

## **Master Drainage Plan Improvements**

The City of Chesapeake utilizes a 320-acre threshold for candidate Master Drainage Facility (MDF) improvements. If a project services less than 320 acres, it will generally not be constructed as part of the City's Master Drainage Plan. Three specific projects were conceived and incorporated into the modeling during the course of this study to reduce the effects of flooding within the subject watershed. These projects are by no means exhaustive, but seem to provide a reasonable amount of flooding relief at reasonable costs. All of the projects appear to be feasible from a preliminary planning standpoint, but issues such as future wetlands delineations and the ability to successfully acquire rights-of-way or parcels of land may necessitate some modifications as these projects move forward. The three projects are shown in Figure 8, and are included in the future modeling.

### **1. Warrington Hall Channel Improvements**

This project is estimated to cost approximately **\$ 670,495** in 2005 dollars, if constructed after surrounding land improvements are in place. If constructed as part of adjacent development projects, the cost to the City could be minimal or insignificant.

Construct improvements to the east side of the ravine adjacent to Warrington Hall. Improvements to the ravine, starting just south of Miriam Drive (node 418) and continuing along ravine for approximately 2,350 linear feet (node 470), include widening the channel bottom to 20 feet while maintaining a side slope of 2 horizontal to 1 vertical. The channel shall be maintained so as to create a Manning roughness factor of 0.04. These channel improvements will provide increased conveyance capacity and flood storage in the ravine.

### **2. Stony Run Manor / Westchester Estates Channel Improvements**

This project is estimated to cost approximately **\$ 549,094** in 2005 dollars, if constructed after surrounding land improvements are in place. If constructed as part of adjacent development projects, the cost to the City could be minimal or insignificant.

Construct improvements to both sides of the natural ravine that travels between the future developments of Stony Run Manor and Westchester Estates. Improvements to the ravine, starting at the end of Warrington Hall Channel Improvements (node 470) and continuing along ravine for approximately 1,100 linear feet to Butts Station Road (node 488), include widening the channel bottom to 20 feet while maintaining side slopes of 2 horizontal to 1 vertical. The channel shall be maintained so as to create a Manning roughness factor of 0.04. These channel improvements will provide increased conveyance capacity and flood storage in the ravine.

### **3. Butts Station Road Outfall Channel Improvements**

This project is estimated to cost approximately **\$ 521,829** in 2005 dollars. The cost to the City can be reduced if coordinated and constructed as part of adjacent development projects.

Construct improvements to the natural ravine downstream of the Butts Station Road outfall. Limits of improvements include the east side of the ravine from Butts Station Road (node 490) to approximately 1,200 linear feet downstream (node 508) and the west side of the ravine starting at Butts Station Road (node 490) to approximately 550 linear feet downstream. The improvements to the ravine include widening the channel bottom to 25 feet while maintaining side slopes of 2

horizontal to 1 vertical. Channel shall be maintained so as to create a Manning roughness factor of 0.04. These channel improvements will provide increased conveyance capacity and flood storage in the ravine.

The goal of this type of study is not to relive *all* flooding, but rather to identify Master Drainage Facility improvements that can be feasibly constructed. It is also important to consider that neighborhood and commercial parcel drainage and storm water systems are neither required nor designed to accommodate flooding from extreme events such as the 50-year storm.