Maryland Licensed Tree Expert Exam Study Guide

For Exam Domain:

Construction Management

Version 5.1

Loss of forest cover in Maryland occurs primarily as a result of increased development and urbanization. Construction damage is one of the greatest causes of tree death and decline in urban areas.

Development impacts can damage trees directly by severing roots, severing branches, and compacting the soil. The most serious damage caused by construction occurs underground from construction activities that cause soil compaction and root damage. Most of a tree's absorbing roots are in the upper few inches of soil. Their ability to absorb oxygen, water and minerals is reduced when soil is compacted and the pore space between soil particles is greatly reduced.

An effective initial step is to perform a **tree resource evaluation** which is completed during the project's planning phase. The trees within the project area and adjacent areas encroaching on the project area should be included based on defined criteria, such as species, size, condition, spacing, and structure. This evaluation can be a survey or an inventory. A survey is a description of all trees based on a representative sample, compared to an inventory which is a comprehensive listing of individual trees. This evaluation is a document describing the tree resources present with information that includes tree species, location, condition, plant community, structure, health, and population estimate. A Tree Expert, arborist, or other qualified professional shall complete the tree resource evaluation. Trees included in the resource evaluation should be assigned suitability for conservation ratings:

- Good = good health, structural stability, and potential for longevity at the site;
- Moderate = fair health, moderate structural defects, and require more intense management;
- Poor = poor health, significant structural defects, and are expected to decline regardless of management.

Factors to consider when evaluating a tree's suitability for conservation include tree health, structural integrity, species response to construction impacts, and tree age and longevity.

A **tree management report** shall be developed during the design phase of the project and should include an evaluation of the impacts on trees and shrubs from the proposed site development and construction activity. This tree management report should include an evaluation of the impacts on trees and shrubs from proposed side development and construction. The report should include tree locations, description of the applicable tree population, suitability for conservation ratings, limits of construction, an evaluation of impacts to the trees, proximity

of trees to existing and proposed features, recommendations for retention or removal of individual trees, recommendations for design changes if needed to preserve trees, tree conservation specifications, and post-construction recommendations.

A **tree conservation plan** should also be developed during the design phase of the project and integrated with the site development plan. This plan should include the locations of trees to be preserved, tree protection zones and barriers, soil erosion controls, staging and storage areas, existing and proposed utilities, and other on-site activities. The plan should also include consequences for non-compliance. Implementation of tree protection specifications should be monitored by an arborist.

Trees scheduled for retention should not be damaged during tree removal during the pre-construction phase. Tree protection zone barriers shall be installed prior to site clearing, grading and demolition, and maintained through construction and landscaping. Specifications for barriers should include, but are not limited to, the type of fencing, use of other barriers (i.e. signs), manner of installation, and conditions for encroachment into the critical root zone (tree protection zone).

During the construction phase of a project, the tree expert or arborist should monitor tree health and compliance with tree protection zones. The arborist should communicate the tree specifications during a pre-construction meeting to all persons involved in the development process. Levels of compliance with tree protection specifications and goals should be documented and reported. Some symptoms and signs of construction damage include:

- Crown - Slow rate of growth, staghorns, or dieback;
- Leaves - Wilted, scorched, sparse, undersized, distorted, chlorotic, browning leaf margins, premature autumn color, or premature leaf drop;
- Trunk - Wounds, bark removed, crown rot, absence of buttress flares, adventitious sprouting, suckering, and severe insect damage and disease;
- Branches - Dieback, slow growth rate, wounds, adventitious sprouting, or suckering;
- Fruits and flowers - Abnormally large crop or absence of fruit or flowering out of season.

In the event of damage to tree protection zone barriers and/or trees within them, corrective measures should be specified and implemented. Treatment of damaged trees should begin when the damage occurs. If a significant portion of the root system is destroyed, then the remaining root system should be pampered. Mulch it to hold soil moisture, moderate temperature extremes, and remove competition from turf grasses and weeds. Regular irrigation is most effective because trees that do not become moisture stressed have better a survival rate. Maintain the tree's vitality to avoid stress and infestation of insects and diseases. If fertilizer with nitrogen is needed, use slow-release form after period of recovery.

The critical root zone is the minimum volume of roots necessary for maintenance of tree health and stability. The Critical Root Zone of a specimen tree (30 inches diameter at breast

height or greater) is a circle with a radial distance of 1.5 feet for every 1 inch dbh. The Critical Root Zone of a nonspecimen tree (less than 30 inches dbh) is a circle with a radial distance of 1.0 foot for every 1 inch dbh with a minimum of eight feet.

If few to no roots over one inch in diameter will be impacted by construction activity, the tree will probably tolerate the impact. Most healthy trees are able to tolerate removal of one-half of their absorbing roots (not structural roots) without serious effect. According to ANSI A300, tree protection devices such as fencing, berms, and signage can be installed prior to site work to limit access to critical root zones.

For temporary traffic over the root zone, use vertical mulching and then place 6-12 inches of mulch to disperse the weight of equipment. When construction is finished, half of the depth can be removed and spread out over the area under the drip line as mulch.

Sometimes aeration systems are installed to help preserve trees, although there is little research to confirm the value of these systems.

When the grade is lowered during construction activity, it is referred to as a cut. Changes in grade can affect root volume, aeration, and drainage. If the grade is raised, it is referred to as fill and roots may be suffocated. As little as four inches of fill can kill some species. Tree wells and retaining walls are scheduled for installation during the construction process to allow tree retention when changes in grade are required.

If a condition is observed requiring attention beyond the original scope of work, the condition shall be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

It is commonly thought that a healthy tree can tolerate removal of approximately 1/3 of its total root mass. Trenching can severely injure a tree. Instead, auger under the roots. Tunneling may be used instead of trenching to minimize impacts to a trees critical root zone. Minimum depth should be 24 inches to avoid damage to any tap roots that may be present. Pruning roots prior to construction can help avoid impacts to the critical root zone. Roots should be cleanly cut using a vibratory knife or other acceptable equipment. Backfill the trench with soil to minimize drying of the roots.

Retained trees located along the Limits of Disturbance (LOD) should be evaluated for susceptibility to windthrow. Interior forest trees are now exposed to the wind as edge trees. They may not have developed a strong root system as they grew and were protected by the other forest trees.