



Planning & Zoning: Step-by-Step Guide

Buffer Management Plans: Planting Plan & Landscape Schedule

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This form determines Establishment, Mitigation or Combination. It calculates area in square feet unless otherwise stated.

To use this form, simply fill out the BLUE boxes on this page and the rest will calculate automatically.

Project Name or Address		Project Number	
Date submitted:		Cross-referenced Projects?	

Step 1: Disturbance within the 100 foot and/or Expanded Buffer

Will this project disturb any ground, soil or trees within 100' of any stream, creek or waterway?

No	Proceed to Step 5.	Yes	If Yes, mitigation is required. Proceed to Step 2.
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Step 2: Determine Required Mitigation Area for Disturbance

Calculate the total area disturbed within the 100-foot and expanded Buffer.

Multiply this area by the mitigation ratio in Table 1 below for square footage.

Table 1. Mitigation Ratios for Development Activities

Activity	Mitigation Ratio	sq ft disturbed	mitigation required
Shore erosion control	1:1		
Riparian water access	2:1		
Development or redevelopment of water-dependent facilities	2:1		
Variance	3:1		
Violation	4:1		
Total Buffer Disturbance Mitigation Required:			

Step 3: Determine Required Mitigation Area for Clearing Trees

Calculate total diameter of all trees removed within the 100-foot and expanded Buffer that are 2 inches or more in diameter. (A tree's diameter = circumference divided by 3.142.) Multiply the total number of inches by 100 SF.

Tree Clearing Mitigation:

Diameter (inches) x 100 SF = SqFt

Step 4: Determine Total Mitigation

Add the results from Step 2 and Step 3 to determine the total mitigation requirement.

Buffer Disturbance Mitigation (Step 2):		
Add: Tree Mitigation (Step 3):	+	
Equals: Total Mitigation Required:	=	

SqFt

Project Name or Address		Project Number	
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Step 5: Determine Required Establishment Area for Development

Identify development category. Determine when the lot was created (grandfathered status). Use Table 2 to determine how much of the Buffer must be established. Use site plan to determine the amount of acreage located within the Buffer.

Table 2. Establishment Categories and Requirements

Development Category	Before Local Program Date	After Local Program Date
New development on vacant lot	Establishment based on total lot coverage	Full establishment
New subdivision or new lot	Full establishment	
New lot with an existing dwelling unit	Establishment based on total lot coverage	
Conversion of land use on a parcel or lot to another land use	Full establishment	
Addition or accessory structure	Establishment based on net increase in lot coverage	
Substantial alteration	Establishment based on total lot coverage	

Establishment Required? Yes No

Year Lot Created:

Establishment Requirement:

Total Area of Buffer Requiring Establishment SqFt

Step 6: Adjust Full Establishment for Existing Forest Cover

If the project requires full establishment of the Buffer, and existing forested vegetation is present on the site, use the site plan, aerial imagery, and/or a site visit to determine the percentage of the Buffer that is forested. Reduce the establishment requirement by this percentage.

For example, if the entire area of the Buffer is 2000 SF, and the existing tree line indicates that approximately 10 percent of the Buffer is forested, then the required Buffer establishment would be 1800 SF.

Full Establishment of Buffer Required? Yes No

If yes:

Total Area of Buffer Required to be Established (step 5):		SqFt
Less: Total Area of Buffer in Existing Forest:	+	SqFt
Equals: Modified Area of Buffer Required to be Established:	=	SqFt

Step 7: Determine Eligibility for Natural Regeneration

If the project requires Buffer establishment greater than one acre, then 50% of the area required can be established through natural regeneration, as long as it is within 50 feet of mature forest, and a supplemental planting plan & financial assurance are provided. If eligible, identify the natural regeneration area on the plan and reduce the planting requirement by the natural regeneration square footage.

Total Area of Buffer Required to Be Established (Step 5 or Step 6):		SqFt
Total Establishment > 1 acre? (1 acre = 43,560 sqft)	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Natural Regeneration Permitted? If Establishment > 1 acre, YES, otherwise, NO.	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Area Eligible for Natural Regeneration:		

Project Name or Address		Project Number	
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Step 8: Determine Stocking

Use Table 3 to determine how much of the area to be planted must be landscaping stock and what area may be planted using "flexible stocking."

Table 3. Stocking Options

Requirement	Amount	Options
Establishment	Less than 1/4 acre	Landscaping Stock
	1/4 acre up to or equal to 1 acre	Landscaping stock = 50% Minimum Flexible stocking = Remainder
	Greater than 1 acre up to or equal to 5 acres	Landscaping stock = 25% Minimum Flexible stocking = Remainder
	Greater than 5 acres	Landscaping stock = 10% Minimum Flexible stocking = Remainder
Mitigation	Less than 1 acre	Landscaping stock
	Equal to or greater than 1 acre	Landscaping stock = 50% Minimum Flexible stocking = Remainder

Establishment Requirement:						SqFt
Stocking Requirement:	Landscaping Stock:		% x	SqFt =		SqFt
	Flexible Stock:		% x	SqFt =		SqFt
	Natural Regeneration:		% x	SqFt =		SqFt

Mitigation Requirement:						SqFt
Stocking Requirement:	Landscaping Stock:		% x	SqFt =		SqFt
	Flexible Stock:		% x	SqFt =		SqFt
	Natural Regeneration:		% x	SqFt =		SqFt

Step 9: Determine if Planting Clusters Can Be Used and Calculate Quantities

If the planting requirement for either Buffer establishment or mitigation is less than 1 acre, then planting clusters may be used. Planting clusters provide bonus credit over individual trees and shrubs because the "cluster design" maximizes the water quality and habitat benefits on smaller sites. Planting clusters are considered "landscaping stock."

Using Table 4, choose a cluster type or types and divide the planting square footage by 300 or 350 to determine the number of clusters. On the planting plan, the plants in each cluster must be grouped together in a mulched bed. The planting plan should provide a schematic of how the clusters will be arranged.

Table 4. Cluster Options

Vegetation Type	Minimum Size Eligible for Credit	Maximum Credit Allowed (SF)	Maximum Percent of Credit
Planting Cluster 1	1 Canopy Tree and 3 Large Shrubs	300	N/A
Planting Cluster 1	2 Canopy Tree and 6 Small Shrubs	300	N/A
Planting Cluster 2	2 Understory Trees and 3 Large Shrubs	350	N/A
Planting Cluster 2	2 Understory Trees and 6 Small Shrubs	350	N/A

Calculations are available on the top of the next page.

Project Name or Address		Project Number	
Total Establishment/Mitigation < 1 acre? Yes <input type="checkbox"/> No <input type="checkbox"/>			
If yes:			
Planting Cluster 1:	<input type="text"/>	(Quantity) x	<input type="text"/> SqFt = <input type="text"/> 0 SqFt
Add: Planting Cluster 2:	<input type="text"/>	(Quantity) x	<input type="text"/> SqFt = <input type="text"/> 0 SqFt
Equals: Total Cluster Planting:	<input type="text"/>	(Quantity) x	<input type="text"/> SqFt = <input type="text"/> 0 SqFt

Step 10: Determine Landscaping Stock Type, Size and Quantity

Based on the results in Step 8 and Step 9, determine the remaining square footage of planting required using landscaping stock.

Use Table 5 to determine the square footage credits for canopy trees, understory trees, large shrubs, small shrubs, and herbaceous perennials. Herbaceous perennials can only be used for planting requirements that are less than one acre. Use the "Maximum Percent of Credit" to determine what square footage of the required planting can be herbaceous perennials, small shrubs, or large shrubs as desired by the landowner.

Divide the square footage by the maximum credit allowed to determine the number of plants of each type that are needed. Because trees maximize water quality and habitat benefits, there is no maximum on the number of canopy trees and understory trees.

The area around the plantings should be mulched or established with other ground cover that will ensure long-term survivability and reduce the threat of invasive species. If full establishment is required, plantings should be evenly distributed throughout the Buffer.

Table 5. Plant Credits

Vegetation Type	Minimum Size Eligible for Credit	Maximum Credit Allowed (SF)	Maximum Percent of Credit
Canopy Tree	2-inch caliper and 8 feet high	200	N/A
Canopy Tree	2-inch caliper and 6 feet high	100	N/A
Understory Tree	1-inch caliper and 6 feet high	75	N/A
Large Shrub	1 gallon and 4 feet high	50	30
Small Shrub	1 gallon and 18 inches high	25	20
Herbaceous Perennial	1 quart	2	10

Total Area of Buffer Required to be Planted:		<input type="text"/>	SqFt
Less: Natural Regeneration Area (Step 7):	-	<input type="text"/>	SqFt
Less: Flexible Stock (Step 8):		<input type="text"/>	SqFt
Less: Cluster Planting (Step 9)	-	<input type="text"/>	SqFt
Equals: Planting Required w/Landscaping Stock:	=	<input type="text"/>	SqFt

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Step 11: Determine "Flexible Stocking" Size and Quantity

If the results of Step 8 allow flexible stocking, use Table 6 to determine the number of trees that must be planted, depending on whether they are seedlings or whips, small container trees, or larger container trees. (The square footage number will need to be divided by 43,560 and then multiplied by the number of stems per acre.)

Only tree species can be used. It is important to note that higher quantities are required because survival has been adjusted to address normal mortality. Monitoring and financial assurance are mandatory.

Table 6. Flexible Stocking

Stock Size (Trees Only)	Required Number of Stems Per Acre	Survivability Requirement	Financial Assurance Period After Planting
Bare root seedling or whip	700	50 percent	5 years
1/2-inch to 1-inch container grown trees	450	75 percent	2 years
More than 1-inch container grown trees	350	90 percent	2 years

Flexible Stock, square feet (Step 8):

Bare Root Seedling or Whip	<input style="width: 40px;" type="text"/>	sqft	x	700	stems/acre	=	<input style="width: 40px;" type="text"/>	stems
1/2-inch to 1-inch container grown trees	<input style="width: 40px;" type="text"/>	sqft	x	450	stems/acre	=	<input style="width: 40px;" type="text"/>	stems
> 1-inch container grown trees	<input style="width: 40px;" type="text"/>	sqft	x	350	stems/acre	=	<input style="width: 40px;" type="text"/>	stems

Step 12: Evaluate Species

All species used should be species native to the Chesapeake Bay and Atlantic Coastal Bays Watersheds. All species in the U.S. Fish and Wildlife Service publication entitled *Native Plants for Wildlife Habitat and Conservation Landscaping - Chesapeake Bay Watershed* are acceptable species that may be used to meet Buffer mitigation or establishment requirements.

The publication is available at <http://www.nps.gov/plants/pubs/chesapeake/>

The classifications as trees, shrubs, and herbaceous plants (including ferns, grasses and grass-like plants, emergents, and vines) used in the publication will be used to determine plant type.

Heights of the various species will be used to determine which species are understory or canopy trees and which species are large or small shrubs. These classifications are based on mature size. A local government may specify the use of salt tolerant species on certain sites and in certain locations as warranted by site conditions.

Step 13: Ensure Species Diversity

It is generally advisable to plant a variety of species within the types by using a few different species of canopy trees, understory trees, large shrubs, small shrubs and herbaceous perennials. Identifying existing species on or around the project site can provide a general indication of those that will adapt well.

For Major Buffer Management Plans, shrubs may not exceed 50 percent of the planting requirement, and no single species may exceed 20 percent of the total planting requirement.

Major Buffer Management Plan (>5,000 sq.ft. of disturbance)? Yes No

If yes:

Maximum percentage of shrubs:	<input style="width: 40px;" type="text"/>	sqft	x	50	percent	=	<input style="width: 40px;" type="text"/>	sqft
Single Species:	<input style="width: 40px;" type="text"/>	sqft	x	20	percent	=	<input style="width: 40px;" type="text"/>	sqft

* = Total Area of Buffer Requiring Establishment (Step 5 or Step 6)