planned maintenance includes mowing that the PWQ CM is designed to accommodate it. Slopes ideally should be 4:1, but any steeper than 3:1 is difficult to mow. Erosion control blanket can clog mowers, so the CDOT Design Engineer must consult with the Maintenance Representative and Environmental staff on whether erosion control blanket may be used and if so, the specific requirements it must meet. Note that these are typical criteria; if the Maintenance Representative indicates that alternative criteria are acceptable, alternative criteria may be used.
6. *The Operations and Maintenance Plan (O&M Plan) is complete and has been reviewed by the CDOT Design Engineer, Hydraulics, and the Maintenance Representative. The O&M Plan should include water control operations required for maintenance and site-specific details and instructions, including for proprietary PWQ CMs. These may include safety and water quality hazards, specific flow rates expected, pollutants of concern being treated, confined space entry protocols, traffic closures, access, seed mixes, additional plantings, weed control procedures, etc.*





This checklist item is intended to ensure that the Maintenance Representative has a thorough and detailed document to determine the maintenance activities and equipment required at each PWQ CM site. The O&M Plan shall be completed by the CDOT Design Engineer (or his Consultant) and reviewed and accepted by Hydraulics and the Maintenance Representative. Guidance to complete the O&M Plan, including the elements it must include, as well as an example O&M Plan, are available on CDOT's PWQ website (<https://www.codot.gov/programs/environmental/water-quality/permanent-water-quality>)

7. *Access to the site, operational procedures, and areas of required maintenance have been established and accepted including: required easements, locations of access roads & stockpile areas for sediment removal, procedures for traffic control/closures and/or night operations. Access meets the requirements of the equipment required for maintenance as specified in the O&M Plan.*

This checklist item specifies some information addressed in other items, as this information will be included as part of the O&M Plan. The information in this checklist item is critical enough that it warrants discussion and should be completed concurrently with item 5. Operational procedures and areas requiring maintenance especially need to be discussed and agreed upon to ensure that areas that are not to be disturbed, such as mitigation wetlands in the bottom of a detention pond, are not disturbed by maintenance operations. This checklist item should be completed by the CDOT Design Engineer with input from the Maintenance Representative.

8. *All intergovernmental agreements (IGA) are in place including PWQ CM maintenance responsibilities and all required easements.*

A PWQ CM may be maintained by a Local Agency within CDOT ROW. Colorado Revised Statute 43-2-135 states the Local Agency shall be responsible for maintaining anything beyond the traveled roadway or edge of oil. CDOT Policy 1050 states CDOT has the right to negotiate and retain maintenance responsibilities for those facilities on interstates and freeways. The CDOT Design Engineer shall initiate the PWQ CM maintenance IGA with the Local Agency during the design phase. The CDOT Design Engineer shall obtain written concurrence from the Region Maintenance Superintendent prior to committing CDOT to maintain a PWQ CM. CDOT Procedural Directive 501 states this IGA shall be signed prior to project advertisement. A specific PWQ CM maintenance IGA must be created that includes required MS4 Permit language and that CDOT will back-charge the Local Agency for failure to maintain the PWQ CM. Where PWQ CM maintenance responsibilities are shared between CDOT and a Local Agency, the IGA shall delineate the responsibilities of each entity. If CDOT receives treatment credit for a PWQ CM not located on CDOT ROW but treating runoff from CDOT ROW, an IGA must be executed to ensure the PWQ CM is maintained.

9. *Responsibility for the checklist has been passed from the CDOT Design Engineer to the CDOT Project Engineer concurrent with the RPEM signing Form 128 and prior to advertisement.*

This checklist item is intended to ensure that the checklist transitions from being the responsibility of the CDOT Design Engineer during design to the responsibility of the CDOT Project Engineer for the construction phase of the project. The CDOT Design Engineer should debrief the CDOT Project Engineer on the history of the project including Maintenance Representative input on PWQ CMs.

10. *As-built drawings have been completed and include the following as applicable: WQCV volume, overflow elevations, top of wall elevations, trickle channel and micropool invert elevations, other important rim, invert, and flowline elevations, and inflow and outfall peak flow rates.*

This checklist item is intended to ensure that as-built drawings are completed for all PWQ CMs on a project. The CDOT Project Engineer must ensure as-built drawings are prepared for each PWQ CM in accordance with the requirements of Sections 105.2.4 and 121.2.3 of the CDOT 2014 Construction Manual (revised 2018) or equivalent sections in the most recent version of this document. As-built





information should include all elevations that may be used by maintenance staff to restore a PWQ CM to the design condition, including top of wall for inlet and outlet structures, forebay and micropool inverts, trickle channel inverts, filter material elevations, etc. As-built drawings will be used to revise the O&M Plan so that maintenance staff have an accurate representation of as-built conditions of the CM they will be maintaining. As-built elevations for trickle channel and micropool inverts as well as the surface and invert elevations of any media filter material will be especially important to ensure efficient and productive maintenance operations.

11. *The O&M Plan has been updated based on as-built information including applicable revised top of wall, invert, rim, surface, and flowline elevations of all CM components including, but not limited to; micropool, outlet structure, trickle channel, storm sewers, headwalls, proprietary structures, and filter media.*

This checklist item is intended to ensure that maintenance staff have an accurate representation of the PWQ CM they will be maintaining. The O&M Plan shall be updated by the CDOT Project Engineer (or his construction contractor) in accordance with the requirements of sections 105.2.4 and 121.2.3 of the CDOT 2014 Construction Manual (revised 2018) or equivalent sections in the most recent version of this document. The CDOT Project Engineer will provide the updated O&M Plan with as-built information to the CDOT Region Maintenance Superintendent and the Maintenance Representative.

12. *All temporary BMPs required for construction have been removed, unless approved to remain, including silt fence, inlet protection, and check dams.*

This checklist item is to ensure that all temporary BMPs that should be removed prior to final acceptance are removed so that they do not interfere with maintenance operations and so that the site functions as intended. Mowers can be damaged by passing over hidden sediment control logs. Inlet protection can prevent an inlet from fully functioning. The CDOT Project Engineer is responsible for this checklist item, however, no partial acceptance of the CM is allowed without approval from the Region Planning and Environmental Manager.

13. *Site has been combed for material to be removed in accordance with Section 212 Specifications to minimize mowing hazards. These items have been removed from the site.*

This checklist item is to ensure that all mowing hazards are removed. The CDOT Project Engineer is responsible for this checklist item, however, no partial acceptance of the CM is allowed without approval from the Region Planning and Environmental Manager.

14. *The entire site has been revegetated (or otherwise protected from erosion by riprap, concrete, etc.) to a minimum of 70% of pre-construction density for final closeout.*

If the construction contractor is responsible for post-construction establishment of vegetation, the CDOT Project Engineer, Environmental staff, and Landscape Architect will evaluate the extent of revegetation following the post construction establishment period. If CDOT Maintenance is responsible for revegetation, the same individuals will evaluate the extent of revegetation following the construction phase.

15. *Keys or combinations for all locked gates have been provided.*

The CDOT Project Engineer is responsible for all keys and combinations provided by the construction contractor. Copies of the keys and combinations shall be provided to the Maintenance Representative.

16. *Final walkthrough has been completed.*

This checklist item is to ensure that a final walk through of each PWQ CM has been completed as it would be for the entire project. The CDOT Project Engineer, the Maintenance Representative, a HQ





PWQ Field Manager, and a Local Agency representative (if there is an IGA) must attend the walk through. Additional personnel invited to attend shall include the Landscape Architect, Specialists, Environmental staff, and the Region Water Pollution Control Manager. The CDOT Project Engineer will note at the end of the checklist who attended the final walkthrough, on what date, and with what comments. A final note on whether the comments were addressed should be added with reasons why they were not addressed if that is the case.

17. *All project permits have been closed out or have been transferred to CDOT Maintenance for final closeout.*

Project permits granted prior to or during construction may include CDPS-SCP, NDPEs, Local Agency stormwater permits, and 404 and 401 permits, among others. The CDOT Project Engineer will be responsible for ensuring this checklist item is complete with support from the Maintenance Representative and Environmental staff as requested, as this process can vary among Regions. Whether a CDPS-SCP is closed out or transferred will be in accordance with Policy Memo 27. Policy Memo 27 also states that CDOT Maintenance is not required to accept, and is strongly recommended not to accept, a permit transfer until the site meets all contracted requirements.

18. *SAP functional location number (FLOC) has been assigned by the Permanent Water Quality Field Manager.*

Once construction of the PWQ CM is complete, the final walk through has been performed, and the PWQ CM is deemed acceptable, the Maintenance Representative along with the Permanent Water Quality Field Manager, is responsible for ensuring that an SAP functional location number (FLOC) is assigned. This number is used to keep track of each PWQ CMs location and is used for asset management. If CDOT receives treatment credit for a PWQ CM, it must be assigned a SAP FLOC and included in the PWQ Inventory, even if it is maintained by a Local Agency under an IGA.

19. *Responsibility for the checklist has been passed from the CDOT Project Engineer to CDOT Maintenance concurrent with the updated O&M Plan, as-built drawings, and IGAs being provided to CDOT Maintenance and the Local Agency, if applicable.*

This checklist item is intended to ensure that the checklist transitions from being the responsibility of the CDOT Project Engineer during construction to the responsibility of CDOT Maintenance for the post-construction phase of the project.

20. *All permanent utilities required for long-term operation or maintenance activities (e.g., electricity for pumps, water for irrigation, etc.) and associated billing responsibility have been transferred to the appropriate party. All permanent utilities are show on the plan view of the O&M plan.*

While most PWQ CMs do not require permanent utilities, when they do, this must be acknowledged, and the responsible party assigned to the appropriate account. If permanent utilities are not required, "N/A" may be used for this checklist item. The CDOT Project Engineer and Maintenance Representative are responsible for determining that the permanent utilities payment responsibilities have been transferred from the construction contractor to the appropriate maintaining agency per the PWQ Maintenance IGA. If the responsible party is CDOT then the asset group (e.g., electrical, water, sanitation, etc.), the vendor (e.g., Excel, water district, sanitary district), and the metering rate (e.g., KW/hr, gal/day, flat rate) will be documented in the notes.

21. *PWQ CM attributes have been included in the PWQ Inventory.*

CDOT's MS4 Permit requires that several attributes of each PWQ CM are delineated and recorded. A GIS attribute table has been created within the PWQ Inventory to collect and store this data. The CDOT Project Engineer is responsible for ensuring the required PWQ CM





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attributes are accurately collected and submitted by the construction contractor prior to final acceptance of the contract. The HQ Permanent Water Quality Field Manager is responsible for updating the PWQ Inventory to include the new PWQ CM attributes. The PWQ Inventory is in CDOT's C-Plan GIS system. The HQ PWQ team will use a Survey123 application that is connected to the system to create new PWQ points. The new PWQ point file will then go to SAP where it will be assigned a FLOC. This will all update the C-Plan system. At the final acceptance meeting the HQ PWQ team will ask for the as-builts, O&M Plan, and any associated relevant documents (e.g. IGA, landscape plans, hydraulic reports). This is a permit required step to ensure we get these documents and they match what is built in the field.

22. *A maintenance schedule has been created for PWQ CM based on the O&M Plan.*

This final step is intended to ensure that the new PWQ CM is integrated into the long-term CDOT Maintenance schedule.

