Office of Facilities Planning and Landscape and Grounds Management Guideline for Tree Protection and Preservation for Planners and PMs

A. INTRODUCTION

1.1 Review of the project site trees is to be coordinated with the Yale Tree Management Plan. Each tree on campus has been surveyed for maintenance practices and environmental benefit. Recommendations for maintenance include tree inspections, comprehensive pruning, pruning, cabling, and removals. Environmental benefits include air quality, stormwater retention, carbon sequestration and storage. These factors are to be reviewed and considered as the actions for each tree are developed. Specific data per tree is available through the ArcGIS application developed in the Yale Tree Management Plan, Critical Root zone (CRZ) map:

(https://yalemaps.maps.arcgis.com/apps/webappviewer/index.html?id=0a67085f32f840587d29d37a73c5e31).

1.2 Project team deliverables include:

- a. Predesign
 - i. AOI with CRZ determine Project Area (Area of Interest (AOI)) showing Critical Root Zone (CRZ) of Trees within Area.
 - ii. Tree protection and preservation method determine this using the Tree Protection Flow Chart.
- b. Schematic Design
 - i. Site plan show tree locations with trees identified that require protection.
 - ii. Project Arborist If determined, Owner to engage services of Project Arborist
- iii. Tree Protection Action Key (TPAK) provide list of trees within in Area of Interest conditions and recommendations.
- c. Design Development through Construction Documents
 - i. Tree Protection Action Key coordinate with site conditions
- ii. Tree Protection Zones (TPZ) determine extent with reference to critical area at roots, CRZ.
- d. Pre-Construction
 - i. Tree Protection Kickoff Meeting with Owner, Project Arborist, design team, construction team and Contract Arborist.
 - ii. Tree Protection Barriers install and coordinate prior to site activity.
- e. Construction
 - i. Project Arborist prepare site visit and reports on tree protection and preservation as implemented by Contract Arborist.
- f. Post Construction
 - i. Final Inspection perform site visit and prepare report by Project Arborist, outstanding items execute by Contract Arborist.
 - ii. Monitoring for period as required for species planted, by construction Contract Arborist.

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B. GENERAL DESIGN REQUIREMENTS

I. Project Formulation / Pre Design:

- 1.1 Utilize the above-linked CRZ map from the campus-wide tree inventory to generate an Area of Interest report to determine what trees may be impacted by the project. The Area of Interest will include all locations where construction will occur and all potential access routes for transporting materials and equipment to the site.
- 1.2. Refer to the Tree Protection Flow Chart below for project requirements per identification of the critical root zones within Area of Interest, or project development area.
- 1.3. Only follow tree protection methods as determined using the flow chart throughout the project. Full description of each tree protection method is detailed in the Tree Protection and Preservation Specification and are to be followed. The specification is prepared as a template for the design team and is to be included within the project manual within standard Division 01 specifications that cover General Requirements. It should not be considered a standalone document for tree protection. The intention is for it to be used by the owner, design team and contractors to incorporate tree protection guidelines from design concept to a successfully completed project.

(https://facilities.yale.edu/contractor-consultant-resources/design-guidelines/yale-university-design-standards-capital-project, 01 56 40 Requirements for Tree Protection and Preservation Specification)

II. Schematic Design:

- 1.1. Once the project identifies the Area of Interest, the site boundaries are to be marked on plans and in the field to delineate which trees and stands of trees are to be protected. If it is determined that a Project Arborist is needed, the Owner is required to engage the services of a Project Arborist. The Project Arborist is an arboricultural consulting firm contracted to provide planning and design services, technical assistance and advice to the Owner and design team. Duties include but are not limited to the following: site investigation and documentation (design phase inventories, assessments, root investigations, etc.); develop tree preservation plans, methods, details and specifications; and provide final document review. The Project Arborist is contracted directly to the Owner and acts specifically on behalf of the Owner concerning tree related issues.
- 1.2. The Project Arborist shall be a qualified arborist experienced in tree preservation plan development to perform a tree inventory that includes the location, size, and health of each tree and delineates quality stands of trees. Scope of the inventory should be based on Area of Interest report and needs of the Owner, as well as city ordinances. Confer with the design team on conceptualizations for site design, so that long- term tree protection and health are integrated into the design.
- 1.3. Identify which trees are most suitable for preservation and those that should be removed due to condition or potential impacts from construction activities or structures and

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infrastructure. Incorporate into design documents a Tree Protection Action Key, (TPAK matrix), developed through coordination with design team members and the Project Arborist, that summarizes all conditions and recommendations from an initial inventory for the project.

Example TPAK:

Г	DB	Н						SCRZ	CRZ	CRZ			Trans	splant		П			Rec	omm	ende	d Pre	serva	tion	Meas	ures					
1	(Diameter at 4.5 feet	Common Name	Botanical Name	Condition Rating	Approx Canopy Radius (FT)	Approx Tree Height (FT)	Number of Stems	Structural Critical Root Zone (radius) in Feet	Root Zone 1 ft radius/in	Critical Root Zone Radius in R (1.5 ft radius/in DBH)	Priorit	Tree level of concern		Transplant Method	Removal	Removal By Arborist	Roof Prune	Mulch	Year 1 Soil Care	Year 2 Soil Care	Year 3-5 Soil Care Soil Restoration/Aeration	Tree Growth Regulator	Tree Conc Inspectic	Watering	n Mattin	Construction Oversight/Monitoring	port Cat	Canopy Prune	Comments	Additional Notes	Condition Notes
																													Treat for gypsy		Full Crown, Small DW (1-2*), Compacted Soils, Included Bark, Stressed, Mechanical Damage,
	1 2	4 White oak	Quercus alba	Fair	30	55	- 1	10.0	24	36	- 1	Moderate	n/a	n/a)	x x	x	x			x	x		×		×	moth	mass present	Insect/Disease Problem,
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Figure 1: Example matrix for Tree Protection Action Key. This would be produced by arborist following an inventory and assessment and deliverable coordination with design team. Final product is included on construction documents.

Considerations

- When selecting trees to be saved on site, refer to tree inventory recorded in the Tree Management Plan and accessed through the ArcGIS platform, Critical root zone map: https://yalemaps.maps.arcgis.com/apps/webappviewer/index.html?id=0a67085f32f8405887d29d37a73c5e31
- In addition to preserving existing trees on site, consider communicating with the project team on areas suitable for future tree planting so that healthy soils can be preserved during and after construction activities for the preservation of all trees on site.

III. Design Documents/Construction Documents

- 1. Communicate with the project team to accurately site structures and utilities and determine the trees to remain on site. Conserve and protect trees in stand or groups where possible. Make sure the trees and stands of trees selected to be saved go into plans and construction documents.
- 2. Include in all plans the Tree Protection Zone (TPZ), an area indicated on drawings surrounding individual trees or groups of trees to be protected during construction, for all saved trees to avoid conflict with the protected area and placement of structures and utilities during construction.

Considerations

- Consider protecting beyond the Critical Root Zone (CRZ) of a tree to further protect the roots and soil essential to tree health and structural stability.
- If there are grade changes occurring on site, work with the landscape architect or engineer to incorporate the use of tree islands and wells to prevent disturbance to tree roots.

III. Pre Construction

1. Tree Protection Kickoff Meeting with Owner, Project Arborist, design team, construction team and Contract Arborist to discuss tree locations for protection and preservation with reference to TPAK.

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- 2. Prior to pre-construction activities, including tree removal, access roads, construction staging areas, and building layout, erect tree protection barriers to visually indicate Tree Protection Zones (TPZs). Be sure to:
 - Coordinate with the Tree Protection and Preservation Specification.
 - Use tree protection barriers that are highly visible, sturdy, and restrict entry into the TPZ.
 - Install or erect signs along the tree protection barrier stating that no one can disturb or enter this area.
 - Remove any branches or trees that pose an immediate risk to structures or people prior to any construction activities.
- 2. Communicate the intent of the tree protection barriers to the construction team to ensure that TPZs are not disturbed during construction activities. Have the construction team sign a contract of compliance.
- 3. Prohibit these activities in the TPZ:
 - Stockpiling of any type, including construction material, debris, soil, and mulch
 - •Altering soils, including grade changes, surface treatment, and compaction due to vehicle, equipment, and foot traffic
 - Trenching for utility installation or repair and irrigation system installation
 - Attaching anything to trunks or use of equipment that causes injury to the tree

IV. Construction

- 1. Schedule Project Arborist site visits to ensure the contract is being met by the construction team and that tree health is not being compromised by construction activity. Inspect and monitor trees for any decline or damages.
 - Project Arborist should coordinate visits with construction and design team to determine if there are any specific issues to address. Construction and design team do not need to be present at visit.
 - Project Arborist shall provide a summary report following each visit that documents any violations or areas of concern that are identified.
- 2. Keep in place all tree protection barriers until the project is completed.

Considerations

- •Apply at least 6" of mulch within the TPZ to prevent disturbance to tree roots and soil.
- Prior to any construction activity, consider taking photographs of the trees to be saved and surrounding areas to identify any construction damage caused to trees during construction.

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• Add a penalty clause in the contract of compliance that prevents moving or altering the tree protection barrier and entering the TPZ.

V. Post-construction

1. Project Arborist perform a final inspection and report. Contract Arborist to continue monitoring after construction for a period as determined necessary for species. Monitoring includes maintaining mulch, managing soil moisture, assessing tree damage, inspecting for insects and pests, and fertilization if needed.

Date	Description of Change	Pages / Sections Modified	ID
05/25/21	New document	-	KC, MW

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> This flow chart is to be used with reference to the Yale Tree Management Plan and the Yale Tree Protection and Preservation Specification. Use the Yale Tree Management Plan online ArcGIS tool Critical Root Zone (CRZ) map to select the potential Area of Interest for the proposed project, include all access routes and storage areas. Does the CRZ of any tree cross the Area of Interest?

