



**CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY
PROPOSED BERGSTROM EXPRESSWAY**

**BEST MANAGEMENT PRACTICES
FOR
LARGE OAK TREES**

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Best Management Practices

Best Management Practices (BMPs) are a set of strategies intended to support the accomplishment of a certain objective. Typically derived from the analysis of successful results, the BMPs outlined for the protection and preservation of The Large Oak Trees comes from the Mobility Authority's maintenance practices, industry research, recommendations from ISA certified arborists, as well as community input.

Certified Arborist

The certified arborist working on the project will be a professional who has over three years of documented and verified experience working in Texas and has passed the written test from the International Society of Arboriculture (ISA). The ISA certified arborist must also maintain their certification during the project duration.

About Large Oak Trees

The diagram on page 3 shows the locations of the 8 large live oak trees, which are just south of Montopolis Drive near Callahan's General Store. Because of the tree condition, Tree # 7 will be removed and not considered in these BMPs. In addition, approval is required from the owner before the BMPs can be executed for Tree # 8.



Stakeholder Input and Research Process

Over the period of more than a year, the Mobility Authority collaborated with community stakeholders to develop a feasible approach to supporting the health of the Large Oak Trees. The Austin Heritage Tree Foundation, owners of Callahan's General Store and Peggy Maceo, along with the City of Austin's arborists, met to discuss issues and concerns, as well as BMPs for the Large Oak Trees. The recommendations contained in this document are a result of the solution-oriented collaboration and input with these stakeholders.

In addition, an advanced tree assessment was conducted in September 2013 to understand the health of the trees and how to best support their preservation and protection during their natural lifespan. The assessment was conducted by certified arborists and included: root collar and critical root zone (CRZ) investigations, upper soil profile composition and soil bulk density analysis, aerial inspections of scaffold branches, and tomographic imaging of stems and selected scaffold branches.

Types of BMPs

The BMPs for the Large Oak Trees are categorized by phase of construction:

- Pre Construction – assessment of and activities that will support the health of the trees prior to construction
- During Construction – protection from construction project related activities in order to support the health of the trees through regular monitoring, watering and fertilization
- Post Construction – ongoing support for the health of the trees through regular monitoring, watering and fertilization

Preconstruction BMPs:

1. Delineation of site boundaries on plans and in the field to define which trees to be protected. Protect as much of the CRZ as possible.
2. Communicate with the project team to accurately site structures and underground utilities to avoid impacts to the Large Oak Trees. Include in all plans the tree protection zone for all of the Large Oaks to avoid conflict with the protected area and placement of structures and utilities during construction where feasible.
3. Assess and treat root collar and structural defects (e.g., carefully clear/expose buried root collars with an air spade or other tool that will avoid scraping or damaging roots, installation of aeration pipes if needed, improvement of aeration to tree root zones, installation of tree protection and mulch to prevent re-compaction of the aerated soils, etc.).
4. Hire an experienced, certified arborist to remove dead wood, dying limbs, and/or branches which may interfere with canopy clearance issues from all of the Large Oak Trees.
5. Return at least 50 percent of the CRZ to natural grade and natural ground cover; no cut or fill greater than four inches located closer to the tree trunk than ½ the CRZ radius distance; and no cut or fill within 1/4 CRZ radius distance. In doing so, care must be taken during removal of existing structures encroaching on the CRZ, so as to minimize impacts to existing roots, if present. Subsequent fertilization may facilitate root growth.
6. Assess soil compaction issues and complete soil aeration as appropriate (see "soil aeration" under During Construction BMPs).
7. As much of the CRZ as practical shall be fenced to avoid soil compaction from human and vehicular traffic while tree health is being improved. Fences shall not be removed unless necessary.

8. Take soil samples to determine soil nutrient limitations. Soil samples would be required to determine soil pH, which affects nutrient uptake. Determine necessary soil augmentation to enhance growing conditions and implement appropriately (i.e., under the most suitable conditions, during the appropriate season, and throughout the CRZ). Humate/nutrient solutions with mycorrhizae components are highly recommended.
9. Develop a maintenance program for the Large Oak Trees, which includes scheduled irrigation, fertilization, mulching, monitoring of tree health and hazards, and other measures to protect and enhance growth.

Construction BMPs:

Implementation of protective measures and special construction techniques include but are not limited to the following:

10. Continue monitoring of tree health and hazards, and other measures to protect and enhance growth.
11. Install a tree protection fence around the tree protection zone(s) prior to the start of site preparation work and maintenance throughout all phases of construction to protect the entire CRZ area or as much of the CRZ as practical (at minimum protect 1/2 CRZ). Install chain-link mesh fencing at minimum height of five feet. It should be highly visible, sturdy, restrict entry, and have warning signs on or near it for the duration of any construction activities.
12. In CRZ areas that cannot be protected during construction with fencing and where heavy vehicular traffic is anticipated, cover those areas with a minimum of 12 inches of organic mulch to minimize soil compaction. Additionally, material such as alturnamats, plywood, and metal sheets, shall be required to minimize root impacts from heavy equipment. Once the project is completed, all materials should be removed, and the mulch should be reduced to a depth of 3 inches.
13. Communicate the intent of the tree protection barriers to the construction manager and workers to ensure that tree protection zones are not disturbed during construction activities.
14. Prohibit these activities in the tree protection zone:
 - a. Stockpiling of any type (including construction material, debris, soil and mulch)
 - b. Altering soils (including grade changes, surface treatment, and compaction due to vehicle, equipment, and foot traffic)
 - c. Trenching for utility installation or repair and irrigation system installation
 - d. Attaching anything to trunks or use of equipment that causes injury to the tree
15. Schedule site visits to monitor trees for any decline or damages. Document (e.g., notes and photographs) site visit results.
16. Any required pruning should be in accordance with the most recent ANSI A300 pruning standard. The maximum allowable impact for tree crowns is that not more than 25 percent of the foliage should be removed within an annual growing season, and that the percentage and distribution of foliage to be removed shall be adjusted according to the plant's species, age, health, and site. Pruning should be in compliance with guidelines for prevention of oak wilt in Texas. Hire an experienced, certified arborist for pruning and removal of dead wood from all of the trees.
17. Avoid impacting roots when digging the road base or when relocating utilities, where feasible.

18. If roots have been damaged and have to be cut, have an experienced certified arborist prune the roots, making a sharp cut. Do not tear the roots.
19. Prior to excavation within tree driplines or the removal of trees adjacent to other trees that are to remain, a clean cut should be made by an experienced certified arborist between the disturbed and undisturbed root zones with a rock saw or similar equipment to minimize root damage.
20. If roots are exposed, rebury them as soon as possible or cover them with a layer of wet burlap covered with wet mulch to avoid desiccation.
21. Erosion and sedimentation control barriers shall be installed or maintained in a manner that does not result in soil build-up within tree drip lines.
22. If grading within the CRZ cannot be avoided, perform grading by hand to minimize root damage.
23. Build trails within the full CRZ above grade by using the sand technique that the City of Austin Connectivity Department uses. This technique does not involve digging or trenching. It would be best to place trails as far out of the root zone as possible.
24. Minimize impervious cover within the CRZ. Install permanent irrigation to compensate for excessive impervious cover, where unavoidable. When installing concrete adjacent to the root zone of a tree, use a plastic vapor barrier behind the concrete to prohibit leaching of lime into the soil.
25. Provide supplemental watering to all trees to be preserved in the absence of adequate rainfall of less than a one-inch rainfall per 30 days. This will be performed under the certified arborist's direction and should be a onetime deep watering per month (3 inch/30 days).
26. Soil aeration should be completed with an air spade, incorporating organic compost deep into soil with air wand; top with 3-4 inches of organic mulch. Full soil aerated area shall be water drenched with the equivalent of 3 to 4 inches to remove air pockets in the freshly aerated soil. Full soil aerated area shall be watered sufficiently to receive the equivalent to 3 inches of water every 3-4 weeks for the remainder of the project for new feeder roots to grow. Soil aerated area shall be fenced for the remainder of the project to avoid further soil compaction.
27. Incorporate design approaches (e.g., construction and grading) that enhance tree survival and avoid adverse impacts, such as appropriate management of drainage, placement of utility, and other features. Maintain to the greatest extent practical natural drainage patterns for trees to be protected.
28. Perform a final inspection and continue monitoring of the Large Oak Trees after construction.
29. The concrete traffic barriers between the trees and the edge of pavement should be slotted at the bottom to allow for water to drain in the area of the trees.
30. The Storm Water Pollution Protection Plan inspection reports will be shared with the certified arborist of record.

Post-Construction BMPs:

Performance of remedial activities, if needed, to enhance degraded soil conditions (e.g., aeration, fertilization, etc.).

31. Implement a monitoring and maintenance program for tree health over a post-construction period of 18 months or greater, wherein parameters critical to tree survival (e.g., irrigation, drainage, monitoring of injuries, diseases, pests, and hazards, etc.) are recorded and preventative or corrective actions are taken as needed and as approved by a certified arborist. Activities could include:
 - a. Provide supplemental watering to all trees to be preserved in the absence of adequate rainfall (3 inches/month).
 - b. Provide mulch and compost and replenish mulch yearly to provide a 3-4 inch depth layer.
32. Hire an experienced certified arborist to monitor the Large Oak Trees per the maintenance schedule.

Sources:

- *Austin Heritage Tree Foundation: BMPs for Gateway Oaks (Tree Preservation and Protection Plan) May 19, 2013*
- *Bartlett Tree Experts Advanced Assessment*
- *Callahan's General Store*
- *Central Texas Regional Mobility Authority*
- *City of Austin Environmental Criteria Manual*
- *City of Austin Tree & Root Protection Zone Ordinance*
- *Texas Department of Transportation*
- *Texas Emerging Communities Texas A&M Forest Service: Best Management Practices for Tree Protection*