

**Date:** May 1, 2015

**To:** Urban Stormwater Work Group

**From:** Tom Schueler, Work Group Coordinator  
Cecilia Lane, Chesapeake Stormwater Network

**Re:** Updated Frequently Asked Questions (FAQ) for  
Stormwater Retrofits and Urban BMPs Built to State  
Stormwater Performance Standards

This FAQ document focuses on the retrofit and performance standards expert panel reports that were approved by the Chesapeake Bay Partnership in the Fall of 2012. This FAQ document was originally approved by the USWG, WTWG and WQGIT in the Fall of 2013, with the expectation that the USWG may add more questions in the future. The document is being updated to respond to state requests.

## ***FREQUENTLY ASKED QUESTIONS***

### ***Questions About the Adjustor Curves***

**Q1:** When will the curves be updated in CAST/MAST/VAST and Scenario Builder?  
*Olivia in Annapolis*

**A:** The CBPO modeling team has finished integrating the curves into its BMP planning tools (CAST et al) and its BMP reporting tool (i.e., Scenario Builder).

**Q2:** Which curve do I use if my project uses a mix of ST and RR practices?  
*Joe from Harrisburg*

**A:** Unless your state stormwater contact indicates otherwise, just go ahead and use the curve for the type of practice (ST or RR) that comprise the majority of the runoff capture volume for the project site as a whole.

**Q3:** I have a hard time reading the curves...can you provide us the actual equations for the curves so we can plug them into a spreadsheet to calculate the removal rates? *Jason from Arlington*

**A:** Yes, you can use the following polynomial equations, and enter the number of inches treated per impervious acre (X) by your retrofit or stormwater practice to get the percent removal for each of the three pollutants. The original expert panel report provided logarithmic curves, but the USWG decided in January 2015 that the polynomial curves should better portray the removal rate data. At that time, the logarithmic curves were replaced in the expert panel reports with the polynomial equations as shown below:

## Frequently Asked Questions About Retrofits and Urban BMPs

|            |    |  |
|------------|----|--|
| <b>TP</b>  | RR | $y = 0.0304x^5 - 0.2619x^4 + 0.9161x^3 - 1.6837x^2 + 1.7072x - 0.0091$ |
|            | ST | $y = 0.0239x^5 - 0.2058x^4 + 0.7198x^3 - 1.3229x^2 + 1.3414x - 0.0072$ |
| <b>TN</b>  | RR | $y = 0.0308x^5 - 0.2562x^4 + 0.8634x^3 - 1.5285x^2 + 1.501x - 0.013$   |
|            | ST | $y = 0.0152x^5 - 0.131x^4 + 0.4581x^3 - 0.8418x^2 + 0.8536x - 0.0046$  |
| <b>TSS</b> | RR | $y = 0.0326x^5 - 0.2806x^4 + 0.9816x^3 - 1.8039x^2 + 1.8292x - 0.0098$ |
|            | ST | $y = 0.0304x^5 - 0.2619x^4 + 0.9161x^3 - 1.6837x^2 + 1.7072x - 0.0091$ |

**Q4:** Can you show me the technical basis for how the adjustor curves were derived?  
*Bill from Richmond*

**A:** The expert panels reviewed a wide range of performance studies to define the runoff reduction and pollutant concentrations changes associated with groups of common stormwater practices. In addition, they crafted a technical appendix that outlines how the performance data was used to derive the curves. See Appendix A/B (retrofit report) or Appendix B/C (performance standards report).

**Q5:** I am using a treatment train of multiple structural and non-structural practices on my project site...do I need to use the curves for each one? *Josh from DC*

**A:** No, you only need to determine the depth of runoff treated per impervious acre for the site as a whole by all of your practices and compute a single removal rate for each pollutant. If your site has a mix of ST and RR practices, see answer to question 2

### ***Questions about Stormwater Practice Classification***

**Q6:** What do I do if I am using a practice in my state design manual that is not contained in the ST/RR Classification Table ? (Table 4 in the performance standards report and Table 2 in the retrofit report) *Scott in Williamsburg*

**A:** The panel tried to ensure that all of BMPs referenced in the seven different state BMP stormwater design manuals were classified as being ST or RR, but a few may have been missed. Check with your state stormwater contact to see how they classify practices not included in the classification table from either memo.

**Q7:** How come dry ponds and dry extended detention ponds are not included in the RR/ST classification table ? *Steve from Baltimore County*

**A:** Both expert panels concluded these two practices had such limited pollutant removal capability that they could not be reliably used for either curve. Most Bay states are discouraging or prohibiting them for new development projects. If your project relies on either practice, used the original CBP-approved lower rate for these practices contained in Table A-5 (retrofit report) or Table B-5 (performance standards report). These older practices are often good candidates for retrofit conversion.

## Frequently Asked Questions About Retrofits and Urban BMPs

**Q8:** I heard that regenerative stormwater conveyance projects may be considered as a retrofit or a new stormwater practice, but I can't find them in the BMP classification table...what gives? *Joe from Baltimore*

**A:** The stream restoration panel decided, and the other panels concurred, that dry-channel regenerative stormwater conveyance projects could be treated as an upland BMP to treat runoff from new development projects or as a new retrofit to treat existing development. In both cases, the removal rate is determined by using the RR curve for the depth of runoff treated per impervious acre.

**Q9:** How would I deal with an innovative stormwater practice that is not contained in my state design manual and/or the BMP classification table, like a floating treatment wetland? *David from Hampton Roads*

**A:** In general, pollutant removal protocols for innovative stormwater practices will be developed by future expert panels, based on the priority assigned by the Urban Stormwater Workgroup. An expert panel on floating treatment wetlands is expected to make recommendations during 2015.

In general, it the policy of the work group not to review proprietary practices, unless they can be classified within a broader treatment class. If your state has approved a proprietary practice, check with your state stormwater contact to see if or how it would be credited as a RR or ST practice.

**Q10:** How do I deal with my historic BMPs that were reported under the old CBP removal rates? *Matt from College Park*

**A:** When dealing with older BMPs that were reported using the unit removal rates contained in Table A-5 (retrofit report) or Table B-5 (performance standards report), localities have two options:

1. Keep the rates and then inspect and verify the BMP in the next permit cycle, or
2. Re-compute the removal rates using the adjustor curves and substitute the new rates for the old rates for each individual stormwater practice, based on its current capacity and drainage area.

**Q11:** What is meant by a non-conforming project and how do I compute removal rates for them? *Ben from Binghamton*

**A:** Non-conforming projects include new development or redevelopment projects installed after 2011 that are:

- Designed under old state stormwater performance standards due to grandfathering provisions, gradual rollout of new standards, waivers or delayed local adoption of stormwater ordinances or review procedures, or
- Designed under the new state stormwater standards, but only partially meet them due to site constraints, waivers, exemptions, etc. AND are not mitigated by

## Frequently Asked Questions About Retrofits and Urban BMPs an acceptable stormwater offset

If a development project is served by a single BMP that can be classified under an existing CBP-approved BMP category, then use the appropriate existing removal rate.

If the project is served by multiple BMPs, determine the runoff treatment volume per impervious acre and whether the BMPs achieve RR or ST, and enter the appropriate removal rate from the curves.

### ***Questions about BMP Reporting and Tracking***

**Q12:** What is the process for reporting BMP data to the state and what happens to it after that? *Randy from Dover*

**A:** Localities report their BMP implementation each year in their annual MS4 permit report submitted to their state stormwater NPDES agency, in a format approved by the state. The state then enters the BMP data into NEIEN which is used as a geographic data hub, which in turn sends it to Scenario Builder to calculate the load generated by the development project for the river basin segment in which the BMP resides and then computes the load reduction based on the appropriate curves for the type of practice it is. The output from Scenario Builder is then used as a direct input to the Chesapeake Bay watershed model, as shown below:

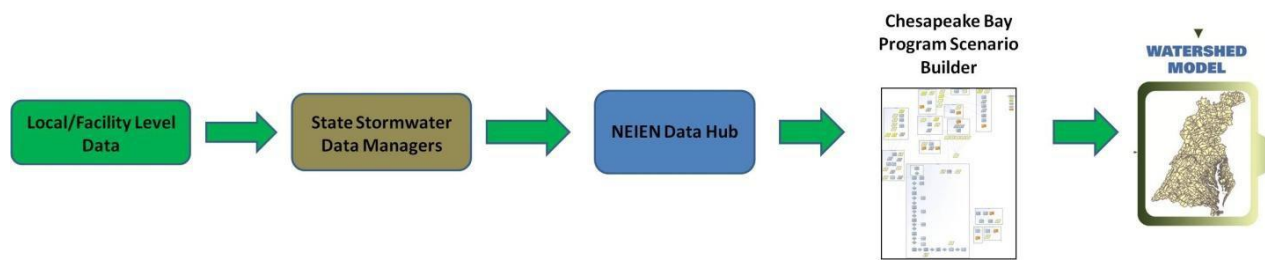


Figure 1. State Stormwater Data Flow Chart (M. Johnston, CBPO, 2013).

Most states will then let their MS4 know how much aggregate load reduction they have achieved from urban BMP projects during that reporting period. Of course, localities can make their own "un-official" load reduction calculations as well, but the decision was made to have states compute the "official" load reductions for the purposes of efficiency and quality control.

**Q13:** I am not subject to a MS4 permit, so who do I send BMP data to? *Willy, from Shakers Township*

**A:** Check with your state stormwater contact and/or data manager.

**Q14:** Who are they? *Willy, again*

**A:** See Table 1 for a current list of these individuals in your state

## Frequently Asked Questions About Retrofits and Urban BMPs

| <b>Table 1. Bay State Stormwater Contacts</b> |                           |  |                     |  |
|---|---------------------------|--|---------------------|--|
| <b>State</b>                                  | <b>Stormwater Contact</b> | <b>Email</b>   | <b>Data Manager</b> | <b>Email</b>   |
| <b>DC</b>                                     | Jeff Seltzer              | <a href="mailto:jeffrey.seltzer@dc.gov">jeffrey.seltzer@dc.gov</a>                   | Steve Saari         | <a href="mailto:steve.saari@dc.gov">steve.saari@dc.gov</a>                             |
| <b>DE</b>                                     | Randy Greer               | <a href="mailto:Randell.Greer@state.de.us">Randell.Greer@state.de.us</a>             | Marcia Fox          | <a href="mailto:Marcia.Fox@state.de.us">Marcia.Fox@state.de.us</a>                     |
| <b>MD</b>                                     | Ray Bahr                  | <a href="mailto:rbahr@mde.state.md.us">rbahr@mde.state.md.us</a>                     | Greg Sandi          | <a href="mailto:gsandi@mde.state.md.us">gsandi@mde.state.md.us</a>                     |
| <b>NY</b>                                     | Robert Capowski           | <a href="mailto:rncapows@gw.dec.state.ny.us">rncapows@gw.dec.state.ny.us</a>         | Ben Sears           | <a href="mailto:brsears@gw.dec.state.ny.us">brsears@gw.dec.state.ny.us</a>             |
| <b>PA</b>                                     | Ken Murin                 | <a href="mailto:kmurin@state.pa.us">kmurin@state.pa.us</a>                           | Ted Tessler         | <a href="mailto:thtesler@state.pa.us">thtesler@state.pa.us</a>                         |
| <b>VA</b>                                     | Ginny Snead               | <a href="mailto:Virginia.Snead@dcr.virginia.gov">Virginia.Snead@dcr.virginia.gov</a> | Bill Keeling        | <a href="mailto:william.keeling@dcr.virginia.gov">william.keeling@dcr.virginia.gov</a> |
| <b>WV</b>                                     | Sherry Wilkin             | <a href="mailto:Sherry.L.Wilkins@wv.gov">Sherry.L.Wilkins@wv.gov</a>                 | Sebastian Donner    | <a href="mailto:Sebastian.Donner@wv.gov">Sebastian.Donner@wv.gov</a>                   |

**Q15:** What urban BMP information do I need to report to get my reduction credit?  
*Matt from Fairfax County*

**A:** Check with your state stormwater contacts to find the exact data and units to report and the format or reporting tool to use. A summary of recommended reporting requirements for new development, redevelopment and non-conforming projects are shown in the flow charts below. Similar flow charts indicate the data to report for the various classes of stormwater retrofits.

**Q16:** Do I have to keep records about BMPs after reporting them to the state? If so, for how long? *Sebastian from Romney*

**A:** Records must be maintained and kept up to date throughout the lifetime of the BMP. While regulations vary by state, it is usually the local authority that maintains these records. If you are a MS4 the record keeping requirements are specified in your permit. Check with your state stormwater data manager (Table 1) if you have questions.

**Q17:** Is there specific software I should use for tracking and reporting BMPs?

**A:** Check with your state stormwater data manager. You will most likely need some form of GIS software. Compatibility with your state database is strongly encouraged and may be required in some states.

## Frequently Asked Questions About Retrofits and Urban BMPs

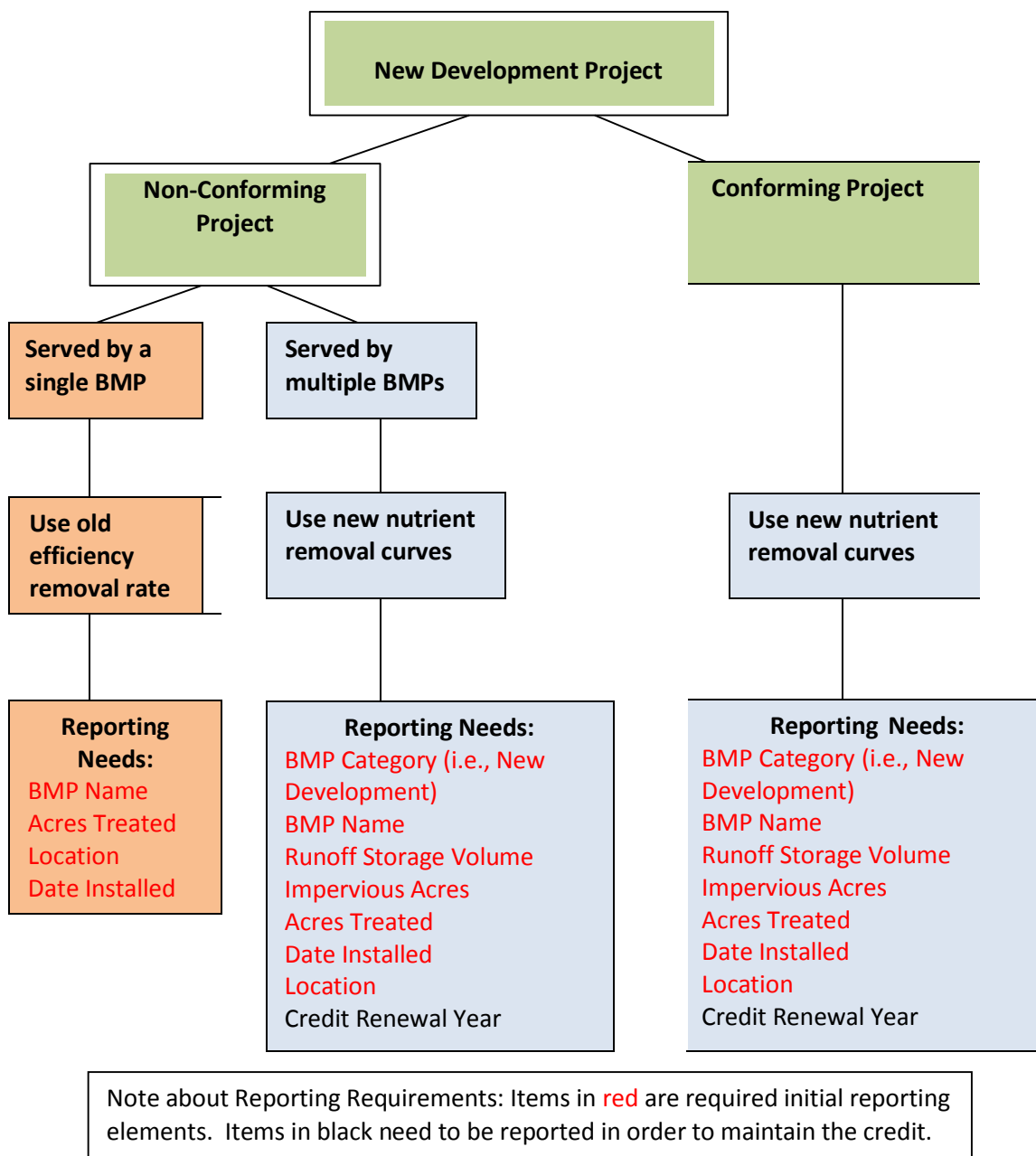


Figure 2. Flow Chart of Reporting Requirements for Conforming and Nonconforming New Development Projects (M. Johnston, CBPO, 2013).

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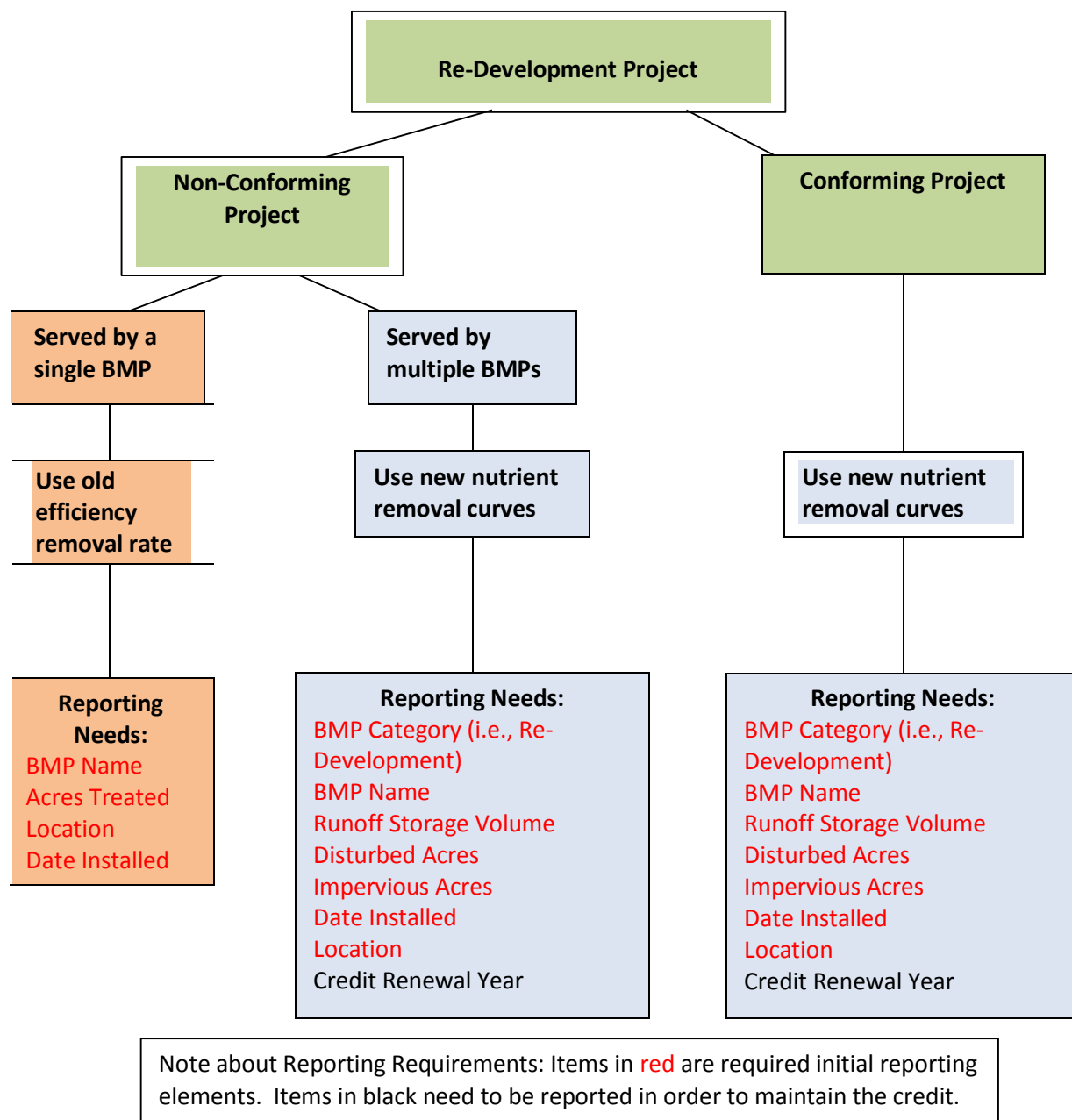


Figure 3. Flow Chart of Reporting Requirements for Conforming and Nonconforming Redevelopment Projects (M. Johnston, CBPO, 2013).

## Frequently Asked Questions About Retrofits and Urban BMPs

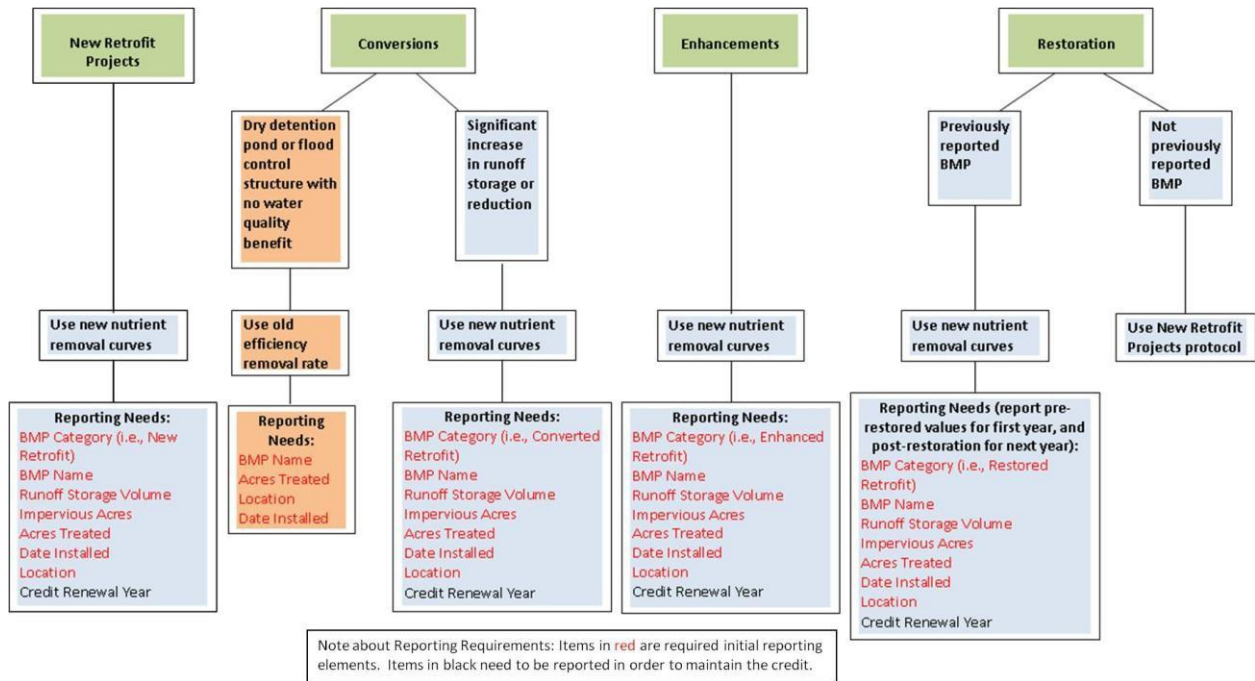


Figure 4. Flow Chart of Reporting Requirements for Retrofit Projects (M. Johnston, CBPO, 2013).

**Q18:** What happens if I don't provide all the BMP information required by the state stormwater reporting agency? *Norm in Falls Church*

**A:** You won't get any credit toward your wasteload or load allocation in the TMDL.

**Q19:** What if the modeling tools do not have available land area that can be treated by my practice? *Matt from Annapolis*

**A:** The modeling tools will always attempt to credit new practices where possible. If less *impervious* urban acres are available for treatment than are reported as treated by your practice, the tools will apply the treatment to other urban acres. If less *urban* acres are available for treatment than are reported as treated by your practice, the tools will treat as many acres as possible with your practice. This would only apply in a situation where ALL urban acres are already considered to be treated by practices.

**Q20:** Could Scenario Builder credit newer practices first, so that older practices would be in excess of domain, if excess exists? *Jeff from Edgewater*

**A:** Scenario Builder will credit the new Stormwater Performance Standards and Retrofit practices before other stormwater BMPs. These BMPs do not currently exist in the historic record, so there is a very low likelihood that these new BMPs would exceed the domain in any area.



***Questions on Urban BMP verification***

**Q21:** How long are the removal rates good for? *Sherry from Sheperdstown*

**A:** The maximum duration for the removal rate will be 10 years and can be renewed based on a field performance verification. The one exception is for on-site retrofits which have a credit duration of 5 years

**Q22:** How long will the practices receive credit in the modeling tools and when will the verification inspections due? *Matt from Annapolis*

**A:** Beginning June 30, 2013, all new and retrofitted practices will receive 10 years of credit in the modeling tools. This means that jurisdictions will need to submit verification inspections prior to June 30, 2023 to receive additional years of credit.

**Q23:** What constitutes a field performance inspection? *Ken from Lancaster*

**A:** Each Bay state will develop protocols for field verification in 2015 that will generally adhere to the principles outlined in the CBP BMP Verification Framework that was adopted in 2014. These involve a field inspection of each practice to confirm that it still exists, is working properly, and is functioning as originally designed.

**Q24:** When will the field visual indicators be developed to assess whether an urban BMP is still performing so that the reduction credit can be renewed? *Bill from Baltimore*

**A:** Good question, Bill

***Specific Questions on the Performance Standards Report***

**Q25:** Can a locality report an Engineering Parameter that is above and beyond the requirements of the respective state? *Mary from St Mary's*

**A:** The curves allow greater pollutant removal rates for projects that treat runoff greater than the state standard.

**Q26:** Does the CBP method supersede my state's stormwater calculations? *Lee Anne from LaPlata*

**A:** No, several of the Bay states require slightly different site-based spreadsheet pollutant load calculations as part of the development review and will continue to do so.

## Frequently Asked Questions About Retrofits and Urban BMPs

**Q27:** What about impervious cover runoff that is treated under older, less stringent stormwater regulations but that doesn't meet current regulations? *Henry from Henrico*

**A:** Stormwater practices that are constructed to treat untreated impervious cover are considered retrofits and users can determine pollutant removal efficiencies for such practices from the retrofit expert panel recommendations.

**Q28:** My state design manual provides for different levels of runoff reduction and pollutant removal for meeting basic and enhanced BMP design standards, how do I account for this with the BMP protocols ? *Sarah from Scranton*

**A:** Should not be a problem in most states. Simply enter the BMP data into your states compliance spreadsheet, and enter the engineering parameter data into the curves. Enhanced BMP designs treat or reduce more runoff than basic designs, and are likely to earn greater pollutant reduction credits.

**Q29:** What happens if my redevelopment site is currently served by an existing BMP? *Elena from Edgewater*

**A:** Unless it was previously reported to the state for credit in the model, you don't have to account for it (the removal rates for older practices are very low). If it was reported, you may still get incremental credit for your new BMP as a retrofit.

### ***Specific Questions for Stormwater Retrofits***

**Q30:** Is a methodology being developed to determine credits for retrofits relative to the existing practice in-place? *Albert from Tidewater*

**A:** Retrofits of existing BMP facilities (conversion, enhancement or restoration) take into account the removal rate of the existing facility and the pollutant removal is reported as an incremental removal rate. If the original BMP was previously reported by the state for credit in the Chesapeake Bay Watershed Model, then the locality must indicate that the removal rate for the existing BMP must be removed from the state input deck and be replaced by an interim rate for one year, which is the new removal rate determined by the curves.

The higher rate would then be reported in the succeeding year, and the interim rate removed. However, practices that were never reported for credit in the Watershed Model are considered "new retrofit facilities" the removal rates of which are determined by the curves.

## Frequently Asked Questions About Retrofits and Urban BMPs

**Q31:** What about when a locality is “enhancing or converting” a dry pond or a dry extended detention pond? *Louisa from Hagerstown*

**A:** Dry ponds and dry extended detention ponds are not considered either RR or ST practices. To determine their original removal rates, users should refer to Table A-5 (Approved CBP BMP Efficiency Rates) in the Retrofit Memo.

**Q32:** What determines the difference between an enhancement and conversion? *Ed from Elkton*

**A:** A BMP conversion involves a change in stormwater treatment mechanism of at least 50% of the final water quality volume for the retrofit project. BMP enhancement projects utilize the same basic stormwater treatment mechanism as was originally installed, although they may add more treatment volume, increase hydraulic residence time, or add other treatment mechanisms (e.g., micro-pools, forebays and wetland elements that collectively comprise less than 50% of the total water quality treatment volume).

**Q33:** What if I try to submit a retrofit practice, but there are not enough acres under the original practice in my jurisdiction’s historical record in Scenario Builder? *Jeremy from Annapolis*

**A:** You will still receive credit for ALL acres submitted as a retrofit. Retrofitted acres on existing practices will result in removing the existing practice from the database for future years. Example: The historical record says there are 5 acres treated by a wet pond in your county, but you submit 10 acres treated by a retrofit. 5 Acres will be removed from historical record, and you will receive 10 acres of credit for each future year.

**Q-34:** I am retrofitting a BMP that was not previously reported to the Chesapeake Bay Program (CBP) and was built before 2006, which is the final year of the CBP Watershed Model calibration period. Can it still be considered a new retrofit and receive full removal rate credit based on its total treatment volume? *Katherine from DC*

**A:** **No, the** project can only be considered an existing retrofit (BMP conversion, enhancement or restoration) and receive the incremental removal credit (the higher retrofit rate less the original removal rate). This is done by using the appropriate protocol outlined on pages 17 and 18 of the expert panel report.

The main reason is that CBP can only give credit for the impact of additional actions that were implemented after the end of the Watershed Model calibration period. That is because it is credited either implicitly or explicitly in the CBP Watershed Model as part of the calibration process, regardless of whether a BMP was reported to CBP. This issue was not addressed by the original expert panel, but the CBP Modeling Workgroup has issued guidelines that apply to other expert panels that ensure that they are modeling in a consistent way that best measures real changes on the ground that have occurred since the model calibration period. The calibration period for the current watershed model (Phase 5.3.2)

**Q-35:** Is it possible to receive credit for retrofitting a water body that was not originally designed for stormwater quality treatment, such as a farm pond, a PL-566 reservoir or a flood control facility, that was not previously reported to the state? *Randy from Richmond.*

**A:** **Yes**, but under some fairly stringent conditions. The removal rate would be calculated using the incremental difference between the original removal rate and the higher removal rate caused by conversion, enhancement or restoration of the facility that occurs after 2005 (See Q-34). In addition, both the treatment volume and drainage area of the original facility and its retrofit will need to be substantiated to quantify the change in removal rate due to the post 2005 retrofit.

### ***Miscellaneous Questions***

**Q36:** Are the pollutant removal curves applicable to other regions of the US? *Barry from LA*

**A:** Not without some adaptation to reflect local rainfall frequency spectrum. The Bay curves are based on a rainfall frequency analysis done with precipitation data from Reagan National Airport in Virginia. The curves could be applicable to other regions of the USA as long as the precipitation analysis described in the report appendices is updated with local data.

**Q37:** Do these removal efficiencies apply to other pollutants as well? *Frances from Farmingham*

**A:** The urban BMPs were evaluated for their ability to remove Total Phosphorus, Total Nitrogen and Total Suspended Solids only in order to meet the Chesapeake Bay TMDL. Limited data is available for other pollutants such as bacteria or trace metals, and the Bay curves should not be used for this purpose.

### ***State-Specific Questions***

#### ***Maryland***

**Q38:** The CBP Adjustor Curves are based on inches treated per impervious acre. My state requires that I use environmental site design and green infrastructure to reduce the runoff from 2.7 inches of rainfall to “forested” conditions. However, converting to “inches per impervious acre” does not always reflect the results of runoff reduction requirements (e.g., zero discharge). How should I use the curves for reporting runoff reduction requirements? *Stew from Baltimore*

**A:** The panel is aware that using “inches per impervious acre” may not reflect the runoff reduction requirements found in some states. Check with your state stormwater contact (Table 1) for the appropriate values that should be used with the Adjustor Curves to better report pollutant removal rates associated with runoff reduction.

## Frequently Asked Questions About Retrofits and Urban BMPs

**Q39:** The CBP is requiring that engineering design components be reported in feet per acre. However, my state uses inches of rainfall (e.g., 1.6", 2.5") as the parameter for assessing compliance with state stormwater management requirements. I understand that other states are submitting results in inches. Will this be acceptable for my state as well? *Ray from Catonsville*

**A:** The CBP allows each state to report engineering design components in either feet per acre or inches of rainfall depending on which design component reflects their stormwater management program requirements.