Appendix A Plant List

A.1. Plant List Development

The following plant list was compiled and enhanced using plants listed by three regional/local planning and ordinance documents. The three regional/local planning documents are the NC DENR BMP Manual, Appendix D (2005); the Huntersville Ordinance Design Manual, Appendix F Plant List (2005); and the Selection and Planting Guide for Aquatic and Wetland Plants in the Piedmont Regional of North Carolina, Mecklenburg County, (1996). The plant lists in these documents have been refined in order to be used for BMPs identified in the *Charlotte-Mecklenburg BMP Design Manual*. A description of the refinements is presented in the following paragraphs.

- **The NCDENR Manual Appendix D**, includes a list of 131 plants that are categorized into eleven groups including aquatics, emergent, herbaceous, bunch grasses, ground cover, prairie gasses, turf grasses, wildflowers, evergreen shrubs, deciduous trees, or evergreen trees. The *NCDENR Manual Appendix D* is presented in the form of a table that lists appropriate hydrologic zones, wetlands indicator status, rate/spacing, light conditions, soil conditions, height/diameter, propagules, (notes related to plant propagation, spreading, or production), and notes for each plant species. The table contains useful information that might be considered in plant selection for BMPs. The list includes some species that may be more suitable for Coastal or Mountain regions and less appropriate for the Piedmont conditions of Mecklenburg County and therefore the list should not be used for application in Charlotte-Mecklenburg.

- **The Huntersville Ordinance Plant List** includes 61 species that are categorized into seven groups including large and small maturing deciduous trees, evergreen trees, deciduous trees, evergreen trees, evergreen shrubs, herbs and flowers, grasses and sedges, or ground cover. The list is presented in the form of a table that provides general water tolerance (high, medium, or low), light exposure, and height for each species. The table is followed by a list of plants that are considered to be invasive exotic species in the Southeast. The native plant list is appropriate for the Piedmont Region, but the table does not contain specific planting requirements for sun/shade tolerance, height, spreading rate, water depth, and flowering.

- **The Mecklenburg County Selection and Planting Guide for Aquatic and Wetland Plants** includes a list of 20 species that are illustrated and described in detail regarding characteristics, growth, planting recommendations, habitat, wildlife and aesthetic benefits. The plants are presented in tables that include plant descriptions, sun/shade tolerance, height, spreading rate, water depth, and flowering. The plant characteristics summary table is followed by tables that show the plants listed by appropriate hydrologic zones. Plant suppliers and some costs information is provided as well. The list is appropriate for the local Piedmont Region, but is specifically focused for installation in wet pond BMPs. This list includes one invasive species (Yellow Iris) that should not be planted.

The plant lists provided in the above listed documents are available to the designer for reference only. The list contained in this Appendix has been expanded and improved to offer additional information for the designer when preparing BMP plans.

A.2. Plant List Selection Criteria Definitions

The following paragraphs provide descriptions/definitions for the plant list data columns that are in Appendix A.

1. Form. In landscaping design terminology, “Form” is the shape of a plant. For example, trees and shrubs can be described as being upright, oval, columnar, spreading, broad spreading, or weeping, in form. Trees, shrubs, forbs and grasses can further be described as “clump-forming” or “colonial”. “Clump-forming” describes a plant which reproduces vegetatively, forming smaller crowns around the

parent which can be divided and planted in new locations. "Colonial" means forming colonies by means of underground rhizomes, stolons, etc.

2. Scientific Name. (syn. botanical name, syn. technical name, syn. Latin binomial)

The scientific name is the name applied to a plant, according to the Codes of Nomenclature. A scientific name is almost always a much more reliable manner of identifying a plant than the often-used common name. Under the codes of binomial nomenclature, a scientific name consists of at least two parts. The first part of the name is a genus, and the second part of the name is a species. The genus and species names together identify a given plant, sometimes with additional detail added:

- A **genus** is a group of closely related species.
- A **species** is the fundamental category of classification which ranks below a genus, and above a subspecies.
- A **subspecies** is the rank of taxa below species but above variety; a subdivision of a species whose members have certain hereditary characteristics distinct from other populations of that species. A subspecies is added to the specific binomial and preceded by "ssp.." such as *sylvestris* in the name *Dipsacus fullonum* ssp*. sylvestris*.
- A **variety** is the rank of classification below subspecies but above forma; a plant which retains most of the characteristics of the species, but differs in some way such as flower or leaf color, size of mature plant, etc. A variety is added to the specific binomial and preceded by "var.." such as *sillicicola* in the epithet *Juniperus virginiana* var. *silicicola.*
- A **cultivar** is an unvarying variety of plant produced by selective hybridization, or, sometimes found in wild populations, and maintained by vegetative propagation or by inbred seed.
- **Forma** is the rank of classification below variety; a plant which retains most of the characteristics of the species, but differs in some way such as flower or leaf color, size of mature plant, etc. A forma is added to the specific binomial and preceded by "f", such as *rubra* in the epithet *Cornus florida* f. *rubra.*

3. Common Name.

The common name is the identifying terms in common, regional, usage; which often reflect appearance, legend, or use of a plant species. Common names may vary greatly by region, increasing the need for standard binomial nomenclature.

4. Planting Zones.

The key to plant selection and subsequent plant survival is based on the primary tolerances for plant which are characterized under the column for "Planting Zones." While consideration of planting zone along does not guarantee success it should be used by the designer as the starting point for plant selection. Each plant species has corresponding hydrologic zone provided to indicate the most suitable planting location for successful establishment. The listing of more than one zone indicates that a plant may survive over a broad range of hydrologic conditions. Descriptions of zones are as follows:

- **ZONE 1 – Deep Water.** The Deep Water Area is an area for plant installation, permanently inundated, where water depths range between 3 feet and 1 foot in depth of the permanent pool. Permanent inundation is defined as inundation or saturation for 76 to 100 percent of the growing season. This Zone may be found in Wet Ponds, Storm Water Wetlands, and sometimes in Extended Dry Detention Basins, but never in Bioretention, Enhanced Grassed Swales or Grassed Channels.

- **ZONE 2 – Shallow Water Bench.** The Shallow Water Bench Area is an area for plant installation, permanently inundated, where water depths range between 1 foot and 0.5 foot in depth of the permanent pool. Permanent inundation is defined as inundation or saturation for 76 to 100 percent of the growing season. This Zone may be found in Wet Ponds, Storm Water Wetlands, and sometimes in Extended Dry Detention Basins, but never in Bioretention, Enhanced Grassed Swales or Grassed Channels.

- **ZONE 3 – Shoreline Fringe.** The Shoreline Fringe Area is an area for plant installation, regularly inundated, where water depths range between 0.5 feet below to and 0.5 feet above the pool elevation. Regular inundation is defined as inundation or saturation for 35 to 75 percent of the growing season. This Zone may be found in Wet Ponds, Storm Water Wetlands, and sometimes in Extended Dry Detention Basins. Because Bioretention can pond up to 6 inches or water, and because Enhanced Grassed Swales and Grassed Channels are subjected to regular, shallow flows, those systems also include a designation for Zone 3.

- **ZONE 4 – Riparian Fringe.** The Riparian Fringe Area is an area for plant installation, periodically or seasonally inundated in all BMP systems listed in this Manual. Periodic or seasonal inundated is defined as inundation or saturation for 13 to 25 percent of the year. In Wet Ponds, Storm Water Wetlands, and Extended Dry Detention Basins, this zone ranges from 0.5 feet above the pool elevation, to approximately the 2-year water surface elevation.

- **ZONE 5 – Floodplain Terrace.** The Floodplain Terrace is an area for plant installation, infrequently inundated in all BMP systems listed in this Manual. Infrequent or irregular inundation is defined as inundated or saturation for 5 to 13 percent of the growing season. In Wet Ponds, Storm Water Wetlands, and Extended Dry Detention Basins, this zone ranges from approximately the 2-year water surface elevation to approximately the 10-year water surface elevation.

- **ZONE 6 – Upland Slopes.** The Upland Slope Area is an area for plant installation which is seldom or intermittently inundated in all BMP systems listed in this Manual. Intermittent inundation is defined as inundation or saturation less than 5 percent of the growing season. In Wet Ponds, Storm Water Wetlands, and Extended Dry Detention Basins, this zone ranges from approximately the 10-year water surface elevation upwards.

5. Wetland Indicator Status. Wetland indicator status reflects the range of estimated probabilities (expressed as a frequency of occurrence) of a species occurring in wetlands versus non-wetland across the entire distribution of the species. A frequency, for example, of 67 to 99 percent (Facultative Wetland) means that 67 to 99 percent of sample plots containing the species randomly selected across the range of species are wetland species. A positive (+) or negative (-) sign is used with the Facultative Indicator categories to more specially define the regional frequency of occurrence in wetlands. The positive sign indicates a frequency toward the higher end of the category (more frequently found in wetlands), and a negative sign indicates a frequency toward the lower end of the category (less frequently found in wetlands).

The wetland indicator categories should not be equated to degrees of wetness. Many obligate wetland species occur in permanently or semi-permanently flooded wetlands, but a number of obligates also occur in and some are restricted to wetlands which are only temporarily or seasonally flooded. The facultative upland species include a diverse collection of plants, which range from weedy species adapted to a number of environmentally stressful or disturbed sites (including wetlands), to species in which a portion of the gene pool (an ecotype) always occurs in wetlands. Both the weedy and ecotype representatives of the facultative upland category occur in seasonally and semi-permanently flooded wetlands.

The wetlands indicator status has been included to show the estimated probability of a species occurring in a naturally-occurring wetland versus an upland area. The indicator status, while not necessarily a reliable design tool, is useful for cross-checking plant selections for their inundation and saturation tolerances. The defined indicator categories are as follows:

- Obligate wetland (OBL): Plants, which nearly always (more than 99 percent of the time) occur in wetlands under natural conditions.

- Facultative Wetland (FACW): Plants, which usually occur in wetlands (from 67 to 99 percent of the time), but occasionally found in non-wetlands.

- Facultative (FAC): Plants, which are equally likely to occur in wetlands and non-wetlands and are found in wetlands from 34 to 66 percent of the time.

- Facultative Upland (FACU): Plants, which usually occur in non-wetlands (from 67 to 99 percent of the time), but occasionally found in wetlands (from 1 to 33 percent of the time).

- Upland (IPL): Plants which almost always (more than 99 percent of the time) under natural conditions occur in non-wetlands.

- NA (No Agreement): The regional panel was not able to reach a unanimous decision on this species.

- NI (No Indicator): Insufficient information was available to determine an indicator status.

- NO (No Occurrence): The species does not occur in that region.

The "percentages of time" indicated above are not the same as the "percent of inundation time" presented in other sections of this Manual

6. Water Tolerance. The column provides the designer with additional data on a plant species' tolerance to saturated soils, based on the available scientific research.

- Permanent inundation is defined as inundation or saturation for 76 to 100 percent of the growing season.

- Regular inundation is defined as inundation or saturation for 25 to 75 percent of the growing season.

- Periodic or Seasonal inundation is defined as inundation or saturation for 13 to 25 percent of the growing seasonal.

- Infrequent or irregular inundation is defined as inundation or saturation for 5 to 13 percent of the growing season.

- Intermittent inundation is defined as inundation or saturation less than 5 percent of the growing season.

7. Mature Height/Diameter. This column indicates the ultimate size that the plant can attain at maturity, provided that optimal conditions for growth and development are present.

8. Bloom Time. This column provides the designer with an estimate of the time of year when the plant will bloom. Bloom-time calendars are based on averages obtained over time, and can be expected to vary over a range of several weeks in a given year.

9. Showy Flower, Fall Foliage, or Fruit Color. This column provides the designer with additional information about the plant with respect to other desirable, aesthetic features it may exhibit.

10. Salinity Tolerance (in PPT). This column provides the designer with an estimate of the plant's ability to tolerate salts, and is expressed either qualitatively or quantitatively (in parts per thousand or grams per liter), based on available scientific research. The information is potentially useful for selected plant species for BMPs where salt input from roadways and industry is problematic for plant growth.

11. Shade Tolerance. This column provides the designer with an estimate of the plant's ability to tolerate shading, as well as the plant's general requirement for sunlight. The information is potentially useful for matching a plant species' requirement for sunlight, to the site conditions.

- ⊕ Requires full sun
- ⊕ Tolerates partial shade
- ● Tolerates full shade

12. Typical On Center (OC) Spacing (All BMPs except Bioretention). This column provides the designer with the minimum distance between all plants within the designated zone. Square spacing at a density of 400 stems per acre is used for trees and shrubs in all areas except bioretention areas. Triangular spacing at a density of 0.5 plants per square foot is used for all herbs and flowers, grasses and sedges, and groundcovers, in all areas, except bioretention.

13. Typical On Center (OC) Spacing (Bioretention Areas). This column provides the designer with the minimum distance between all plants within bioretention areas. Square spacing at a density of 1,000 stems per acre is used for trees and shrubs. When herbs and flowers, grasses and sedges, and groundcovers are incorporated (in addition to the trees and shrubs), then triangular spacing at a density of 0.5 plants per square foot is used for those spaces.

14. Minimum Size for Plants (All BMPs except Bioretention). This column provides the designer with the required minimum sizes and root condition of the planting stock in all areas, except Bioretention.

15. Minimum Size for Plants (Bioretention Areas). This column provides the designer with the required minimum sizes and root condition of the planting stock in Bioretention areas. The designer shall further comply with size requirements listed in the Tree Ordinance.

16. An additional note concerning minimum sizes and spacing:

- B&B refers to plants "Balled in burlap".
- CG refers to plants which are "Container Grown".
- HT refers to the height of the plant.
- #SP4 refers to a small plant container size SP4, with a volume ranging between 51 and 63 cubic inches.
- 2" Dia. X 5" Plug refers to a small plant container with a minimum volume of 16 cubic inches, in which the plant has been grown.