TECHNICAL MEMORANDUM #11

TO: Applicants and Designers for State and Federal Projects

FROM: Sediment and Stormwater Plan Review Division, Water and Science Administration

DATE: July 17, 2018

SUBJECT: Stormwater Management Spreadsheets – Instructions and Definitions of Terms

The Sediment and Stormwater Plan Review Division has developed computational spreadsheets for State and federal applicants and their designers to calculate a project's stormwater management requirements. These spreadsheets follow the process presented in *Technical Memorandum #10 Stormwater Management Overview*. The purpose of the spreadsheets is to reduce the time and money spent by both designers and reviewers assessing a project's requirements and to "get everyone on the same page." Every attempt was made to simplify the process while adhering to regulatory requirements. Unfortunately, the very issues that have given cause for question and resulted in varying interpretations of the stormwater regulations have also produced multifaceted computations, which upon first glance, may appear overly complicated. Please understand that many of the nuances addressed by the spreadsheets will not apply to the majority of projects and are easily skipped over, but the steps and computations are built-in regardless, for use with the complicated projects – the ones with dozens of points of investigation, shifts in drainage areas, existing management, loss of existing water quality, partial waivers, etc.

All projects, except those exclusively eligible for a waiver in accordance with Section 3.3.A of the Guidelines, will be required to use these spreadsheets. Projects that are exclusively MS4 restoration only need to use the Provided Treatment Summary. Projects that are exclusively demolition only need to use the Water Quality Summary Sheet. **There will be a three month grandfathering period for this requirement from issuance of this memorandum.** Electronic copies of the spreadsheets are available on MDE's website at http://mde.maryland.gov/programs/water/StormwaterManagementProgram/Pages/PlanReviewforStateandFederalProjects.aspx

Instructions and definitions of terms are provided herein for four spreadsheets:

For reference,

BMP is best management practice.
ESD is environmental site design.
ESDv is ESD volume.
IART is impervious area requiring treatment.
LOD is limit of disturbance.
POI is point of investigation/ LOI is line of investigation.
SWM is stormwater management.

I. SWM Calculator – Instructions and Definitions of Terms

The SWM Calculator is to be completed for each point of investigation (POI), line of investigation, or sub-drainage area identified in the SWM report (i.e. one spreadsheet per POI/LOI). Print outs should be included in the concept design report and then updated for the final design report.

This spreadsheet was made compatible for Microsoft Excel 97-2003 and newer. It was created in Microsoft Excel 2016 and tested in multiple versions. It utilizes macros to eliminate the need for repetitive calculations and formatting by the user. When opening the file, a message will appear below the tool bar that reads "**Security Warning** Macros have been disabled. Options…" Click on "Options" and then "Enable this content."

The SWM Calculator has two sheets: the Development Category Sheet and the ESDv Sheet. The development category needs to be determined first. Depending on level of existing imperviousness, the point of investigation will be categorized as either "redevelopment" or "new development". This classification affects the level of management required for reconstruction activities and decides which set of calculations will be used by the ESDv Sheet to determine the stormwater management requirements. It is important to note that a both sheets need to be completed for each POI and that care be taken not to skip the Development Category Sheet.

A. Development Category Sheet (establishes development classification)

1. The turquoise cells in the Development Category Sheet serve as a user guide by providing instructions and defining terms used within the sheet. These cells, along with the "Clear Input Cells" and "Re/New Development ESDv" button, will not print. The yellow cells are input cells to be completed by the designer. To clear all input cells, click the "Clear Input Cells" button.
2. "Project Description", "Point of Investigation", "Job #", "Contract #", "Date", and "Designed by" are to be completed by the designer.
3. "MDE #" will be assigned by the MDE reviewer. After the initial submittal this number should be typed in by the designer following the 00-SF-0000 format.
4. "Reviewed by" is written in by the MDE reviewer.
5. The entries for "Project Description", "Point of Investigation", "Job #", "Contract #", "Date", "Designed by", "MDE #", and "Reviewed by" will automatically carry over to the ESDv sheet.
6. "County" is chosen from the drop down provided. This data is for informational purpose and does not affect calculations.
7. "**SWM Study Area, A_s**" is the boundary area for determining the development classification. It typically corresponds to the LOD draining to the point of investigation under existing conditions but could also be the property area, the site area, or the right-of-way. Refer to Technical Memorandum #10 for a detailed discussion on the SWM Study Area.
8. "**Existing Impervious Surface Area, A_{EXi}**" is the pre-development impervious area within the corresponding SWM Study Area.
9. "**Percent Existing Imperviousness, %I**" is calculated by the spreadsheet. This percentage is used to asses on which side of the 40% threshold the POI falls. If I>40%, then the reconstructed areas are considered "redevelopment." If I≤40%, then the reconstructed areas are considered "new development" and need to be managed accordingly. "Development Classification for Reconstruction" will auto populate based on the %I, and the reconstruction will be classified as either "re-development" or "new development." *Record this value in*

Column D of the Water Quality Summary Sheet (WQSS).

10. Once data is input on this sheet, proceed to the ESDv Sheet by clicking the purple "Re/New Development ESD_v" button located on the right. Make sure that the development classification is determined before clicking the button. The spreadsheet will then navigate to the calculations for the respective development category. If revisions are made to the Development Category Sheet after the ESDv Sheet has been completed, steps 1-10 of the ESDv Sheet will update accordingly. It is possible to toggle between sheets without losing the input.

B. **ESDv Sheet (calculates the IART and the ESDv requirements for the POI)**
The entries for "Project Description", "Point of Investigation", "Job #", "Contract #", "Date", "Designed by", "MDE #", and "Reviewed by" will automatically carry over to the ESDv sheet.

The yellow cells are input cells to be completed by the designer. To clear all input cells, click the "Clear Input Cells" button on the Development Category Sheet. Calculations that do not apply for the respective development category are made inactive, struck through, or printed with a result of 0. All Steps within this tab will print.

Step 1 – Site/ Drainage Area Data. The user inputs the data as follows:

- **Existing Condition Drainage Area - A_E**: the area that comprises the total drainage area to the POI in pre-development conditions. This data is for informational purposes and does not affect calculations.
- **Proposed Condition Drainage Area - A_P**: the area that comprises the total drainage area to the POI in post-development conditions. This data is for informational purposes and does not affect calculations.
- **Existing Impervious Area within LOD - A_{Ei}**: the pre-development impervious area within the LOD within the existing drainage area to the POI. This includes all pavement and roof-top including maintenance and access areas in A_{Mi}. *Record this value in Column B of the WQSS.*
- **Proposed Impervious Area within LOD - A_{Pi}**: the post-development impervious area within the LOD within the proposed drainage area to the POI. This includes all pavement and roof-top including maintenance and access areas in A_{Mi}. Alternative surfaces should be included in this value. They will also need to be listed as treatment practices. This way they can be tracked. *Record this value in Column C of the WQSS.*
  Note: A_{Ei} is based on the existing drainage area, and A_{Pi} is based on the proposed drainage area. This will allow a correct assessment of management requirements should the drainage area divide shift from existing to proposed conditions. However, if the drainage area shift involves impervious area outside the LOD, it needs to be accounted for in A_{SHIFT} below.
- **Area for which WQ is Not Required (i.e. 3.3.A Waiver) - A_{Mi}**: any impervious surface within the LOD for which management is not required. This includes existing impervious areas that are considered maintenance or that qualify for a 3.3.A waiver. It may also include impervious surfaces shown within the LOD that are part of the work area but are being left intact or are generally not considered to be a disturbance. Examples of this include milling/resurfacing areas as well as taxiways, roads, or parking lots being traversed for access or used for staging. Any area included in this

column must also be included in A_{Ei} and A_{Pi}. *Record this value in Column E of the WQSS.*

- **Loss of Existing Water Quality (Area) - A_{Li}:** the existing impervious area that is losing water quality benefits due to the removal of an existing water quality BMP or other water quality feature, such as an alternative surface or non-structural practice, previously approved by MDE or due to the removal of an existing pond with water quality features as described in Chapter 5 of the 2000 Maryland Stormwater Design Manual. Lost water quality must be re-cooped. Therefore, this deficit is added to the IART. *Record this value in Column F of the WQSS.*
  Notes:
  (1) If the treated P_E is less than 1.0 inch, this value must be pro-rated to reflect the effective treatment area. For example, a BMP that treats 0.5 acres of impervious for a P_E of 0.7 inch has an effective impervious treatment area of 0.35 acre.
  (2) If previously treated impervious area is removed along with the water quality feature, the result is considered a "wash". If previously treated impervious area is removed, but the water quality feature or BMP is not physically being removed, the result is also considered a "wash" because the treatment is effectively lost since there is no impervious area to be treated. These equivalent scenarios can be reflected by recording the impervious area that was previously treated and is now being removed in both A_{Li} and A_{RECi}
- **Loss of Existing ESD_v (Volume) - $ESD_{V\ Loss}$**: the ESD volume lost due to the removal of an existing water quality BMP, alternative surface, or non-structural practice previously approved by MDE or the removal of a pond that provides water quality features as described in Chapter 5 of the 2000 Maryland Stormwater Design Manual. If the previously treated impervious area is removed along with the water quality feature, there is no loss of existing ESDv. The designer needs to provide separate computations supporting this volume.
- **Loss of Existing Recharge (Volume) - $Re_{v\ Loss}$**: the recharge volume lost due to the removal of an existing water quality BMP, alternative surface, or non-structural practice previously approved by MDE or the removal of a pond that provides water quality features as described in Chapter 5 of the 2000 Maryland Stormwater Design Manual. If the previously treated impervious area is removed along with the water quality feature, there is no loss of existing Re_v. The designer needs to provide separate computations supporting this volume.
- **Reconstructed Impervious Area Already Treated (Area) - A_{RECi}:** the existing impervious area within the LOD that in existing conditions drains to a functioning water quality practice. A value in this box indicates that the treatment practice will remain operative and will continue to treat the specified amount impervious area after the area has been reconstructed. The entered value reflects the full treated acreage without any adjustments for redevelopment. The IART is reduced by either 50% or 100% of this value depending on whether the development is classified as redevelopment or new development. *Record this value in Column G of the WQSS.*
  Notes:
  (1) If previously treated impervious areas are being removed, those areas need to be included in A_{RECi} as well A_{Li}.
  (2) If the treated P_E is less than 1.0 inch, this value must be pro-rated to reflect the effective treatment area. For example, a BMP that treats 0.5 acres of impervious for a P_E of 0.7 inch has an effective impervious treatment area of 0.35 acre.

(3) There is a potential for overlapping areas in $\mathbf{A_{Mi}}$ and $\mathbf{A_{RECi}}$. If maintenance or utility work is being performed on an existing impervious surface that already has water quality treatment, include this area only in $\mathbf{A_{Mi}}$.

- **Existing Impervious Area outside of LOD Shifted in/out of POI - $\mathbf{A_{SHIFT}}$**: the impervious area outside of the LOD that is shifted into or out of the POI from existing to proposed conditions. This can occur when a storm drain system that collects runoff from outside the LOD is modified as a result of the proposed project. A positive number indicates impervious area shifted into the POI from existing to proposed conditions, and a negative number indicates impervious area shifted out of the POI from existing to proposed conditions.
- **Will POI Qualify for Cp_v Waiver under Section 3.3.B of the Guidelines? - Cp_{vw}**: This is a YES/NO input. It is set to a default value of "NO" and requires user input to change the field if the POI qualifies for a 3.3.B waiver. ESD volume requirements are reduced to a P_E of 1.0 inch when the POI qualifies for a 3.3.B waiver. "YES" should also be selected if a variance from Cpv has been requested and granted by MDE. For POIs that are classified as redevelopment and have $\Delta A_i \leq 0$, this box is irrelevant.

Step 2 – Determine the Impervious Area Requiring Treatment (IART):

This step calculates the IART based on the development classification and the input from Step 1. Many projects involve a combination of redevelopment and new development. The portion of IART that comes from redevelopment and the portion that comes from new development are calculated and then totaled.

IART from Redevelopment ($IART_{RE\text{-}DEV'L}$):

When the POI is classified as redevelopment, $IART_{RE\text{-}DEV'L}$ is calculated based on the equation shown and the input from Step 1.
When the POI is classified as new development, $IART_{RE\text{-}DEV'L}$ will be inactive and set to a value of zero.
Record this value in Column 1 of the ESDSS. This value should match Column I of the WQSS.

IART from New Development ($IART_{NEW}$):

When the POI is classified as redevelopment, $IART_{NEW}$ is calculated based on the equation shown and the input from Step 1.
When the POI is classified as new development, $IART_{NEW}$ is calculated based on the equation shown and the input from Step 1.
Record this value in Column 3 of the ESDSS. This value should match Column J of the WQSS.

Total IART:

The total IART is the sum of $IART_{RE\text{-}DEV'L}$ and $IART_{NEW}$ and A_{Li}.
This value should match Column K of the WQSS.

Steps 3 through 8 calculate the required ESDv. There is an ESDv requirement for the project and an ESDv requirement for the POI. The ESDv for the project is calculated by the ESDSS based the SWM Calculator's step-by-step breakdown of each POI. The required ESDv for the project is the sum of the ESDv from redevelopment and the ESDv from new development with adjustments made as necessary for 3.3.B waivers, shifts in drainage areas, and loss of existing water quality.

When the **reconstruction** is classified as **redevelopment (Redevelopment POI**) and there is a **decrease in impervious area (ΔAi<0)**, the computational structure is as follows:

PROJECT ESD_V	=	$ESD_{VRE\text{-}DEV'L}$ based on $IART_{RE\text{-}DEV'l}$ and P_E=1.0 in **(step 3)**	+	ESD_{VNEW} based on $IART_{NEW}$ and P_E=1.0 in *negative number **(step 4)**	+	ESDv for impervious area shifted into/out of POI from outside the LOD **(step 6)**	+	ESDv from loss of existing water quality **(step 7)**

When the **reconstruction** is classified as **redevelopment (Redevelopment POI)** and there is an **increase in impervious area (ΔAi≥0)**, the computational structure is as follows:

PROJECT ESD_V	=	$ESD_{VRE\text{-}DEV'L}$ based on $IART_{RE\text{-}DEV'l}$ and P_E=1.0 in **(step 3)**	+	ESD_{VNEW} based on $IART_{NEW}$ and P_E=2.0 to 2.6 in or in case of 3.3.B waiver P_E=1.0 in **(step 5)**	+	ESDv for impervious area shifted into/out of POI from outside the LOD **(step 6)**	+	ESDv from loss of existing water quality **(step 7)**

When the **reconstruction** is classified as **new development (New Development POI),** the computational structure is as follows:

PROJECT ESD_V	=	ESD_{VNEW} based on $IART_{NEW}$ and P_E=2.0 to 2.6 in or in case of 3.3.B waiver P_E=1.0 in **(step 5)**	+	ESDv for impervious area shifted into/out of POI from outside the LOD **(step 6)**	+	ESDv from loss of existing water quality **(step 7)**

The required ESDv for the POI is a function of the amount of new development proposed within the respective POI only. The Regulations require that new development be managed for channel protection volume (Cpv), and channel projection volume, like other forms of quantity management, can only be managed within the impacted drainage area and POI. The required ESDv for the POI also takes into consideration whether the POI qualifies for a 3.3.B waiver, has a shift in drainage area from outside the LOD, or experiences a loss of existing water quality. Step-by-step instructions continue below:

Step 3 – Determine the Required Environmental Site Design Volume for treating Redevelopment ($ESD_{VRE\text{-}DEV'L}$):

This step calculates the portion of the required ESDv that is attributed to the redevelopment portion of the proposed development. The rainfall depth, P_E, required to be treated for redevelopment is 1.0 inch. The required area to be treated is the $IART_{RE\text{-}DEV'L}$. Because $IART_{RE\text{-}DEV'L}$ is 100% impervious, Rv is always 0.95.

When the POI is classified as new development, $ESDv_{RE\text{-}DEV'L}$ will be inactive and set to a value of zero.

Record this value in Column 3 of the ESDSS.

Step 4 – Determine the Environmental Site Design Volume Reduction from Decreasing Impervious Area ($ESDv_{reducedAi}$) for Redevelopment Classification when $\Delta A_i < 0$):

This step is active only when the POI is classified as redevelopment and there is a reduction of impervious area from existing to proposed conditions ($\Delta Ai<0$). This volume (which is equivalent to a negative $IART_{NEW}$ and $ESDv_{NEW}$) is calculated separately to illustrate the ESDv reduction that results from removing impervious area as well as to allow appropriate assessment of the ESDv required at the POI. For POIs that experience strictly impervious reduction, there is no ESDv requirement at the POI. However, impervious reduction within the LOD can be accompanied by a shift in drainage area from outside the LOD and/or a loss of existing water quality. The reduction in impervious area can be used to offset the ESDv required from a shifted drainage area or a loss of existing water quality. Therefore, the reduction, based on a P_E of 2.6 inches, represents the maximum offset available from the impervious reduction. To simplify calculations and eliminate debates between designers and reviewers, 2.6 inches is being used regardless of soil type.

Step 4.1 - Determine the $ESD_{V\ reduced\ Ai}$ Applied to Project:

This step calculates the ESD volume reduction based on 1.0 inch of P_E and ΔAi ($IART_{NEW}$). This is always a negative volume and is credited towards the ESD volume requirement at the project level. *Record this value in Column 4a of the ESDSS.*

Step 4.2 - Determine the $ESD_{V\ reduced\ Ai}$ Applied to POI:

This step calculates the ESD volume reduction based on 2.6 inch of P_E and ΔAi ($IART_{NEW}$). This is always a negative volume and is credited towards the ESD volume requirement at the POI level. *Record this value in Column 4b of the ESDSS.*

Step 5 – Determine the Required Environmental Site Design Volume for treating New Development ($ESD_{V\ NEW}$) for POI:

This step calculates the portion of the required ESDv that is attributed to the new development portion of the proposed development. The rainfall depth, P_E, required to be treated for new development ranges from 2.0 to 2.6 inches depending on the soils. The required area to be treated is the $IART_{NEW}$. Because $IART_{NEW}$ is 100% impervious, Rv is always 0.95. For POIs that qualify for a 3.3.B waiver, the required P_E is reduced to 1.0 inch.

Step 5.1 - Determine the $ESD_{V\ NEW}$ for 3.3.B Waiver:

This step is active only when the POI qualifies for a 3.3.B waiver and a value of "YES" is selected for "Cp_{vw}" in Step 1. This step calculates the required $ESD_{V\ NEW}$ for a 3.3B waiver based on the $IART_{NEW}$ and a P_E = 1.0 inch. This value contributes to project level ESDv requirements.

If this step is active then Steps 5.2 and 5.3 will be inactive. *Record this value in Column 5.a of the ESDSS.*

Step 5.2 Determine Weighted P_E:
This step is active when $IART_{NEW} > 0$ and a 3.3.B waiver does not apply. This step calculates the weighted P_E to be used in Step 5.3. Input by the user is required in the $IART_{NEW}$ column of the Weighted P_E table. $IART_{NEW}$ entries should be representative of the predominant Hydrologic Soil Group (HSG) within the LOD or the actual soil breakup within the LOD. Where selection between two HSGs is required, use the more conservative option. The user should enter the area on the respective row or rows. The total $IART_{NEW}$ must equal the $IART_{NEW}$ calculated in Step 2.

Step 5.3 Determine the $ESD_{V\ NEW}$ for No Waiver or No Impervious Reduction ($\Delta A_i \geq 0$):
This step is active when $IART_{NEW} > 0$ and a 3.3.B waiver does not apply. This step calculates the ESD volume requirement based on the $IART_{NEW}$ and the weighted P_E from Step 5.2. This value contributes to both the project and POI level ESDv requirements. *Record this value in Column 5.b of the ESDSS.*
Note: If "?????" is shown in the $ESD_{V\ NEW}$ box, return to Step 5.2 to correct the inconsistency in $IART_{NEW}$ between Step 5.2 and Step 2.

Step 6 - Determine the Required Environmental Site Design Volume for the Shifted Impervious Area ($ESD_{V\ SHIFT}$) in/out of POI:
This volume can be a positive or negative value. A positive number reflects the required ESDv for the impervious area shifted into the POI from outside the LOD. A negative number reflects the ESDv off-set for the impervious area shifted out of the POI from outside the LOD. This value contributes to the ESDv requirements at both the POI level and the project level. At the POI level, a positive value reflects the required ESDv. At the project level, the required ESDv is $\sum ESD_{V\ SHIFT}$ for all the POIs. If an equivalent amount of impervious area is shifted both in and out for the project, there will be no overall $ESD_{V\ SHIFT}$ requirement for the project.
If a POI has shifted impervious area into the POI, but the POI qualifies for a Cpv waiver (despite the shift), the $ESD_{V\ SHIFT}$ is also waived, and this step will be inactive. *Record this value in Column 6 of the ESDSS.*
Note: The net contribution of the $ESD_{V\ SHIFT}$ from all the POIs should be zero at the project level if there are no Cpv waivers at any POI.

Step 7 - Determine the Required Environmental Site Design Volume from Loss of Existing SWM ($ESD_{V\ Loss}$):
No calculations are performed in this step. The value shown here is the **$ESD_{V\ Loss}$** as reported in Step 1 and based on separate computations by the designer supporting this volume. It is a positive number and reflects the ESDv requirement due to the loss of an existing water quality BMP or water quality feature. This value contributes to both the project and POI level ESDv requirements. This step is always active. If there was no input to the $ESD_{v\ Loss}$ field in Step 1, this step will report a value of zero. *Record this value in Column 7 of the ESDSS.*

Step 8 - Determine the Required Environmental Site Design Volume for the POI (ESD_{VPOI}):

This step calculates the total ESDv requirement for the POI. This spreadsheet only calculates the required ESDv; treated ESDv is recorded on the ESDSS. This step is always active. *Record this value in Column 8 of the ESDSS.*

Notes:

(1) This SWM Calculator only considers impervious area when calculating ESDv requirements. Therefore, when there is an increase in the overall drainage area to the POI from existing to proposed conditions, MDE will also require that the 1-year discharge rate for proposed conditions not exceed the rate for existing conditions. This will not be in an issue for minor increases in drainage area, but in the case of shifted drainage area divides could necessitate additional management. When $A_P > A_E$, an advisory message is given that reads, If "$(A_P - A_E) > 0$, provide separate calculations demonstrating that the Proposed Condition 1-Year Discharge Rate (Q_{1P}) <= the Existing Condition 1-Year Discharge Rate (Q_{1E})"

(2) Apart from the requirements of this SWM Calculator for ESDv, the user is reminded that the overbank and extreme flood protection management requirements must also be met at the POI, namely 2-year, 10-year, and 100-year management as set forth by the local approval authority. The necessary calculations are to be included in the SWM report.

(3) A negative value results when there is a decrease in impervious area. When the results of the SWM Calculator are entered into the ESDSS, Column 8 will re-calculate the required ESDv for the POI and, if negative, will show value as zero.

Step 9 - Determine the Required Recharge Volume (Re_v):

This step calculates the recharge volume requirement based on the Soil Specific Recharge Factor and the $IART_{NEW}$ as well as any loss in existing recharge. This recharge volume shall be satisfied at the project level.

Step 9.1 – Determine Weighted Soil Specific Recharge Factor (S):

The Weighted Soil Specific Recharge Factor Table will populate based on entries to the Weighted P_E Table in Step 5.2. This step is active when $IART_{NEW} > 0$.

Step 9.2 – Determine the Required Recharge Volume ($Re_{V\ NEW}$) for New Development:

This step calculates the recharge volume requirement based on the Soil Specific Recharge Factor from step 9.1 and the $IART_{NEW}$. This step is active when $IART_{NEW} > 0$.

Step 9.3 – Determine Loss of Existing Recharge Volume ($Re_{V\ Loss}$):

This step calculates the recharge volume requirement due to the loss of existing recharge volume. This step is always active. If there was no input to the $Re_{v\ Loss}$ field in Step 1, this step will report a value of 0.0.

Step 9.4 – Determine Total Recharge Volume (Re_V):

This step calculates the total recharge volume requirement that shall be satisfied at the project level. This step is always active. If Steps 9.1 and 9.2 are inactive, and $Re_{v\ Loss} = 0$, Re_v will report a value of 0.0. *Record this value in Column 10 of the ESDSS.*

Step 10 – Designer's Notes:

This step is for any designer's notes, including assumptions or descriptions of unusual design circumstances. The maximum character limit is 600 characters.

Last Step – SAVE FILE!

The standard format of the SWM Calculator requires a separate file for each POI. Avoid data loss by saving the Excel file under a name with POI number before entering data for succeeding POIs. The condensed format spreadsheet records data for more than one POI.

The SWM Calculator is available in standard format and condensed format. Both spreadsheets are available on MDE's website. The standard format is recommended for designers unfamiliar with the SWM Calculator or for projects with only a few POIs. The condensed format uses the same process, but rather than entering data from top to bottom through explained steps, data is entered from left to right in a tabular format, resulting in a single sheet of data for multiple POIs.

II. Environmental Site Design Summary Sheet (ESDSS) – Instructions

One ESDSS is to be completed per project or per 6-digit watershed in the case of projects that span multiple watersheds. A print out should be included in the concept design report and then updated for the final design report. The ESDSS is a compilation of the stormwater management requirements for all the POIs based on the results of the SWM Calculator and is used to calculate the overall ESDv requirement for the project. Additionally, it presents a summary of the proposed BMPs.

This spreadsheet was made compatible for Microsoft Excel 97-2003 and newer. It was created in Microsoft Excel 2016 and tested in multiple versions. It utilizes macros to eliminate the need for repetitive calculations and formatting by the user. When opening the file, a message will appear below the tool bar that reads "**Security Warning** Macros have been disabled. Options…" Click on "Options" and then "Enable this content."

User Instructions:

1. A maximum of twenty POI entries are permissible in the spreadsheet. If the project consists of more than twenty POIs, please contact the Plan Review Division for an appended spreadsheet. Calculations are performed at the top of the spreadsheet so for projects having fewer POIs, set the print area to exclude the blank POI fields. The spreadsheet is set up with five rows per POI for water quality practices, but BMP rows can be deleted or added as necessary by moving cursor to left hand column with row numbers and right clicking.
2. All user entries must be entered sequentially, working from the left to the right of the spreadsheet.
3. All yellow cells in the spreadsheet are the input cells. Cells will turn grey when they do not apply.
4. Data validations are present within this spreadsheet. If data entry is not consistent with data entry provided in the spreadsheet, an error message will appear and alert the user about the inconsistency is causing the error.

ESDVSS Column Descriptions and Instructions

Required ESD Management

Point of Investigation

Enter the number associated with the POI, LOI, or sub-drainage area in the SWM report. A given POI will require more than one row if there are multiple treatment practices in the associated drainage area.

Column 1 - $IART_{RE\text{-}DEV'L}$

Enter the IART from Redevelopment as computed in **Step 2** of the SWM Calculator. The spreadsheet calculates the total $IART_{RE\text{-}DEV'L}$ for the project at the top of the column.

Column 2 - $IART_{NEW}$

Enter the IART from New Development as computed in **Step 2** of the SWM Calculator. Note that if $IART_{NEW} > 0$, then column 4a and 4b will be grayed out and unavailable for input. The spreadsheet calculates the total $IART_{NEW}$ for the project at the top of the column.

Column 3 - $ESD_{V\ RE\text{-}DEV'L}$ (P_E = 1.0 in)

Enter the Required ESD Volume for Treating Redevelopment as computed in **Step 3** of the SWM Calculator. This value is based on 1.0 inch of P_E and $IART_{RE\text{-}DEV'L}$. The spreadsheet calculates the total Required $ESDv_{\ RE\text{-}DEV'L}$ for the project at the top of the column.

Column 4a - $ESD_{V\ reducedAi}$ Reduction Applied to Project (P_E = 1.0 in)

Enter the ESDv Reduction Applied to the Project from Decreasing Impervious Area as computed in **Step 4.1** of the SWM Calculator. This value represents the ESD volume reduction based on 1.0 inch of P_E and ΔAi ($IART_{NEW}$). It is always a negative number and is credited towards the ESD volume requirement at the project level. The spreadsheet calculates the total $ESD_{V\ reducedAi}$ Reduction for the project at the top of the column.

Column 4b - $ESD_{V\ reducedAi}$ Reduction Applied to POI (P_E = 2.6 in)

Enter the ESDv Reduction Applied to the POI from Decreasing Impervious Area as computed in **Step 4.2** of the SWM Calculator. This value represents the ESD volume reduction based on 2.6 inch of P_E and ΔAi ($IART_{NEW}$). It is always a negative number and is credited towards the ESD volume requirement at the POI level.

Column 5a - $ESD_{V\ NEW}$ for 3.3.B Waiver (P_E = 1.0 in)

Enter the Required ESDv for Treating New Development when the POI qualifies for a 3.3.B Waiver as computed in **Step 5.1** of the SWM Calculator. This value is based on 1.0 inch of P_E and $IART_{NEW}$. This value contributes to the required ESDv at the project level. Note that if there is an entry in this field then there cannot be an entry in Column 5b. The spreadsheet calculates the total required $ESD_{V\ NEW}$ for 3.3.B waivers for the project at the top of the column.

Column 5b - $ESD_{V\ NEW}$ (P_E = 2.0 to 2.6 in)

Enter the Required ESDv for Treating New Development when there is No Waiver or No Impervious Reduction as computed in **Step 5.3** of the SWM Calculator. This value is based on a weighted P_E ranging from 2.0 inches to 2.6 inches and $IART_{NEW}$. This value contributes to the required ESDv at the POI level. Note that for there to be an entry in this field, Column 2 must be greater than zero and Column 5a cannot have an entry. The spreadsheet calculates the total required $ESD_{V\ NEW}$ for the project at the top of the column.

Column 6 - $ESD_{V\ SHIFT}$ (P_E = 2.6 in)

Enter the ESD Volume for the Shifted Impervious Area in/out of POI from outside the LOD as computed in **Step 6** of the SWM Calculator. This value is based on the impervious area shifted into or out of the drainage area to the POI and a P_E of 2.6 inches. A positive number reflects existing impervious shifted into the POI, a negative value reflects existing impervious shifted out of POI. This value contributes to the required ESDv at both the POI and project levels. The spreadsheet calculates the total $ESD_{V\ SHIFT}$ for the project at the top of the column.

Column 7 - $ESD_{V\ Loss}$

Enter ESD Volume from Loss of Existing SWM as computed in **Step 7** of the SWM Calculator. It is a positive number and contributes to the required ESDv at both the POI and project levels. The spreadsheet calculates the total $ESD_{V\ Loss}$ for the project at the top of the column.

Column 8 – Required ESD_V for POI

This column is calculated by the spreadsheet and is the sum of the corresponding fields in Columns 4b, 5b, 6, and 7. It should be the same value as the Required ESDv for the POI as computed in **Step 8** of the SWM Calculator. If the result of Step 8 is a negative value, there is no POI level requirement and zero will be recorded. **If the values do not match Step 8 of the SWM Calculator, check for input errors in the ESDSS.**

Column 9 – Required ESD_V for the Project

This field is calculated by the spreadsheet and is the sum of Columns 3, 4a, 5a, 5b, 6, and 7. This is the total ESD volume requirement for the project resulting from the work proposed in all the POIs collectively. The project requirement will govern the needed level of management when quality management is provided outside the POI for POIs that have no quantity management requirements because there is redevelopment or a 3.3.B waiver.

Column 10 – Required Re_V

Enter the Required Recharge Volume as computed in **Step 9.4** of the SWM Calculator. This is a positive number and is a function of $IART_{NEW}$ and any loss of existing Re_V. The spreadsheet calculates the total Required Re_V for the project at the top of the column.

Provided ESD Management

Column 11 – Type of Practice

From the fly down, select the type of SWM practice being proposed. This can include alternative surfaces, non-structural practices, and micro-scale practices from Chapter 5 of the SWM Manual as well as various types of Chapter 3 practices and innovative technologies as allowed by MDE. A given POI/LOI will require more than one row if multiple treatment practices are being proposed within the associated drainage area. The spreadsheet is set up with five rows per POI for water quality practices, **but BMP rows can be deleted or added as necessary.**

Column 12 – BMP number

Enter the BMP identification number as assigned by the designer or the applicant.

Column 13 – P_E Treated by Practice

Enter the amount of rainfall (P_E) treated by the practice listed in Column 11. This value should be calculated using MDE's spreadsheet "**Provided Treatment: Achieved P_E and Treated ESDv**" or an equivalent. Any value other than 1.0 inch will automatically update to a text color of red. This value is limited to the rainfall level for the 1-year storm in the respective county and the spreadsheet will not accept a value larger than 3.0 inches.

Column 14 – Provided ESD_V

Enter the ESD volume that the respective practice is treating. This value should be calculated using MDE's template spreadsheet "**Provided Treatment: Achieved P_E and Treated ESDv**" or an equivalent. This value is governed by either the drainage area to the facility or the physical storage provided within the facility, whichever is more limiting. For ESD filtering practices that are required to store only 75% of the ESDv, the treated ESDv is the provided surface storage divided by 0.75 (assuming physical storage, not drainage area, is the limiting parameter). The spreadsheet calculates the total Provided ESD_V for the project at the top of the column.

Note that if it is not practicable to provide the entire ESD volume in ESD practices and instead structural practices are used to provide Cpv (i.e. for P_E above 1 inch), the designer

needs to demonstrate how Cpv management is being met. If the structural practice is a Chapter 3 water quality enhancing practice, the practice can use the remaining required ESD volume as the design water quality volume. If the proposed structural practice is without water quality features (i.e. dry extended detention), the designer must demonstrate through separate calculations that Cpv management is being met in accordance with Appendix D.11 of the SWM Manual.

Column 15 – ESDv from WQ Bank Debit

For projects that are satisfying water quality and IART by debiting the Water Quality Bank, the associated ESDv may be credited towards meeting the ESDv requirement at the project level. The WQ Bank may not be used to meet ESDv requirement at the POI level. This entry requires that the WQSS first be completed. If a debit is not being made to the WQ Bank, input either zero or leave cell blank. Otherwise, calculate the input value as $ESDv_{BANK}$ = (1.0 in)(0.95)(debit in acres)(43,560 sf/ac)/12 in/ft.

Column 16 – Provided Re_v

Enter the recharge volume that the respective practice is providing. The spreadsheet calculates the total Provided Re_V for the project at the top of the column.

ESD_V and Re_v Requirements

ESDv Project Requirement and Provided ESD_V Check

This check is calculated by the spreadsheet. If the ESD_V provided at the project level > the ESD_V required at the project level, a "CHECK: OK" will print. If the ESD_V provided at the project level < the ESD_V required at the project level, a "CHECK: FAIL" will print and a red ALERT will be given that additional management is necessary. If a variance is being granted by MDE for the POI or project due to exceptional circumstances, additional management may not be necessary.

Re_v Project Requirement and Provided Re_v Check

This check is calculated by the spreadsheet. If the Re_v provided at the project level > the Re_v required at the project level, a "CHECK: OK" will print. If the Re_v provided at the project level < the Re_v required at the project level, a "CHECK: FAIL" will print and a red ALERT will be given that additional management is necessary. If a variance is being granted by MDE for the POI or project due to exceptional circumstances, additional management may not be necessary.

Is the POI Requirement met?

This check is calculated by the spreadsheet. If the ESD_V provided at the POI level > the ESD_V required at the POI level, a "Provided ESD_V at POI x cf >= y cf" and "YES" will populate this field. If the ESD_V provided at the POI level < the ESD_V required at the POI level, a "Provided ESD_V at POI x cf < y cf" and "NO" will populate this field. Also, a red ALERT will be given if additional management at the POI is necessary. If a variance is being granted by MDE for the POI due to exceptional circumstances, additional management may not be necessary.

III. Water Quality Summary Sheet (WQSS) – Instructions

The WQSS was originally developed as an accounting ledger for the Water Quality Bank and was previously only required for projects that were crediting or debiting the Bank.[1] As part of this new initiative, every project (except 3.3.A waivers and MS4 restoration projects) will need to complete a WQSS. One WQSS is to be completed per project or per 6-digit watershed in the case of projects that span multiple watersheds. Note that for applicants with multiple banks based on watershed, a separate water quality summary sheet is required for each watershed affected by the project. A print out should be included in the concept design report and then updated for the final design report.

The WQSS is a compilation of the water quality requirements for all the POIs based on the results of the SWM Calculator and is used to calculate the overall IART requirement for the project (or watershed). Additionally, it presents a summary of the proposed BMPs.

This spreadsheet was created in Microsoft Excel 2007 and tested in multiple versions. It utilizes macros to eliminate the need for repetitive calculations and formatting by the user. When opening the file, a message will appear below the tool bar that reads "**Security Warning** Macros have been disabled. Options…" Click on "Options" and then "Enable this content."

The yellow cells are input cells to be completed by the designer. To clear all input cells, click the "Clear Input Cells" button. All Steps within this tab will print.

User Instructions:

1. The spreadsheet is configured for a maximum of eighty rows of data. Please use multiple spreadsheets if the project requires more than eighty rows. Entry rows can be shown or hidden by clicking on the (+) or (-) along the left hand column. Calculations are performed at the top of the spreadsheet so for projects using fewer rows, set the print area to exclude the blank rows.
2. Either POI data or BMP data can be entered on a row. The POI entry should be the top row with the BMPs listed below the respective POI. The first BMP in the group can be entered on the same row as the POI data. Repeat this for all the POIs. The format should mirror the ESDSS.
3. All user entries must be entered sequentially, working from the left to the right of the spreadsheet.
4. All yellow cells in the spreadsheet are the input cells.

[1]In the early 1990s, the Plan Review Division developed a banking system for the State Highway Administration in which the currency was impervious area. In the decade that followed, banks were established for other State and federal applicants through a formal Memorandum of Agreement. Additionally, MDE has been operating informal banks with some applicants. At present twelve federal installations and twelve state institutions have water quality banks. For more information on the Water Quality Bank and the terms of the banking agreement, contact Amanda Malcolm amanda.malcolm@maryland.gov .

WQSS Column Instructions and Descriptions

Column A – POI

Enter the number associated with the POI, LOI, or sub-drainage area in the SWM report. A given POI will require more than one row if there are multiple treatment practices in the associated drainage area.

Column B - Existing Impervious Area within LOD (acres), A_{Ei}

Enter A_{Ei} from **Step 1** of the SWM Calculator. This value includes all pavement and roof-top including maintenance and access areas recorded in Column E as A_{Mi}.

Column C - Proposed Impervious Area (acres) within LOD, A_{Pi}

Enter A_{Pi} from **Step 1** of the SWM Calculator. This value includes all pavement and roof-top including maintenance and access areas recorded in Column E as A_{Mi}. Alternative surfaces need to be included in this column and also listed as treatment practices in Columns L - R.

Column D – Existing Imperviousness within SWM Study Area (0 to 100), %I

Enter %I from the **Development Category Sheet** of the SWM Calculator. This value ranges from 0 to 100. It is not the same %I used to determine the P_E.

Column E - Area for which WQ is Not Required (acres), A_{Mi}

Enter A_{Mi} from **Step 1** of the SWM Calculator. Any area included in this column must also be included in Columns B and C.

Column F - Loss of Existing Water Quality (acres), A_{Li}

Enter A_{Li} from **Step 1** of the SWM Calculator. This value represents the effective impervious area previously treated and is pro-rated for partial treatment. (A treated $P_E \geq 1.0$ inch is considered full treatment. A treated $P_E < 1.0$ is pro-rated linearly. For example, P_E = 0.1 inch is considered 10% treatment.)

Notes: If previously treated impervious area is removed along with the water quality feature, the result is considered a “wash”. If previously treated impervious area is removed, but the water quality feature or BMP is not physically being removed, the result is also considered a “wash” because the treatment is effectively lost since there is no impervious area to be treated. These equivalent scenarios can be reflected by entering the impervious area that was previously treated and is now being removed in both Columns F and G.

Column G – Reconstructed Impervious Area Already Treated (acres), A_{RECi}

Enter A_{RECi} from **Step 1** of the SWM Calculator. This value represents the effective impervious area previously treated and is pro-rated for partial treatment. (A treated $P_E \geq 1.0$ inch is considered full treatment. A treated $P_E < 1.0$ is pro-rated linearly. For example, P_E = 0.1 inch is considered 10% treatment.)

Note: If previously treated impervious areas are being removed, those areas need to be included in this column as well as Column F. There is a potential for overlapping areas in Column E and G. If maintenance or utility work is being performed on an existing impervious surface that already has water quality treatment, include this area only in Column E.

Water Quality Required

Column H - Net Increase in Impervious (acres), ΔAi

This column is calculated by the spreadsheet and equals the net change in impervious area from existing to proposed conditions. **H = C-B**. A positive number reflects an increase in impervious area, and a negative number reflects a decrease in impervious area.

Column I - IART from Redevelopment (acres), $IART_{RE\text{-}DEV'L}$

This column is calculated by the spreadsheet and equals the portion of the proposed development that must meet redevelopment requirements (i.e. 50% management). For POIs where the existing impervious area exceeds 40%, this equals fifty percent of the existing impervious area less the maintenance areas and the already treated impervious areas within the LOD. For POIs where the existing impervious area is less than or equal to 40%, this value is zero because the existing impervious must meet new development requirements and as such is accounted for in Column J. **If D > 40%, then I = 0.5(B-E-G). If D ≤ 40%, then I = 0.**

This value should be the same value as the $IART_{RE\text{-}DEV'L}$ as computed in **Step 2** of the SWM Calculator. **If the values do not match, check both the SWM Calculator and the WQSS for input errors.** The spreadsheet calculates the total $IART_{RE\text{-}DEV'L}$ for the project at the top of the column.

Column J - IART from New Development (acres), $IART_{NEW}$

This column is calculated by the spreadsheet and equals the portion of the proposed development that must meet new development requirements (i.e. 100% management). For POIs where the existing impervious area exceeds 40%, this equals the net increase in impervious area. For POIs where the existing impervious area is less than or equal to 40%, the entire LOD must meet the new development requirements (i.e. 100% management) and this equals the proposed impervious area, less the maintenance areas and the already treated impervious areas. **If D > 40%, then J = H. If D ≤ 40%, then J = C-E-G.**

This value should be the same value as the $IART_{NEW}$ as computed in **Step 2** of the SWM Calculator. **If the values do not match, check both the SWM Calculator and the WQSS for input errors.** The spreadsheet calculates the total $IART_{NEW}$ for the project at the top of the column.

Column K - TOTAL IART (acres), IART

This column is calculated by the spreadsheet and equals the impervious area requiring water quality treatment for a P_E of 1 inch. The total IART equals the IART from redevelopment plus the IART from new development. Any loss of existing water quality recorded in Column F is added to the IART. **K = I+J=F**. The spreadsheet calculates the total IART for the project at the top of the column.

Water Quality Provided

Column L - Type of Treatment

List all proposed water quality practices located within the drainage area to the respective POI. This includes the various types of alternative surfaces, non-structural practices, and micro-scale practices from Chapter 5 of the SWM Manual as well as Chapter 3 practices and innovative technologies proscribed in the Banking Terms or otherwise accepted by MDE. A given POI/LOI will require more than one row if multiple treatment practices are being proposed within the associated drainage area.

Column M - BMP Tracking Number or Practice ID

List the unique number assigned by the applicant/designer to the stormwater treatment practice.

Column N – Treatment Already Provided by Existing BMP (acres)

Enter the reconstructed impervious area already treated. This will be the same value reported in Column G if the treated area is also in the LOD. This value represents the effective impervious area treated and before entering needs to be pro-rated for partial treatment. (A treated $P_E \geq 1.0$ inch is considered full treatment. A treated $P_E < 1.0$ is pro-rated linearly. For example, $P_E = 0.1$ inch is considered 10% treatment.) **This column is not used by spreadsheet to calculate the Impervious Area Treated; its purpose is to help distinguish between existing treatment and proposed treatment within an existing/retrofit BMP.** For example, a new inflow pipe is being added to an existing BMP that provides water quality for 1 acre in existing conditions. The BMP is being enlarged and will provide water quality for 3 acres in proposed conditions. Column N will be 1 acre, and Column O will be 2 acres.

Column O - Treated Impervious Area from on-site or inside the ROW (acres)

Enter the amount of on-site impervious area within the drainage area to the treatment facility. If the BMP is existing or a retrofit of an existing BMP, the previously treated impervious area from Columns G and N is not included here. "On-site" refers to area that is within the applicant's property. Whether this area is located inside or outside the project's LOD is irrelevant. The IART does not have to be treated in the POI for which it was generated; it can be treated anywhere in the defined Watershed.

Column P - Treated Impervious Area from off-site or outside the ROW (acres)

Enter the amount of off-site impervious area within the drainage area to the treatment facility. If the BMP is existing or a retrofit of an existing BMP, the previously treated impervious area from Columns G and N is not included here. "Off-site" refers to area owned by an entity other than the applicant. Whether this area is located inside or outside the project's LOD is irrelevant. A 50% efficiency rate is applied to this area to compensate for the applicant's lack of control over property owned by others.

Column Q - P_E Treated by Practice (inches)

Enter the total amount of rainfall (P_E) treated by the water quality practice listed in Column L. This value should be calculated using MDE's spreadsheet "**Provided Treatment: Achieved P_E and Treated ESDv**" or an equivalent. For water quality banking purposes, the required treatment is $P_E = 1$ inch for the 1-year storm. One inch corresponds to the "first flush" and is the water quality component of the target P_E. Any treatment provided in excess of 1.0 inch (for meeting ESDv) will not receive additional water quality credit. Water quality credit is limited to 1.0 inch. Partial credit will be given for practices that provide less than 1.0 inch of treatment. Enter the total P_E treated by the practice for the 1-year storm; Column P will automatically limit the effective P_E to 1.0 inch.

Column R - Effective Impervious Area Treated (acres)

This column is calculated by the spreadsheet and represents the equivalent amount of impervious area receiving full treatment by pro-rating partial treatment (i.e. $P_E<1$ inch) and discounting off-site treatment areas by 50%. **If $P_E \geq 1.0$ inch, R = O+ 0.5P. If $P_E < 1.0$ inch, R = (Q/1 inch)(O + 0.5P).** The spreadsheet calculates the total **Effective Impervious Area Treated** for the project at the top of the column.

Column S - Water Quality Summary Excess/Deficit (acres)

The box at the top of this column is calculated by the spreadsheet and summarizes the resulting water quality required or provided for a given POI and/or treatment practice. **$S = \Sigma R - \Sigma K$**. A positive number indicates excess treatment, and a negative number indicates a deficit in treatment. The spreadsheet calculates the total excess/deficit water quality for the project at the top of the column. A positive number indicates an excess/credit, and a negative number indicates a deficit/debit. If there is a deficit, additional water quality treatment needs to be provided or the scope needs to be modified to be commensurate with the proposed treatment. Alternatively, for applicants having a Water Quality Bank with MDE, a debit may be withdrawn from the bank, subject to the approval of the applicant's bank keeper. For projects resulting in a debit to the Water Quality Bank, the amount of the debit needs to be entered in Column 15 of the ESDVSS.

Excess water quality will be credited to the Water Quality Bank for the respective watershed. MDE "charges" a 15% banking fee. The banking fee is the price the applicant pays for having the latitude to provide WQv management at a selective location outside the project limits. The fee is applied to credits before they are deposited in the bank. However, no fee is applied to credits, or portions thereof, that result from impervious removal. Also, a fee is not applied when the applicant has an approved institutional management plan (e.g. BWI, UMBC). A banking fee is not applied to debits.

If $\Sigma S > 0$, there is a credit and the banking fee = 15% (ΣR)*

***** The banking fee is only applied to excess treatment and not to any impervious removal.

If $\Sigma S = 0$, there is a "wash" and the banking fee = 0
If $\Sigma S < 0$, there is a debit and the banking fee = 0

IV. Provided Treatment: Achieved P_E, Treated ESDv, and Treated Re_V

The previous three spreadsheets focus on SWM design requirements. This spreadsheet, on the other hand, calculates the SWM treatment provided by the proposed BMPs. It is unprotected and intended to be used as a template for correctly calculating the provided ESDv, achieved P_E, and provided Re_V.

If the user edits the formatting, please assure that the printed version include the SWM report shows the equations used in the calculations as well as an explanation.

Questions about this information or other items relating to sediment and stormwater plans for State and federal projects can be directed to Amanda Malcolm amanda.malcolm@maryland.gov

SIX TRICKY SCENARIOS
(Note this is a simplistic representation using 1.0 acre for all values in order to illustrate the principal.)

	SCENARIO	Ai exist.	Ai prop.	I%	loss of WQ A_{Li}	A_i already treated A_{RECi}	RESULT
1	Previously untreated impervious area is being removed.	1.0 ac	1.0 ac	>40%	0	0	0.5 ac credit
2	Previously treated impervious area is being reconstructed, and BMP remains.	1.0 ac	1.0 ac	>40% or ≤40%	0	1.0 ac	0 (requirement met)
3	Previously treated impervious area and BMP are being removed.	1.0 ac	0	40% or ≤40%	1.0 ac	1.0 ac*	0 (wash)
4	Previously treated impervious area is being removed, and BMP remains (to possibly be used in future or not).	1.0 ac	0	>40% or ≤40%	1.0 ac*	1.0 ac*	0 (wash)
5	Previously treated impervious area is being reconstructed, and BMP is being removed.	1.0 ac	1.0 ac	>40% or ≤40%	1.0 ac	1.0 ac*	IART = 1.0 (treatment needs to be re-cooped for A_i)
6	New impervious area is added in drainage area to BMP with available WQ treatment capacity.	0	1.0 ac	>40% or ≤40%	0	0	1.0 ac of treatment required and 1.0 acre of treatment provided by indicating previously unused capacity as new treatment in Column O or P.

* Need to enter it this way to get the correct result.

Note that removal of <u>treated</u> impervious area does not result in a WQ credit regardless of whether corresponding BMP is left in the ground or removed. From a SWM development regulatory standpoint, impervious area treated by a BMP is considered to be equivalent with undeveloped pervious area (although in reality the best BMP is pavement removal).