

CHAPTER 6: LANDSCAPE DESIGN STRATEGIES

6.1 MEASUREMENT OF PROGRESS IN SUSTAINABLE DESIGN

To improve the University's ability to monitor progress in the performance of landscape improvements, the University may require, in RFPs, that projects monitor the following factors for the project area. (The University should coordinate this effort with on-going LEED and the AASHE Sustainability Tracking Assessment and Rating System measurements.)

ITEMS TO BE QUANTIFIED DURING PRE-DESIGN AND DESIGN

- Existing and proposed pervious and impervious surfaces within the project area
- Extent of stormwater receiving landscape areas for infiltration
- Stormwater quantity; monitor the inflow and outflow of piped stormwater entering and exiting the project area, and correlate with daily rainfall data
- Preconstruction stormwater quality: analysis of total suspended solids, and other contaminants appropriate to measure for the site location
- Tree canopy coverage
- Enumerate dark sky compliant exterior light fixtures, and estimated electricity usage per fixture based on lamps and hours of operation
- Preconstruction photo documentation of scenic views, particularly mountain views
- Irrigation water consumption to the extent it is measurable based on available metering

ITEMS TO BE QUANTIFIED POST-CONSTRUCTION

- Weekly maintenance hours expended by maintenance units, such as mowing, weeding, trash pick-up, etc.
- Irrigation water consumption based on available metering. The number of irrigation heads and controllers
- Tree canopy coverage. The number, type and location of existing trees
- Stormwater quantity measurements at the same locations as pre-design metering locations; correlated with daily rainfall data
- Stormwater quality analysis of total suspended solids and other contaminants appropriate to measure for site location
- Enumerate dark sky compliant exterior light fixtures and estimated electricity usage per fixture based on lamp

- type and hours of operation
- Photo documentation of scenic views
- Use of local, recycled, and recyclable materials

6.2 LANDSCAPE DESIGN REVIEW PROCESS

All new construction and renovation projects should be consistent with the LMP, or be able to show how it can improve upon the plan. The design review process for ensuring that the plan is carried forward is defined in this section.

6.2.1 DECISION AUTHORITY

The final authority for design decisions regarding the campus landscape lies with the Chief Design & Construction Officer (CDCO). The CDCO delegates authority to the Director for Campus Planning who considers recommendations from the Landscape Review Committee. The University administration, department of Planning, Design and Construction, and the office of Facilities Management, prepare, review, and recommend projects to the Board of Trustees Campus Planning Committee.

6.2.2 DESIGN REVIEW PROCESS

The following process will guide design decision making for the campus landscape projects.

Step 1. Pre-Design Planning: Before an RFP is issued for a landscape project or other facilities or utilities project with a landscape component, the scope of landscape changes should be estimated in physical and monetary terms and documented in writing for use in the RFP. A budget for the landscape component of the project shall be established with a reasonable contingency, based on the level of project specificity available. The functional, technical, environmental, educational and aesthetic purposes and objectives of the landscape project should be documented in written form and included in the project brief. The Landscape Manager will determine if a certified arborist is required on the project team.

Step 2. Briefing of the Design Team: After a landscape design team has been contracted, relevant information should be assembled and provided to the selected landscape design team including:

- Project description, including a statement of issues and budget
- Prior history and relevant studies of the project area
- Specific sustainable design strategies that may apply in accordance with the Landscape Master Plan and the

- Sustainable Sites Initiative Guidelines and Performance Benchmarks
- The LMP and related campus-wide plans
- A list of trees to be protected
- Survey information indicating project limits, easements, boundaries, physical features, topography, vegetation, and infrastructure
- Circulation and parking patterns that reflect the site
- Service and infrastructure functions that must be accommodated
- Maintenance requirements and parameters
- Details of related projects

Step 3. Design Problem Summary: Designers of the landscape should review all of the briefing materials and conduct a thorough site analysis of the project area, including a review of existing trees identified for protection. Based on the site analysis and the briefing materials, the designers should prepare a Design Problem Summary. The Design Problem Summary should consist of a written narrative and drawings that describe the designer's understanding of the project's key challenges and potentials; key issue areas and problems to be solved; an assessment of opportunities to apply sustainable design strategies; the key aspects of the existing site organization; landscape and building conditions surrounding the site; how the guidelines set forth in the Landscape Master Plan apply; and suggested directions for design. The Design Problem Summary should be tailored in scope and detail to the nature of the problem, and presented to the LRC for review and comment prior to beginning Schematic Design.

Step 4. Design: The project design shall be presented to the Landscape Review Committee (LRC) and the Plan Review Committee (PRC) for Schematic Design, Design Development and at 50% Construction Documents.

Each of the presentations must include but not be necessarily limited to:

- A concise statement of the project purpose and objectives; what the project seeks to achieve,
- A description of the particular existing conditions influencing the design response,
- A summary of applicable guidelines from the Landscape

For Design Development and Construction Documents, the presentation should also include but not be necessarily limited to:

- The detail development of the design and the decisions made to advance the project purpose
- A landscape design plan and a description of how it con-

- forms with the LMP guidelines. Drawings and illustrations appropriate to the phase of work
- Detail development of sustainable design solutions employed
- Detail planting design proposals and description of all trees proposed for removal, special protection or transplanting
- Construction materials and details
- Landscape protection plan specifying fencing, root pruning and other measures specified for landscape protection during construction. The final plan shall be approved by the Landscape Manager prior to issuance for bids. The Landscape Manager may also require an evaluation of the landscape protection plan by a Certified Arborist.
- Updated construction cost estimates

Step 5, Construction: If warranted by the complexity of sensitivity of the project, a representative of the design team shall attend the pre-bid meeting and present the landscape component of the project to prospective bidders to insure that the landscape component of the project is understood. Upon selection of a contractor, a design team representative shall meet with the contractor to review all landscape protection measures prior to construction. The LRC may periodically review the work progress during construction to observe compliance with landscape protection requirements.

6.3 REQUIRED TREE PROTECTION DURING CONSTRUCTION

Campus trees are a significant resource contributing to local climate regulation, air and water cleansing, erosion and sediment control, stormwater quality control, habitat functions, food products, educational benefits, and human health and well-being. Therefore, it is important that the tree resources of the campus be protected from site and building construction activities.

6.3.1 PRE-PLANNING AND DESIGN

At the outset of the design process for all landscape, building, utility, drainage and infrastructure projects, the design team with the assistance of the LRC shall identify all campus trees that might be impacted by the proposed project. In addi-

tion, Specimen Trees of exceptional value because of their size, species, official designation or role in the campus landscape will be identified. These determinations will be made for all projects including renovation, renewal, and new construction. During the design process, the design team shall identify all conditions where construction activities such as grading, trenching, demolition, site access, building access, power washing, chemical treatments, construction parking, materials storage and other activities potentially harmful to trees may occur because of a given building, infrastructure, or landscape project.

Designs and protections shall be conceived to minimize damaging impacts to existing quality trees as identified by the Landscape Review Committee.

6.3.2 TREE PROTECTION PLAN

A Tree Protection Plan shall be prepared, and tree protection specifications such as fencing, signage, and pre-construction root pruning shall be included in the project manual.

In projects where tree impacts are anticipated, given the location of Specimen Trees and other important trees related to the project, the LRC may direct that a tree protection plan be developed and included in the project construction documents. The plan will be prepared based on field evaluation of the conditions surrounding the trees to be protected. The plan will indicate the locations of all trees to be protected, and specify the location of protection fencing, boxing, signage, root prune lines, special irrigation during construction and other protection measures. The plan will also indicate protective measures to prevent damage to soils from compaction, spills, construction debris, and other negative impacts.

6.3.3 REFERENCED STANDARDS

All tree protection activities shall comply with applicable requirements of the following standards:

- American National Standards Institute (ANSI): Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees, and for Cutting Brush.
- International Society of Arboriculture (ISA): Guide for Establishing Values of Trees and Other Plants
- National Arborist Association (NAA): Pruning Standards for Shade Trees

6.3.4 DAMAGE PENALTIES

- Specimen Trees within or adjacent to construction areas will be identified by the Owner and the Architect, and marked with red tags. Loss of any of these trees will result in fines assessed at a minimum of \$10,000 (or higher amount that may be determined by the University prior to construction) per tree. Damage to all other trees on the property will be assessed at the rate of \$200 per inch

caliper of the tree.

- A fine of \$1,000 will be levied against the Contractor for each incident of construction or other activities that may negatively impact the trees inside tree protection areas.
- Damages to trees, shrubs, and other vegetation will be assessed by the Architect and Owner in accordance with the ISA Guide.

Trees or roots visibly damaged will cause the Owner to withhold from the Contractor an assessed amount conforming to the requirements stipulated above for a period of five years. After that period the impact of the damage to any tree will be assessed accordingly.

- If any trees or shrubs designated to be saved are damaged and replacement is required, a number and diameter of trees or shrubs of the same species and variety, as specified by the Owner and Architect, shall be furnished and planted by the Contractor. The total inch diameter of the replacement trees or shrubs shall equal the diameter of the tree or shrub to be replaced. The Contractor shall not be liable for any loss or damage which occurs while the Contractor is complying with instructions given by the Owner, Architect, or arborist working on the Project.

Trees to be root pruned (by a qualified professional) shall be root pruned to a depth of 24 in. or to a depth where roots over one inch diameter are no longer encountered. Backfill root pruning trench with existing soil mixed with organic material to a mixture of approximately 90% soil and 10% organic additive by volume. Tamp lightly and water to set soil.

6.3.5 PRUNING

Pruning of trees to remain shall consist of removal of only dead or declining material a year after construction. Pruning shall be executed by a qualified Arborist and include consideration of a fertilization/watering/insecticide program during recovery. Pruning trees that are dead, dying, diseased, that need structural training or that will be removed, can be removed during construction.

6.3.6 CONSTRUCTION PERIOD IRRIGATION

Based on the specific site conditions, a determination should be made by the design team, with review by the LRC, to include temporary irrigation for trees that will suffer root loss during construction. Temporary irrigation should be arranged to provide the tree with adequate moisture during the construction period and its recovery period after construction. Irrigation shall be included in the Tree Protection Plan, and be approved by the Landscape Manager prior to issuing of the bid documents.

6.3.7 VEGETATION PROTECTIVE SIGNAGE

Two types of signs shall be posted at the project site with re-

spect to the care of vegetation. The exact sign and language will be developed with the Landscaping Manager. The signs are as follows:

- A sign at all access points to the construction areas, informing all personnel that they are entering "an environmentally protected area" and that any violations which occur in the protected areas will be fined. Exact sign and language will be developed by the Landscape Architect.
- A sign mounted on the vegetation protective fencing at 50'-0" intervals warning construction personnel to keep out of protective zones and informing them that all violators will be subject to fines.

6.3.8 TREE PROTECTION FENCING

Prior to start of demolition work and clearing and grubbing operations, tree protection fencing shall be installed in accordance with the Tree Protection Plan. Fencing shall be located 15 ft. beyond the drip line of trees to be protected, unless otherwise approved by the LRC, Grounds Manager and the Landscape Architect. All fenced tree protection area shall be kept free of all activity during the construction period, including excavation, materials storage, staging, parking, trailers, portable toilets, contractor rest area, and surveying set ups. If it becomes necessary for the contractor to enter the tree protection area, written permission of the Grounds Manager is required.

- Tree protection fencing shall be galvanized chain link fencing, minimum 5 ft. high. Stakes for fencing shall be 8 ft. galvanized steel posts, driven a minimum of 3 ft. into the ground. Posts shall be spaced 10 ft. o.c. maximum.

6.3.9 ROOT PRUNING

Where construction will be in close proximity to existing trees designated to remain, roots shall be pruned in advance of construction by a qualified professional. Root prune lines shall be indicated on the Tree Protection Plan. Root pruning is the physical cutting of tree roots to minimize root damage and promote healing and root regeneration. Suitable means for root pruning include mechanical trenching or air spade excavation followed by hand pruning. Any method which excessively dislocates and tears roots or disturbs the soil beyond the grading limit is unacceptable.