City of Charlottesville – Stream Buffer Mitigation Manual for the Water Protection Ordinance

The purpose of this manual is to provide guidance to the City of Charlottesville staff and affected landowners on implementing the stream buffer requirements of the Water Protection Ordinance.

This manual contains the following sections:

1. Stream Buffers – What They Are & Why it is Important to Protect Them
2. Mitigation – What it is & Why it's Required in Certain Circumstances
3. Mitigation Plan Approval Process
4. Mitigation Options
5. Standard Details & Design Guidance
6. Sample Plans for Residential Mitigation

1. Stream Buffers – What They Are & Why It is Important to Protect Them

Stream buffers are areas of vegetation along waterways that perform important functions by being a barrier between a particular land use (house, lawn, commercial area) and the water. Ideally, a stream buffer consists of three levels of vegetation: (1) trees, (2) shrubs, and (3) ground cover. Together, these three layers of vegetation function as a system to protect ecological values and water quality.

The Water Protection Ordinance defines "stream buffer" as follows:

An area of land at or near a tributary streambank and/or nontidal wetland that has an intrinsic water quality value due to the ecological and biological processes it performs or is otherwise sensitive to changes which may result in significant degradation to the quality of state waters (Section 10-5).

The Water Protection Ordinance specifies that stream buffers shall be retained or established for the purposes of retarding runoff, preventing erosion, and filtering nonpoint source pollution from runoff (Section 10-71). Other values of stream buffers include:

- Protecting aquatic and terrestrial habitats by provided food, shade, and structural habitat features.
- Holding streambanks in place and protecting property owners from damage from streambank erosion.
- Providing natural flood control and protection by functioning as a giant sponge to absorb and slow down flood waters.
- Providing areas of refuge and recreation within an urban setting. The Rivanna Trails Foundation paths and City of Charlottesville greenbelt are excellent examples.
- Helping to improve air quality by filtering dust and absorbing airborne pollutants.

Stream buffers are not just a local issue, but are important objectives of the Chesapeake Bay Program (Chesapeake 2000 Agreement, http://www.chesapeakebay.net/c2k.htm), Virginia's Chesapeake Bay Preservation Act (http://www.cblad.state.va.us/), and the

Virginia Department of Forestry (http://www.dof.virginia.gov/rfb/index.shtml), among, other agencies and programs.

2. Mitigation – What it is & Why it's Required in Certain Circumstances

Stream buffers are valued for the functions they provide to landowners, the community, and the environment, as described above. In certain circumstances, development activities may be permitted to encroach into a stream buffer, as authorized by the Department of Neighborhood Services (NDS) in accordance with criteria in the Water Protection Ordinance (Section 10-74). In these circumstances, a mitigation plan is required that spells out measures to replace, protect, or preserve the functions that are being lost due to the encroachment (Section 10-75). For example, if vegetation is proposed to be removed from the buffer, then the plan can specify how similar vegetation will be planted elsewhere in the buffer. It is important that the mitigation plan address how the functions of the buffer are being replaced or mitigated for.

3. Mitigation Plan Approval Process

Mitigation Plans must be approved BEFORE an encroachment or disturbance to the stream buffer takes place. Otherwise, the activity would be considered a violation of the Water Protection Ordinance and appropriate penalties pursued. Section 10-73 specifies particular activities that are exempt from the requirement to maintain or establish a stream buffer. Section 10-74 outlines activities that may be authorized by NDS, and a mitigation plan is required is certain cases.

The process for having a mitigation plan approved is as follows:

- For development activities, the applicant should confer with NDS staff during project planning (pre-project meeting) to see if a proposed activity can be authorized under the WPO. In making this determination, NDS staff should determine whether the proposed activity is listed in Section 10-74 AND whether the evaluation criteria for mitigation plans in Section 10-75(d) can be satisfied (e.g., whether development in the buffer is the "minimum necessary"). For individual building permits, NDS staff may not know about a planned encroachment until the permit application is received. In this case, NDS staff should contact the applicant to explain the buffer requirements and whether the encroachment can be authorized. An onsite or office meeting may be needed to make the proper evaluation of the proposed encroachment, existing condition of the buffer, and other factors.
- If the encroachment can be authorized for a subdivision plat or site plan, then the preliminary plat or plan should show conceptual mitigation features – this step ensures that the mitigation is feasible, will fit on the site, and will address the mitigation requirements of Section 10-75. For building permits, after conferring with NDS about whether the encroachment can be authorized, the applicant should prepare a mitigation plan to submit as part of the building permit application (see Sample Plans in Section 6 of this document).
- For subdivision plats and site plans, the final plan should show all the mitigation details. NDS may approve this plan with the final plat or plan after undergoing a

review/revision process. All structural stormwater measures and plantings should be bonded as a site improvement. For building permits, NDS may approve the mitigation plan with the building permit application. If a bond is not appropriate for an individual lot, then NDS should ensure that the plan is implemented prior to issuing a C.O. or by another schedule or milestone.

- All bonds can be released when NDS staff confirms that the plan has been implemented. Periodic inspections can be scheduled thereafter to ensure that mitigation measures are in place and functioning as designed.

4. Mitigation Options

Table 1: Stream Buffer Mitigation Matrix provides a guide for selecting an appropriate mitigation strategy for specific circumstances. The matrix can be used by following the steps outlined below:

- Go to Column #1 to determine whether a proposed project is for a development project (subdivision plat or site plan) or for an individual lot improvement (building permit application).
- Go to Column #2 to determine whether the activity that impacts the stream buffer is new development or redevelopment (redevelopment may include modifications to an already developed site or improvements to an existing structure, such as an addition or deck).
- Go to Column #3 to ascertain the existing condition of the stream buffer on the subject property. The existing condition may be developed (the stream buffer already has some impervious cover or improvement); forest (in general, mature canopy and understory trees with a shrub and ground cover layer); open lawn, meadow, or turf; or scrub (small pioneer species trees, shrubs, grasses, and ground cover). The existing condition will influence which mitigation options are appropriate for the site.
- Column #4 states the preferred mitigation option, and Column #5 lists some other mitigation options that can be considered by NDS staff.

All terms that have **bold font** in the matrix are further explained by descriptions and guidance following the matrix.

Table 1: Stream Buffer Mitigation Matrix

Type of Project	Status	Existing Buffer Condition	Preferred Mitigation	Other Mitigation Options
Site Plan or Subdivision Plat	New Project See Section 10-71.c and Section 10-74.d.1.	Forest	**Preserve** full buffer (100 feet); provide **upslope stormwater controls** to prevent erosive flows through buffer; provide **signage** to mark buffer; provide **optic orange fencing** during construction.	Encroachments for new development should be strongly discouraged, and can only be allowed in accordance with Section 10-74(d). Encroachments should be the **minimum necessary** and mitigation should include **advanced stormwater controls** upslope of remaining buffer plus **signage.**
		Open Lawn, Meadow	**Restore** & **preserve** full buffer; provide **upslope stormwater controls** to prevent concentrated flows through buffer; provide **signage** to mark buffer; provide **optic orange fencing** during construction.	See above. Mitigation should include **compensatory plantings**, **signage**, and **advanced stormwater controls** to prevent erosive flows through buffer.
		Scrub	**Enhance** & **preserve** buffer with plantings based on site conditions; provide **upslope stormwater controls** to prevent concentrated flows through buffer; provide **signage** to mark buffer; provide **optic orange fencing** during construction.	See above. Mitigation should include **compensatory plantings** (depending on site conditions) and/or upslope **advanced stormwater controls**, plus **signage**.

Type of Project	Status	Existing Buffer Condition	Preferred Mitigation	Other Mitigation Options
Site Plan or Subdivision Plat (cont)	Redevelop-ment See Section 10.74.d.1.	Developed (existing impervious cover or improvement within buffer)	Remove existing **impervious cover** and other development from at least inner 50 feet of buffer (more if practical); **Restore** at least inner 50 feet of buffer with **compensatory plantings**; provide **upslope stormwater controls** to prevent erosive flows through buffer; provide **signage** to mark remaining buffer; provide **optic orange fencing** during construction.	• Allow redevelopment on existing footprint within buffer. Provide **advanced stormwater controls** for site impervious cover; protect and/or restore inner 25 feet of buffer. • Provide design that does not exceed existing encroachment and that protects water quality and habitat, and prevents damaging runoff velocity.
		Forest	Same preferred and other mitigation options as for "New Project" described above	
		Open Lawn, Meadow		
		Scrub		
Individual Lot	New Construction See Section 10.74.d.1.	Forest	**Preserve** full buffer; provide 25 foot setback from **principal structure** to buffer line; provide **optic orange fencing** during construction.	Allow **encroachment** that is the **minimum necessary** in accordance with Section 10-74.d.1; provide **on-lot runoff practice**.
		Open Lawn, Meadow	**Preserve** full buffer; mark buffer line with **plantings**, **signage**, or other means; provide 25 foot setback from **principal structure** to buffer line; provide **optic orange fencing** during construction.	Allow **encroachment** that is the **minimum necessary** in accordance with Section 10-74.d.1; provide **compensatory plantings**.
		Scrub	**Preserve** full buffer; mark buffer line with **plantings**, **signage**, or other means; provide 25 foot setback from **principal structure** to buffer line; provide **optic orange fencing** during construction.	Allow **encroachment** that is the **minimum necessary** in accordance with Section 10-74.d.1; provide **compensatory plantings** and/or **on-lot runoff practice**, depending on site.

Type of Project	Status	Existing Buffer Condition	Preferred Mitigation	Other Mitigation Options
Individual Lot (cont)	Improvement to Existing Structure (e.g., addition, shed, deck) See Section 10-74.d.1.	Existing Structure or Improvement	Remove existing improvement if practical (e.g., dilapidated shed) to reduce buffer encroachment; provide **compensatory plantings** for area of buffer to be restored.	Allow existing structure and additional improvement (up to 400 square feet) within the 50 landward feet of the buffer (Section 10-74.d.1); Provide **compensatory plantings** or **on-lot runoff practice**, depending on site.
		Forest	**Minimize** disturbance to the buffer. If allowed **encroachment** into buffer < 200 square feet, **preserve** remaining buffer. If allowed **encroachment** > 200 square feet (up to 400 square foot maximum), **preserve** remaining buffer and provide **on-lot runoff practice**.	N/A
		Open Lawn, Meadow	**Minimize** disturbance to the buffer. If allowed **encroachment** into buffer < 200 square feet, **preserve** remaining buffer and mark buffer line with **plantings**, **signage**, or other means. If allowed **encroachment** > 200 square feet (up to 400 square foot maximum), **preserve** remaining buffer and provide **compensatory plantings**.	N/A

Type of Project	Status	Existing Buffer Condition	Preferred Mitigation	Other Mitigation Options
Individual Lot (cont)	Improvement to Existing Structure (e.g., addition, shed, deck) (cont)	Scrub	**Minimize** disturbance to the buffer. If allowed **encroachment** into buffer < 200 square feet, **preserve** remaining buffer and mark buffer line with **plantings**, **signage**, or other means. If allowed **encroachment** > 200 square feet (up to 400 square foot maximum), **preserve** remaining buffer and provide **compensatory plantings** or **on-lot runoff practice**, depending on site.	N/A

Type of Project	Status	Existing Buffer Condition	Preferred Mitigation	Other Mitigation Options
Storm-water manage-ment facilities and erosion control measures	To serve new development or to modify existing structures. See Section 10-74.b.	Variable to site	In general, keep these facilities outside of the buffer. If such measures must encroach into the buffer due to site conditions, then additional measures should include **compensatory plantings** to restore and/or enhance buffer vegetation after the E&S measures are removed (Section 10-72.a). Permanent facilities within the buffer should be **advanced stormwater controls** and should discharge in a manner that spreads water across the buffer and/or does not erode the buffer (see specifications for **upslope stormwater controls**).	N/A

Type of Project	Status	Existing Buffer Condition	Preferred Mitigation	Other Mitigation Options
Paved Pathways & Trails Exceeding 3 feet in Width	New Construction or Renovation or Existing Facilities See Section 10-74.d.4. Also see 10-72.b.5 and 10-72.c.4 for conditions related to pathways and trails.	Variable to site	Pathways and trails should avoid the inner 25 feet of the buffer, except for rare occasions to gain access to the water or where topography prevents the trail being outside of this zone (such as a steep slope along a narrow floodplain). General design guidance for trails is contained in the *Riparian Buffers Modification & Mitigation Manual* (DCR, Chesapeake Bay Local Assistance, 2003, pages 71-81). Some of the regulatory guidance in this document does not pertain to the City's WPO. The document can be found at: http://www.cblad.state.va.us/ripbuffstat.cfm. In addition to this guidance, the design for paved pathways and trails exceeding 3' in width shall include **compensatory plantings** and low-tech runoff controls, such as vegetated swales and biofiltration, in places where runoff may produce erosive conditions.	

Definitions & Guidance For Terms in Bold From Table 1:

Advanced Stormwater Controls – Measures used to control runoff that address water quality, downstream channel protection, and water quantity (detention) if needed. These measures may also be used to meet the requirements of Article III of the Water Protection Ordinance. Advanced stormwater controls should be designed to be upslope from the protected buffer area in such a way that runoff is filtered, infiltrated, slowed down (made non-erosive), or otherwise treated. Examples include biofiltration, extended detention, some manufactured BMPs, or upslope low-impact development designs. The Virginia Stormwater Management Handbook is a design source (http://www.dcr.virginia.gov/sw/stormwat.htm#handbook).

Compensatory Plantings – Planting within the buffer for the purpose of compensating for an encroachment. The intent of the planting is to maintain the natural functions of the buffer, including water quality protection, erosion and sediment control, runoff control, flood control, and habitat protection. Compensatory plantings should be specified in a planting plan. This plan should include the approximate location of the plantings, species, size, root condition (type of stock), planting specifications (e.g., time of year), and maintenance requirements. The plan can be a buffer reforestation plan or a more formal landscape plan using native species. The former is an informal plan to promote the ultimate creation of a riparian forest, while the latter is more a designed plan (by a landscape architect or horticulturalist) that also promotes the natural functions of the buffer. In either case, plant materials can be balled and burlap, container stock, bare root stock, container grown seedlings, bare root seedlings, and/or seeds and plugs. For bare root stock and seedlings, tree tubes and brush mats should be used to reduce browsing and competition during the initial years.

Encroachment – Any *development, land development, or land development project* as defined by the Water Protection Ordinance that occurs or is authorized by the program authority to occur within the stream buffer.

Minimize – See below under “Minimum Necessary.”

Minimum Necessary – This term occurs in the Water Protection Ordinance and the Chesapeake Bay Preservation Regulations. The Chesapeake Bay Local Assistance Department (CBLAD) provides the following guidance on administering projects to adhere to this standard:

> *The terms “minimum necessary to afford relief” is inherently a subjective standard that must be considered on a case-by-case basis, taking into account the specifics of a particular request. When considering the minimum necessary to afford relief, things such as the size of the structure, the types of proposed structures, and the placement of the structures in relation to the size, layout and location of the lot or parcel are important considerations. Some examples of requests that would not be the minimum necessary to afford relief could include an application for an extremely large structure on a given lot or parcel, especially*

when compared to the size of the structures in the adjacent lots. Another example would be a request for a house that would be located outside of the RPA, but with a large attached deck with a pool that would be located within the RPA. In this instance, the sole reason for the exception request relates, not to a use of the property, but to the extent that the applicant wishes to use the property. In this example, consideration of relocation of the house on the lot or resizing the deck and pool are all potential solutions that may result in the property owner achieving their desired use without the need for an exception. Should alternative location, sizing, or orientation options to avoid the need for an exception be available, and the applicant chooses to continue with the exception request, then the finding of "minimum necessary to afford relief" would not be present. (Excerpted from: "Exceptions – Guidance on the Chesapeake bay Preservation Area Designation and Management Regulations," September 16, 2002, Chesapeake Bay Local Assistance Department).

On-Lot Runoff Practice – Practices that address roof, yard, and driveway runoff in a way that the runoff does not impair or even enhances the natural functions of the downslope buffer. These practices may collect/reuse runoff water, filter or infiltration runoff, or use landscaping to treat and slow down the water. Examples are rain gardens (also known as "bioretention planting bed"), dry wells, french drains, rain barrels, or specific landscaping techniques to conserve and protect water (e.g., Bayscapes: http://www.acb-online.org/project.cfm?vid=85)

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Optic Orange Fencing -- High visibility safety or tree protection fencing that is used as a temporary measure during construction to keep construction equipment and activities out of a protected area.

Preserve -- Measures taken to ensure that a buffer area (or remaining buffer area after an allowed encroachment) is protected from further disturbance. For a subdivision plat, this can include placing the buffer area in open space or a buffer easement, restrictive language in covenants or deeds, donation of the buffer to an easement holding entity, and/or providing signs that clearly mark the buffer boundary and explain that the vegetation is to be protected. The management of vegetation is in accordance with Section 10-72 of the Water Protection Ordinance.

Principal Structure – The Chesapeake Bay Local Assistance Department provides the following guidance on principal structures:

Webster's Dictionary (9th edition) defines "principal" as "…a matter or thing of primary importance." Using this definition, a principal structure would be one primary structure. Furthermore, the principal structure would be one that is necessary to use the land in the manner permitted by the underlying zoning classification. Necessary utilities includes such things as electric and telecommunication lines, water and onsite or public sewage disposal facilities. (Excerpted from: "Resource Protection Area: Buffer Area Encroachments, Guidance on the Chesapeake Bay Preservation Area Designation and

Management Regulations, September 16, 2002, Chesapeake Bay Local Assistance Department).

Restore – Plantings within the buffer that help maintain the natural functions of the buffer, including water quality protection, erosion and sediment control, runoff control, flood control, and habitat protection. See the guidance and standards for **compensatory plantings**.

Signage -- Any signs, posts, etc. approved by the City that mark the boundary of the buffer and state that the vegetation is protected. Signs should also include contact information in case someone has questions about the restrictions.

Upslope Stormwater Controls -- Measures employed to prevent damage to a buffer area from concentrated runoff. These measures can also be used to comply with Section 10-52 of the Water Protection Ordinance. In general, measures are designed to slow down and spread out runoff, and may include energy dissipators, level spreaders, check dams, or detention facilities designed in accordance with Section 10-52.