



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

South-central Region
Waterways and Wetlands Program



YCCD NPDES Permitting Workshop

Completing the PCSM Worksheets

March 18, 2015



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DEPARTMENT OF ENVIRONMENTAL PROTECTION



South-central Region
Waterways and Wetlands Program

Completing Standard Worksheets 1-5

Standard Worksheet 1

3330-PM-WM0035 Rev. 11/2010

Worksheet 1. General Site Information	
INSTRUCTIONS: Fill out Worksheet 1 for each watershed	
Date:	
Project Name:	
Municipality:	
County:	
Total Area (acres):	
Major River Basin:	http://www.pawaterplan.dep.state.pa.us/StateWaterPlan/docroot/default.aspx
Watershed:	
Sub-Basin:	
Nearest Surface Water(s) to Receive Runoff:	
Chapter 93 – Designated Water Use:	http://www.pacode.com/secure/data/025/chapter93/chap93toc.html
Impaired according to Category 4 or 5 of the Integrated Water Quality Monitoring and Assessment Report?	Yes <input type="checkbox"/> No <input type="checkbox"/>
	http://www.portal.state.pa.us/portal/server.pt/community/water_quality_standards/10556/integrated_water_quality_report_-_2010/682562
List Causes of Impairment:	
Is there an established TMDL that applies:	Yes <input type="checkbox"/> No <input type="checkbox"/>
Total Maximum Daily Loads (TMDLS)	
	http://www.dep.state.pa.us/watermanagement_apps/tmdl/ http://www.epa.gov/reg3wapd/tmdl/pa_tmdl/index.htm
Is project subject to, or part of:	
Municipal Separate Storm Sewer System (MS4) Requirements?	Yes <input type="checkbox"/> No <input type="checkbox"/>
	http://www.portal.state.pa.us/portal/server.pt/community/stormwater_management/10628/npdes_ms4%2%A0information/669119
Existing or planned drinking water supply?	Yes <input type="checkbox"/> No <input type="checkbox"/>
If yes, distance from proposed discharge (miles):	
Approved Act 167 Plan?	Yes <input type="checkbox"/> No <input type="checkbox"/>
	http://www.portal.state.pa.us/portal/server.pt?open=514&objID=564325&mode=2
Existing River Conservation Plan?	Yes <input type="checkbox"/> No <input type="checkbox"/>
	http://www.dcnr.state.pa.us/brc/rivers/riversconservation/registry/

- Separate Worksheet 1 for each Receiving Surface Water
- Total Area = Total Project Area (Section B.2 of NOI)

Standard Worksheet 2

3330-PM-WM0035 Rev. 11/2010

Worksheet 2. Sensitive Natural Resources

INSTRUCTIONS

1. Provide Sensitive Resources Map according to non-structural BMP 5.4.1 in Chapter 5. This map should identify wetlands, woodlands, natural drainage ways, steep slopes, and other sensitive natural areas.

2. Summarize the existing extent of each sensitive resource in the Existing Sensitive Resources Table (below, using Acres). If none present, insert 0.

3. Summarize Total Protected Area as defined under BMPs in Chapter 5.

4. Do not count any area twice. For example, an area that is both a floodplain and a wetland may only be considered once.

EXISTING NATURAL SENSITIVE RESOURCE	MAPPED? Yes/no/n/a	TOTAL AREA (Ac.)	PROTECTED AREA (Ac.)
Waterbodies			
Floodplains			
Riparian Areas			
Wetlands			
Woodlands			
Natural Drainage Ways			
Steep Slopes, 15% - 25%			
Steep Slopes, over 25%			
Other:			
Other:			
TOTAL EXISTING:			

- Worksheet 2 should cover Total Project Area
- Sensitive Resources Map

Standard Worksheet 2

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Worksheet 2. Sensitive Natural Resources

INSTRUCTIONS

1. Provide Sensitive Resources Map according to non-structural BMP 5.4.1 in Chapter 5. This map should identify wetlands, woodlands, natural drainage ways, steep slopes, and other sensitive natural areas.
2. Summarize the existing extent of each sensitive resource in the Existing Sensitive Resources Table (below, using Acres). If none present, insert 0.
3. Summarize Total Protected Area as defined under BMPs in Chapter 5.
4. Do not count any area twice. For example, an area that is both a floodplain and a wetland may only be considered once.

EXISTING NATURAL SENSITIVE RESOURCE	MAPPED? Yes/no/n/a	TOTAL AREA (Ac.)	PROTECTED AREA (Ac.)
Waterbodies			
Floodplains			
Riparian Areas			
Wetlands			
Woodlands			
Natural Drainage Ways			
Steep Slopes, 15% - 25%			
Steep Slopes, over 25%			
Other:			
Other:			
TOTAL EXISTING:			

- If claiming Protected Area, then the type of protection (easement, deed restriction, etc.) shall be identified/included

Standard Worksheet 3

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Worksheet 3. Nonstructural BMP Credits	
PROTECTED AREA	
1.1 Area of Protected Sensitive/Special Value Features (see WS 2)	_____ Ac.
1.2 Area of Riparian Forest Buffer Protection	_____ Ac.
3.1 Area of Minimum Disturbance/Reduced Grading	_____ Ac.
TOTAL	_____ Ac.
<p style="text-align: center;"> $\text{Site Area} - \text{Protected Area} = \text{Stormwater Management Area}$ </p> <p style="text-align: center;">This is the area that requires stormwater management</p>	
VOLUME CREDITS	
3.1 Minimum Soil Compaction (See Chapter 8, page 22 – SW BMP Manual)	
Lawn _____ ft ²	x 1/4" x 1/12 = _____ ft ³
Meadow _____ ft ²	x 1/3" x 1/12 = _____ ft ³
3.3 Protect Existing Trees (See Chapter 8, page 23 – SW BMP Manual)	
<i>For Trees within 100 feet of impervious area:</i>	
Tree Canopy _____ ft ²	x 1/2" x 1/12 = _____ ft ³
5.1 Disconnect Roof Leaders to Vegetated Areas (See Chapter 8 page 25 – SW BMP Manual)	
<i>For runoff directed to areas protected under 5.8.1 and 5.8.2</i>	
Roof Area _____ ft ²	x 1/3" x 1/12 = _____ ft ³
<i>For all other disconnected roof areas</i>	
Roof Area _____ ft ²	x 1/4" x 1/12 = _____ ft ³
5.2 Disconnect Non-Roof Impervious to Vegetated Areas (See Chapter 8, page 26 – SW BMP Manual)	
<i>For Runoff directed to areas protected under 5.8.1 and 5.8.2</i>	
Impervious Area _____ ft ²	x 1/3" x 1/12 = _____ ft ³
<i>For all other disconnected roof areas</i>	
Impervious Area _____ ft ²	x 1/4" x 1/12 = _____ ft ³
TOTAL NON-STRUCTURAL VOLUME CREDIT* _____ ft	
<small>*For use on Worksheet 5</small>	

- Separate Worksheet 3 for each Drainage Area/Point of Interest

Standard Worksheet 3

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Worksheet 3. Nonstructural BMP Credits	
PROTECTED AREA	
1.1 Area of Protected Sensitive/Special Value Features (see WS 2)	_____ Ac.
1.2 Area of Riparian Forest Buffer Protection	_____ Ac.
3.1 Area of Minimum Disturbance/Reduced Grading	_____ Ac.
TOTAL	_____ Ac.
<p>Site Area - Protected Area = Stormwater Management Area</p> <p>This is the area that requires stormwater management</p>	
VOLUME CREDITS	
3.1 Minimum Soil Compaction (See Chapter 8, page 22 – SW BMP Manual)	
Lawn _____ ft ² x 1/4" x 1/12 = _____ ft ³	
Meadow _____ ft ² x 1/3" x 1/12 = _____ ft ³	
3.3 Protect Existing Trees (See Chapter 8, page 23 – SW BMP Manual)	
<i>For Trees within 100 feet of impervious area:</i>	
Tree Canopy _____ ft ² x 1/2" x 1/12 = _____ ft ³	
5.1 Disconnect Roof Leaders to Vegetated Areas (See Chapter 8 page 25 – SW BMP Manual)	
<i>For runoff directed to areas protected under 5.8.1 and 5.8.2</i>	
Roof Area _____ ft ² x 1/3" x 1/12 = _____ ft ³	
<i>For all other disconnected roof areas</i>	
Roof Area _____ ft ² x 1/4" x 1/12 = _____ ft ³	
5.2 Disconnect Non-Roof Impervious to Vegetated Areas (See Chapter 8, page 26 – SW BMP Manual)	
<i>For Runoff directed to areas protected under 5.8.1 and 5.8.2</i>	
Impervious Area _____ ft ² x 1/3" x 1/12 = _____ ft ³	
<i>For all other disconnected roof areas</i>	
Impervious Area _____ ft ² x 1/4" x 1/12 = _____ ft ³	
TOTAL NON-STRUCTURAL VOLUME CREDIT*	_____ ft ³
<small>*For use on Worksheet 5</small>	

- Undisturbed area(s) can be taken out of Managed Area by Reduced Grading

Standard Worksheet 3

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Worksheet 3. Nonstructural BMP Credits			
PROTECTED AREA			
1.1 Area of Protected Sensitive/Special Value Features (see WS 2)			___ Ac.
1.2 Area of Riparian Forest Buffer Protection			___ Ac.
3.1 Area of Minimum Disturbance/Reduced Grading			___ Ac.
		TOTAL	___ Ac.
VOLUME CREDITS			
3.1 Minimum Soil Compaction (See Chapter 8, page 22 – SW BMP Manual)			
Lawn	___ ft ²	x 1/4" x 1/12	= ___ ft ³
Meadow	___ ft ²	x 1/3" x 1/12	= ___ ft ³
3.3 Protect Existing Trees (See Chapter 8, page 23 – SW BMP Manual)			
For Trees within 100 feet of impervious area:			
Tree Canopy	___ ft ²	x 1/2" x 1/12	= ___ ft ³
5.1 Disconnect Roof Leaders to Vegetated Areas (See Chapter 8 page 25 – SW BMP Manual)			
For runoff directed to areas protected under 5.8.1 and 5.8.2			
Roof Area	___ ft ²	x 1/3" x 1/12	= ___ ft ³
For all other disconnected roof areas			
Roof Area	___ ft ²	x 1/4" x 1/12	= ___ ft ³
5.2 Disconnect Non-Roof Impervious to Vegetated Areas (See Chapter 8, page 26 – SW BMP Manual)			
For Runoff directed to areas protected under 5.8.1 and 5.8.2			
Impervious Area	___ ft ²	x 1/3" x 1/12	= ___ ft ³
For all other disconnected roof areas			
Impervious Area	___ ft ²	x 1/4" x 1/12	= ___ ft ³
TOTAL NON-STRUCTURAL VOLUME CREDIT*			___ ft
*For use on Worksheet 5			

- If claiming Volume Credits, ensure that all criteria are met
- Include the criteria checklists in the application

Standard Worksheet 4

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Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: _____
 Drainage Area: _____
 2-Year Rainfall: _____ in

Total Site Area: _____ acres
 Protected Site Area: _____ acres
 Managed Area: _____ acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2'S)	Q Runoff (in)	Runoff Volume ² (ft ³)
Woodland								
Meadow								
Impervious								
TOTAL:								

Developed Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2'S)	Q Runoff (in)	Runoff Volume ² (ft ³)
TOTAL:								

2-Year Volume Increase (ft³):

2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume

- Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
 P = 2-Year Rainfall (in)
 S = (1000/ CN)-10
- Runoff Volume (CF) = Q x Area x 1/12
 Q = Runoff (in)
 Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

- Separate Worksheet 4 for each Drainage Area/Point of Interest

Standard Worksheet 4

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Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: _____
 Drainage Area: _____
 2-Year Rainfall: _____ in

Total Site Area: _____ acres
 Protected Site Area: _____ acres
 Managed Area: _____ acres

Existing Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2"S)	Q Runoff (in)	Runoff Volume ² (ft ³)
Woodland								
Meadow								
Impervious								
TOTAL:								

Developed Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2"S)	Q Runoff (in)	Runoff Volume ² (ft ³)
TOTAL:								

2-Year Volume Increase (ft³): _____

2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume

- Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
 P = 2-Year Rainfall (in)
 S = $(1000 / CN) - 10$
- Runoff Volume (CF) = $Q \times \text{Area} \times 1/12$
 Q = Runoff (in)
 Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

- Needs to match NOI Section D.3
- Needs to match Worksheet 3

Standard Worksheet 4

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Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: _____
 Drainage Area: _____
 2-Year Rainfall: _____ in

Total Site Area: _____ acres
 Protected Site Area: _____ acres
 Managed Area: _____ acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2'S)	Q Runoff (in)	Runoff Volume ² (ft ³)
Woodland								
Meadow								
Impervious								
TOTAL:								

Developed Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2'S)	Q Runoff (in)	Runoff Volume ² (ft ³)
TOTAL:								

2-Year Volume Increase (ft³): _____

2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume

- Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
 P = 2-Year Rainfall (in)
 S = (1000/ CN)-10
- Runoff Volume (CF) = Q x Area x 1/12
 Q = Runoff (in)
 Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Existing Conditions to be in compliance with 25 Pa Code Sections 102.8(g)(2)(i) and 102.8(g)(2)(ii)

Standard Worksheet 4

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Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: _____
 Drainage Area: _____
 2-Year Rainfall: _____ in

Total Site Area: _____ acres
 Protected Site Area: _____ acres
 Managed Area: _____ acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2'S)	Q Runoff (in)	Runoff Volume (ft ³)
Woodland								
Meadow								
Impervious								
TOTAL:								

Developed Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2'S)	Q Runoff (in)	Runoff Volume (ft ³)
TOTAL:								

2-Year Volume Increase (ft³): _____

2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume

- Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
 P = 2-Year Rainfall (in)
 S = (1000/ CN)-10
- Runoff Volume (CF) = $Q \times \text{Area} \times 1/12$
 Q = Runoff (in)
 Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Ex. Conditions Total
 Runoff Volume = Box 4
 of Section D.3 of NOI

Dev. Conditions Total
 Runoff Volume = Box 5
 of Section D.3 of NOI

Standard Worksheet 4

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Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: _____
 Drainage Area: _____
 2-Year Rainfall: _____ in

Total Site Area: _____ acres
 Protected Site Area: _____ acres
 Managed Area: _____ acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2"S)	Q Runoff (in)	Runoff Volume ² (ft ³)
Woodland								
Meadow								
Impervious								
TOTAL:								

Developed Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2"S)	Q Runoff (in)	Runoff Volume ² (ft ³)
TOTAL:								

2-Year Volume Increase (ft³):

2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume

- Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
 P = 2-Year Rainfall (in)
 S = (1000/ CN)-10
- Runoff Volume (CF) = Q x Area x 1/12
 Q = Runoff (in)
 Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

2-Year Volume Increase = Box 6 of Section D.3 of NOI

Standard Worksheet 4

- All disturbed areas shall be accounted for on Standard Worksheet 4
- If claiming meadow conditions in post dev. conditions, then clearly identify the vegetation/planting and area on the PCSM Plan

Standard Worksheet 5

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Worksheet 5. Structural BMP Volume Credits

PROJECT: _____
 SUB-BASIN: _____

Required Control Volume (ft³) – from Worksheet 4: _____

Non-structural Volume Credit (ft³) – from Worksheet 3:
 (maximum is 25% of required volume) - _____

Structural Volume Reqmt (ft³) _____

(Required Control Volume minus Non-structural Credit)

Proposed BMP	Area (ft ²)	Volume Reduction Permanently Removed (ft ³)
6.4.1 Porous Pavement		
6.4.2 Infiltration Basin		
6.4.3 Infiltration Bed		
6.4.4 Infiltration Trench		
6.4.5 Rain Garden/Bioretention		
6.4.6 Dry Well / Seepage Pit		
6.4.7 Constructed Filter		
6.4.8 Vegetated Swale		
6.4.9 Vegetated Filter Strip		
6.4.10 Berm		
6.5.1 Vegetated Roof		
6.5.2 Capture and Re-use		
6.8.1 Constructed Wetlands		
6.8.2 Wet Pond / Retention Basin		
6.7.1 Riparian Buffer/Riparian Forest Buffer Restoration		
6.7.2 Landscape Restoration / Reforestation		
6.7.3 Soil Amendment		
6.8.1 Level Spreader		
6.8.2 Special Storage Areas		
Other		

Total Structural Volume (ft³): _____

Structural Volume Requirement (ft³): _____

DIFFERENCE _____

- Separate Worksheet 5 for each Drainage Area/Point of Interest

Standard Worksheet 5

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Worksheet 5. Structural BMP Volume Credits

PROJECT: _____
 SUB-BASIN: _____

Required Control Volume (ft³) – from Worksheet 4: _____

Non-structural Volume Credit (ft³) – from Worksheet 4
 (maximum is 25% of required volume) _____

Structural Volume Requirement (ft³) _____

(Required Control Volume minus Non-structural Credit)

Proposed BMP	Area (ft ²)	Volume Reduction Permanently Removed (ft ³)
6.4.1 Porous Pavement		
6.4.2 Infiltration Basin		
6.4.3 Infiltration Bed		
6.4.4 Infiltration Trench		
6.4.5 Rain Garden/Bioretention		
6.4.6 Dry Well / Seepage Pit		
6.4.7 Constructed Filter		
6.4.8 Vegetated Swale		
6.4.9 Vegetated Filter Strip		
6.4.10 Berm		
6.5.1 Vegetated Roof		
6.5.2 Capture and Re-use		
6.6.1 Constructed Wetlands		
6.6.2 Wet Pond / Retention Basin		
6.7.1 Riparian Buffer/Riparian Forest Buffer Restoration		
6.7.2 Landscape Restoration / Reforestation		
6.7.3 Soil Amendment		
6.8.1 Level Spreader		
6.8.2 Special Storage Areas		
Other		

Total Structural Volume (ft³): _____

Structural Volume Requirement (ft³): _____

DIFFERENCE _____

NS Volume Credit cannot exceed 25% of Required Volume

Dev. Total Volume minus Difference =

Box 7 of Section D.3



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South-central Region
Waterways and Wetlands Program

Water Quality Compliance: Worksheets 10-13

Water Quality Compliance

- Chapter 8: Stormwater Calculations and Methodology [*Pennsylvania Stormwater Best Management Practices Manual* (PCSM Manual), DEP Document No. 363-0300-00]
- Chapter 8.6: Stormwater Quality Management

Water Quality Compliance

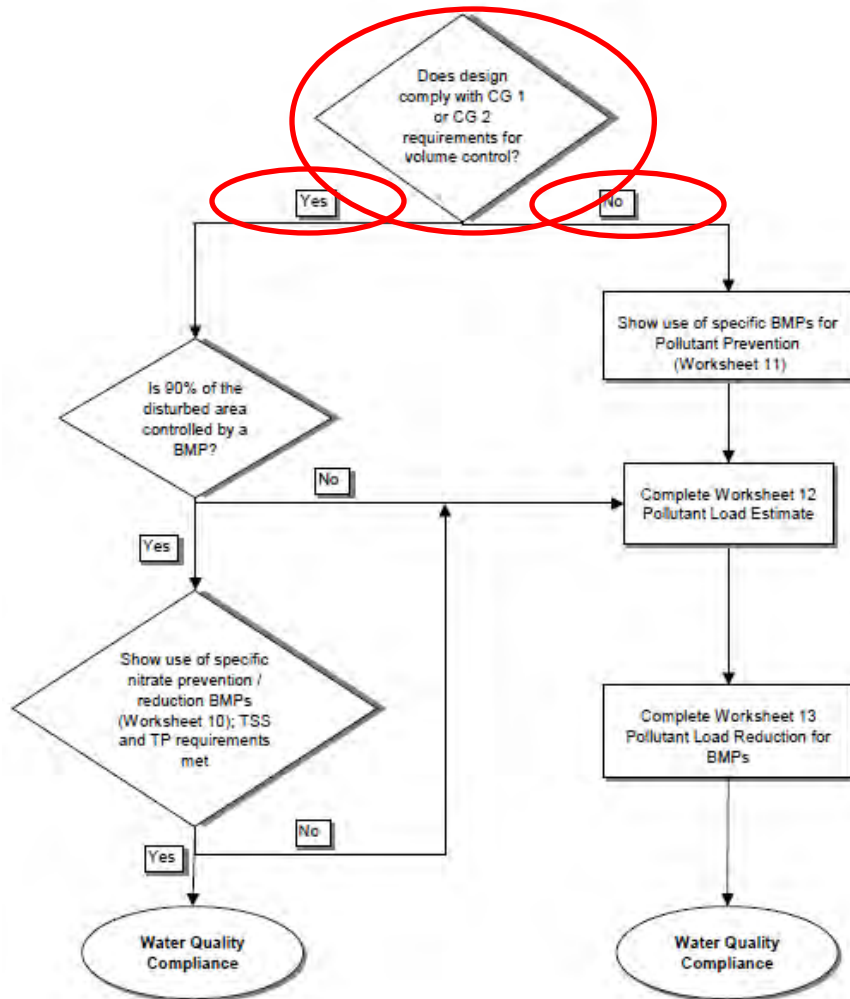
- Chapter 8.6: Stormwater Quality Management
(Page 7)
- Chapter 8.7.2: Water Quality Calculations
(Page 16)
- Flowchart D
(Page 40)

Water Quality Compliance

- If the site is discharging to one drainage area; then complete one set of water quality worksheets
- If the site is discharging to multiple drainage areas; then complete separate water quality worksheets for each watershed

Flow Chart D

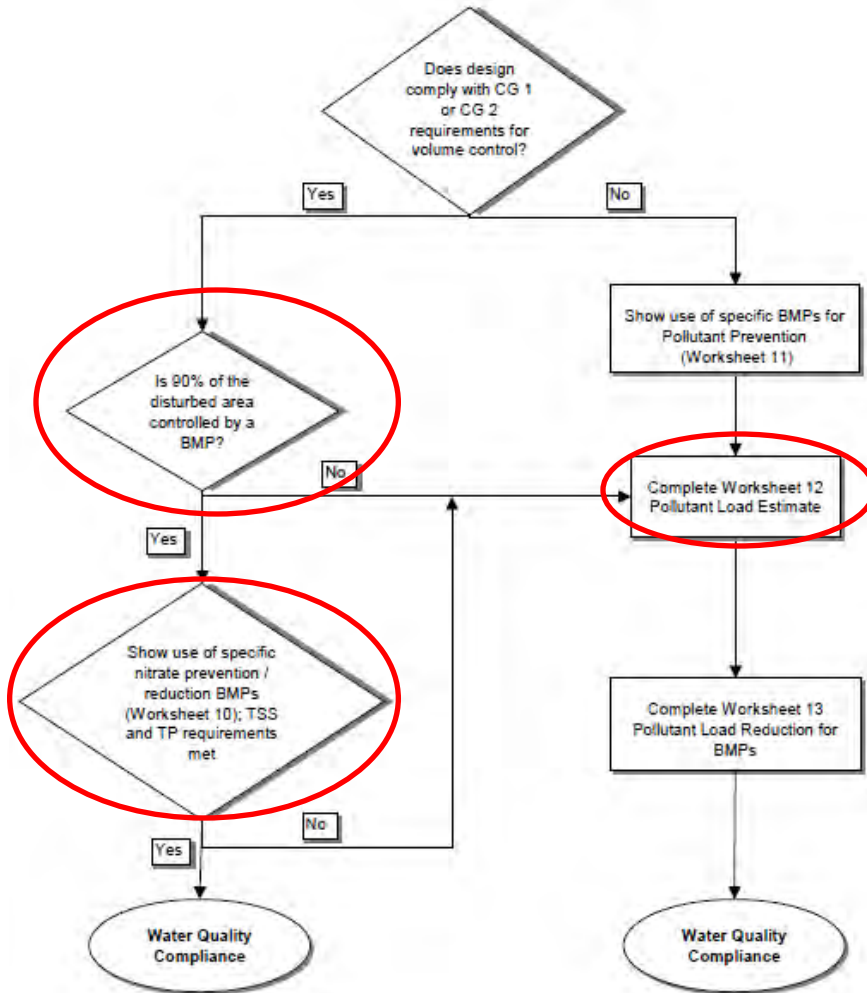
Flow Chart D
Water Quality Process



- Are you meeting CG-1/CG-2?
- Yes, left side of chart
- No, right side of chart

Flow Chart D: Meeting CG-1/CG-2

Flow Chart D
Water Quality Process



- Is 90 percent of the disturbed area controlled by a BMP?
- Yes, to Worksheet 10
- No, to Worksheet 12

Standard Worksheet 10

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Worksheet 10 – Water Quality Compliance for Nitrate

Does the site design incorporate the following BMPs to address nitrate pollution? A summary "yes" rating is achieved if at least 2 Primary BMPs for nitrate are provided across the site or 4 secondary BMPs for nitrate are provided across the site (or the equivalent) provided across the site" is taken to mean the specifications for that BMP set forward in Sections 5 and 6 are satisfied.

	Yes	No
Primary BMPs for Nitrate:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.2 – Protect/Conserve/Enhance Riparian Buffers	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.5.4 – Cluster Uses at Each Site	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.1 – Minimize Total Disturbed Area	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.3 – Re-Vegetate/Re-Forest Disturbed Areas (Native Species)	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.9.1 – Street Sweeping/Vacuuming	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
Secondary BMPs for Nitrate:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.1 – Protect Sensitive/Special Value Features	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.3 – Protect/Utilize Natural Drainage Features	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.2 – Minimize Soil Compaction	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.5 – Rain Garden/Bioretention	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.8 – Vegetated Swale	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.9 – Vegetated Filter Strip	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.6.1 – Constructed Wetland	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.3 – Soils Amendment/Restoration	<input type="checkbox"/>	<input type="checkbox"/>

- 2 Primary BMPs
- Or 4 Secondary BMPs
- Or 1 Primary and 2 Secondary BMPs

Standard Worksheet 10

- Ensure BMPs are clearly shown on PCSM Plan
- Ensure proper construction, operation and maintenance notes are on PCSM Plan
- Ensure BMP is in accordance with Chapters 5 or 6 of the *Manual*

Standard Worksheet 10

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Worksheet 10 – Water Quality Compliance for Nitrate		
Does the site design incorporate the following BMPs to address nitrate pollution? A summary "yes" rating is achieved if at least 2 Primary BMPs for nitrate are provided across the site or 4 secondary BMPs for nitrate are provided across the site (or the equivalent) "provided across the site" is taken to mean the specifications for that BMP set forward in Sections 5 and 6 are satisfied.		
	Yes	No
Primary BMPs for Nitrate:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.2 – Protect/Conserve/Enhance Riparian Buffers	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.5.4 – Cluster Uses at Each Site	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.1 – Minimize Total Disturbed Area	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.3 – Re-Vegetate/Re-Forest Disturbed Areas (Native Species)	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.9.1 – Street Sweeping/Vacuuming	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
Secondary BMPs for Nitrate:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.1 – Protect Sensitive/Special Value Features	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.3 – Protect/Utilize Natural Drainage Features	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.2 – Minimize Soil Compaction	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.5 – Rain Garden/Bioretention	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.8 – Vegetated Swale	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.9 – Vegetated Filter Strip	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.6.1 – Constructed Wetland	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.3 – Soils Amendment/Restoration	<input type="checkbox"/>	<input type="checkbox"/>

- Ensure these BMPs meet all the criteria on pages 18–26 in Chapter 8
- Include the checklists in the application

Standard Worksheet 10

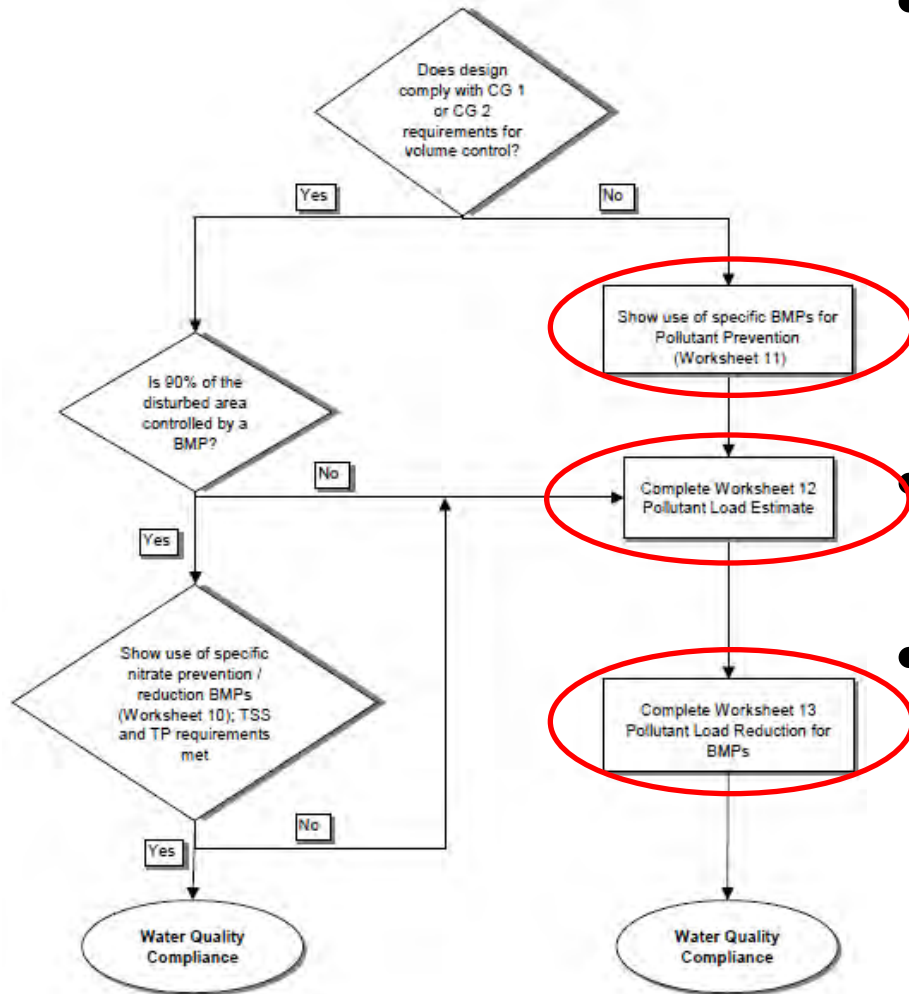
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Worksheet 10 – Water Quality Compliance for Nitrate		
Does the site design incorporate the following BMPs to address nitrate pollution? A summary "yes" rating is achieved if at least 2 Primary BMPs for nitrate are provided across the site or 4 secondary BMPs for nitrate are provided across the site (or the equivalent) "provided across the site" is taken to mean the specifications for that BMP set forward in Sections 5 and 6 are satisfied.		
	Yes	No
Primary BMPs for Nitrate:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.2 – Protect/Conserve/Enhance Riparian Buffers	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.5.4 – Cluster Uses at Each Site	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.1 – Minimize Total Disturbed Area	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.3 – Re-Vegetate/Re-Forest Disturbed Areas (Native Species)	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.9.1 – Street Sweeping/Vacuuming	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
Secondary BMPs for Nitrate:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.1 – Protect Sensitive/Special Value Features	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.3 – Protect/Utilize Natural Drainage Features	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.2 – Minimize Soil Compaction	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.5 – Rain Garden/Bioretention	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.8 – Vegetated Swale	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.4.9 – Vegetated Filter Strip	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.6.1 – Constructed Wetland	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.3 – Soils Amendment/Restoration	<input checked="" type="checkbox"/>	<input type="checkbox"/>

- If meet Worksheet 10, then obtained assumed water quality compliance
- If not, got to Worksheet 12 (only for NO₃)

▶ Flow Chart D: Not Meeting CG-1/CG-2

Flow Chart D
Water Quality Process



- Cannot meet CG-1/CG-2, then go to Worksheet 11
- Complete Worksheet 12
- Complete Worksheet 13

Standard Worksheet 11

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Worksheet 11 – BMPs for Pollution Prevention		
<p>Does the site design incorporate the following BMPs to address nitrate pollution? A summary "yes" rating is achieved if at least 2 Primary BMPs are provided across the site. "Provided across the site" is taken to mean that the specifications for that BMP set forward in Chapters 5 and 6 are satisfied.</p>		
	Yes	No
BMPs for Pollution Prevention:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.1 – Protect Sensitive/Special Value Features	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.2 – Protect/Conserve/Enhance Riparian Buffers	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.3 – Protect/Utilize Natural Flow Pathways in Overall Stormwater Planning and Design	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.5.1 – Cluster Uses at Each Site; Build on the Smallest Area Possible	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.1 – Minimize Total Disturbed Area - Grading	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.2 – Minimize Soil Compaction in Disturbed Areas	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.3 – Re-Vegetate/Re-Forest Disturbed Areas (Native Species)	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.7.1 – Reduce Street Imperviousness	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.7.2 – Reduce Parking Imperviousness	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.8.1 – Rooftop Disconnection	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.8.2 – Disconnection from Storm Sewers	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.9.15 – Street Sweeping	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.3 – Soils Amendment and Restoration	<input type="checkbox"/>	<input type="checkbox"/>

- 2 Primary BMPs

Standard Worksheet 11

- Ensure BMPs are clearly shown on PCSM Plan
- Ensure proper construction, operation and maintenance notes are on PCSM Plan
- Ensure BMP is in accordance with Chapters 5 or 6 of the *Manual*

Standard Worksheet 11

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Worksheet 11 – BMPs for Pollution Prevention		
Does the site design incorporate the following BMPs to address nitrate pollution? A summary "yes" rating is achieved if at least 2 Primary BMPs are provided across the site. "Provided across the site" is taken to mean that the specifications for that BMP set forward in Chapters 5 and 6 are satisfied.		
	Yes	No
BMPs for Pollution Prevention:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.1 – Protect Sensitive/Special Value Features	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.2 – Protect/Conserve/Enhance Riparian Buffers	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.3 – Protect/Utilize Natural Flow Pathways in Overall Stormwater Planning and Design	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.5.1 – Cluster Uses at Each Site; Build on the Smallest Area Possible	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.1 – Minimize Total Disturbed Area - Grading	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.2 – Minimize Soil Compaction in Disturbed Areas	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.3 – Re-Vegetate/Re-Forest Disturbed Areas (Native Species)	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.7.1 – Reduce Street Imperviousness	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.7.2 – Reduce Parking Imperviousness	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.8.1 – Rooftop Disconnection	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.8.2 – Disconnection from Storm Sewers	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.9.15 – Street Sweeping	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.3 – Soils Amendment and Restoration	<input type="checkbox"/>	<input type="checkbox"/>

- Ensure these BMPs meet all the criteria on pages 18–26 in Chapter 8
- Include the checklists in the application

Standard Worksheet 11

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Worksheet 11 – BMPs for Pollution Prevention		
Does the site design incorporate the following BMPs to address nitrate pollution? A summary "yes" rating is achieved if at least 2 Primary BMPs are provided across the site. "Provided across the site" is taken to mean that the specifications for that BMP set forward in Chapters 5 and 6 are satisfied.		
	Yes	No
BMPs for Pollution Prevention:	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.1 – Protect Sensitive/Special Value Features	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.2 – Protect/Conserve/Enhance Riparian Buffers	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.4.3 – Protect/Utilize Natural Flow Pathways in Overall Stormwater Planning and Design	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.5.1 – Cluster Uses at Each Site; Build on the Smallest Area Possible	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.1 – Minimize Total Disturbed Area - Grading	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.2 – Minimize Soil Compaction in Disturbed Areas	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.6.3 – Re-Vegetate/Re-Forest Disturbed Areas (Native Species)	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.7.1 – Reduce Street Imperviousness	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.7.2 – Reduce Parking Imperviousness	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.8.1 – Rooftop Disconnection	<input type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.8.2 – Disconnection from Storm Sewers	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NS BMP 5.9.15 – Street Sweeping	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.1 – Riparian Buffer Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.2 – Landscape Restoration	<input type="checkbox"/>	<input type="checkbox"/>
Structural BMP 6.7.3 – Soils Amendment and Restoration	<input type="checkbox"/>	<input type="checkbox"/>

- If you meet Worksheet 11, then go to Worksheet 12
- If not, then you have not met water quality compliance

Standard Worksheet 12

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Worksheet 12 – Water Quality Analysis of Pollutant Loading from All Disturbed Areas

Total Site Area (AC)	
Total Disturbed Area (AC)	
Disturbed Area Controlled by BMPs (AC)	

Total Disturbed Areas:

	Land Cover Classification	Pollutant			Cover (Acres)	Runoff Volume (AF)	Pollutant Load		
		TSS EMC (mg/l)	TP EMC (mg/l)	Nitrate-Nitrite EMC (mg/l as N)			TSS** (LBS)	TP** (LBS)	NO ₃ (LBS)
Pervious Surfaces	Forest	39	0.15	0.17					
	Meadow	47	0.19	0.3					
	Fertilized Planting Area	55	1.34	0.73					
	Native Planting Area	55	0.40	0.33					
	Lawn, Low-Input	180	0.40	0.44					
	Lawn, High-Input	180	2.22	1.46					
	Golf Course Fairway/Green	305	1.07	1.84					
	Grassed Athletic Field	200	1.07	1.01					
Impervious Surfaces	Rooftop	21	0.13	0.32					
	High Traffic Street/Highway	261	0.40	0.83					
	Medium Traffic Street	113	0.33	0.58					
	Low Traffic/Residential Street	86	0.38	0.47					
	Res. Driveway, Play Courts, etc.	60	0.46	0.47					
	High Traffic Parking Lot	120	0.39	0.60					
	Low Traffic Parking Lot	58	0.15	0.39					
	TOTAL LOAD								
REQUIRED REDUCTION (%)							85%	85%	50%
REQUIRED REDUCTION (LBS)									

*Pollutant Load = [EMC, mg/l] X [Volume, AF] X [2.7, Unit Conversion]

**TSS and TP calculations only required for projects not meeting CG1/CG2 or not controlling less than 90% of the disturbed area

- All disturbed area to be accounted for (match NOI)
- Cover is based on post construction conditions

Standard Worksheet 12

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Worksheet 12 – Water Quality Analysis of Pollutant Loading from All Disturbed Areas

Total Site Area (AC)	
Total Disturbed Area (AC)	
Disturbed Area Controlled by BMPs (AC)	

Total Disturbed Areas:

	Land Cover Classification	Pollutant			Cover (Acres)	Runoff Volume (AF)	Pollutant Load		
		TSS EMC (mg/l)	TP EMC (mg/l)	Nitrate-Nitrite EMC (mg/l as N)			TSS** (LBS)	TP** (LBS)	NO ₃ (LBS)
Pervious Surfaces	Forest	39	0.15	0.17					
	Meadow	47	0.19	0.3					
	Fertilized Planting Area	55	1.94	0.73					
	Native Planting Area	55	0.40	0.33					
	Lawn, Low-Input	180	0.40	0.44					
	Lawn, High-Input	180	2.22	1.46					
	Golf Course Fairway/Green	305	1.07	1.84					
	Grassed Athletic Field	200	1.07	1.01					
Impervious Surfaces	Rooftop	21	0.13	0.32					
	High Traffic Street/Highway	261	0.40	0.83					
	Medium Traffic Street	113	0.33	0.58					
	Low Traffic/Residential Street	98	0.30	0.47					
	Res. Driveway, Play Courts, etc.	80	0.46	0.47					
	High Traffic Parking Lot	120	0.39	0.60					
	Low Traffic Parking Lot	58	0.15	0.39					
TOTAL LOAD									
REQUIRED REDUCTION (%)							85%	85%	50%
REQUIRED REDUCTION (LBS)									

Native Planting Area

Lawn, Low-Input

Low Traffic Parking Lot

(same for Worksheet 13)

*Pollutant Load = [EMC, mg/l] X [Volume, AF] X [2.7, Unit Conversion]

**TSS and TP calculations only required for projects not meeting CG1/CG2 or not controlling less than 90% of the disturbed area

Standard Worksheet 13

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Worksheet 13 – Pollutant Reduction Through BMP Applications*

*Fill this worksheet out for each BMP type with different pollutant removal efficiencies. Sum pollutant reduction achieved for all BMP types on final sheet.

BMP Type: _____

Disturbed Area Controlled by this BMPs (A^c)

Disturbed Area Controlled by this BMPs:

	Land Cover Classification	Pollutant			Runoff Volume (AF)	Pollutant Load**		
		TSS EMC (mg/l)	TP EMC (mg/l)	Nitrate-Nitrite EMC (mg/l as N)		TSS** (LBS)	TP** (LBS)	NO ₃ (LBS)
Pervious Surfaces	Forest	39	0.15	0.17				
	Meadow	47	0.19	0.3				
	Fertilized Planting Area	55	1.34	0.73				
	Native Planting Area	55	0.40	0.33				
	Lawn, Low-Input	180	0.40	0.44				
	Lawn, High-Input	180	2.22	1.46				
	Golf Course Fairway/Green	305	1.07	1.84				
	Grassed Athletic Field	200	1.07	1.01				
Impervious Surfaces	Rooftop	21	0.13	0.32				
	High Traffic Street/Highway	261	0.40	0.83				
	Medium Traffic Street	113	0.33	0.58				
	Low Traffic/Residential Street	86	0.36	0.47				
	Res. Driveway, Play Courts, etc.	60	0.46	0.47				
	High Traffic Parking Lot	120	0.39	0.80				
	Low Traffic Parking Lot	58	0.15	0.39				
TOTAL LOAD TO THIS BMP TYPE								
POLLUTANT REMOVAL EFFICIENCIES FROM APPENDIX A. STORMWATER MANUAL (%)						85%	85%	50%
POLLUTANT REDUCITON ACHIEVED BY THIS BMP TYPE (LBS)								
POLLUTANT REDUCTION ACHIEVED BY ALL BMP TYPES (LBS)								
REQUIRED REDUCTION from WS12 (LBS)								

*Pollutant Load = [EMC, mg/l] X [Volume, AF] X [2.7, Unit Conversion]

**TSS and TP calculations only required for projects not meeting CG1/CG2 or not controlling less than 90% of the disturbed area

Standard Worksheet 13

- Make sure to account for BMPs in a Series, i.e. do not double dip on pollutant loading
- If you are doing BMPs in a Series, clearly identify the separate BMPs in the calculations and you may need to provide a delineation map to each BMP

Standard Worksheet 13

- How to handle BMPs in a Series:
 - Removal efficiency for series (Chapter 8, Page 11)

$$R = 1 - \{(1 - r_1) * (1 - r_2) * (1 - r_3) \dots\}$$

R = Efficiency Removal of Series

r_i = Efficiency of BMP_i

- First printing of *Manual* had + instead of *

Standard Worksheet 13

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Worksheet 13 – Pollutant Reduction Through BMP Applications*

*Fill this worksheet out for each BMP type with different pollutant removal efficiencies. Sum pollutant reduction achieved for all BMP types on final sheet.

BMP Type: _____

Disturbed Area Controlled by this BMPs (AC)

Disturbed Area Controlled by this BMPs:

	Land Cover Classification	Pollutant			Cover (Acres)	Runoff Volume (AF)	Pollutant Load**		
		TSS EMC (mg/l)	TP EMC (mg/l)	Nitrate-Nitrite EMC (mg/l as N)			TSS** (LBS)	TP** (LBS)	NO ₃ (LBS)
Pervious Surfaces	Forest	39	0.15	0.17					
	Meadow	47	0.19	0.3					
	Fertilized Planting Area	55	1.34	0.73					
	Native Planting Area	55	0.40	0.33					
	Lawn, Low-Input	180	0.40	0.44					
	Lawn, High-Input	180	2.22	1.46					
	Golf Course Fairway/Green	305	1.07	1.84					
	Grassed Athletic Field	200	1.07	1.01					
Impervious Surfaces	Rooftop	21	0.13	0.32					
	High Traffic Street/Highway	261	0.40	0.83					
	Medium Traffic Street	113	0.33	0.58					
	Low Traffic/Residential Street	86	0.36	0.47					
	Res. Driveway, Play Courts, etc.	60	0.46	0.47					
	High Traffic Parking Lot	120	0.39	0.80					
	Low Traffic Parking Lot	58	0.15	0.39					
TOTAL LOAD TO THIS BMP TYPE									
POLLUTANT REMOVAL EFFICIENCIES FROM APPENDIX A. STORMWATER MANUAL (%)							85%	85%	80%
POLLUTANT REDUCITON ACHIEVED BY THIS BMP TYPE (LBS)									
POLLUTANT REDUCTION ACHIEVED BY ALL BMP TYPES (LBS)									
REQUIRED REDUCTION from WS12 (LBS)									

*Pollutant Load = [EMC, mg/l] X [Volume, AF] X [2.7, Unit Conversion]

**TSS and TP calculations only required for projects not meeting CG1/CG2 or not controlling less than 90% of the disturbed area

- BMPs in a series: may modify Worksheet 13 to include a line for pollutant loading not removed (pollutants going downstream)

Water Quality Compliance

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Worksheet 13 – Pollutant Reduction Through BMP Applications*

*Fill this worksheet out for each BMP type with different pollutant removal efficiencies. Sum pollutant reduction achieved for all BMP types on final sheet.

BMP Type: _____

Disturbed Area Controlled by this BMPs (AC)

Disturbed Area Controlled by this BMPs:

	Land Cover Classification	Pollutant			Cover (Acres)	Runoff Volume (AF)	Pollutant Load**		
		TSS EMC (mg/l)	TP EMC (mg/l)	Nitrate-Nitrite EMC (mg/l as N)			TSS** (LBS)	TP** (LBS)	NO ₃ (LBS)
Pervious Surfaces	Forest	39	0.15	0.17					
	Meadow	47	0.19	0.3					
	Fertilized Planting Area	55	1.34	0.73					
	Native Planting Area	55	0.40	0.33					
	Lawn, Low-Input	180	0.40	0.44					
	Lawn, High-Input	180	2.22	1.46					
	Golf Course Fairway/Green	305	1.07	1.84					
	Grassed Athletic Field	200	1.07	1.01					
Impervious Surfaces	Rooftop	21	0.13	0.32					
	High Traffic Street/Highway	261	0.40	0.83					
	Medium Traffic Street	113	0.33	0.58					
	Low Traffic/Residential Street	86	0.36	0.47					
	Res. Driveway, Play Courts, etc.	60	0.46	0.47					
	High Traffic Parking Lot	120	0.39	0.80					
	Low Traffic Parking Lot	58	0.15	0.39					
TOTAL LOAD TO THIS BMP TYPE									
POLLUTANT REMOVAL EFFICIENCIES FROM APPENDIX A. STORMWATER MANUAL (%)							85%	85%	50%
POLLUTANT REDUCITON ACHIEVED BY THIS BMP TYPE (LBS)									
POLLUTANT REDUCTION ACHIEVED BY ALL BMP TYPES (LBS)									
REQUIRED REDUCTION from WS12 (LBS)									

BMPs in a Series:

add line for the downstream BMP to account for pollutants not removed by upstream the BMP

*Pollutant Load = [EMC, mg/l] X [Volume, AF] X [2.7, Unit Conversion]

**TSS and TP calculations only required for projects not meeting CG1/CG2 or not controlling less than 90% of the disturbed area

Standard Worksheet 13

- You cannot use two BMPs in one. A detention basin with infiltration is either an extended dry detention basin or an infiltration basin. You cannot have a Worksheet 13 for the EDDB and a Worksheet 13 for the infiltration

Table A-4: Summary of Efficiencies

Table A-4. Summary of pollutant removal efficiencies of stormwater BMPs.

COMPREHENSIVE BMP LIST				
		Pollutant Removal Efficiency %		
		TSS	TP	NO3
Non-Structural BMP				
5.4.1	Protect Sensitive / Special Value Features	SC	SC	SC
5.4.2	Protect / Conserve / Enhance Riparian Areas	SC	SC	SC
5.4.3	Protect / Utilize Natural Flow Pathways in Overall Stormwater Planning and Design	30	20	0
5.5.1	Cluster Uses at Each Site; Build on the Smallest Area Possible	SC	SC	SC
5.5.2	Concentrate Uses Areawide through Smart Growth Practices	SC	SC	SC
5.6.1	Minimize Total Disturbed Area - Grading	40	0	0
5.6.2	Minimize Soil Compaction in Disturbed Areas	30	0	0
5.6.3	Re-vegetate and Re-forest Disturbed Areas using Native Species	85	85	50
5.7.1	Reduce Street Imperviousness	SC	SC	SC
5.7.2	Reduce Parking Imperviousness	SC	SC	SC
5.8.1	Rooftop Disconnection	30	0	0
5.8.2	Disconnection from Storm Sewers	30	0	0
5.9.1	Streetsweeping	85	85	50
Structural BMP				
6.4.1	Porous Pavement with Infiltration Bed	85	85	30
6.4.2	Infiltration Basin	85	85	30
6.4.3	Subsurface Infiltration Bed	85	85	30
6.4.4	Infiltration Trench	85	85	30
6.4.5	Rain Garden / Bioretention	85	85	30
6.4.6	Dry Well / Seepage Pit	85	85	30
6.4.7	Constructed Filter	85	85	30
6.4.8	Vegetated Swale	50	50	20
6.4.9	Vegetated Filter Strip	30	20	10
6.4.10	Infiltration Berm and Retentive Grading	60	50	40
6.5.1	Vegetated Roof	85	85	30
6.5.2	Rooftop Runoff - Capture and Reuse	100	100	100
6.6.1	Constructed Wetland	85	85	30
6.6.2	Wet Pond / Retention Basin	70	60	30
6.6.3	Dry Extended Detention Basin	60	40	20
6.6.4	Water Quality Filter	60	50	20
6.7.1	Riparian Buffer Restoration	85	50	50
6.7.2	Landscape Restoration	85	85	50
6.7.3	Soils Amendment and Restoration	85	85	50

SC, Self Crediting: The BMP reduces the pollutant load, thus is self-crediting. BMPs with this designation are labeled as "Preventive" in Section 5.

- Table A-4 from Appendix A of the *Manual*
- Watch Water Quality Filter

Table A-4: Summary of Efficiencies

Table A-4. Summary of pollutant removal efficiencies of stormwater BMPs.

COMPREHENSIVE BMP LIST				
		Pollutant Removal Efficiency %		
		TSS	TP	NO3
Non-Structural BMP				
5.4.1	Protect Sensitive / Special Value Features	SC	SC	SC
5.4.2	Protect / Conserve / Enhance Riparian Areas	SC	SC	SC
5.4.3	Protect / Utilize Natural Flow Pathways in Overall Stormwater Planning and Design	30	20	0
5.5.1	Cluster Uses at Each Site; Build on the Smallest Area Possible	SC	SC	SC
5.5.2	Concentrate Uses Areawide through Smart Growth Practices	SC	SC	SC
5.6.1	Minimize Total Disturbed Area - Grading	40	0	0
5.6.2	Minimize Soil Compaction in Disturbed Areas	30	0	0
5.6.3	Re-vegetate and Re-forest Disturbed Areas using Native Species	85	85	50
5.7.1	Reduce Street Imperviousness	SC	SC	SC
5.7.2	Reduce Parking Imperviousness	SC	SC	SC
5.8.1	Rooftop Disconnection	30	0	0
5.8.2	Disconnection from Storm Sewers	30	0	0
5.9.1	Streetsweeping	85	85	50
Structural BMP				
6.4.1	Porous Pavement with Infiltration Bed	85	85	30
6.4.2	Infiltration Basin	85	85	30
6.4.3	Subsurface Infiltration Bed	85	85	30
6.4.4	Infiltration Trench	85	85	30
6.4.5	Rain Garden / Bioretention	85	85	30
6.4.6	Dry Well / Seepage Pit	85	85	30
6.4.7	Constructed Filter	85	85	30
6.4.8	Vegetated Swale	50	50	20
6.4.9	Vegetated Filter Strip	30	20	10
6.4.10	Infiltration Berm and Retentive Grading	60	50	40
6.5.1	Vegetated Roof	85	85	30
6.5.2	Rooftop Runoff - Capture and Reuse	100	100	100
6.6.1	Constructed Wetland	85	85	30
6.6.2	Wet Pond / Retention Basin	70	60	30
6.6.3	Dry Extended Detention Basin	60	40	20
6.6.4	Water Quality Filter	60	50	20
6.7.1	Riparian Buffer Restoration	85	50	50
6.7.2	Landscape Restoration	85	85	50
6.7.3	Soils Amendment and Restoration	85	85	50

- These values are generic and not specific
- If using a manufactured device, provide the manufacturer's removal efficiencies



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION



South-central Region
Waterways and Wetlands Program

Nathan R. Crawford, P.E.
Permits Section Chief
Waterways & Wetlands Program
South-central Region
(717) 705-4798
nathcrawfo@pa.gov