Appendix F: Technical Requirements to Enter UTC BMP into Scenario Builder

Presented to the WTWG for Review and Approval:

Background: In accordance with the *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model* (WQGIT, 2015) each BMP expert panel must work with CBPO staff and the Watershed Technical Workgroup (WTWG) to develop a technical appendix for each expert panel report. The purpose of this technical appendix is to describe how the Urban Tree Canopy Expert Panel's recommendations will be integrated into the Chesapeake Bay Program's modeling tools including NEIEN, Scenario Builder and the Watershed Model.

Q1. How is the Urban Tree Canopy BMP defined for the Phase 6 Chesapeake Bay Watershed Model?

A1. At this time, the Urban Tree Canopy BMP is defined as the planting of trees in an urban area that are not otherwise part of a riparian forest buffer or a structural BMP (e.g. bioretention, tree bioretention/planter). The nutrient and sediment reductions will be simulated as a land use change, where the reduction is based on the difference between the previous developed land use and the new Tree Canopy land use with a lower loading rate. The area converted is based upon a default broadleaf tree for the Bay-wide climate, where 300 newly planted trees are equivalent to 1 acre of tree canopy land use.

For land use mapping purposes, it is assumed that once a tree attains a canopy area of 97 ft^2 ($9m^2$) and 5 m (16.4 ft) in height, it will be observed in the land cover imagery and classified in a tree canopy land use. Mapping and land use classification rules are not the purview of the expert panel, but the panel did consider how these rules may affect their methods and protocols.

Q2. What are the nutrient and sediment reductions a jurisdiction can claim for urban tree planting in the Watershed Model?

A2. The expert panel recommended that the Phase 6 Model treat urban tree plantings as a land use change to either "tree canopy over impervious" or "tree canopy over turfgrass". The nutrient and sediment reduction credit for a land use change BMP equals the relative, or percent change in nitrogen, phosphorus and sediment load achieved by converting the underlying pervious or impervious land use to the appropriate tree canopy land use.

DRAFT

Table 1. Relative loading rate reduction achieved by tree canopy land use conversion

Land Use	Total Nitrogen Reduction (%)	Total Phosphorus Reduction (%)	Total Sediment Reduction (%)
Canopy over Turfgrass*	23.8	23.8	5.8
Canopy over Impervious**	8.5	11.0	7.0
*Represents conversion from "turfgrass" to "tree canopy over turfgrass". ** Represents conversion from "impervious roads" or "buildings and other", to "tree canopy over impervious". These reduction values were developed using an assumed distribution for tree canopy land uses of 90% over roads and 10% over building and other.			

(Source: Appendix B, Hynicka and Divers 2016)

Q3. What should jurisdictions submit to NEIEN to receive credit for urban tree planting in the Phase 6 Model?

A3. For urban tree plantings, jurisdictions should report the following information to NEIEN:

- *BMP Name:* Urban Tree Canopy
- *Measurement Name:* Number of Trees Planted
- *Geographic Unit:* Qualifying NEIEN geographies including: Latitude/Longitude; *or* County; *or* Hydrologic Unit Code (HUC12, HUC10, HUC8, HUC6, HUC4); *or* State
- *Date of Implementation:* Year the trees were planted
- *Land Uses:* Turfgrass, Roads, Buildings and Other

Q5. Is Urban Tree Canopy an annual or cumulative BMP?

A5. The credit of this BMP is cumulative, which means that the acres reported in a previous year carry over into the next year. This BMP may be considered a 'stackable' BMP, where additional BMPs may be applied to the underlying land use. For example, urban nutrient management may be applied to the pervious area under the tree canopy. As a land use change BMP, the converted acres will be eligible to receive other urban BMPs reported to through NEIEN.

Q6. What is the credit duration for the Urban Tree Canopy BMP in the Model?

A6. The suggested BMP credit duration is 10 years. Once new high resolution imagery is available, the trees will be captured through the tree canopy land uses rather than annual BMP submissions. The area of the reported canopy projects within the period of credit duration will continue to be tracked through the BMP history since these projects represent management actions. Once new high resolution imagery is available, changes in the areal extent of tree canopy will be captured through these data.

Q7. How does the Urban Tree Canopy BMP avoid the double counting of reductions caused by overlap with the tree canopy land uses?

A7. To avoid double counting with the existing tree canopy land use,-new acres through canopy expansion projects will be tracked and reported as BMPs since they represent on-the-ground management actions. It's assumed that the expansion of canopy through these projects are part of the net change in canopy tracked through different points in time of the high resolution imagery. The environmental models simulate this net change. If there's an overall reduction in canopy between the two point in time, the nutrient and sediment loads will increase because of the changing conditions. If there's a net increase in canopy, nutrient loads will decrease. Again, reported canopy project are part of the overall net change. If there's a net decrease in canopy overtime, the canopy project can be thought of as lessening the degree of the decrease.

Q8. How do the panel's recommendations affect ongoing historical BMP data cleanup efforts of the jurisdictions?

A8. Jurisdictions should report tree canopy expansion projects with the associated time they occurred going back to 1985 – for which they have data. Jurisdictions should not report overall net changes in canopy since these are captured through changes in imagery data with prescribed methods.

DRAFT