



November 20, 2012

**TASK ORDER No. 1**

**M-NCPPC Montgomery County Planning Department**

TO:	Brown and Caldwell / Biohabitats, a Joint Venture
CONTRACT NO.:	
SUBJECT:	Clarksburg Master Plan Limited Amendment for the Ten Mile Creek Watershed

**PURPOSE:**

The Consultant will provide data and environmental analysis of the Ten Mile Creek watershed for development scenarios in support of the Clarksburg Master Plan Limited Amendment for the Ten Mile Creek Watershed. This information will be compiled and scientific information and recommendations will be clarified so that documents can be understood by the lay reader.

**SCOPE:**

**A. Data Discovery**

The Consultant will review existing data and reports provided by the Planning Department and Montgomery County Department of Environmental Protection (DEP). This will include DEP monitoring data; data collected by Planning from other sources (e.g., Clarksburg Monitoring Partnership, Audubon Naturalist Society, Maryland Department of Natural Resources, U.S. EPA, USGS, etc.); draft NRI/FSD submittals; GIS data; and field data collected by Planning Department and DEP staff.

The Consultant will prepare digital maps using available data illustrating the following features:

- Geology
- Soils
- Topography
- Topology
- Morphology
- Surface Water (streams, wetlands, ponds)
- 100-year floodplain and stream buffers
- Vegetation cover
- Rare and unique plant communities
- Rare, Threatened and Endangered Species
- Historic and cultural sites
- Federal, State and County resource protection areas
- Infrastructure (sanitary sewer, water, cable, roads, electric, transmission, etc.)
- Biological Monitoring and Habitat Index Scores for SPA stations



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- Water temperature
- Geomorphology

The Consultant will review the draft maps for completeness and accuracy and summarize baseline watershed conditions. Field plans for collecting additional data will also be developed, if deemed necessary by the Planning staff. The Consultant will also participate in a kick off meeting with Planning Department and other agency staffs.

**Deliverables:**

- Maps/data and summary of environmental conditions
- Participation in kick off meeting
- PowerPoint slides of existing conditions

**B. Data Collection**

The Consultant will conduct limited field investigations to supplement existing data and verify watershed conditions. The focus of these investigations will be to identify priority areas for conservation (e.g., spring seeps, forested areas, wetlands, and tributaries), potential restoration and enhancement of resources and localized impacted areas (e.g., I-270 stormwater runoff, impacts from agriculture). Field investigations under this task may extend over several months in support of additional data needs identified during Task C. Also included is the preparation of several representative stream cross sections, if currently unavailable. The Consultant will not conduct monitoring or sampling.

It is assumed that the physical condition of Ten Mile Creek (e.g., bank stability, embeddedness, etc.) will be characterized by Planning and DEP staff from available data or during their limited field investigations. Planning and DEP staff will also conduct a synoptic flow study.

**Deliverables:**

- Electronic copies of all field notes, data collection forms, and analysis spreadsheets
- GIS layers, as edited or new information
- Recommendation for additional field work

**C. Analysis**

C.1 Spatial Watershed Analysis

Using the spatial data compiled as part of Task A, the Consultant will define attribute characteristics that have the potential to either influence the landscape's ability to recover from disturbance, or that are critical to long term ecological stability and integrity. These may include:

- Soil characteristics (e.g., highly erodible soils, highly permeable soils, shallow soils)
- Steep slopes
- Seeps and springs



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- Streams (perennial and intermittent) and wetlands (+regulatory buffers)
- 100-year floodplain
- Rare and unique plant communities and corresponding buffers
- Rare, threatened and endangered species habitat and corresponding buffers (based on existing data or data collected by Planning and DEP staff)
- Federal, State and County resource protection areas
- Public recreation features
- Sensitivity of streams to channel erosion and enlargement

A series of maps will be generated which the Consultant will overlay to determine the landscape's ecological stability and integrity and its ability to support development. This analysis will help delineate potential development and resource protection zones.

The Consultant will prepare a GIS map illustrating this analysis, with supporting maps and a brief memo documenting the methodology used to prepare the suitability boundaries. Colored maps will include:

- Ecological Attributes Inventory Maps
- Ecological Conditions Analyses Maps
- Development Suitability and Resource Protection Map
- Constraints and Opportunities Map

The Consultant will also analyze trends in biological and habitat data for similar Special Protection Area (SPA) watersheds within Montgomery County. This analysis will help inform anticipated impact projections of development on Ten Mile Creek. The consultant, in conjunction with Planning and/or DEP staff, will select monitoring stations within existing SPAs that meet the following criteria:

- Whose watershed size is similar to that of Ten Mile Creek
- Who have numerous years of monitoring data pre and post construction (min five years pre construction and three years post construction)
- Whose land use pre construction was similar that of Ten Mile Creek
- Whose records are complete in that they contain the habitat data sheets and individual IBI metric scores
- Whose underlying geology is similar to that of Ten Mile Creek
- Where a stream gauge is located nearby in order to ascertain the affects of hydrology on the macroinvertebrate population and whose period of record extends back to the earliest macroinvertebrate sampling event that is being analyzed

Comparisons will be made to trends of IBI scores pre and post construction to determine if negative effects can be attributed to the development within the watershed. The consultant will evaluate overall IBI score trends as well as trends within the individual IBI metrics pre and post construction. Habitat assessment data sheets will also be evaluated from the same biological monitoring stations to determine pre and post construction trends in overall, and individual metric, scores. Due to the infrequent nature of fish sampling at biological monitoring stations, as well as the intermittent nature of



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headwater streams, FIBI scores and metrics will not be evaluated. However, the presence of insectivorous fish may be analyzed to determine effects on insect populations from predation. In addition to evaluating biological monitoring data for sites in developed watersheds, the consultant will also make comparisons to trends in nearby reference sites.

### C.2 Summary of Current Data Regarding Watershed Responses to Development using ESD/LID

The Consultant will identify and assess other studies that document the impacts of development on drainage basins using ESD/LID. Also included will be a summary of the current state of knowledge - including a comparison of typical instrumented or monitored watershed responses to development using traditional stormwater management BMPs. Potential parameters include analyzing changes to erosion/sediment control, reforestation and storm water management regulations and new laws that were not in place during the development of Special Protection Areas. The assessment will also include new state requirements that set additional standards and limit grading to 20 acre increments.

This analysis should seek to characterize the potential difference between past studies of imperviousness to stream health and the potential impacts of the same level of imperviousness under the new regulations. The Consultant will collect data through the NPS listserv and professional contacts, and a literature review.

### C.3 Development of Watershed Protection Toolbox for Construction and Post-Construction Phases

The Consultant will describe the major types of watershed protection measures and strategies that could be used to preserve ecological resources in the Ten Mile Creek watershed. This information will be compiled primarily to support the development of land use scenarios in Task C.4. The following types of measures may be included:

- Parcel/site/ development scale (e.g., enhanced ESD beyond that defined and required in the MD Design Manual, vertical construction, etc.)
- Stage 4 scale (e.g., stream buffers, ecological covenants, residential pollution prevention, etc.)
- Watershed scale (e.g., forest conservation, stream buffers, agriculture management)
- Seasonal protections (migrations, spawning, etc.)

### C.4 Analysis of Land Use Scenarios

The Consultant will evaluate scenarios developed jointly with Planning Department and agency staff. They will be provided to the Consultant in GIS format to evaluate potential impacts on Ten Mile Creek. The number of scenarios and degree to which each is analyzed will be determined by agreement between the Planning Department and the Consultant based on the analysis tools used. Time consuming analyses will be limited to key scenarios that will act as sensitivity tests for a range of scenarios.



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For each scenario, the Consultant will conduct the following evaluations:

- Annual pollutant load analysis using the Watershed Treatment Model
- Hydrologic analysis evaluating the range of peak discharges and runoff volume within the Ten Mile Creek area at the subwatershed and watershed scale
- Landscape corridors and patches
- Estimate of natural land cover lost and restored (or enhanced)
- Estimate of agricultural land affected
- A comparison of the development scenarios to the Spatial Watershed Analysis results including likely impacts to the landscape and other resources identified

The Consultant will summarize the results of these analyses and will develop inferences on regarding the potential responses of Ten Mile Creek to proposed development under ESD/LID in terms of hydrology, stream channel response, water quality and biology. The Consultant will also evaluate the effectiveness of ESD practices given local conditions.

#### C.5 Comprehensive Assessment Report

The Consultant will produce a final report that documents all analyses and identifies potential impacts to Ten Mile given the different development scenarios and potential enhancements to watershed protection. This should include recommendations about options for balancing the effects of development and environmental protection of Ten Mile Creek.

#### **Deliverables:**

- Comprehensive Assessment Report

#### **D. Public Outreach**

The Consultant will provide technical support to the Planning Department throughout the process. This shall include:

- Attendance at weekly progress meetings (in person or teleconference)
- Attendance at three work sessions with Planning, Parks and County staff
- Attendance at three public meetings
- Attendance at three Planning Board work sessions
- Attendance at one public hearing
- Attendance at one County Council session

The Consultant will also prepare PowerPoint, graphics and maps in support of the process. Planning will schedule and organize all meetings, including reproduction and distribution of meeting materials.

The Consultant will provide expert testimony if authorized as an additional service.