Appendix D
Plant Spacing Guidelines

D.1. Plant Density

In planting zones 4, 5, and 6; for all BMPs described in this Manual except Bioretention; the appropriate overall planting density for trees and shrubs is determined to be 400 stems per acre, which is generally equivalent to 11.8-foot, regular on-center spacing. The appropriate species mix is governed by a ratio of 10 percent trees and 90 percent shrubs. Individual species selections are determined from the plant list in Appendix A, and the general guidance for species mix in each Planting Zone.

Recommended Practice - The use of the "Cluster Layout Method" requires an irregular spacing technique as explained below:

The areas shown on the plans shall be planted with a density of 400 stems per acre, which shall include a minimum of 40 trees and 360 shrubs, for each acre. To achieve a more natural-looking forest, plants should be planted in random "planting clusters". Planting clusters can be made a convenient size by taking a 100 foot garden hose, with the ends attached to one another and stretching the hose to form a circle. (Alternatively, a circle could be marked in the soil with marking paint or other physical means).

Using the planting hose technique, these planting clusters can be circular, with a radius of 15 feet, 11 inches (r = 15.9 feet). The diameter of the cluster is 31 feet, 10 inches and the circumference of each cluster is 100 feet. The internal area of each cluster shall be 795.6 square feet. Each cluster would contain a minimum of 8 plants, comprised of at least 1 tree and 7 shrubs (appropriate species and mix from guidelines in Appendix A).

Each acre should have a total of 50 planting clusters for a total density of 400 stems per acre.

1 tree + 7 shrubs = 8 plants

(8 plants)(50 clusters) = 400 plants per acre.

When planting cluster has been laid out, move the hose template, or mark out the next cluster immediately adjacent to the first. Clusters can touch at a single point. Clusters laid out in this fashion will necessarily leave small "gaps" between them, which are acceptable, so long as the overall density and the minimum and maximum spacing limits are met.

Bioretention requires 1,000 stems per acre. The same methods are used to layout Bioretention plantings with the exception that a higher plant density of 1,000 stems per acre is implemented.

D.2. Example

A planting site has an area of 10,980 square feet. The site area is thus one-quarter acre. Planting density requires a total of 50 clusters per acre.

(50 clusters)(0.25 acre) = 12.5 clusters)

Round up the number of clusters required to the next whole number. A total of 13 planting clusters are required for the site.

Each planting cluster must contain a total of 8 plants, which includes at least 1 tree and 7 shrubs. The total numbers of plants necessary for the planting site is:

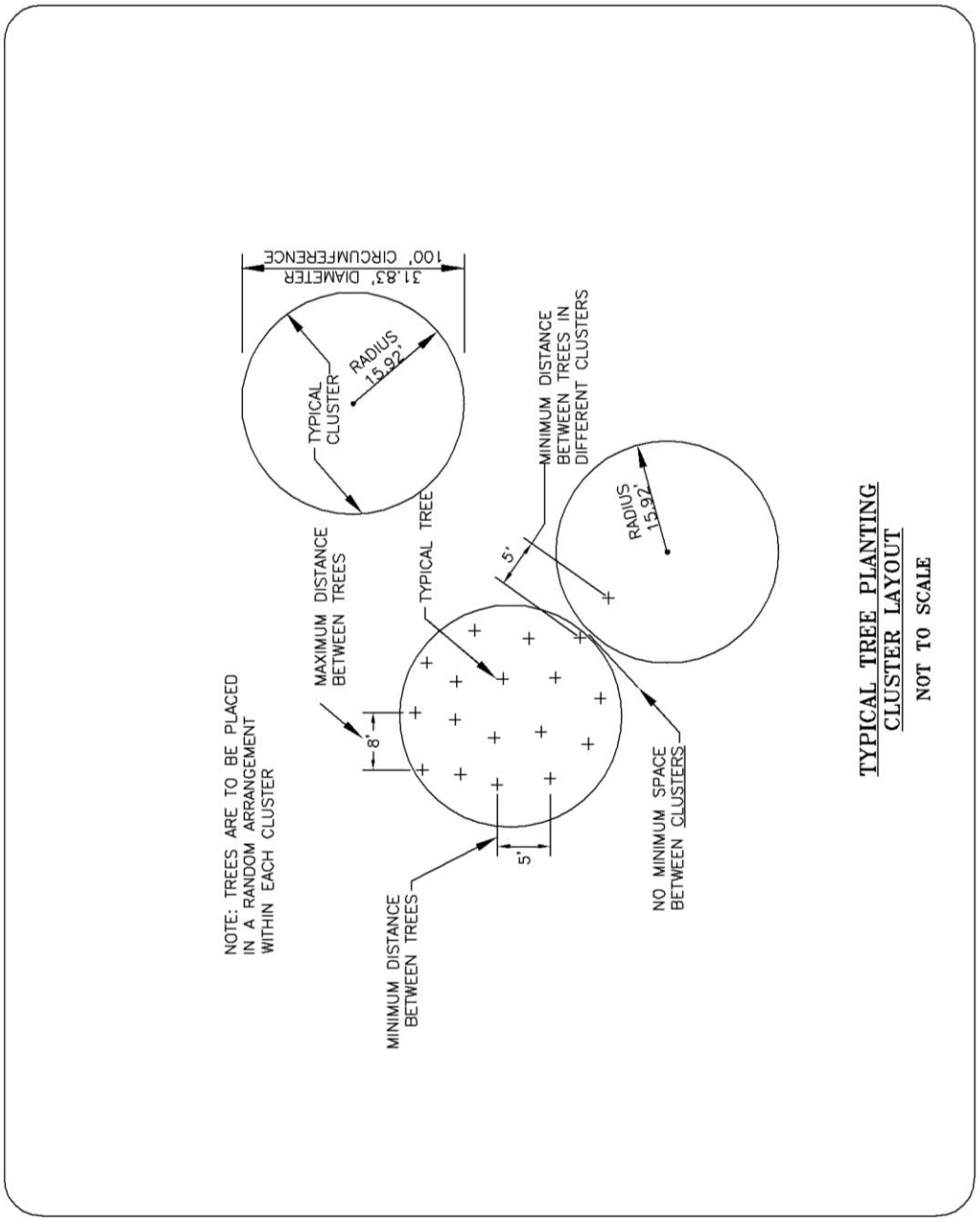
(1)(13) = 13 trees and

(7)(13) = 91 shrubs.

The appropriate species are selected from the list in Appendix A, and the appropriate mix of species is determined by site conditions and guidelines in Appendix A.

Planting clusters are laid out in the field and plants are spaced at the required minimums and maximum. The result is more natural-looking forest area, with an apparent “random” spacing pattern and the appropriate densities and mix of species.

The following figure illustrates the plant cluster method. Note that only one tree is required for each cluster, but if more are used, the spacing in the following figure should be used.



A “triangular spacing” approach may be used when laying-out and planting herbaceous plants in Planting zones 1, 2, and 3 for all BMP’s described in this Manual.

The following figure illustrates the “triangular spacing” approach.