Site tab (New Dev)

Section 3·0, p·11

1. Enable macros to allow access between worksheets (tabs).
2. Use the CLEAR ALL button to delete all prior user data inputs from entire spreadsheet.
3. Select either the 2011 or the Draft 2013 BMP Specifications list from the top of the worksheet (**row 2**). *This triggers the appropriate runoff reduction credit associated with 4.c. Grass Channel with Compost Amended Soils (Specification #4) listed on the drainage area tabs.*
4. Enter project name (**cell B4**) and date (**cell B5**) in the provided spaces.

Site tab (New Dev - land cover inputs)

Section 3·0, p·13

5. Enter the post-development acreages of each land cover type by soil group (**cells B13 to E15**).

   Emphasis should be placed on environmental design principles during the early phases of project development. If Forest/Open space is used, take note of pop-up message in **cell A16**.

Site tab (New Dev - computations)

Section 3·3, p·16

6. Take note of the post-development TP reduction requirement in **cell E29**.

   a. This requirement is a site-based water quality requirement and unlike water quantity control requirements, which must be met at each of the site's stormwater discharge points (per *9VAC25-870-66*), the TP load reduction requirement can be met using various **Drainage Area tab** load reduction combinations.

   b. Depending on the post-development land cover type and HSGs, the site may or may not require further TP load reduction to meet the water quality compliance requirements.

   If the computed TP load reduction requirement (**cell E29)** is:

   i. Less than or equal to zero (site is at or below the 0.41 lb/ac/yr load limit), the site's TP load meets water quality compliance requirements. A message will appear in **cell G29**:

   TP load reduction is not required;

   ii. Greater than zero (site is above the 0.41 lb/ac/yr load limit), **cell E29** will reflect the TP load reduction required for site compliance.

7. If **cell E29** is greater than zero, proceed to **Drainage Area tab**.

Site tab (Re-Dev)

Section 4.2.3, p.38

RD1. Select either the 2011 or the Draft 2013 BMP Stds and Specs (**row 2**)

RD2. Enter Total Disturbed Acreage (**cell F10**)

RD3. Enter Pre-ReDevelopment land cover based on existing conditions (conditions at time application submitted).

RD4. Enter Post-ReDevelopment Land Cover based on proposed conditions.

RD5. Any error notifications (**cells H10-K13**) or Check Areas! messages (**row 27**) must be resolved before proceeding.

RD6. Take note of the **Indigo Cells** indicating maximum reduction required (**cell F12**), the site's net increase in impervious cover (**cell F13**), the post-development TP reduction requirement in **cell F14** and also **G63** within the indigo results section (**rows 62-65**).

a. As noted in Step 6 for New Development, the post-development TP reduction requirement is a site-based water quality requirement and can be met using various **Drainage Area tab** load reduction combinations.

b. Depending on the post-development and pre-redevelopment land cover areas, TP load reduction within the **Drainage Area tabs** may or may not be needed to meet water quality compliance requirements.

   If the post-redevelopment TP load, **cell I56**, (which excludes new net impervious cover) is less than the target pre-redevelopment TP load or the TP baseline (see Equations 22a and 22b), then no further TP load reduction is required for the redevelopment portion of the site, and:

   i. A TP load credit will appear as a negative value in **cell I60**

      (see Section 9.4 for more information)

   ii. If sufficient, such load credit will be applied to offset TP reduction requirements for any new net impervious cover (**cell L60**) which will reduce the TP load reduction requirement for the total site (**cell G63**).

Drainage Area tab

Section 5·0, p·39

8. Determine how many **Drainage Area tabs** are to be used to evaluate site water quality compliance. Site compliance may be achieved within one drainage area, a portion of a drainage area, or in multiple drainage areas (limited by the TP load available per drainage area):

a. Each **Drainage Area tab** can reflect a site drainage area with a distinct discharge point from the site, or

b. Similar BMP credit areas for the same type of practice(s) (areas of the site draining to specific BMPs or BMP treatment trains) can be grouped together on one **Drainage Area tab** even if they exist within different site drainage areas as long as:

If the computed TP load reduction requirement (**cell E29**) is:

i. Treatment volumes for each individual BMP (TV_{BMP}) are calculated separately; and

ii. Any managed turf areas draining to separate BMPs within a grouping must have the same runoff coefficient, i.e., different managed turf areas must all have the same HSG configurations (total areas per HSG) in order to be grouped together.

(only applied when managed turf areas are draining to more than one practice in the grouping).

c. Nutrient removal within each **Drainage Area tab** is limited by the nutrient available for removal within that **Drainage Area tab** (varies with load generated for that **Drainage Area tab**, which is based on user inputs for **D.A. tab** land cover types by HSGs). TP available for removal is computed in **cell M7** within each **Drainage Area tab**.

d. Discretion should be exercised if drainage areas or sub-drainage areas with different flow path times of concentration (Tc) are grouped together in a single **D.A. tab.**

Drainage Area tab (Land Cover Areas)

Section 5·1, p·41

9. Click on the CLEAR BMP AREAS button to reset all BMP credit areas to zero.

10. Enter land cover data in **cells B5 to E7** at the top of the **Drainage Area tab** (acreages entered for each land cover type by HSGs). The land cover data must be entered on the **Drainage Area tab** in order to allow all of the **grey cells** to auto-calculate in this tab and within other tabs (e.g., **Water Quality Compliance tab, Runoff Volume and CN tab**).

Note that the CLEAR BMP AREAS *button does not clear land cover data (***B5 to E7***), which may only change slightly if users are trying different BMP configurations within the* **Drainage Area tab**.

Drainage Area tab (BMP selection) *Section 5·3, p·46*

11. Select runoff reduction BMPs (top half of **Drainage Area tab**) and then, if necessary, non-runoff reduction pollutant removal BMPs (bottom half of **Drainage Area tab**), which can include proprietary BMPs listed as Manufactured Treatment Devices.

Starting the BMP selection process with runoff reducing BMPs followed by non-runoff reducing pollutant removal BMPs (and then utilizing a stepwise iterative process back to ESD principles) is consistent with the VRRM.

12. Find the appropriate **rows** for the selected BMP(s) and enter the contributing drainage areas in acres to each of the selected BMP(s) in the Credit Area **cells** (**column C** for Managed Turf and **column D** for Impervious Cover). Impervious Cover and Managed Turf areas must be entered separately for each BMP:

a. Forest/Open Space is not treated by BMPs in accordance with the VRRM, but surface areas of certain BMPs can qualify as Forest/Open Space as per the VRRM land cover type definitions (Table 1) and should be entered accordingly in the Land Cover Area sections within both the **Drainage Area tab** and the **Site tab**.

i. Natural undisturbed vegetated areas can be preserved and protected for certain BMP installations in accordance with design specifications (e.g., sheetflow to Forest/Open Space, BMP Design Spec. 2); or

ii. Land cover conversions can be performed to transform areas to one of the non-proprietary BMPs (e.g., buffer areas can be reforested as conservation areas or vegetated filter strips, managed turf can be transitioned to forest/open space via soil amendments and natural vegetation; see VRRM Land Cover Definitions and BMP Specifications for additional details).

iii. Increasing Forest/Open Space results in a reduction of generated runoff volume and consequently nutrient load for the individual **Drainage Area tab(s)** and **Site tab.**

Vegetated Roof, Rooftop Disconnection, and Permeable Pavement allow credit area entries for only impervious areas.

Drainage Area tab (BMP selection) Section 5·3, p·46

b. Rooftop Disconnection to Rainwater Harvesting (2.h., Spec. No. 1) requires the user to enter a runoff volume reduction credit (**cell B24**), which is determined separately using the Cistern Design Spreadsheet (see Virginia Stormwater BMP Clearinghouse) or a similar method that configures cistern sizing with water budget development.

c. Manufactured Treatment Devices (MTDs) (**rows 90-92**) require user entries for phosphorus removal efficiencies. The efficiencies entered for specific MTD(s) planned for use should match the DEQ approved efficiencies published on the Virginia Stormwater BMP Clearinghouse website (under Proprietary BMPs section).

13. If BMP's are to be used in series (e.g., treatment trains):

a. The credit area draining directly to a BMP should be entered only once. The next BMP in the treatment train is selected in the same **row** as the previous receiving practice from the pull down menu of the Downstream Practice (**columns N-O**).

A down arrow will appear at the bottom right of the **cell** *Downstream Practice to be Employed once that* **cell** *is selected. Clicking the arrow will allow the user to scroll and select from the menu of practice options applicable to the upstream BMP.*

b. The previous step can be repeated if additional BMPs are used in the treatment train.

Drainage Area tab (Summary sections) Section 5·3, p·53

14. Check the **Drainage Area tab** summaries for performance of Runoff Reduction BMPs (**rows 57-67**), and for performance of all BMPs combined (non-RR BMPs and RR BMPS), (**rows 95-105**). Summary information here includes runoff volume reductions achieved, TP load reductions achieved and TP remaining. **Drainage Area tab** area checks should also be reviewed in both summary locations to ensure BMP credit areas do not exceed **Drainage Area tab** land cover type totals (**cells F6 and F7**). See summary tables above for additional details.

Similar summaries are also provided for Total Nitrogen loading (**cells V63-V64** for RR-BMPs and **cells I109-I111** for all BMPs).

15. If other **Drainage Area tabs** are used, repeat steps 9 through 14 for each **Drainage Area tab**.

16. Proceed to the **Water Quality Compliance tab** for additional area checks and to verify compliance with water quality requirements for entire site.

Water Quality Compliance (Site results) - Area checks

Section 6·0, p·55

17. Check the Water Quality Compliance Area Checks (**C8-G8** and **H4-H7**) to ensure:

a. Treated land cover areas do not exceed land cover areas available within each **Drainage Area tab**, and

b. Areas entered on **Drainage Area tabs** do not exceed areas entered on **Site tab**.

18. If **AREA EXCEEDED!** messages appear, check information entered on **Drainage Area tabs** (land cover information and BMP Credit Areas) and **Site tab**. Error messages on these tabs will help direct the user to problem entries

Water Quality Compliance (Site results) *Section 6.0, p.57*

- Runoff reduction volume and TP by drainage area

19. Check to see if water quality compliance has been achieved on the site by going to the Remaining TP Load Reduction Required result in **cell C23**:

a. If the result indicates anything greater than zero lb/yr, then the user must continue to reduce the TP load by the amount indicated in **cell C23** (which is the difference between the site based TP load reduction required in **C21** and the reduction which is so far achieved in **cell C22**):

i. Check the runoff reduction volumes and total phosphorus loadings (**cells C12-H15**) for where additional opportunities to reduce the TP load may be found and optimized.

ii. Return to **Site tab** and **Drainage Area tabs** to possibly reconfigure the site layout and/or revise the on-site BMP strategy (change BMP credit areas and/or BMP selections).

b. If the result indicates that either:

NO TP FURTHER REDUCTION REQUIRED

OR

TARGET TP REQUIRED EXCEED BY __ LB/YR,

then the user can proceed with the proposed site layout and selected BMPs per **Drainage Area tab** to begin the site design

20. If information on nitrogen loads is desired, check the Total Nitrogen sections (**cells C17-H17 and C26-C28).**

21. Proceed to the **Runoff Volume and CN tab** if the spreadsheet results for runoff (watershed-inches) and/or curve number adjustments will be used in subsequent water quantity calculations **.**

22. Proceed to the **Summary tab** to view and print a VRRM Spreadsheet Compliance Report.

Runoff Volume and CN tab (User inputs)

Section 7·1, p·60

23. Enter the 24-hour rainfall depth for the Target Rainfall Event (inches) which can be the 1-year, 2-year and/or 10-year frequency storm events

a. The rainfall depths can be found using NOAA Atlas 14 *(http://hdsc.nws.noaa.gov/hdsc/pfds/)*

b. Remember that **Drainage Area tab** land cover data must be entered before calculations can be performed on this tab.

Summary tab

Section 8·0, p·68

24. **Remember**: Macros must be enabled for full functionality of the **Summary tab.** Return to **Site tab** and Step 1.

25. Ensure that the correct BMP Design Specifications list appears in **cell C4.** If not, revise the selection in **row 2** of the **Site tab**.

26. Click the **Update Summary Sheet** button in order to populate the individual **Drainage Area tabs** with BMP summaries.

Each time changes are made to individual Drainage Area tabs, the **Summary tab** must be updated by selecting this button

27. Review the summary sheet:.

a. If errors are noted, return to the tabs identified in the error notification table (Fig.24)

b. If there are no errors, proceed to the next step.

28. Click the **Print Preview** button. This will open the Excel Print Preview Screen (Fig. 25) and allow the user to :.

a. View the report prior to printing, and/or

b. Select the Excel Page Setup function (top bar menu option) in order to customize the report printout .

29. At this point, the user can click the **Print** button, select a connected printer or print to pdf (Fig. 26).