LDS Technical Guidance
Stream Restoration Projects
March 2008

The following is provided to County staff as an internal guidance document to clarify the applicable County requirements on stream restoration projects. This is to be considered a "living document", and will be updated in the future as warranted.

Background

Effective July 1, 2006 (Code of Virginia §10.1-561.A), stream restoration and relocation projects that incorporate natural channel design concepts are not man-made channels and are exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to Sections 10.1-561, 562, or 570 of the state code.

The Fairfax County Public Facilities Manual (PFM) Section 6-0203.3, which is promulgated pursuant to Sections 10.1-561 and 562 of the state code, does not provide independent criteria for establishing adequacy for stream restoration and relocation projects that incorporate natural channel design. Consequently, the purpose of this technical guidance is to establish guidelines for reviewing stream restoration projects. The items outlined herein should be addressed on the plan.

There are plans where the specific purpose of the plan is to provide stream restoration and other plans where the stream restoration work is ancillary to a land development project that show an increase in impervious area. If stream restoration or relocation design is part of a development plan that increases impervious area, the plan must comply with the drainage easement requirements in the PFM.

Notifications and site posting requirements established in the Zoning Ordinance (for stream restoration projects that are part of a site plan) or the Subdivision Ordinance (for stream restoration projects that are part of a subdivision plan) must be met.

Certification regarding "natural channel design concepts"

According to state code, §10.1-560, "natural channel design concepts means the utilization of engineering analysis and fluvial geomorphic processes to create, rehabilitate, restore, or stabilize an open conveyance system for the purpose of creating or recreating a stream that conveys its bankfull storm event within its banks and allows larger flows to access its bankfull bench and its floodplain."

The state code does not provide guidance as to what standards to use regarding engineering analysis and fluvial geomorphic processes. In order to be considered a stream restoration or relocation project, the designer must certify that the natural channel

design is based on established guidelines and cite the guidelines that were used in the design.

Design Guidelines

The following is a list of documents, which Fairfax County recognizes as established guidelines; however, this list may be amended on a case-by-case basis:

- The latest edition of Applied River Morphology, published by Wildland Hydrology and authored by Dave Rosgen and Lee Silvey. Also documents related to Levels I through V of Rosgen's stream restoration courses, including but not limite to:
  - Level I Applied Fluvial Geomorphology
  - Level II River Assessment and Monitoring
  - Level IV River Restoration and Natural Channel Design
  - Level V River Restoration Design Implementation
- The latest edition of The Virginia Stream Restoration and Stabilization Best Management Practices Guide, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation
- The latest edition of Urban Subwatershed Restoration Manual No. 4, Urban Stream Repair Practices, Center for Watershed Protection, November 2004
- The latest edition of Guidelines for Natural Stream Channel Design for Pennsylvania Waterways, Keystone Stream Team

Stream Restoration Plans

All plans must include a plan and profile showing both existing and proposed grades using 6" contour interval topography. Design calculations (based on the referenced established guidelines) must also be included to ensure the stability of the natural channel practices. These calculations should include, at a minimum, a narrative describing the hydrologic basis of the design and relevant computations (e.g. shear stress or other scientifically valid methods) demonstrating that the stream bed will remain viable and functioning in accordance with the established natural channel design concepts used for the project.

For example, if there is an adequate sediment supply from upstream reaches, the computations should demonstrate that the channel substrate (typically defined by the D_{50} of the in-situ material as determined through a laboratory analysis, not from generalized soil survey data) will be moved through the system at the proper rate to prevent future incision as well as aggradation. Conversely, if the sediment supply is determined to be insignificant, then demonstation that the channel substrate will not move under bankfull conditions must be provided.

Stability of the floodplain must also be demonstrated through a comparison of modeled, overbank velocities during the 100-year storm with published allowable velocities (based on soil type and vegetative cover type). Soil types used for the determination of allowable velocities can be determined from field samples or county soil maps. Plan and profile of the modeled 100-year water surface elevation must also be provided.

Typical details for various cross-section types (i.e. riffles, pools, etc.) must also be provided. These details are to provide enough information for the construction of the improvements as well as show the level of the water surface elevations resulting from the selected design storms.

Erosion and Sediment Control

Limits of disturbance (including construction access and material stockpile areas), drainage divides and 6" contour interval topography (including adjacent areas) shall be shown on the plan. A 2-foot contour interval may be used for construction access routes. If there are downstream impoundments, the requirements of Letter to Industry 03-05 must be met.

Effective July 1, 2008 (Code of Virginia §10.1-563), persons engaged in mitigation banking in more than one jurisdiction may choose to file erosion and sediment control specifications with the state in lieu of submitting an erosion and sediment control plan to the county. A stream restoration mitigation bank in Virginia must be approved and operated pursuant to a mitigation banking instrument signed by the Department of Environmental Quality, the Marine Resources Commission, or the U.S. Army Corps of Engineers. Therefore, if the developer can provide evidence that the stream restoration work is part of a mitigation bank (written verification by a state or a federal agency), the plans submitted to the county do not have to address erosion and sediment control. A copy of the approved annual erosion and sediment control specifications shall be submitted to the county.

If the plan is not part of a stream restoration mitigation bank, the plan should be reviewed to ensure that appropriate erosion and sediment control practices have been provided to protect the receiving stream and downstream properties in accordance with the Chapter 11 of the PFM and Virginia Erosion and Sediment Control Handbook. The erosion and sediment control narrative on the plan shall address the staging of construction and be specific to the project in order to minimize any impacts downstream of the project.

Planting Plan

If plantings are proposed with the stream restoration project, the plan shall include a plant schedule and a planting plan specifying species, quantity of each species, stock size, type of root stock to be installed, spacing of proposed plants and specifications for planting

procedures. The planting plan shall be in accordance with the buffer area establishment criteria in Section 118-3-3(f) of Chapter 118 of the Fairfax County Code of Virginia (Chesapeake Bay Preservation Ordinance).

Floodplain and Resource Protection Area (RPA) Delineation

The existing 100-year floodplain (or floodplain easement if one is recorded) and RPA shall be delineated on the plan as well as any proposed changes to the delineation. Further description of how impacts to each are to be addressed in the plan set are described below.

Floodplain

Certain stream restoration projects, particularly changes in stream alignment or to cross-sections that contain flow from the 100-year event, will require a hydraulic analysis to quantify any changes to the 100-year water surface elevation. If an increase is proposed as result of the stream restoration project, a revised floodplain study, and new floodplain and storm drainage easements may be required to comply with the Zoning Ordinance and the PFM. New floodplain easements will not be required on off-site properties if the 100-year water surface elevation remains unchanged by or is lowered by the project. The plan shall show the appropriate floodplain and storm drainage easements.

RPA

A Water Quality Impact Assessment (WQIA) is required for any stream restoration project located within an RPA. The WQIA, which can be included on the stream restoration plan set, should include delineations of the County-mapped RPA boundary, the existing RPA boundary based on site specific data gathered for the project (if it is found to be different from the mapped boundary), and the limit of the proposed RPA boundary based on the stream restoration project.

The WQIA must address any impacts to adjacent properties. The relative locations of each of these boundaries will determine whether formal notifications to adjacent property owners will be necessary.

The developer must minimize any changes to the RPA boundary on offsite properties. If the proposed RPA boundary is different from the existing RPA boundary, adjacent property owners must be notified. The notice must show the county-mapped RPA, the existing RPA and the proposed RPA on the affected property, and indicate that the proposed RPA area will be subject to restrictions regarding future development in accordance with Chapter 118 of the County Code such as limiting future disturbance or development in the RPA. The notice must also inform the property owners that a plan

has been submitted to the county and provide the appropriate county site review contact information and owner/developer contact information.

However, if the community in which the work is being performed requires the adjacent property owners to be informed of the project, the following statement must be included in the materials sent to the affected property owners:

> *"The location of Resource Protection Area (RPA) boundaries on adjacent properties may be affected by changes in the stream channel alignment. We anticipate these changes to be relatively minor. RPAs are environmentally sensitive areas subject to more restrictive requirements regarding development, land disturbance, and vegetation removal under Fairfax County's Chesapeake Bay Preservation Ordinance."*

If this statement is included as part of the required notification in communities that have such requirements, a separate notification will not be required.

Wetlands Certification and State and Federal Requirements

Other regulatory agencies may be involved in permitting of the stream restoration project. Impacts to wetlands and/or other Waters of the United States (WOUS) will require approval from the U.S Army Corps of Engineers (COE), the Virginia Department of Environmental Quality (DEQ), or possibly the Virginia Marine Resources Commission (VMRC, for contributing drainage areas exceeding 5 square miles). The coversheet shall include a signed wetlands statement to ensure that the developer will obtain the necessary state and federal permits regarding wetlands.